

# The York University Magazine

Spring/Summer 2016



## Greening Up Their Act

The art  
(and science)  
of sustainable theatre

### PLUS

Radical chic for engineers  
Nanosatellites  
Raccoons unleashed



Imagine  
that



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The  
York University  
Magazine

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# THE PRESIDENT



**MAMDOUH SHOUKRI**  
**PRESIDENT AND VICE-CHANCELLOR**

**THE TIME IS NOW** for York University to make our impact. Since our establishment in 1959, we've pushed boundaries and explored the unknown through groundbreaking research, leading-edge programs and a diverse community of students, faculty, staff, researchers, donors, friends and nearly 300,000 alumni making an impact all over the world – in fact, that is what we've done best.

Our impact can also be seen and felt in many of the exciting developments taking place across the University, including the 50th anniversary celebrations at both our Glendon campus and our world-renowned Schulich School of Business; the opening of our Lassonde School of Engineering's new home, the Bergeron Centre for Engineering Excellence; and our expansion into York Region with the upcoming Markham Centre campus.

As you may have heard, we recently received an incredible \$20 million gift from alumnus Victor Phillip Dahdaleh – the largest gift ever made by a York graduate and the largest international gift in the University's history. Through this visionary support, we are establishing The Dahdaleh Institute for Global Health, which will serve as a catalyst for international dialogue and collaboration in innovative health research and teaching.

Building on this tremendous growth, this spring's public launch of Impact – The Campaign for York University is our most ambitious fundraising and alumni engagement campaign to date. I know I speak for all of us at York when I note how thrilled we are about it. This \$500 million effort will expand our limits of possibility and help to provide the necessary resources to bring York to the forefront of higher education and research in Canada.

This campaign is our promise that together we can drive advances both in the classroom and in communities around the world. As York alumni, you are our most passionate and important ambassadors, and your support and participation are critical to our success. Eighty per cent of all donations to York come directly from our graduates. This wonderful generosity tells us that our alumni understand what York needs to succeed and are actively engaging in our mission.

The Campaign for York University is a challenge to the entire community to assist us in supporting the unmatched accomplishments of our scholars, fuelling growth and opening minds everywhere. As we embark on this journey, we look to you to help us bring York's vision to the world.

A handwritten signature in black ink, appearing to read 'M. Shoukri', written in a cursive style.

# The York University Magazine



THE ALUMNI MAGAZINE  
OF YORK UNIVERSITY

Volume 1, Number 3

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Publications Mail Agreement No. 40069546  
Return undeliverable Canadian addresses to:  
Communications & Public Affairs  
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**THE YORK UNIVERSITY MAGAZINE** is printed and mailed  
to alumni and friends of the University once a year,  
in the fall. The spring/summer and winter issues are  
available online only. Ideas and opinions expressed  
in the articles do not necessarily reflect the ideas or  
opinions of the University or the editors.

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## EDITOR'S NOTES

### Spring Mixer

**SPRING IS FOR GARDENERS**, returning birds and, of course, putting the spring issue of *The York University Magazine* to bed. It is also – at least this year – a time for polar vortexes (whatever they are), ice storms and electrical outages. So when Mark Twain said about this unpredictable season, “In the spring, I have counted 136 different kinds of weather inside of 24 hours,” he wasn’t too far wrong.

Looking at this issue’s lineup, it’s odd how certain patterns emerge, either entirely unplanned or at least not too consciously. And maybe that’s how the best story mixes come about – that is, from a kind of fortuitous happenstance. We have a piece about the latest research on urban raccoons (see “Home Invasion,” page 32) and one about “green” theatre (see “Greening Up Their Act,” page 12). We also have an in-depth article on the fascinating world of nanosatellites (see “Small Wonder,” page 22). Although it’s a science piece at its core, it is also about how we can harness space technology to tackle climate change – again, a green theme.

Another feature story deals with an aspect of York University that few of us have seen in its entirety: York’s permanent art collection (see “Off The Wall,” page 28). If it comes as a surprise to you that the University owns works by such eminent artists as Jean-Paul Riopelle, Jack Bush and Andy Warhol, that’s good!

– MICHAEL TODD



### ON THE COVER

James McKernan and Ian Garrett  
photographed by Mike Ford

# View

OUTLOOK & IDEAS

## Listen Up!

*Owl ears could  
provide clues to help solve  
human hearing problems*

**PHOTOGRAPHY BY SOFIE KIRK**



**M**OST OF US normally think of ears as soft, squishy

microphones, simply detecting sound. But ears can also emit sound. These sounds, called otoacoustic emissions (OAEs), are thought to be a byproduct of a biological amplifier at work in the ear and they can be detected by inserting a sensitive microphone into the ear canal. A rough analogy: You are delivering a wedding toast and you get too close to the speaker with your microphone. Result? You'll get screechy feedback.

Typically, only healthy ears emit sound, allowing OAEs to be used for clinical applications such as newborn hearing screening. The biophysical principles underlying sound generation are not well understood, however, which limits their potential use.

Professor Christopher Bergevin of York University's Centre for Vision Research and Department of Physics & Astronomy is studying how other types of ears can be used to better understand how and why our ears emit sound. His recent work, published in the *Proceedings of the National Academy of Sciences*, focuses on comparing owls and lizards with humans.

"These animals, just like human beings, emit sound from their ears," says Bergevin. "The fact that measurements are non-invasive is a bonus. We can obtain fantastic physiological data without harming a scale or a feather."

The study reported OAEs from all three ear types originate from similar biomechanical principles, despite the differences in ear anatomy. "This indicates there's a common biophysical thread at work in the ears across the species we studied, even though they are very different structurally," he says.

"Put another way, not only are we learning something about hearing, but the ear also serves as a striking example of a biological system that can motivate new physics." ●

**HOW KNEW?** Christopher Bergevin (left) did



## BEAUTY QUARK

*Professor's particle prediction proves true*

**TWO NEW SUBATOMIC** particles were discovered last year by an international team of researchers, but the particles' properties had been predicted seven years earlier in a paper authored by York University physics Professor Randy Lewis and Richard Woloshyn, a scientist at the TRIUMF lab in Vancouver. The European Organization for Nuclear Research, known as CERN, used its Large Hadron Collider to make the discoveries.



**QUARKS EXPRESSED:**  
Randy Lewis

The new particles are part of the baryon family, which makes them cousins of the familiar proton and neutron. Baryon particles are each made up of three elemental subatomic particles called quarks. They contain a very heavy kind of quark called a "b" quark, sometimes referred to as a "beauty" or "bottom" quark. The specific particles observed are known as  $\Xi_{b^-}$  and  $\Xi_{b^*}$ .

Lewis and Woloshyn predicted the composition and mass of the new baryons using a computer calculation based on a theory called lattice quantum chromodynamics, which describes the mathematical rules for how quarks behave. ●

**I**T'S THE KIND of media attention scientists drool over – high-profile television, radio, print and online coverage of their work, both at home and abroad – which is apropos since the subject of the research is drool itself, specifically moose and reindeer saliva.

Certain plants use chemical deterrents as a means of self-preservation, and it seems saliva from big, hoofed animals (ungulates) is able to suppress and even disarm their defences.

Moose are big. And to keep all that moose mass running smoothly they have to eat a lot of grass and twigs. Some yummy plants such as red fescue, a common grass, have a symbiotic relationship with a “live-in” fungus, and when eaten together, they produce alkaloid toxins strong enough to make the hooves of animals fall right off. Those toxins don't seem to bother moose or reindeer, however, and nobody knows why.

York researchers Dawn Bazely and Mark Vicari and their colleagues may be shedding some light on how certain herbivores manage to defuse the toxic effect.

Little is understood about fungal endophytes and their relationship with plants since they have only recently been identified as the cause of many livestock illnesses and mortality. (Red fescue isn't the only plant that has a relationship with endophytes.)

“Most plants contain bacterial and fungal endophytes,” says Vicari. “They feed on nutrients within plant tissues but cause no symptoms of infection.”

Endophytes can be beneficial to the plant by repelling grazing animals or insects. In protecting the plant, the fungus also protects its own food source, but if the fungus can make chemicals to combat its herbivore rivals, why not vice versa?



## CHEMICAL WARFARE

*How moose drool conquers nature's best defences*

“That's a question we were interested in exploring,” says Vicari.

His colleague Andrew Tanentzap obtained moose saliva courtesy veterinarians at the Toronto Zoo. It was collected from sedated animals during their annual checkups.

It seems moose, like people, drool while asleep, and York biologists only needed a couple of tablespoons for their research purposes.

The drool was then applied to red fescue grown in the York greenhouse and also to Petri dishes teeming with colonies of the fungus *Epichloë festucae*. Compared to fungal samples treated with water (as a control), the moose saliva slowed the growth of the fungal colonies.

When applied to clipped fescue grass to simulate browsing by moose, the drool reduced the production of the fungal toxin ergovaline between 41 and 70 per cent compared to unclipped plants untreated with saliva, or treated with plain water.

Most plants that have been tested harbour endophytes, says Vicari. In fact, scientists believe there may be on average about four species of endophytic fungus for every species of plant. “That's about a million fungal species, most of which have yet to be discovered,” he explains.

The specific secret of moose spit that enables it to suppress toxins remains a mystery. Researchers suspect that compounds in moose saliva interfere with the chemical signals that switch on toxin production when the plants get eaten.

Vicari says their next step will be to identify the chemical(s) in herbivore saliva that are antagonistic to endophytes. Those chemicals might turn out to be useful antimicrobial compounds.

Will we see fields being sprayed with moose spit anytime soon? Not likely, but you can bet that if endophyte research can save farmers money, it's sure to make them salivate. ●





# FIT TO BE TIED

Sartorial splendor that's out of this world



WHEN PAUL DELANEY isn't busy collecting space-themed ties, he's lecturing in them as a professor of physics and astronomy at York. He is also director of both the Division of Natural Science and the York University Observatory and its outreach program.

Are there a surprising number of ties out there with celestial motifs? "Not enough, in my view," says Delaney. "I was at a NASA Kennedy Space Center store in Florida last month and they had none!" ●



PHOTOGRAPHY BY MCKENZIE JAMES





*Online avatars could be a dead giveaway*

# SELF- PORTRAIT?

PHOTOGRAPHY BY MCKENZIE JAMES

**I**F YOU'RE A GAMER with an online avatar, you might be telling people more about your personality than you think. Even if you took pains to craft an avatar that you felt wasn't like you, unconsciously you may have created one that's an accurate portrait of how you view yourself. So much for anonymity.

While online avatars are rarely a 100 per cent reflection of their creators, they are often close enough to provide more hints about their crafters' personalities than they realize, according to a recent York University study published in the *Personality and Social Science Bulletin*.

In the digital world, we think we can create characters to reflect or suppress our real-world identities, but research by Katrina Fong, a York PhD candidate in psychology, shows that online aliases are often based on how we perceive ourselves away from the computer as well as in front of it. In

other words, who we are in real life does to some extent drive our choices in deciding how to represent ourselves online.

"I'm generally interested in how individuals use media to better understand others and themselves," she says.

Fong and her colleagues recruited 100 students and asked them to fill out a personality survey which gauged the "big five" personality traits: openness, conscientiousness, extraversion, agreeableness and neuroticism. After that, participants went into a computer lab where they were asked to create their own avatars using WeeWord.com, an online tool that creates simple, two-dimensional characters. Students were able to customize their avatars according to gender, skin tone, hair type, clothing and accessories. Half of the participants were told the avatar should represent who they really are, while the other half were told the avatar didn't need to look like them.

**D**OES A BELIEF in guardian angels keep you safe? According to a recent York University study, people who believe in them also take fewer risks, so it's possible they stay safer as a result. But do angels have much to do with it? Not likely.

David Etkin, a professor of disaster and emergency management at York, found that people who believe in the efficacy of guardian angels, or spirits, are usually risk-averse and hence lead less adventurous lives. This was the opposite of what he had predicted.

"We actually thought a belief in guardian spirits would be associated with a decreased risk perception and therefore an increase in risk-taking behaviour," says Etkin. "Instead of belief resulting in people feeling protected and being more prone to risky behaviour, it is more likely that people who are risk-averse tend to have a belief in guardian angels, possibly as a coping strategy.

"The idea to study guardian spirits came to me because of a book I read on risk, written by John Adams. I found that question so interesting I decided to investigate it."

Etkin and a group of graduate students interviewed 198 people for the study, asking how interviewees viewed risk, what sort of risky business behaviour they participated in and why they chose to do so.

Sixty-eight per cent of participants who said they believed in guardian spirits said it affected how they took risks. A clear majority indicated they were more risk-averse than non-believers. Women believed in guardian angels more than men did and they were also found to be more risk-averse.

Etkin says he has not had any interactions with guardian angels personally and therefore is not a believer. "However, if it ever happens, I will reverse my opinion." ●



## ON GUARD FOR THEE

*Does believing in higher powers protect you?*

A second group of approximately 200 participants – unrelated to the first group – reviewed the first group's avatars by filling out a questionnaire that evaluated their characteristics. Participants were asked how strongly they would or would not want to become friends with the creator of that character.

Fong found those who ranked high on agreeableness, for example, were more likely to have given their avatars features that would prompt others to befriend them. And people who self-reported as extraverted, agreeable and conscientious were more likely to be accurately predicted based on their avatar, while people who said they were more neurotic secured less accurate predictions.

Additionally, Fong's analysis of the data showed that people could detect how anxious, outgoing or agreeable someone was by his or her avatar. What could not be detected by looking at others' avatars was how conscientious or open to

new experiences people were.

Avatars with smiles, oval faces, brown hair and open eyes were more likely to be interpreted as friendly, while those with black hair, short hair, a hat, sunglasses or any expression other than a smile were seen as less friendly.

Curiously, Fong says sweaters were the only accessory choice that made a character seem more welcoming. (She speculates they may connote warmth.)

"It's important to think of the context of these studies," says Fong. "Online life is broad and people can engage in a number of activities, from leisure to socialization. People's motivations may change based on what kind of activity they're engaged in, so we should be careful not to overgeneralize the results from one study that examined one particular set of circumstances." ●



*James McKernan  
and Ian Garrett  
talk  
sustainable theatre*

**BY MICHAEL TODD  
PHOTOGRAPHY BY MIKE FORD**

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# GREEN ING UP THEIR ACT

**I F YOU'RE A BUDDING ECOHOLIC**, today's theatre scene should strike a chord. Why? Because there's a green revolution going on that's all about lessening the environmental impact of theatrical productions while upping the artistic ante. Solutions include converting to energy-efficient LED lights, sourcing sustainably managed wood for building sets, using environmentally friendly dry cleaners for costumes and putting more eco-conscious makeup on actors.

In fact, artists from many disciplines – not just theatre – are beginning to reconsider their processes. Visual artists are rethinking the kinds of materials they use, seeking out less toxic paints and glues, and theatres are working to put more bums in seats to lower their carbon footprint per production (a full house being the most environmentally sustainable in terms of energy use).



*The York University Magazine* recently spoke to theatre Professors Ian Garrett and James McKernan about green initiatives in the arts, and in theatre at York in particular.

After graduating with dual MFAs in producing and lighting design from the California Institute for the Arts, Garrett became fascinated by the environmental impact of theatre. He is now cofounder and director of the Centre for Sustainable Practice in the Arts, and he has designed ecologically minded productions in Canada, the U.S. and England. One such production was *Vox:lumen*, a dance choreographed by William Yong for the Toronto Harbourfront Centre's 2015 World Stage event. The show marketed itself as being "green," and it delivered – so much so that the audience was responsible for powering the lights for the performance by pedalling electricity-generating bikes.

McKernan teaches stage technology and explores leading-edge and traditional methodologies. He works in the area of ecological responsibility and sustainability. Before he arrived at York, he was a carpenter and construction coordinator in the entertainment industry, working on award-winning productions such as the Juno Awards and Rhombus Media's feature film production of *Stormy Weather*. He was also a set designer for the company's production of *Opera Erotique*, where the goal was to produce the opera with as little impact on the environment as possible.

**THE MAGAZINE:** What sparked your interest in sustainable theatre?

**GARRETT:** I'm from the States and grew up in Los Angeles and had parents in the entertainment industry. At one time, I thought I wanted to be an architect, so I went to architecture school at Rice University and during that time I became interested in theatre design. In my architectural courses, I got a lot of training designing sustainable buildings and a



**IAN GARRETT:** What's sustainable theatre?

background in sustainability in general. So my interest began independently as I researched these topics. While I was working on a Thomas Gibbon play in 2006, I found myself thinking about how much energy our lights were using and whether they could be powered by a solar array and, if so, how large would it have to be and what would it cost. I gradually became more and more interested in theatre's role as a space for public debate on environmental issues, theatre's ecological impact and how we could mitigate that – if we could.

**MCKERNAN:** Before I started at York, my wife and I were taking a pretty serious look at the environment and what we should and shouldn't be eating. The more we looked into it, the more other environmental issues also popped up, and when I started at York it seemed like a natural process to get into the whole issue of sustainable theatre.

**THE MAGAZINE:** What is meant by "greening the arts"?

**GARRETT:** I think theatre probably seems, to most people, an unlikely place to start thinking about ideas around sustainability. But that's what makes it interesting to me. In performance we're dealing with time, with impermanence, as opposed to a building which is standing for a long time. A play usually runs for several weeks.

**MCKERNAN:** If you only look at the performance in terms of time in a particular space, you're not wrong, but if you look at the building in the same way, you are wrong. Buildings are long-term, plays are not. The building itself uses 80 per cent of the power. It's the biggest [energy] consumer, not the performance.

**THE MAGAZINE:** Can advertising the fact that a performance is sustainable help draw an audience?

**GARRETT:** To some degree. There are theatre companies that have taken this approach and made it a selling point. It's marketing toward an audience that might be interested in the experiment ... but what does that mean? How does it change

[the production]? An important aspect of all this is addressing the question of how does a work or performance communicate the message of sustainability to an audience, either in form or function?

**MCKERNAN:** I think absolutely, sustainability can be a draw, but it can also be a turnoff. I'm completely cynical about the whole thing – hopefully in a good way. [Laugh.] If you choose to stand up and say, "I'm part of this!" that's great, but not everyone will buy into it.

**THE MAGAZINE:** What kind of steps can we take to be greener on stage?

**GARRETT:** There are a number of different things producers can do to reduce their impacts environmentally: there are energy-efficient lights and fixtures; different ways of bringing less toxicity into the construction environment, such as dyes, paints and fixatives; alternatives to some adhesives; certified sustainable-growth lumber and organic fabrics; even printed versus non-printed publicity materials. One of the things I advocate most is that companies produce work that brings in a full house because it is highly energy efficient. Why? That's what heating and cooling systems are designed for – a full house. It's the most efficient way to "green" your theatre right away: maximize your audience.

**MCKERNAN:** You can cut your operating budget by thousands of dollars through building changes. Many green technologies are just not there [yet] for performances, but they are for buildings.

**THE MAGAZINE:** When and where did the green theatre movement start?

**GARRETT:** While eco-drama and eco-theatre can be traced back to the start of the modern environmental movement, the greening of production is more recent. One could argue that it's about eight years old, and in the English-speaking world I think you could say it kicked off in the U.K. – a lot of it with [not-for-profit organization] Julie's Bicycle,



**JAMES MCKERNAN:** Good question!

which started in the music industry. The U.K. government then invited [Julie's Bicycle] to look at other kinds of arts organizations. [Julie's Bicycle is a global charity bridging the gap between environmental sustainability and creative industries, working with more than 2,000 arts organizations internationally to help them measure, manage and reduce their environmental impact.]

**MCKERNAN:** We all take our thoughts ultimately from Rachel Carson's *Silent Spring* – at least in the Western world. But the

greening-the-theatre movement, the theory side, started with Theresa May's book *Greening Up Our Houses*.

**THE MAGAZINE:** Every discipline has its own unique logistics. Is it hard to create an all-encompassing standard for "greenness" in the arts?

**GARRETT:** You're not wrong there. Once you start getting granular it becomes difficult. We deal with time in a different way and deal with materials in a different way. It's much different from planning for a sustainable building that is going to be standing for a long time. By comparison, a performance is short, but it's important to figure out where we can have the most impact for productions, audiences and our people.

**MCKERNAN:** Most productions have a metaphorical rehearsal and an opening night, but other than that it's different for every theatre company. They'll all have their own particular demands and constraints. Job titles can be similar, but what the people with those titles do can be quite different. What works in Austin, Texas, will not necessarily work in Montreal or somewhere in Italy, and vice versa.

**THE MAGAZINE:** What is York doing, specifically?

**GARRETT:** In the theatre department, I teach both graduate and undergraduate courses that are about building and sustainable staging techniques.

**MCKERNAN:** We do a bunch of things. For example, we

## Why the Grass Isn't Always Greener

**IN A RECENT ARTICLE** published in *The Conversation*, titled "The battery revolution is exciting, but remember they pollute too," York University researcher Caleb Goods and social science Professor Carla Lipsig-Mummé from York's Faculty of Liberal Arts & Professional Studies argue that new green technologies need to be looked at in a broader context. The article makes the case that though cheaper green technologies, such as energy-storing batteries, "make the transition to a greener economy easier and faster," manufacturers still need to green their materials and work procedures.

Goods is a postdoctoral visitor with the Work in a Warming World research program and a co-investigator on a project called "Adapting Canadian Work & Workplaces to Respond to Climate Change" (ACW). Lipsig-Mummé is a professor of work and labour studies, and ACW project's principal investigator.

"[Our research] looked at some of the environmental impacts associated with the rise and use of battery technologies across a range of industries, but primarily electric cars," says Goods.

The article draws upon examples such as the recently unveiled Powerwall storage battery used in Tesla electric cars and for generating domestic electricity, and lithium-ion batteries used in electric cars. The production of lithium-ion batteries, they explain, requires graphite.

"Graphite in itself doesn't kill people, but the fragments from mining it get into the air and pollute the landscape. And there are a lot of agricultural areas where they mine it," says Goods. "You want new, greener technologies because we need to advance and shift the economy in a greener direction, but you don't want to do it at any cost." ●

reuse materials as much as possible, but every theatre does that. We try to build things a certain way so they can go into stock because we have space, but not every theatre can do that. We kicked out caustic chemicals for health and safety reasons as much as sustainable ones.

**THE MAGAZINE:** How can we educate the public more about greening theatre?

**GARRETT:** I've been doing work with Harbourfront [Centre] and I know there is certainly interest in what exactly being sustainable means and their part of the larger Toronto community. It's valuable to them because they are also telling human stories. I know there are smaller companies that are also doing interesting things in this area but don't really tell anybody about it, which is too bad. But yes, there's marketability to it. It's also important to share the information ... everyone benefits from it, not just the marketing department. In theatre, there are some things we've been doing the same way for decades – and for hundreds of years – because we're under tight deadlines, so we go with what works. Sometimes performance can be very risk averse.

**MCKERNAN:** There's always more to be done. We have sustainability managers on our shows now and they are responsible for studying the show's environmental impact. Then, if you want to, you can put publicity information in the lobby explaining what the carbon footprint of a show was.

**THE MAGAZINE:** What does the future hold for sustainable theatre?

**GARRETT:** I think we'll see companies minimizing their environmental impact and maximizing their social impact more and more.

**MCKERNAN:** The less tech we use, the greener we'll be. But I don't think the arts are going to shoot past the world in this. Everything we do tends to be custom built. We're very much a niche industry although we don't produce actual goods. But one thing we do have is a stage, so our marketing is built into our product. When you come to a show, you're not walking away with a thing; you're walking away with an experience – and an experience can change you in a way a product never can. ●





# BRYDEN ALUMNI AWARDS

## AN EVENING OF CELEBRATION IN HONOUR OF YORK'S FINEST

Join us as we celebrate outstanding York alumni alongside grads, students and friends that help keep our University's future bright



**NOVEMBER 24, ROYAL ONTARIO MUSEUM**

Sign up to be the first to receive exclusive event details  
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# Fresh Start

*Schulich grad Ran Goel left Wall Street  
to explore sustainable farming*



BY LINDSAY MACADAM  
PHOTOGRAPHY BY MIKE FORD

**F**RESH CITY IS PROBABLY as different from a Wall Street investment bank as it gets. A typical weekday afternoon at the Toronto startup's north-end warehouse involves smiling staff clad in sweatshirts and jeans, boxes of farm-fresh local produce lining the walls, and "As Long As You Love Me" by the Backstreet Boys blaring from the back room speakers as two enthusiastic employees assemble Pinterest-worthy salads in Mason jars and jokingly blame the cheesy '90s playlist on their boss (OK, maybe that last part only happened when *The Magazine* was visiting).

So how did Schulich School of Business alumnus Ran Goel (BBA '02) end up here, as founder and CEO of an urban farm and produce delivery service, when only four years ago he was pushing paper as a big-shot lawyer in New York City?

It all began with a routine brainstorming session with a fellow Schulich-grad-turned-Canadian-expat who was equally eager to transition out of his law career. "I remember telling him about this business idea one day, saying, 'Urban farming is where it's at.' I had all sorts of ideas, but this is the one that stayed with me," says Goel. "I kept saying to myself, 'I don't have any farming experience, I have no food retail experience, so it would be crazy to try this,' but it just stuck in my head."

As some young lawyers do, Goel had become disillusioned with the legal career path he embarked on. But what set him apart from others considering a job change was that he had an undergraduate degree in business – plus a certificate in applied business ethics to prove his eventual segue wasn't completely random after all. "I thought, where in the world could I make the most difference? And the more I read about the food industry, the more I realized it's a huge area of need right now," he says. "For me, it worked out well because food brought together a lot of the things I was passionate about – how farm labourers are treated, and the climate change and public health impacts of food production. Even on a social level, we're not spending enough time eating together anymore."

From an entrepreneurial standpoint, it also seemed like a smart move to Goel. He'd noticed a growing consciousness around local, organic produce and eating seasonally, but at the same time people were leading busier lives and had more limited cooking skills than previous generations.

Goel's leap of faith came in 2012 when he quit his job and moved back to Toronto to start fresh – Fresh City, that is. With no food industry

background to speak of – only stories from his Israeli grandparents about how delicious eggs used to be and how good tomatoes used to taste when they were freshly picked – he was determined to create a meaningful career for himself using nothing but the life experience he had gained up to that point. “I really found myself, almost daily for a period of time, constantly thinking about all the things I learned in accounting and marketing and finance [at Schulich],” he says.

Recognizing that urban farming would be difficult economically given the competition against much larger farms, and not wanting to rely on government grants to fund his passion project for fear that the cash flow would stop once the farming craze faded, Goel knew he needed to come up with a unique business model to differentiate his startup. He

wanted the farm to become not just a production space, but a place where he could meet his customers face-to-face. “We used the farm as a platform by bringing people in to experience it through workshops and tours and events,” he says. “Every June, we have an Open Farm event for families – last year we hosted almost 1,000 people.”

He further distinguished his business by offering not just the bare-bones produce bags for those who are comfortable in the kitchen, but services to suit people who might not have as much time or cooking experience – recipe kits for easy-to-prepare, healthy meals, and the aforementioned premade, vacuum-sealed salads. “I didn’t want to sit there fighting other farmers for the same slice of the pie, because then we’re not really broadening the market,” says Goel.

He also aimed to make his company as “green” as possible, an evolving process that continues to this day. “I always say what we’re really trying to do is create an alternative food system,” he says.

Almost all packaging the company uses is reusable and/or recyclable, including the ice packs, cooler bags and salad jars. The company even donates \$1 to charity for every three jars that are returned. Most of the small farmers the company orders from deliver their goods in reusable containers, and



**I kept saying to myself, “I don’t have any farming experience, I have no food retail experience, so it would be crazy to try this”**

roughly 30 per cent of Fresh City’s deliveries are completed with zero emissions, using electric vehicles, electric-assist rickshaws or bikes. “We’re really trying to rethink how food gets produced and how it gets delivered to you,” says Goel. “And the cool thing is, many times it makes economic sense, too. Our bags are reused up to 15 times. Our bikes don’t get parking tickets downtown because they can be parked on the sidewalk; you don’t have to pay insurance on them and they don’t require gas.”

Four years later, Fresh City now has two sites: a farm and greenhouse at Downsview Park, and a warehouse and administrative office at Keele and Lawrence. The company grows a lot of its own food, especially in the summer months, and also brings in produce from other local growers and makers, including bakers, dairy

farmers and organic butchers. More than 2,500 homes across the Greater Toronto Area now receive Fresh City deliveries, and the company drops bags off at various pickup locations for people who prefer to save the \$3 delivery fee. With its 25-person staff of environmentally conscious go-getters, Fresh City now offers much more than weekly and biweekly grocery delivery. Customers can add extra items to their bags through a virtual farmers’ market and completely customize their produce deliveries if they so choose.

World domination probably isn’t in the cards for Fresh City, but the planet could certainly use more food industry entrepreneurs like Goel. Rather than trying to expand as quickly as possible, he is determined to stay true to his original vision and use it to guide every decision he makes. “Our raison d’être is to foster more sustainable farming, and that takes deeper relationships with farmers,” he says. “My hope is that we’ll be delivering to the entire Golden Horseshoe within the next couple of years, serving the entire area where we source our food.”

From an environmentally conscious university student with dreams of becoming a human rights lawyer to an ethical businessman reimagining the world’s food system through his sustainable farming startup, Goel’s path may have been an untraditional one, but he wouldn’t have it any other way. ●

*When Glendon College's founding Principal Escott Reid gifted funds for a scholarship in his will, he enabled ambitious students like Natalia Ladyka-Wojcik the opportunity to pursue her dreams and make a difference in the world.*

# A Legacy Story

“I want to thank the late Principal Reid and all York supporters, on behalf of the entire York University student body, for the opportunities and connections that you have made possible and without which many students would never realize their dreams, their goals and their futures.”

Natalia Ladyka-Wojcik is a 3rd year York International Studies and Psychology student, recipient of the Escott Reid Entrance Scholarship and an international volunteer.

To learn more, contact Marisa Barlas at 416-650-8221 or [legacy@yorku.ca](mailto:legacy@yorku.ca)

[myyorklegacy.com](http://myyorklegacy.com)





# Small Wonder



**SPACE BOUND:** Professor Tom McElroy holds an image stabilization unit that will be tested on a NASA balloon flight in New Mexico in September

How nanosatellites may help  
solve the riddle of global warming



**The world's first satellite wasn't  
much bigger than a beach ball,  
but its impact on history was truly massive.  
Launched into orbit almost 60 years ago,  
Sputnik 1 marked the start of the "space race"  
between East and West.**

**Y**ET THIS HUMBLY BEEPING SPHERE wasn't just a symbol of Cold War brinkmanship; its real purpose was to gather useful information about the nature of space. Thousands of Sputnik 1's successors now circle the Earth, carrying payloads that perform a variety of functions. Some collect space data and others facilitate global communication. Satellites help us to navigate our planet, to understand its every physical detail. And today, they play a central role in the study of – and the fight against – climate change.

Global warming is among the gravest problems of our time. York University has no shortage of thinkers grappling with its challenges, at the levels of science, business, communications and government policy. As you'd expect, most of these great minds are busy examining changes on Earth. But the greenhouse effect is an atmospheric problem – one that harms our planet, even as it takes place outside it. If the problem isn't attacked at the extraterrestrial level, it stands little chance of being solved.

"Climate change is a global phenomenon, and different parts of the globe respond differently to it," says Gordon Shepherd, professor emeritus of earth and atmospheric science at York's Lassonde School of Engineering. "While ground-based measurements provide valuable information about specific locations, satellite observations are the only way to cover the entire planet. For that reason, the entire Earth must be observed."

That's why the work being done by scientists and engineers in York's well-known space programs is of critical importance right now. "We have a unique capability within Canada to bring brainpower together and come up with a new way of monitoring this problem," says Regina Lee, chair of Lassonde's Department of Earth & Space Science & Engineering (ESSE).

**BY CYNTHIA MACDONALD PHOTOGRAPHY BY MIKE FORD**



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## SATELLITE OBSERVATIONS ARE THE ONLY WAY TO COVER THE ENTIRE PLANET

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Other universities offer space science programs and, like York, they regularly partner with the Canadian Space Agency to work on international missions. But York is different in that it also offers a unique education in space engineering. “Our aim is to have engineering support science, and get the science program to drive engineering into new technologies and capabilities,” says ESSE Professor Tom McElroy, who holds the CSA/ABB/NSERC Industrial Research Chair in Atmospheric Remote Sounding. “This isn’t often done, because the specialties and timescales are very different.”

As aerodynamics expert Theodore von Kármán once wrote: “The scientist discovers that which exists. The engineer creates that which never was.” Scientists like McElroy identify problems, collect data and analyze it; engineers like Lee develop infrastructure and systems, such as satellites and spacecraft, to support that process. (On that note, the term “rocket scientist” – often used to denote a smarter-than-average person – turns out to be somewhat erroneous. People who create rockets, while educated in scientific principles, are always engineers).

McElroy is a perfect fit for Lassonde’s mission of teaching “renaissance engineers” who can slalom effortlessly between disciplines, and that’s because he is one of the country’s foremost “renaissance scientists.” Fascinated by robotics since grade school, he ultimately became a designer and builder of scientific instruments – one of which, intended to measure electromagnetic waves in space, was tested by astronaut Marc Garneau on the Challenger shuttle in 1984. A similar apparatus was flown by York alumnus Steve MacLean (PhD ’83) on Columbia in 1992.

But McElroy is best known for two inventions that, while ground-based, were also created to evaluate changes occurring high above in the atmosphere – changes that were having an effect on people’s health and well-being. Now used in more than 45 countries, the Brewer Ozone Spectrophotometer was initially invented to monitor the atmosphere’s thinning ozone layer. Later, it was adapted to measure increasing amounts of harmful UV radiation that were reaching the ground as a result.

And the UV index – which McElroy co-invented in 1992, during his time as a research scientist with Environment

Canada – is even better known. It has been credited with saving thousands of lives around the world by increasing public awareness of the sun’s potentially damaging properties.

Ozone is considered one of the “good news” stories in climate change. Scientists like McElroy were able to show that human activity (specifically the widespread use of chlorofluorocarbons, found in refrigerants and aerosol sprays) was contributing to ozone depletion. After their revelations were made, a campaign of evidence denial ensued that foreshadowed the global warming denial of today. But, says McElroy, “eventually the science won out, and industry agreed to solve the problem.”

The highly successful international treaty that was struck to ensure this, known as the Montreal Protocol on Substances that Deplete the Ozone Layer, will mark its 30th anniversary next year. Recently, satellite pictures have revealed that the ozone layer is slowly starting to repair itself. Without the concerted effort of science, government, industry and the public, NASA has calculated the rate of skin cancer today due to UV radiation might now be 650 per cent higher than it is.

Convincing interested parties to reduce carbon dioxide and methane emissions will be a taller order, McElroy concedes. But he thinks it can be done. “You have to believe that it’s possible to make this huge change,” he says. “I’m sure people didn’t think it was possible to turn off coal-fired electricity in Ontario, because Nanticoke was the largest generating plant in North America. But now it’s gone.”

Visual evidence of thinning ozone, gathered by satellite cameras, was one of the things that helped convince people that action needed to be taken. Today, satellite images of dwindling sea ice at both poles are also proving to be a powerful weapon in the effort toward greenhouse gas reduction.

Like McElroy, York geophysicist Christian Haas, the Canada Research Science Chair in Arctic Seas Ice Geophysics, uses satellite technology to complement what he does on the ground or from an airplane. He is an expert on the disappearance of sea ice, one of the most famous results of climate change. Via a combination of measuring techniques, scientists have estimated that sea ice in the Arctic Ocean could be reduced to half its 20th century volume by the middle of the 21st.

Combining techniques is key in Haas’s work – these include measurements taken in space and sky and on ground (even underground, since thawing permafrost may be releasing large amounts of greenhouse gas).

McElroy believes that with today’s more sophisticated techniques, pictures of the melting Arctic could prove even more compelling to the public than earlier pictures of a growing ozone hole. This type of new instrumentation could “map





**REGINA LEE:** Bringing Canadian  
brainpower together

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## SATELLITES THAT USED TO BE THE SIZE OF A SCHOOL BUS ARE NOW GOING TO BE AS SMALL AS A CHINESE TAKEOUT BOX

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pollution in the Arctic, and watch the evolution of methane as the permafrost thaws during the summer,” he says.

Such a device could well emerge from an important facility now being planned at York. Next year, Lasonde anticipates the opening of its new Suborbital Payload Research Centre – a state-of-the-art design, building and testing facility.

The centre will feature a strong emphasis on microfabrication technology – remote sensors that were once big, cumbersome and expensive will be reduced to thumbnail-sized computer chips. Whereas Sputnik 1 was small, satellites that followed in its wake were much larger (and cost a lot more to boost into space as a result). Now, the scientific tide is turning. “Satellites that used to be the size of a school bus are now going to be as small as a Chinese takeout box,” says Lee.

The advent of “CubeSats” is now greatly reducing the cost of sending data-gathering technology into space. Shuttle missions designed to orbit the Earth once cost up to \$200 million each; suborbital nanosatellites can be carried into space (by balloons, aircraft or sounding rockets) for a tenth of the price. Consequently, many more satellites can be deployed, enabling scientists to acquire a much richer picture of climate change causes and effects.

In addition to disappearing sea ice, nanosatellite pictures can theoretically count every animal of a given threatened species, every tree lost to deforestation or sea creature lost to overfishing, and every CO<sub>2</sub>-emitting vehicle on the roads. “There are lots of areas where air traffic is not being tracked, for example. With nanosatellite constellations, we’ll be able to do that,” says Lee.

Nanosatellites are already examining other potential causes of atmospheric disturbance, beyond greenhouse gases. “One of the things we are involved in is measuring the magnetic field around the Earth,” says Lee, “which used to be done much more expensively, by big satellites.” Fluctuations in this field can cause earthquakes, which satellite data could help predict – resulting, again, in countless saved lives.

Microtechnology will also make the complicated testing process much easier. Large instruments that go into space

must be rigorously tested to withstand its harsh conditions. They are placed in helium-flooded thermal vacuum chambers with a temperature of -260 C, sometimes for up to a month. In the small cleanroom at York, that process will be hastened and cheapened by being brought in-house.

Interplanetary exploration is naturally of great interest to York space researchers. And though it may not seem so, this research is linked to climate change questions as well. Discoveries made by teams from York’s Centre for Research in Earth & Space Science can also have an impact on Earth. In 2008, York-designed weather instruments on the Phoenix Mars Lander revealed heretofore unseen pictures of snow falling from clouds on the red planet. Mars and other planets experience climate variability too, though of course it isn’t anthropogenic (caused by people) in nature.

What happens on other planets is still instructive as a subject of study. Venus, for example, experienced a greenhouse effect when large amounts of water on the planet evaporated, releasing a great deal of water vapour (itself a greenhouse gas) into the air. As a result, Venus is now the hottest planet in our solar system.

All this means that every researcher in the field of space – whether scientist or engineer, whether concerned with Earth or other planets – has a vested interest in the study of climate change. One of the reasons Lee cites for scientists and engineers to band together is that when researchers pool their findings on climate change, the likelihood that the government, business and consumer sectors will be persuaded by them is greater. Too often, parties remain within their own spheres of interest. But that’s changing.

At York’s Suborbital Payload Research Centre, the design, testing and launch of a typical nanosatellite mission will take place over the span of an average MSc degree, which would provide students with the chance to participate in the process from beginning to end.

“More has been learned about this planet from space in the last 40 years than in all previous history,” wrote science journalist William E. Burrows in his 2006 book *The Survival Imperative: Using Space to Protect Earth*. And even greater advances have been made since then. In the past, space research has sometimes been marred by its association with military posturing, obscure experiments and disasters that were costly not only in monetary terms, but in those of human life.

No more. The new space race is about something very different: creating technology designed to preserve and protect humanity from the ravages of a rapidly warming Earth. It is a race that scientists and engineers at York University are in a very good position to win. ●



## Get the most out of your summer

Tired of the same old summer plans? Looking for a new way to spend your holidays? Check out York's Ultimate Summer Bucket List for **exclusive alumni deals** on all of the exciting things to do in Toronto (and beyond) from May to August.

[alumniandfriends.yorku.ca/bucketlist2016](http://alumniandfriends.yorku.ca/bucketlist2016)

**YORK**  
UNIVERSITÉ  
UNIVERSITY 



BY MICHAEL TODD  
PHOTOGRAPHY BY MIKE FORD

**PICTURESQUE:** Art Gallery of  
York University curator  
Philip Monk in York's art vault

# Off The wall

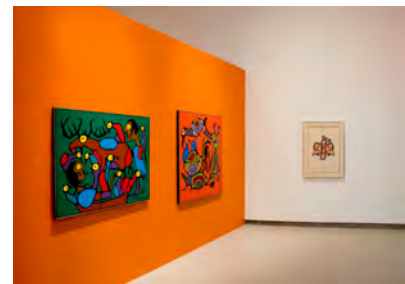
*York's permanent art collection exposed*

**S** **TASHED AWAY IN VAULTS** somewhere on campus is an assortment of sculpture, paintings, drawings and artifacts known as the York University Permanent Collection. While the 1,647-piece collection includes works by well-known artists such as Andy Warhol, Jack Bush, Norval Morrisseau and Quebec artist Jean-Paul Riopelle, it also includes anonymous treasures by Inuit and Thule artists from west Alaska and Baffin Island.

“We have a number of historically significant artists, but there remain oddities in the collection,” says Philip Monk, curator of the Art Gallery of York University (AGYU). “For instance, what is authentic and what was produced for the tourist trade in the Papua New Guinea collection of sculpture? Or why is the collection the repository for a large number of works by outsider artist Alma Rumball? There’s no clear answer. Sometimes bringing a collection to the light of day asks more questions than it settles.”

Monk says collections like York’s are ultimately about time, and they reflect the collected sediment, if you will – like archeological layers – of their institution’s history.

Below: Two works by Norval Morrisseau (left) and one by Bill Reid (right)





**EXPOSED:** Last year, the AGYU mounted an exhibition of select works from York's permanent collection, including the above paintings by Jack Bush

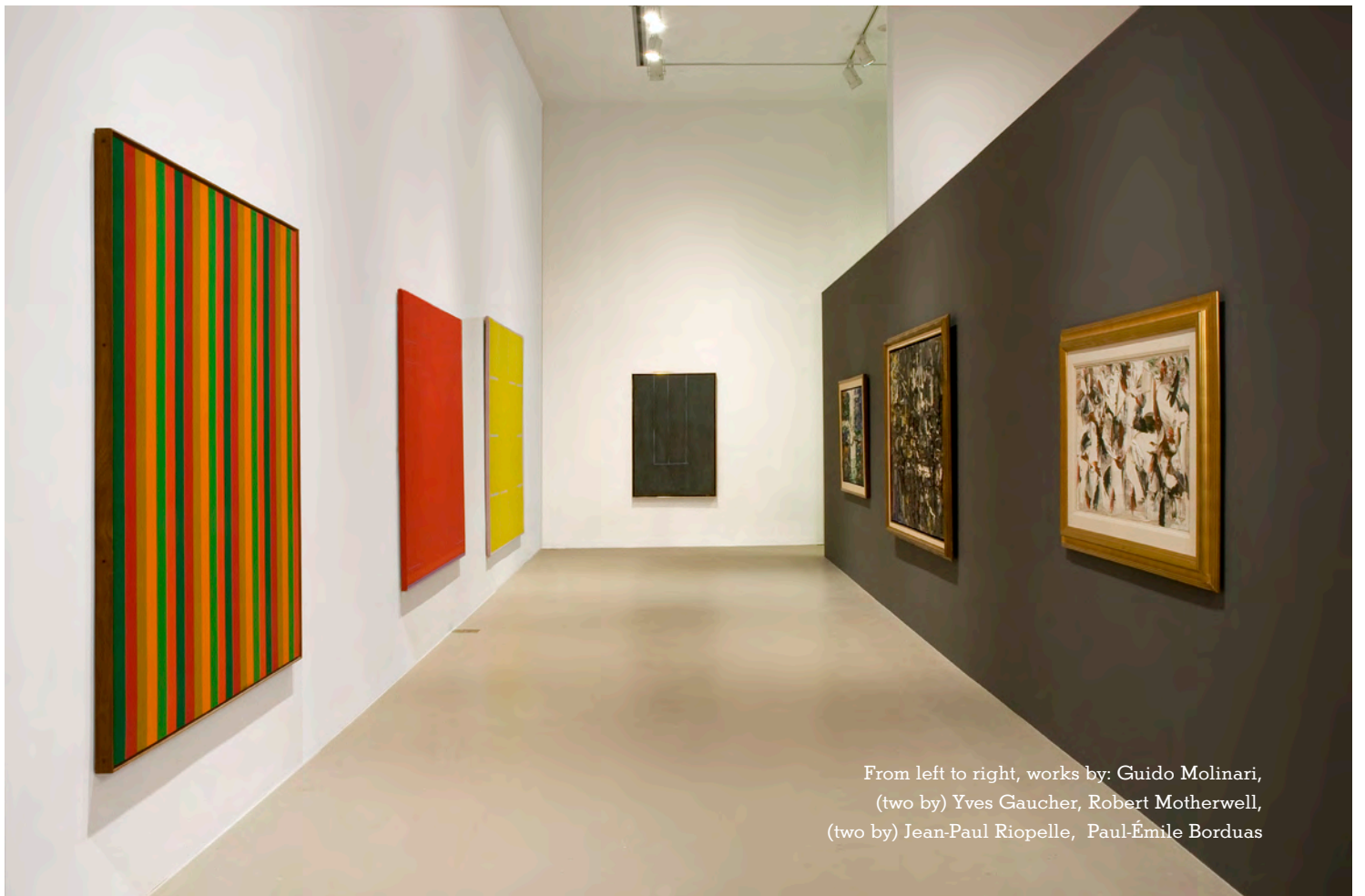
York's collection, he says, is best viewed as a reflection of its time and as a comment on the tastes and collecting interests of various decades. "The collection developed in the interests of the moment: The five per cent purchases for art when the campus was built resulted in some classics of the 1960s Canadian painting, with an interlude for purchase of op and pop art prints. Then, in the '70s, a large Inuit collection was formed in one fell swoop. Later, York received

gifts from generous donors like Joan and Martin Goldfarb, who gave 76 paintings, sculpture and works on paper."

Given chronic university underfunding, should postsecondary education even be in the art collecting business? "There's no reason universities shouldn't have collections in the way other non-art institutions, such as private corporations or governments, do," he says. "On the other hand, they don't have the same mandates as large, provincially funded art galleries, and usually cannot collect in the same way – that is, widely or in particular depths. So that might mean developing specialized types of collections to make campuses a particular destination." ●



From left to right, works by: Harold Town, Jack Reppen, Claude Tousignant

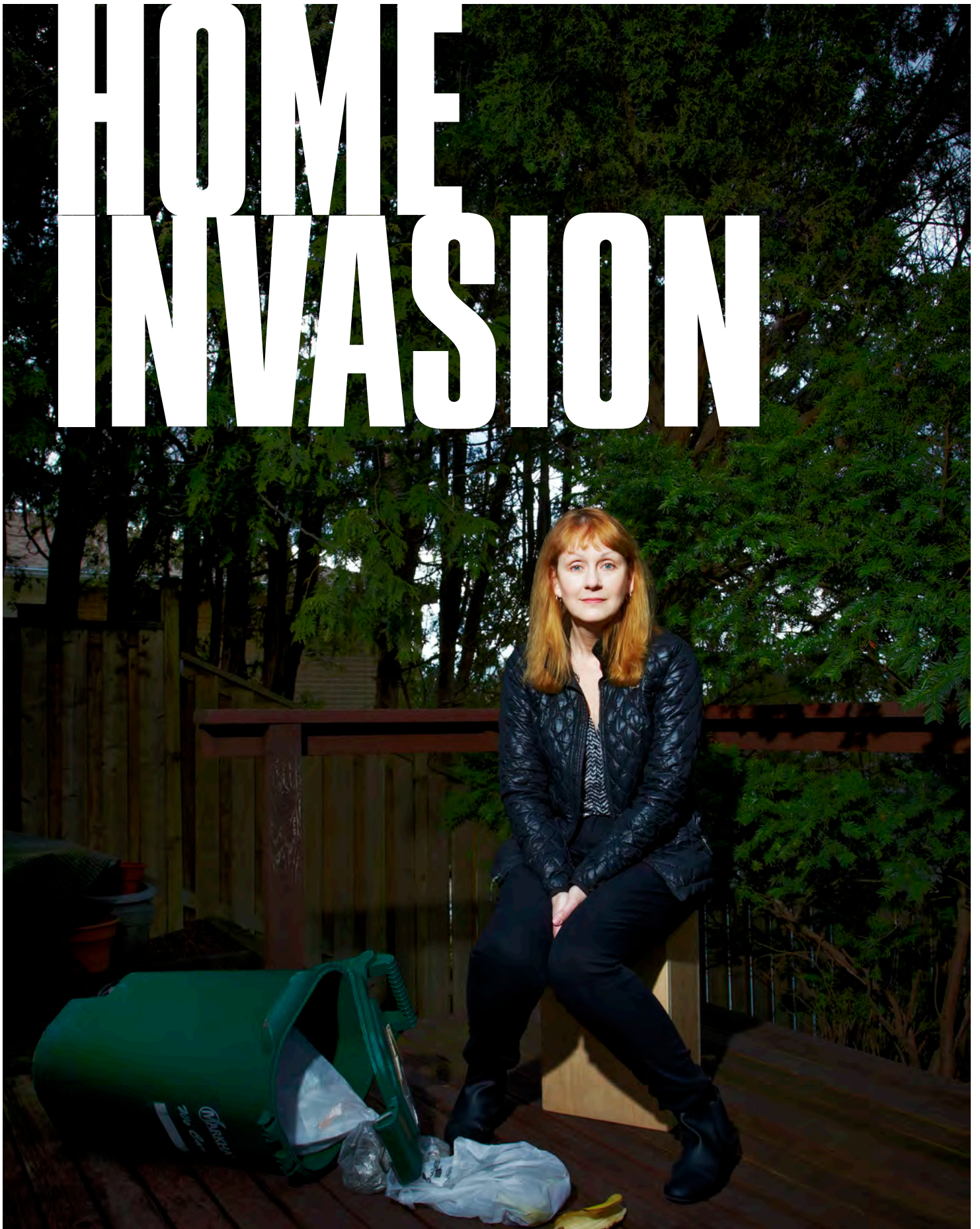


From left to right, works by: Guido Molinari,  
(two by) Yves Gaucher, Robert Motherwell,  
(two by) Jean-Paul Riopelle, Paul-Émile Borduas



From left to right, works by:  
Joyce Wieland, N. E. Thing Co.  
(Iain Baxter and Ingrid Baxter),  
(two by) Andy Warhol, Eduardo  
Paolozzi, Richard Hamilton

# HOME INVASION





## *Why raccoons are thriving beside urban humans*

BY SANDRA MCLEAN PHOTOGRAPHY BY SOFIE KIRK



**I**T IS MIDNIGHT in your downtown or suburban backyard and all is quiet, or so you think. But while you sleep, there is a whole industrious nocturnal world happening under the light of the moon.

Raccoons, one of the most prevalent night prowlers, emerge as the sun sets and stay up most of the night gorging on garden delights, tearing up lawns for delicacies such as grubs, ripping apart roof shingles to gain entry to a warm attic or pulling apart flimsy boards to crawl under your deck to have babies. In other words, there's a party happening out there and you weren't invited. While there won't be empty beer bottles or cigarette butts to clean up in the morning, there may be a few bites out of your cucumbers or a curbside mess on garbage day, and little footprints from multiple partygoers. Raccoons see your backyard as their land of opportunity.

From a city raccoon's perspective, humans have kindly provided an easy means of food, shelter, water (swimming pools are their watering holes) and even a freeway system – they use the tops of fences as their personal highway to transverse the neighbourhood, says York psychology Professor Suzanne MacDonald, who studies animal behaviour.

“In a three-square block area – their usual territory size in the city – they will have about 10 den sites each and there may be about 20 raccoons,” she says. “So there will always be tons of raccoons in your backyard, you just don't know they're there. People think, ‘OK, I'll just block off the hole in my roof and never see them again.’ No. They'll just saunter off somewhere else in your yard or go to your neighbour's.”

And if there's one thing raccoons are good at it's adapting to new environments. “They actually thrive next to humans, while most other species don't.” MacDonald studies their

habits, behaviours and population density – pockets of Toronto may be overrun – and her work will likely help with the city's policy and management decisions regarding these nocturnal marauders.

MacDonald recently played a role in designing Toronto's new raccoon-detering green bins. Raccoons don't have opposable thumbs; their long fingers are all in a row and the new bins are meant to foil them. At the moment, it's working. The problem is the more puzzles we give them, the smarter they get, says MacDonald. She knows this first-hand as she constantly gives them new challenges as part of her research, such as different designs of garbage cans, to see if they can solve them.

In an effort to figure out what raccoons were up to all night, MacDonald asked her neighbours if she could install cameras in their backyards. “Many people said, ‘Sure, you can put your camera in my backyard but you won't see anything. We never see raccoons,’ ” she says. “Turning on my cameras up was an eye-opener.” She uses motion-capture infrared cameras that work at night. “I can actually see what's going on in the backyards and it's wild. There are so many of them in all the backyards. It's like this little secret world.”

She also put GPS collars on them to track their movements. The results were surprising. “City raccoons stay in the same general three-block area, and they don't cross big roads. They live and they die in the same small area. As a psychologist, that really interests me,” she says. “An animal that has to figure out how to get all of its resources and find a mate and have babies, and do all that in a very small territory that is overlapped by many other raccoons and is in our backyards, that's quite a challenge.”

## The urban ones will try a multitude of solutions. That leaves me to suspect that, in fact, the urban environment is selecting for smarter raccoons

MacDonald then started looking beyond the urban backyard, setting up her cameras in various places – from Georgian Bay to near Ottawa. Altogether, she amassed some 800 hours of video of raccoons carrying on their nightly business. “All this work happens at three in the morning,” she says. “Finding urban ones is not hard. You just go out in people’s backyards. But finding them in the country is quite difficult because they have large ranges.”

Her observations have led her to hypothesize that city raccoons are being selected to be smarter through cognitive evolution over their rural counterparts. Like city humans, urban raccoons live in denser and smaller areas than those in the country, and this has created differences.

Unlike their city relatives, country raccoons have large home ranges, some as big as 20 square kilometres. They go in and around rivers, in forests, across meadows. They don’t see many others of their species and their territories don’t overlap much. That has made the country raccoon much more solitary, says MacDonald. “They have a completely different life history than the animals that live in the city.”

For the past several years, MacDonald has tested her hypotheses about raccoon behaviour by giving both city and country raccoons simple and complex problems. Turns out, both groups can do the simple tasks, but only the urbanites can solve the complex ones. “The latter use more strategies,” she says. “The country raccoons tend to just focus on a problem one way and then if that doesn’t work, they give up, whereas the urban ones will try a multitude of solutions. That leaves me to suspect that, in fact, the urban environment is selecting for smarter raccoons.”

She watched one female try to get into a garbage can for over six hours. “In the country they wouldn’t have six hours to spend. They’d have to go find food elsewhere,” says MacDonald. “The raccoon went away, she came back, she went away over the course of six hours before she got in, but she got in. That’s how they get in so successfully, because they don’t give up until they get in.”

Because they’re omnivores, raccoons can eat pretty much anything. That’s why garbage is so attractive to them. Once they’ve cracked the garbage pail puzzle, it’s an all-you-can-eat buffet of leftovers in the city. “It’s not that there isn’t

food in the country, but it’s more spread out,” she says. “Our cities have resources clumped together, especially on garbage night, and there are a lot of resources in people’s backyards. They have gardens, they put food out for the cats, there are water sources. [Raccoons] will eat

insects, eggs, whatever they can find. The city is food abundant and that’s why raccoons can spend six hours breaking into a garbage can. They’re quite fat in the city; they’re not that fat in the country. You’re not svelte when you’re eating takeout all day.”

MacDonald has, however, found a few things raccoons don’t like – onions and hot peppers are at the top of the list. She tests them in her own backyard, so they know where to go for a slightly burned tray of cookies or leftover fried chicken. She doesn’t recommend feeding them, though, and only does it herself for research purposes. But she notices all the onions are left behind. And if she rubs onions on her patio door, they stop placing their hands on it to peer inside. They’re also not big vegetable fans and they’re particularly not fond of tomatoes, although you wouldn’t know it. “They often take one bite out of everything,” she says. If you’re trying to deter raccoons from your backyard, things like cayenne pepper may help. Just don’t put marshmallows out. Raccoons love them and will come back looking for more.

This summer, she plans to focus on raccoon babies to see if her hunch about selection and cognitive evolution is correct. She will then compare country and city kits by giving them new problems to solve. “You’re not trying to train them; you can only give them the task once.” This will tell her if the urban kits really are smarter than their country cousins.

Taking it a step further, MacDonald believes the city and country raccoons will eventually develop into two different species. “When you have that difference in selective pressures, so that the ones in the country are dealing with a different environment and different sorts of social activities than the ones in the city, what I suspect is that there will be speciation.”

As raccoons continue to thrive in the concrete jungle, we may be unwittingly helping to create a smarter animal that will be harder to fool, but as MacDonald says, “We are going to have to figure out how to live with them as they’re not going anywhere.” ●

# RADICAL CHIC

A bold new building promises  
a head-turning shift  
in traditional engineering

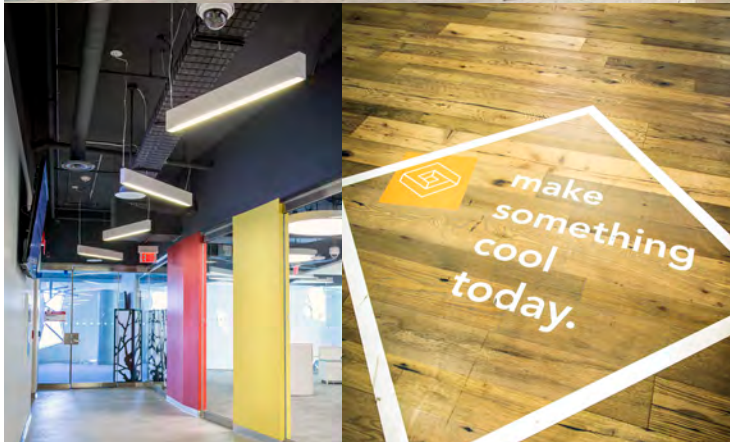
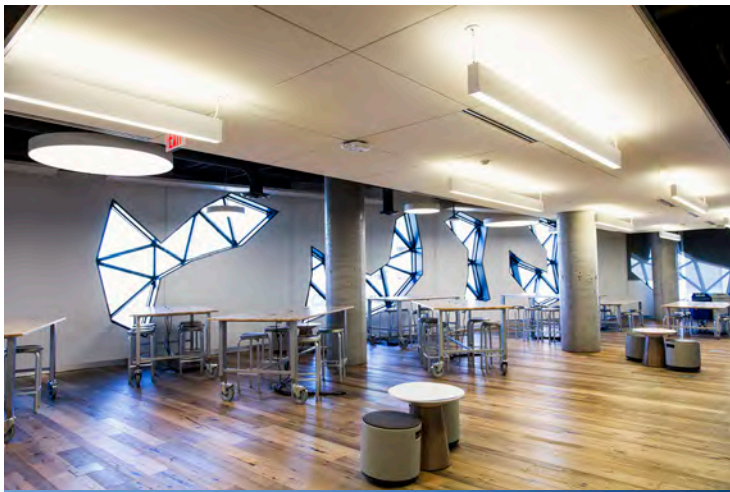
BY MICHAEL TODD  
PHOTOGRAPHY BY MIKE FORD





**The futuristic building has been designed to “flip the classroom”**





**A** **T FIVE STOREYS HIGH**, 167,500 square feet and shaped like a cloud, the Lassonde School of Engineering's new Bergeron Centre for Engineering Excellence is a bold experiment in architecture, but also a fitting home for a radically new vision of engineering education. Designed by ZAS Architects, it houses York's recently launched civil, electrical and mechanical engineering programs. The futuristic building has been designed to "flip the classroom," so students will watch their lectures online at home or in a café and come to campus for active learning sessions with professors, classmates and mentors.

Even the hallways and elevators are designed for impromptu learning. Covered in whiteboard panels, they offer students and professors constant opportunities for brainstorming. The building also boasts plenty of open-concept space and lounge areas for socializing or studying.

The centre was made possible through a \$10 million donation by Doug and Sandra Bergeron. "Their support will give our students the opportunity to explore their passions and gain new perspectives in a home that's completely different to any engineering school ever built in Canada," says Janusz Kozinski, Lassonde's founding dean. ●

# Giving

FRIENDS & PHILANTHROPY

## Laser Focus

Allan Carswell is empowering future scientists and engineers

BY SHARON ASCHAIK  
PHOTOGRAPHY BY SOFIE KIRK

**A**LLAN CARSWELL'S decades-long research and business career has been as bright, focused and intense as the subject of that career: lasers. The world-renowned physicist pioneered laser radar, or LiDAR (light detection and ranging), a remote sensing and environmental diagnostics technology that has dramatically improved how we map physical features on the Earth's surface, as well as below and beyond it. It's an innovation Carswell says evolved with tremendous resources and encouragement from York University, and now he is returning the favour with a \$1 million gift that will fund graduate scholarships for the next generation of scientists and engineers.

BECAUSE  
SCIENCE AT THE  
UNIVERSITY WAS  
RELATIVELY NEW,  
IT WAS A HIGHLY  
DYNAMIC TIME

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“It will enable students to enhance the depth and breadth of their research, strengthen science and engineering programs at York, and advance innovation in the field,” Carswell says.

He is promoting the same opportunities to pursue scientific inquiry that were first afforded to him in 1968, when he joined York’s newly established Faculty of Science and initiated the University’s research of the then-recently-invented laser. The holder of a doctoral degree in physics from the University of Toronto, Carswell had previously studied the device at RCA Victor Research Laboratories in Montreal, where he led a team in developing Canada’s first helium-neon and carbon dioxide lasers. Looking back on his early years at York, he remembers the thrill of participating in the University’s foray into scientific research.

“Because science at the University was relatively new, it was a highly dynamic time and all sorts of plans were under way,” he says.

For Carswell, those plans involved exploring the properties and applications of high-powered lasers and LiDAR, which uses light in the form of a pulsed laser to measure the distance between objects. One of his early successes with the technology was when he developed a truck-mounted mobile LiDAR system to conduct atmospheric studies throughout Ontario and Quebec. He went on to develop atmospheric LiDAR for observatories in the Arctic, and marine LiDAR for studying lakes and rivers.

By 1974, more and more companies were showing interest in his work, so Carswell decided the time was ripe to commercialize LiDAR technology. Together with his wife, Helen, and a former York colleague, he formed Optech Incorporated, a company focused on designing and manufacturing commercial LiDAR systems. They originally developed atmospheric and marine LiDAR, and later focused on topographic surveying, 3D imaging, industrial process measurement, vehicle guidance and even spacecraft tracking and landing. Under Carswell’s leadership, the enterprise evolved into a 275-employee international company that became the top LiDAR technology provider for surveyors, researchers and governments worldwide.

One particularly noteworthy accomplishment for Optech was its collaboration with NASA on its 2007 Phoenix mission

to Mars. Part of a team of organizations led by York University under the direction of the Canadian Space Agency, Carswell shared his expertise in conducting atmospheric measurements on the red planet and provided instruments to perform temperature, pressure and wind measurement. The

intensive four-year project resulted in a LiDAR system that, after 152 days on Mars, was able to capture a wealth of information about its atmosphere, including the presence of snow.

Carswell’s LiDAR research and business activities helped spur extensive innovation in terrestrial, airborne and hydrographic LiDAR. Today, the technology is used for a diverse range of functions in areas such as agriculture, archeology, mining, robotics, urban planning, geology, forestry and law enforcement. For his key role in developing LiDAR and researching the technology – his findings have appeared in more than 250 scientific and technical publications – Carswell has received many accolades, including the Order of Canada and the Queen Elizabeth II Diamond Jubilee Medal. York has also acknowledged his accomplishments with an honorary doctor of science degree and, most recently, with a Lifetime Achievement Award from the Lassonde School of Engineering.

In 1998, after three decades at York, Carswell retired to run Optech full-time. In 2012, he sold part of the business to Teledyne Dalsa, a Waterloo, Ont.-based manufacturer of high-performance digital imaging equipment and semiconductors, and last year, he sold his remaining stake in the company. He now funds education and health-care causes through the Carswell Family Foundation, which he runs with his three children and two of his eight grandchildren. The foundation’s generous gift to York, which is being matched by the University, will create an expendable fund and a permanent endowment, both of which will provide scholarships for graduate students in science and engineering programs. Carswell has made significant donations to York before. In 2005 he gave \$125,000 to newly outfit a physics laboratory and to fund new courses in laser physics and atom trapping (the latter is a unique-in-Canada undergraduate course). He has also supported various awards and other causes at York.

“When I look back at what I have achieved, I have a good feeling, but I also feel the best is yet to come,” he says. “My biggest satisfaction right now comes from giving things away.” ●

# Classes

## 1968

**BIDERMAN, BEVERLY** (BA Glendon) has had progressive hearing loss since she was a toddler. It became profound by the time she reached her early teens, and from that point on, she was completely unable to understand any speech without lip-reading. As an adult, she had cochlear implant surgery, and then everything changed. She is pleased to announce the birth of an opera based on her memoir, *Wired for Sound: A Journey into Hearing*.

## 1971

**ROSENTHAL, LOWEN** (MBA) believes his MBA has been a godsend, helping him become one of Canada's top

insurance advisors. When he graduated in 1971, his first job was as a research analyst with a boutique investment dealer on Bay Street, where he remembers Seymour Schulich also worked as one of their resource analysts.

## 1972



**COOMBS, DAVID** (BA Spec. Hons., PhD '78) was a member of McLaughlin College from the day it

opened in September 1968 until 1977 – he met and thanked Col. R.S. McLaughlin for his donation – with a

year away at Rutgers in 1972-73. Coombs stayed in McLaughlin residence for all those years, first as an undergrad and then as a Don for four years. He has a BA in history from York, an MA in history from Rutgers and a PhD in history from York. He was the president of McLaughlin for its first two years and sat as a student representative on York's first search committee to find a successor to Murray Ross. As a graduate student, he purchased land in the Madawaska Valley and built a log cabin. After earning his PhD, he worked as a stockbroker for 27 years and then retired at age 54 to his cabin in the bush with his wife. People have told him he's lived a varied life and he has captured some of the lessons in his novel, *The Beckoning Land*.



**STROM, ELLIOT** (BA Spec. Hons. McLaughlin) recently published *Rabbit, Run*, which has

received some very nice attention.

## 1974

**PARIS, DAVID** (BA Stong) returned to Canada after receiving his PhD in human anatomy from the University of Oregon. He has been the director of athletic therapy at Concordia University's Department of Exercise Science for over 30 years, and has worked with soccer and multisport teams as a



### MCFARLANE, PETER

(BFA Spec. Hons. '85, Stong) is a sculptor and painter represented by six galleries in Canada and the U.S. He lives on beautiful Salt Spring Island, B.C. When not in his studios or playing with his band (Thru Fare), he can be found in the garden or the orchard. His son Geoff is currently studying music at York University.



certified athletic therapist at national and international events such as the Maccabiah Games, the Pan American Games and the Olympic Games. In 2012, he received the Canadian Athletic Therapists Association (CATA) Distinguished Athletic Therapy Educator Award. In 2015, he was inducted into the CATA Hall of Fame.

## 1978

**DAVIES, PETER** (BFA Spec. Hons. Founders) has worked mainly in technology businesses in Chicago, London, Rochester, Maastricht and

Barcelona, for companies including Apple, Motorola, HP and Experian. He currently works in London as a chief technology and marketing officer for a global business that tracks maritime assets.

## 1979

**BOWMILE, ROCHELLE** (BA, BEd Stong) is the head of the Department of Special Education at Unionville High School. The amazing professors and teachers that she encountered in her years at York University helped to mould, motivate and inspire her. She

strongly believes that her job is not just a job, but an inspiring journey of learning, teaching and self-discovery.

## 1982



**DEKESEREDY, WALTER** (BA, MA '84, PhD '88) received the Career Achievement Award from the American

Society of Criminology's Division of Victimology. Walter also co-authored *Violence Against Women in Pornography*.

## 1985

**MULLEN, CAROLANN** (BA Spec. Hons Winters) is currently a U.S. Fulbright Scholar and has published her 20th book, *Education Policy Perils: Tackling the Tough Issues*. The collection, written by experienced scholar-practitioners, offers insights that include descriptions of challenges facing educators and recommendations for overcoming them with an eye toward more successful policy and better implementation.

## 1986

**BARWIN, GARY** (BFA Spec. Hons.; BA '88; BEd '01, Vanier) was the 2014-15 writer-in-residence at Western University. His 18th book is *I, Dr. Greenblatt, Orthodontist, 251-1457*. Forthcoming are *Sonosyntactics: Selected and New Poetry of Paul Dutton* and *Yiddish for Pirates*. He lives in Hamilton and teaches at King's University College in London, Ont.

## 1990

**MARSDEN, SCOTT** (MFA) earned a PhD in educational studies from the University of Victoria in 2015. He is currently the executive director at the Haida Gwaii Museum.

## 1992

**CHU, ALBERT** (LLB) was appointed the Hong Kong senior consultant for the global immigration consulting firm Elevay, based in Dubai. He was also a senior account director of ultra-high-net-worth individuals for the Hong Kong market at Savills & Colliers International, and he is currently with the to-be-listed local real estate brokerage firm Centaline, catering to the luxurious market segment. Previously, he was the associate director of the private banking departments at Merrill Lynch, ING and Fortis.

## 1994

**MINTZ, JUDITH** (BFA Spec. Hons. Winters) worked as a shiatsu therapist and yoga instructor after graduating from York. She completed her master's degree in Canadian and indigenous studies at Trent University in 2011, through which she wrote her thesis, "Helpers and Demons: Binary Representations of Early 20th Century Midwives, Doctors, and Childbirth in Ami McKay's *The Birth House*." Upon completion of her MA, she was accepted into the PhD program in Gender, Feminist & Women's Studies at York University. Her current field work in the yoga world is fulfilling



**CARINCI, DAVID** (BA, LLB '95, LLM '00) is senior legal counsel at DMTI Spatial Inc., a Neopost Digital Company. He received the York Catholic District School Board 2014 Distinguished Alumni Award for volunteering and contributing to community in York Region. He and his wife Rosalba welcomed the birth of their daughter Ava Rose on April 22, 2015. Brother Dominic enjoys having his little sister cheer him on at his ball hockey and soccer games.

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**PURCELL, GENNET** (BA '96, McLaughlin) was recently appointed to serve as an administrative law judge for the Labor Standards Bureau in the Government of the District of Columbia's Department of Employment Services. She has a longstanding career in the financial services industry, serving previously as both deputy commissioner and commissioner of the Department of Insurance, Securities & Banking for the Government of the District of Columbia. She served as co-chair of the District of Columbia's Health Reform Implementation Committee, the four-member advisory body responsible for implementing the recent Patient Protection & Affordable Care Act in the District of Columbia, where she currently resides with her husband and three children.

her research plans. The tentative title of her dissertation is "Gender, Health and Cross-Cultural Consumption in North American Yoga Communities: A Post-Colonial Feminist Ethnography." She lives in Toronto with her daughters and partner, and continues to teach yoga part-time.



**OUANOUNOU, AVIV** (BSc Spec. Hons. Bethune) is an assistant professor of pharmacology in the Faculty of Dentistry at the

University of Toronto, from where he received both his DDS and MSc. He teaches pharmacology to undergraduate and graduate students and is also a clinical instructor. He has won several Dental Student's Society teaching awards, including the "Best Teacher of the Year Award" in 2013. He was also the recipient of the prestigious 2014-15 Dr. Bruce Hord Master Teacher Award for excellence in teaching. He is an author of many peer-reviewed articles in the fields of neurophysiology and neuropharmacology, he is a member of the American Academy of Pain Management and the American College of Clinical Pharmacology, and he also maintains a general private practice in Toronto.

## 1997

**CAPPADOCIA, FRANK** (BA Hons. Vanier) was recently promoted to associate vice-president of Lakehead University's Orillia campus, where he has served as assistant dean (student affairs) and associate vice-provost. He moved to Lakehead Orillia from York,

where he served as the past director of the Centre for Student Community & Leadership Development.

## 2001

**ANDREW, JILLIAN** (BA, BA Hons. '02, BEd '03) celebrates thousands of people's lives through her activist work as an educator, journalist/writer, public speaker and events creator. She is the co-founder of Canada's only national awards recognizing the work of body equity activists, the Body Confidence Canada Awards, and founder of the BITE ME! Toronto Int'l Body Image Film & Arts Festival, among many other body positivity initiatives. Visit [bodyconfidencecanadaawards.com](http://bodyconfidencecanadaawards.com) for more information.

## 2002

**LORICO, HAZEL** (BA Winters) is an actress, copywriter and published author of *Diary of an (Un)Glamorous Model: A Novel*. Currently in Toronto, she has appeared in numerous TV shows and commercials for RBC, Comwave and Nowhere to Hide (Investigation Discovery). She also graduated from the technical writing program at Humber College.

**MACHARIA, SARAH** (MA, PhD '08) works as a global coordinator of a transnational collaborative feminist research initiative on gender in the news media. Last November, she launched the report "Who Makes the News? The Global Media Monitoring Project 2015," which helped to start this season's BBC "100 Women" debate, "Is news failing women?" The findings were featured in numerous news

# Classes

media around the world, including the *New York Times*, the *Guardian*, the *Independent*, *Vice* and the *Huffington Post*.

## 2004

**BURT, MATTHEW** (BA Hons. Vanier) is the host of the Toronto-based weekly music podcast “Songs In Seven with Matt Burt.” He writes, records and releases a new, original rock song every seven days from his home studio. You can find the podcast on iTunes. He used to play in the band Avenue Road that won York’s Battle of the Bands competition in 2002.

**NGUYEN, THANH-PHUONG** (BA Spec. Hons. Calumet) received the Meritorious Service Medal from the governor general at Rideau Hall. He also recently joined the York University Alumni Association (YUAA) board.

## 2005

**NGUI, ANDREW** (BDes Spec. Hons. Winters) is the manager of entrepreneurial programs at MIT.

## 2010

**KESLICK, SHAUNNA-MARIE** (BA Hons.) works as the program manager of a pre-employment, literacy and basic skills program for marginalized women in downtown Toronto. Working with women who are homeless or precariously housed and often dealing with concurrent challenges such as addiction and mental health, she helps her clients develop self-advocacy skills.

## 2011

**PENNINGTON, KRISTEN** (BA Hons.) received her juris doctor from the University of Toronto and was called to the Ontario bar this year. She recently started her labour and employment law practice with the Toronto-based firm Grosman, Grosman & Gale. She remains passionate about human rights issues and was recently selected as a blogger for the Canadian Women’s Foundation.

## 2012

**ARAIN, AHAD** (BAS Spec. Hons. McLaughlin) found employment at a major software company in Silicon Valley and launched his own consulting practice since graduating from York.

## 2013

**KOULAKIAN, TANIA** (BA Hons. Calumet) is co-founder and chief communications officer of Ekko, the “World’s First Digital Time Capsule” and one of Canada’s leading startup companies.

## 2014

**TREMBLAY, DANIELLE** (BA Hons. Calumet) works as a residential counsellor with Oakdale Child & Family Services. She is also currently enrolled in Lakehead’s one-year Honours Bachelor of Social Work program, working alongside a women’s shelter for a community project and hoping to secure a student placement for next semester. She would love to see her fellow alumni again and hopes everyone out



**SETTE, RALPH** (BA, BA '09, Vanier) has been teaching with the Toronto Catholic District School Board as a secondary/high school teacher for six years. He received an award in 2014 for TSU Beginning Teacher of the Year. He also started a rugby program at Monsignor Percy Johnson Catholic Secondary School – they won two Tier 2 Championships in their first two years of the program. He got married in June 2015.

there is accomplishing great things and having the time of their lives.

**DE SOUSA, OSVALDO** (LLM) works at Harrison Pensa LLP in London, Ont., as a foreign legal consultant. He was admitted as a qualified arbitrator of the ADR Institute of Ontario and is also a board member of the Brazil-Canada Chamber of Commerce.

## 2015

**HA-REDEYE, OMAR** (LLM) received the OBA Foundation Award in November 2015 for exceptional contributions to the legal system and public legal education.

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