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AFF ORD ABLE

THE
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In cities such as Toronto and Vancouver, owning a house is becoming a fantasy for all but the wealthiest families. Better urban planning is part of the solution. Adjusting our expectations may be another

BY JOHN LORINC / ILLUSTRATIONS BY RAYMOND BIESINGER



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When Elena Yunusov, a digital marketer, and her husband, Pulat, a commercial litigator, bought a two-bedroom condo in Toronto's High Park neighbourhood several years ago, they were among very few owners in the building with a small child. The other occupants were mostly seniors, and they doted on the Yunusovs' infant daughter. Today, the couple also has a two-year-old son, and there are, Elena estimates, about a dozen other families with kids living there. ¶ Elena grew up in an apartment in a small city in Crimea, and doesn't yearn to own a house with a yard the way that many North Americans do. Yet she is keenly aware of the cons of her own family's condo: a tiny kitchen, a chronically congested hallway and the complex dance she performs each day to leave an eighth-floor apartment with kids and a stroller in tow.

Looking ahead, she knows her child will eventually need separate bedrooms, but soaring real estate costs make it difficult to envision a move. It's hardly an unusual story for apartment-dwelling families like the Yunusovs. As she observes, "A lot of people are stuck where they are, for better or for worse."

Across Toronto and other successful North American cities, homebuyers increasingly find themselves caught up in a market that feels like a historic point of inflection. In the postwar period, many working- and middle-class families bought homes in sprawling new suburbs consisting mainly of single-family houses with front and back yards. In recent years, however, a growing number of people with young kids have found themselves priced out of this market. The average selling price of a detached home in Toronto earlier this year was almost \$1.3 million — just shy of the record reached in 2014. According to *MoneySense* magazine, households earning more than \$200,000 a year can reasonably cover the mortgage payments on such a home.

The reality is that for a widening slice of society, including professionals ranging from nurses and accountants to teachers, the dream of owning a house with a yard has become unattainable. For some, like Giulio and Antonia Cescato, who have a two-year-old, the choice to buy a condo in Toronto's Regent Park flowed easily from their desire to live downtown. Access to cultural institutions, restaurants and transit "was important to us," says Giulio, an urban planner.

Others have found the experience of raising kids in condos to be constraining. In a recent City of Toronto study on diverse communities, Jane Farrow (BA 1989) is a public consultation expert, interviewed numerous young couples in condos who were juggling kids and careers. Some fret about eventually sharing their small apartments with teens. "There were people who felt they were without options," she says.

The big question hovering over this generational transition is all about city-building and whether increasingly dense metropolitan regions such as Toronto and Vancouver can figure out how to turn all those newly sprouted forests of highrises into

communities that are both affordable *and* appealing to the wide range of people who call these cities home.

The wrinkle in this evolving story is that many developers still balk at designing buildings geared to people with kids. Marketing materials for most condos feature seductive images of young people lounging around a rooftop terrace; luxurious lobbies; and chic interiors looking out onto a glittering skyline. Children rarely appear in this fantasy world.

Farrow, who has worked closely with the City of Toronto on urban planning issues, says some developers still promote their projects as “adult communities,” with amenities such as gyms and party rooms. “The marketing companies have a lot of power in creating and maintaining stereotypes about who lives in these buildings,” she says.

Richard Florida, an urban theorist and director of cities at U of T’s Martin Prosperity Institute, is critical of how Toronto has allowed the construction of a kind of vertical monoculture. “We’re building a lot, but we’re building all wrong,” he says. “We need to build more affordable housing.” Fast-growing cities such as Toronto are experiencing what Florida describes as a “phase shift,” transitioning from ground-level residential communities to high-density ones that are closer to transit, aren’t as car dependent and use infrastructure, such as roads and sewers, more efficiently. But he says the form and planning in Toronto leaves much to be desired when it comes to creating vertical communities “that work for everyone,” especially seniors, kids and families with modest incomes.

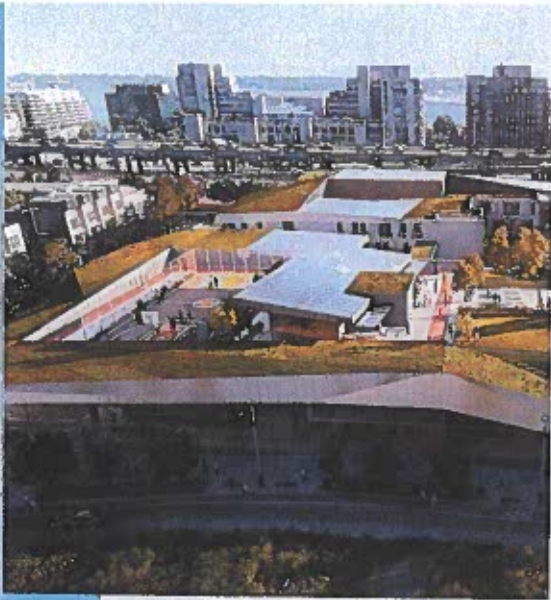
At the macro level, Florida argues, Toronto simply needs to be investing more in its social and community infrastructure – schools, transit, cycling tracks and public spaces. “The big thing is that we have to grow up. The property tax rates are ludicrously low.” What’s more, affordable housing policies – such as those requiring developers to set aside a certain number of less expensive units in their building – aren’t sufficient, he adds. Toronto lags behind what’s happening in other large, expensive cities such as New York, where Mayor Bill de Blasio’s administration has embarked on an aggressive strategy to build 300,000 new affordable homes – virtually all of them



apartments – by 2026. Even accounting for scale, Toronto’s goals are modest. Mayoral challenger Jennifer Keesmaat has pledged to add 100,000 “truly” affordable housing units within a decade. Mayor John Tory promises 40,000 over 12 years.

The challenge of creating highrise neighbourhoods with schools, parks and community centres also entails the formulation of a more comprehensive planning approach. Last fall, the city produced a groundbreaking study entitled “Growing Up: Planning for Children in New Vertical Communities” that offered detailed design guidelines. Highrise communities shouldn’t be planned any differently than traditional neighbourhoods of single-family homes, observes Emily Reisman (MSc in Planning, 2004), a consultant who worked on the report. They should include different home sizes, a mix of rental and for-sale units, public spaces, community amenities and retail stores, she adds. “These principles don’t get thrown out the window when we look at the vertical context.”

Toronto in recent years has also embarked on far-ranging planning exercises in high-density areas where a lot of development is happening, such as in the downtown core and around Yonge and Eglinton. The goal, in part, is to create better pedestrian experiences and to direct investment into community amenities – especially additional public spaces, such as the proposed “decked” park over the railway next to CityPlace. With the proliferation of small apartments, the public realm becomes increasingly critical, comments Matti Siemiatycki, a professor of geography and planning and the interim director of U of T’s School of Cities. “[Residents] are using the city as their



A BETTER BLEND

Allowing for more mixed-use buildings would bring vital community resources closer to the people who use them

In cities around the world, many apartment buildings follow a standard template: residential above, retail at street level. Toronto was no exception.

But in the past decade, says Matti Siemiatycki, a professor of geography and planning and the interim director of U of T's School of Cities, Toronto has seen a growing number of innovative mixed-use projects that include non-profit organizations, daycare centres and cultural facilities. His research team has identified 60 such buildings, including a midtown condo built atop North Toronto Collegiate Institute and a Leslieville condo that incorporates a shelter for families and women. "Toronto is leading the way

with the radical mixing of uses," he says. "It's not done abroad nearly to the extent that it's done here."

While these one-off projects tend to be difficult to execute, a growing number of builders and institutions, including non-profits such as the YMCA and the Toronto District School Board, have developed the expertise to see them through to completion. "Every tall building should have some kind of public use in it," Siemiatycki says, adding that such combinations allow the community to benefit from the wealth generated by highrise development projects. —John Lorinc

Canoe Landing Centre in Toronto's CityPlace will include two elementary schools and a child-care facility

living room and the apartment for storage and as an address."

Market forces, however, remain a formidable challenge to young families who want to buy into vertical communities. Small apartments have become sought-after investment vehicles, frequently rented either to longer-term tenants or as Airbnb units. And developers have commonly resisted building more family-friendly two- and three-bedroom apartments, insisting they are difficult to sell.

But there's some evidence that a growing number of builders are taking this step, perhaps sensing the sort of demand expressed by couples such as the Yunusovs and the Cescatos. "The market is out there," says Reisman. She notes the Growing Up study found that families prefer to have apartments near street level, and some developers are clustering larger units on these lower floors. Also, compared to units in the sky, lower-floor condos typically sell for less, and thus are more attractive to families with kids and lots of expenses.

Planners understand that larger apartments can't somehow be reserved just for buyers with kids or teens. But Annelly Zonena (MSc in Planning, 2006), a senior planner with the City of Toronto, points out that the city's long-term goal is to ensure that a full range of housing types, at different sizes and prices, are built. According to the planning department's research, 23 per cent of the city's households have four or more people, but since 2011, less than 10 per cent of units in new buildings of five storeys or more can properly accommodate families of that size. "We want to ensure that buildings have a variety of units," she says.

It's not just the apartments themselves that can be a problem. "Amenity spaces are practically non-existent for families," observes Farrow, who notes that many condos offer use-specific common areas, such as exercise rooms, where kids aren't welcome. "Parents can be subject to a great deal of judgment and negative attitude from fellow tenants." Most buildings also lack spaces where children can rehearse musical instruments or just make noise, as kids do. Giulio Cescato points to a fourth-floor outdoor terrace in his building, which has a rapidly growing cohort of kids. The space includes a quiet "conversation area" that is rarely used. "If there was a play structure instead of stone benches, the terrace could get a lot more traffic."

There are plenty of examples underscoring the mismatch between what's designed and how families actually live in these buildings. Reisman recalls noticing in her condo almost a metre of space between the tops of the closets and the ceiling that could have been pressed into service as additional storage.

In some cases, residents are pushing for changes in how common areas are used. Reisman describes how parents in one building identified an abandoned storage area and pitched the condo board with a plan to convert it into a kid zone where they could leave bulky shared toys. "They [said] to the condo board that there are a lot of families with kids living here," she says. "That group of families came together and were able to make the condo lifestyle work for them."

With other locales, architects are attempting to address these design failings proactively. Drew Sinclair (MARCH 2007), a partner with SvN Architects and Planners, points to a three-building complex his firm is designing in Etobicoke. It will provide affordable rentals, assisted living apartments for seniors and

AN ELUSIVE DREAM

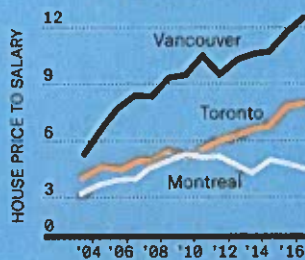
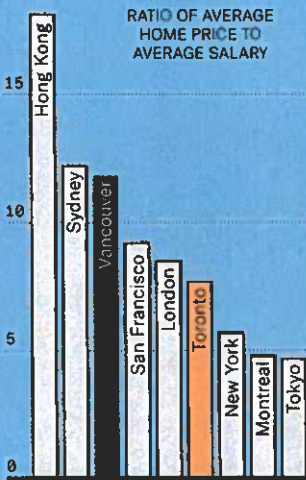
Houses in Toronto and Vancouver now cost more than the average family can afford. Renters don't have it much better



TORONTO IS LESS AFFORDABLE THAN TOKYO TO BUY A HOME

The average Toronto house costs eight times an average salary. In Vancouver, it's 12 times

TORONTO AND VANCOUVER HOUSE PRICES HAVE DOUBLED RELATIVE TO INCOME SINCE 2004



\$200,660

Annual salary you need to afford a detached house in Toronto

“Toronto faces a crisis of housing affordability that threatens the well-being of its people and their ability to achieve the Canadian Dream”

— Prof. Richard Florida, of U of T's Martin Prosperity Institute

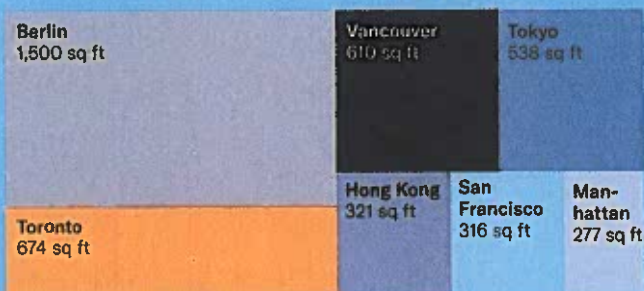
IT'S TOUGH FOR RENTERS, TOO

The average monthly cost of a one-bedroom apartment in Toronto and Vancouver is high, even compared to other global cities

\$2,700 Tokyo	\$2,650 Hong Kong	\$2,020 Toronto	\$2,000 Vancouver	\$1,310 Montreal
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BUT YOUR MONEY GOES FURTHER IN CANADA THAN ELSEWHERE

Here's what \$2,000 a month gets you in...



family-style condos. The design includes a large, open common space linking the three buildings, which contains amenities meant to encourage social interaction, such as a tool-sharing area and a play zone with rubberized flooring. On the grounds will be small vegetable plots and a teaching garden for children. “The landscape design,” says Sinclair, “is for everyone.”

In the Yunusovs' condo, the evolution to a multi-generational community is proceeding apace. A common room once used mainly for seniors' yoga classes and bridge sessions has been fitted with modern, moveable furniture so the space can be used for birthday parties. And the building's library, which Elena describes as “much loved,” is also changing. “Now,” she says, “there's a kids' books section, which didn't exist before.”

So while the couple focuses on the practical business of raising two children instead of fretting about their longer-term space needs, one point seems certain: that their building, over time, will become home to more and more Toronto kids. “Where else would families go?” Elena muses. “Everyone's going to go vertical.” ■



ONE SIZE DOES NOT FIT ALL

A new kind of condo that can grow or shrink with its owner's needs

Architect Drew Sinclair (MArch 2007) is working on a project in Hamilton, Ontario, that pushes the notion of flexibility in apartment design. In most condos, units are separated by load-bearing concrete walls. The Hamilton venture consists of “lots,” or room-sized blocks that buyers can assemble into apartments ranging from 250 to 1,000 square feet in size. The building uses columns as supports rather than walls. Pipes, drains and vents are situated along corridors: this allows each apartment's interior walls to be easily removed. Owners can expand a unit by purchasing an adjacent lot from a neighbour who simultaneously wants to downsize, explains Sinclair, noting that New York City co-ops have evolved like this for decades. “It's a plug and play idea. Adaptability is baked into the design.” —John Lorinc

THE
CITIES
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ACCESSIBLE

Prof. Ron Buliung was already studying urban mobility when he learned his young daughter would need a wheelchair. His family's experiences highlight the unnecessary obstacles that people with disabilities encounter every day

BY RON BULIUNG, AS TOLD TO MARCIA KAYE / PHOTOGRAPHS BY ANGELA LEWIS

Prof. Ron Gulijung's daughter Aaha prompted him to ask: What does a city without barriers look like?



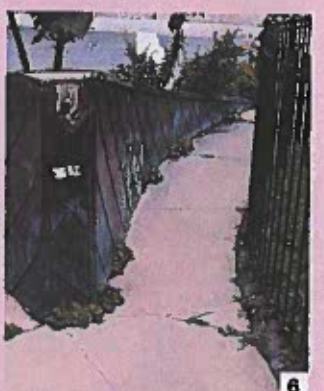
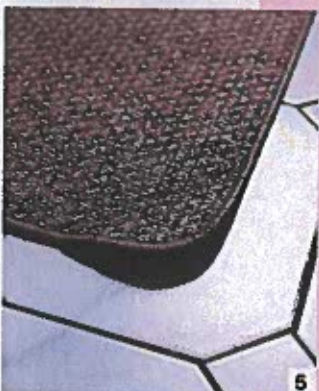
THE BIRTH OF HIS THIRD DAUGHTER, ASHA,

profoundly changed Ron Buliung's life and work. Asha, now seven, was born with spinal muscular atrophy type 2, a genetic neuromuscular disease that causes progressive muscle weakness and requires her to use a wheelchair. As a geography professor at U of T Mississauga, Buliung was already studying transportation issues in the Toronto area and beyond. But as Asha's dad, he suddenly became more aware of how our urban environments create unnecessary barriers for people with mobility challenges. Here he talks about how Asha has been the motivating force in reshaping his perspective and his research.

Before Asha was born, I was naive about the broader set of experiences that can happen in families around mobility. That changed following Asha's diagnosis, when we were told she'd probably never walk. My wife and I left the clinic, with Asha in her stroller, and for me it was like taking off one pair of glasses and putting on another. All I could see were barriers everywhere: curbs, step-ups into stores, traffic, streetcar tracks. And I realized that disability is not just produced in the body. There are also the disabling aspects of the environment around us.

Asha uses a 300-pound power wheelchair and we have a rear-loading disability van. To make it safer and more accessible to transfer Asha from our house to the van or to a school bus, we had to negotiate with the City of Toronto to have our front yard redeveloped, at our expense. It took two years—two years!—to get a license for front pad parking on our own property. Even on the city's application form to change your front yard parking, there's nothing that talks about disability. That's a problem.

Asha sings in the Young Voices Toronto children's choir and they do performances at Trinity-St. Paul's



United Church on Bloor Street West. When we took her recently to the dress rehearsal, there was a guy without a permit sitting in his car in the disability parking space. There's barrier number one. We had to ask him very nicely to leave, and you know that conversation could have gone one of two ways. Fortunately he moved on and we parked there. But then I had to unload Asha. So she backs out of the van, then she has to drive a short distance against the flow of traffic, then she has to cross the bike lane against the oncoming bikes. It's hair-raising!

I'm an avid cyclist myself and I like that the city is having a conversation about drivers and cyclists sharing road space. But I also look at that process from the perspective of a transportation researcher who has a

DISABLING THINGS

Sure, stairs are impossible for someone in a wheelchair. But what about all the less obvious obstacles?

1—After garbage collection, navigating a wheelchair along the sidewalk can be impossible. The city owns part of everybody's frontage, so they could cut a piece into the property and have a pad put there for the cans, says Ron Buliung. "If we made that change, anyone with a walker, a cane or pushing a stroller wouldn't be further disabled."

2—The flaw here, says Buliung, is not with Stopgap, the organization that makes the portable ramps. The real problem is in identifying who's responsible for ensuring that there's no step from the sidewalk to the storefront in the first place. Whose responsibility is it to correct environments that straddle the private and public spheres? And how do we make change happen?

3—The button that can help may become the button that doesn't, particularly when placed at an inappropriate height, or when it requires excessive force or fails to work at all. We live in a touchscreen world, says Buliung. "We can do better."

4—Broken sidewalks, cracked pavement and uneven surfaces pose a risk to people of all ages using mobility aids. In this case, the temporary fix may have made things worse, says Buliung, by further altering the elevation of the fractured surface.

5—Any loose mat or piece of carpeting can pose a hazard for a motorized wheelchair, says Buliung. The material can get bound up in the wheels and is impossible for a child to remove. (It's difficult for an adult.) Obstacles can be almost invisible, he says, yet easily fixed in some cases.

6—Narrow walkways place a burden on wheelchair users, who must question if the space is passable, and navigate in the presence of other pedestrians. Tight, crowded spaces can also pose a danger to children with certain bone diseases, who could suffer a fracture if they're inadvertently pushed or knocked over by other pedestrians.

child with a mobility challenge. In my graduate seminar last year, we considered what a bicycle network looks like when it's planned inclusively; we concluded that the city could do a better job. There are ways to use design – road geometry, surface texture and paint, signage, curb cuts and the placement of parking close to destinations – to reduce the risk of collision or conflict between cyclists and others trying to cross bike lanes.

In her power wheelchair, Asha is legally considered a pedestrian. She even uses words like "walking" and "running" when she's driving her power chair. That's fascinating to me because we have ideas about what walking is, and she challenges those ideas entirely. When she "runs," she's going full speed in her chair. I can't keep up with her.

In one research project, we asked children with mobility challenges to take photos of what they saw as barriers in their environment that make it hard for them to get around (see "Disabling Things," left). Asha took a photo of a carpet, which sometimes gets caught up in her wheels. So it doesn't have to be a massive change to make a meaningful difference.

Other challenges are more difficult to address. My daughter Meera, who's 10, goes to a school that's 450 metres from our home, but it's totally inaccessible. Asha's school is more than three kilometres away. Meera is doing band and choir and a range of things that our family goes to. The gym in that school is upstairs and there's no elevator, so we carry Asha in her stroller up two flights of stairs. We can do that maybe another year. It's crazy. It's also not totally safe.

I haven't come across any city that's an accessibility utopia, but I see interesting examples in different cities. At the National Children's Forest in California, thousands of feet up, there's a paved hiking trail. If you were talking to a 1980s version of me, with long hair and super-fixated on the environment, I would have been opposed to a paved hiking path at the top of a mountain. But now, wow! This was amazing. It gave us an opportunity as a family to go for a hike.

In the summer, Asha went to a day camp at the Royal Ontario Museum. I would have brought her there on the subway but High Park station, where we live, and Museum station don't have lifts. If a TTC station is accessible – and that's a big *if* – could Asha even press the elevator button? Probably not, especially if it's high up, because she's profoundly weak and it takes a lot of force to press a tiny button. We live in a world of touch technology, so why don't we have buttons like that?

Barriers can be things we see, but they can be unseen as well. At ROM camp, Asha's group would eat lunch down in the depression near Philosopher's Walk. But it was too dangerous for Asha to drive her chair down there, so she had to eat at the top with the younger children. We wanted her to eat with her peers, so we were thinking: we can either figure out how to get Asha safely down there, or maybe we could suggest to the counsellors that the children come up and eat with her. It was a simple way of turning that on its head. It's an uphill battle – literally!

My wife is a physician, and we realize we have massive amounts of privilege in terms of income, flexibility in our schedules and access to resources. But that also brings responsibility, so how do we use that privilege and access? For me, it's partially about bringing these experiences into my research and teaching. What concerns me is, what's happening to another Asha



who doesn't have this web of privilege and resources around her? So now every time I go out and work with an institution on transportation, I need to be the person in the room who raises questions around accessibility. I can get kind of annoying, which is good.

Broadly speaking, my research asks the question: What does a city without barriers look like and how do we get there? I have some upcoming research that will look at inclusive play in childhood; my family has experienced the disappointment of inaccessible playgrounds. And I'm also very interested in working with teenage youth with disabilities – that is, people who are gradually aging out of pediatric systems of care and headed toward the greater complexity and resource challenges in adult health care. Families with older children have told me the transitional experiences are hell.

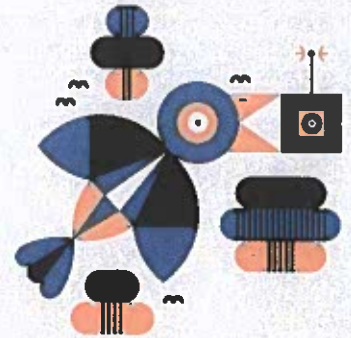
Asha herself gives me hope. I can fight and advocate for change, but I don't want to lose sight of the amazing, intelligent, powerful person right in front of me. One morning when I dropped her off at the ROM camp, the other kids were a little farther ahead and the door closed and she couldn't press the button to get in. So she just used her voice and yelled and someone came and opened the door. She figured it out.

I'm hopeful that my teaching and research will encourage the next generation of scholars and planners to put accessibility higher up on the laundry list of things we consider when we design and build cities. Also, for those of us who don't have a disability now, that can change at any time. I think that's something people forget. ■

Ron Buliung is a professor in the department of geography and programs in environment at U of T Mississauga; he is also the associate chair of the graduate department of geography and planning at the University of Toronto.

↑
An elevator enables Asha to move independently between her home's first floor and basement

What makes a city "smart"? For a tech fi such as Microsoft or IBM, it's about how collect and use urban data to make smart decisions, says Mark Fox, a U of T profes of urban systems engineering. "But from social sciences perspective, it's more abo a city's ability to use the knowledge of its employees, citizens and companies to do things better." Mixing data with human expertise isn't simple, but if it's done well goes a long way toward turning the ideal of smart city planning into reality.



Improved Air Quality in Beirut

You don't have to spend much time in Beirut to know that air pollution is a problem. But just how bad is it – and what's the solution?

Marianne Hatzopoulou, a professor in U of T's department of civil and mineral engineering who holds the Canada Research Chair in Transportation and Air Quality, has been working with a professor from the American University of Beirut to study air quality across the Lebanese capital. She and Prof. Ibrahim Alameddine are using low-cost sensors to measure carbon monoxide, nitrogen dioxide, coarse particulate matter and other pollutants at nearly 70 sites across the city.

They match their data with traffic ma housing density, location of factories and power stations, and other local information to ident air pollution hot spo and where people are most at risk. The goal is to use the information to devel policies that will lea to better health for t city's residents.

For example, policymakers might change building cod in high-pollution are to require greater attention to indoor a quality or enact stric regulations on vehic emissions.

"Transportation planning is not just about congestion or traffic, but also about air-pollution exposure and quality of health," she says. —Patchen Barsz

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THE
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To avoid catastrophic climate warming, almost everything about our cities will have to change—and quite soon. But how?

BY JOE CASTALDO / PHOTOGRAPHS BY MARK SOMMERFELD



Students in physical and environmental sciences at U of T Scarborough tend to a garden atop the Instructional Centre. Each year, the plot yields as many as 30 different crops – from corn and tomatoes to basil and cardamom. The Sustainability Office uses some of the produce in its Food Discussion Cafés, where participants learn more about the origins of the food they're preparing

E

very day, we perform countless actions without thinking. We don't decide to brush our teeth in the morning; it's just something we do. Likewise, we don't debate each day whether to take the car, bike or bus to work, but stick with what's most convenient. John Robinson, a professor at U of T's Munk School of Global Affairs and Public Policy, has been examining how to make sustainable actions just as automatic and unconscious. Embedding sustainability in our everyday behaviour will be key to lowering carbon emissions and addressing the threats posed by global warming. "If we don't even think about what we're doing, then we've succeeded," Robinson says. ¶ The problem is that one of the tactics we've been using to shift people's behaviour is all wrong.

Reducing emissions to a globally sustainable level will require an enormous change in nearly everything we do. Many cities have responded to the challenge by setting aggressive targets. Toronto's climate action plan, TransformTO, calls for cuts in greenhouse gas emissions of 80 per cent from 1990 levels by 2050. To get there, the city will need to embrace a green revolution. It will have to massively retrofit existing structures. It will have to boost the construction of buildings that use solar, geothermal or wind sources to produce as much energy as they consume (or generate even more energy than they consume). It will have to find ways to dramatically reduce vehicle emissions and to produce less waste.

To meet these sustainability goals, government officials and policy-makers can choose from a variety of strategies. These include new regulations (such as raising fuel economy standards for vehicles), taxes (on carbon or gas) and infrastructure (such as bike lanes and public transit). Policy-makers also often try to convince citizens to change their behaviour – typically by providing people with facts and figures on, say, the benefits of recycling or the harm done by gas-guzzling SUVs. The expectation is that after being equipped with the "correct" information, people will alter their ways. But research shows this hasn't worked, Robinson says. Neither have nudges or various incentives.

Instead, Robinson, who is also appointed to U of T's School of Environment, says we need to focus less on the individual and create entirely new social norms. For example, for city-dwellers, cycling or taking public transit to work needs to become "just something we do." This approach is derived from social practice theory, which suggests that individual actions are determined largely by group norms and behaviour. (The theory has been around since the 1970s, but has been applied to the environmental realm only in the past decade or so.)

Shifting group behaviour involves taking a hard look at many factors that influence what we do. Even our immediate surroundings can have a big impact. The Centre for Interactive Research on Sustainability at the University of British Columbia was designed to be a very environmentally friendly building. In 2016, Sylvia Coleman – one of Robinson's PhD students – examined how the building affected the behaviour of those who work there. Through interviews and surveys, some denizens spoke of reducing

Efforts continue at each of U of T's three campuses to reduce their greenhouse gas footprint, save on energy bills and put money back into student programs.

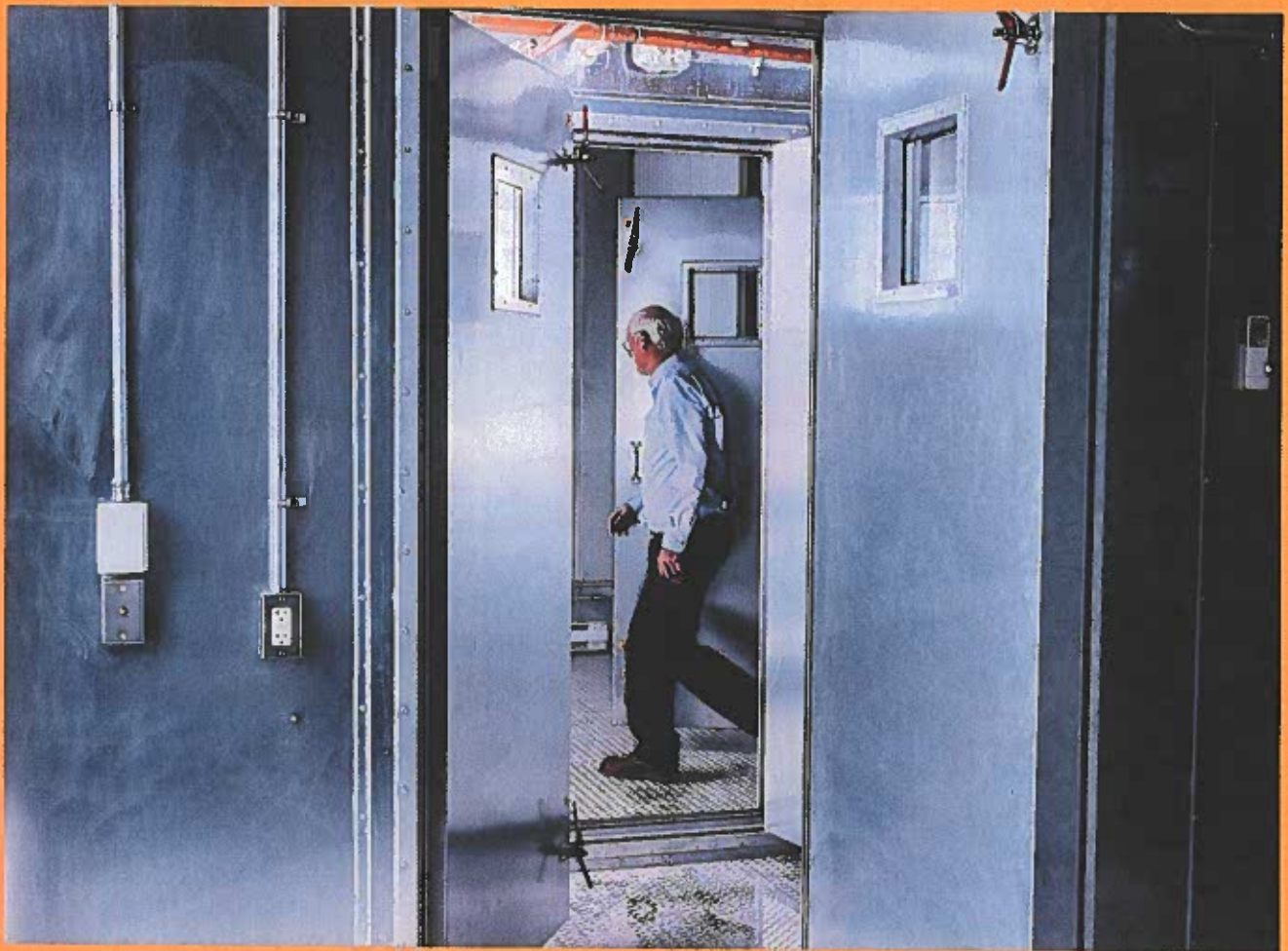
1—This LED light in the Dalla Lana School of Public Health dims to 20 per cent when the area is not in use. It is one of 100,000 installed at U of T over the past two years

2—Ensuring that each of the 1,100 fume hoods used in laboratories on the downtown campus are closed after use could save \$100,000 a year

3—U of T generates solar energy at all three campuses. This array, atop the Toronto Pan Am Sports Centre at U of T Scarborough, reduces the building's energy use by 10 to 15 per cent

4—The new Myhal Centre for Engineering Innovation and Entrepreneurship uses specially constructed windows to reduce the cost of heating in winter and cooling in summer





More than a fifth of Canada's greenhouse gas emissions come from buildings, so making changes to how we design, heat and cool these structures will be important as we aim to reduce our carbon footprint.

The Twin Suites Modular Lab, perched atop U of T's Sanford Fleming Building, holds two identical, reconfigurable rooms where U of T researchers are investigating new building materials.

Having two identical pods is key, explains Prof. Mariahne Touchie of civil and mineral engineering: One room provides the baseline measurements, while the

other is the guinea pig. To test a new kind of insulation, the team would install it in just one of the units, then measure both to detect how that material affects indoor temperature, energy use, air quality and other factors.

Until now, this type of research has had to take place in people's homes, which is both costly and time-consuming. The new labs will allow the research team, which includes professors Jeffrey Siegel and Kim Pressnail (above) of civil and mineral engineering, to perform tests quicker and more accurately, and enable them to do longer-term studies.—Graham F. Scott

paper use and forgoing disposable plates and cutlery in the cafeteria. A different study found that people recycled more in the centre than in another campus building. (The hitch is that participants made more mistakes when sorting waste.) Simply working in a sustainable building, according to the research, was enough to shift behaviour and create new social norms. "If people know this building is supposed to be highly sustainable, that creates an awareness and it does have an impact on what people are doing," Coleman says.

Norms don't solely exist within four walls, of course, but are entrenched in entire industries, including the building sector. Robinson estimates that only a small percentage of new structures each year qualify as sustainable, even though the benefits are well understood. In construction, the barriers to creating green buildings aren't primarily technical or economic. Instead, the industry has fallen into a set of norms and habits that were developed before sustainability was an issue. This makes change difficult. "We have to get into the guts and examine the rules that govern what we actually do," Robinson says.

The good news is that change is possible. These days, Copenhagen is thought of as a bicycling utopia, where roughly half the population cycles to work or school. But the city actually removed bike lanes in the 1960s and '70s before planners reversed course and doubled the length of the cycling network. With TransformTO, Toronto is hoping for a similar outcome. The plan calls for 75 per cent of trips less than five kilometres to be taken by foot or bike by 2050. Today, more than half of these short trips take place in the inner suburbs, such as Scarborough and North York, where cycling is barely a consideration. "Even if everybody in downtown Toronto bikes and walks, and the outer council areas don't change their transportation behaviour, Toronto can't meet its 2050 goals," says Trudy Ledsham, a cycling researcher and PhD candidate in planning at U of T.

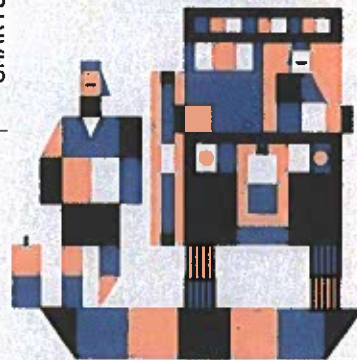
Building protected bike lanes would go a long way to normalize cycling and increase rider safety. Still, Ledsham says many smaller steps can also be taken. She helped develop a project called Scarborough Cycles to encourage biking in the area. Since 2016, Scarborough Cycles has established three bike hubs that offer repair services and training, as well as a mentorship program for newcomers. The hubs have received more than 2,800 visits. "It's not a sea change, but change has begun," Ledsham says.

Robinson acknowledges that creating new social norms is a vital ingredient in achieving the emissions cuts we need but alone won't be enough. A carbon tax, or a cap-and-trade regime, such as the one that Ontario's government is scrapping, are essential components. In fact, the effects of carbon pricing and new social norms can reinforce one another: people may respond more positively to a carbon tax if sustainable

ILLUSTRATION BY RAYMOND BIESINGER

SMARTER CITIES #2

Better Transit for Montevideo



Montevideo, Uruguay, is a city of more than a million people, and a growing commercial centre in South America. But its future success will depend at least in part on developing a modern, efficient public transit system.

Eric Miller, a U of T professor in civil and mineral engineering, is working with the city to eventually create simulations that will help planners decide where to place bus lines, when and how to add rapid transit such as express buses or light rail - and even how much to charge for tickets.

His detailed simulations require extensive data, which Montevideo happens to have. The city uses smart-card payments for transit, and has a high penetration of cellphone usage, which can help track how people move around the city.

Miller, who is director of U of T's Transportation Research Institute, has done simulations of Toronto and other Canadian cities, but he cautions against assuming that what works in Canada will succeed elsewhere. Though his work is data-driven, his research also involves learning about local politics, culture, history and geography to ensure he's developing smart solutions that will work for that city.

—Patchen Barsz



Over the past seven years, U of T's Green Roof Innovation Testing (GRIT) Lab at 230 College St. has found that green roofs can retain up to 70 per cent of rainwater, making them a crucial tool in reducing urban flooding. Their surface is also two degrees cooler, on average, than the air temperature - and as much as 50 degrees cooler than conventional rooftops. A second facility atop the Daniels Faculty at 1 Spadina Cres. (above) will investigate the effect of using surface water runoff, which contains urban pollutants, to irrigate green roofs



1



2

1—David Oliver helps keep cyclists moving at Bikechain, a not-for-profit group on St. George Campus that fixes bikes and teaches people how to do their own repairs. More than 25,000 cyclists have used the service since it opened a decade ago

2—Michael Muir (left) and Clement Chow of the U of T Beekeeping Education Enthusiast Society (B.E.E.S.) inspect a hive on the roof of the Faculty Club. The student society formed in 2008 to promote urban beekeeping

practices have already started to become part of daily life, Robinson says.

Any large-scale change can't happen without political will. That realm, too, is rife with long-standing norms that result in unsustainable outcomes. Take bike lanes again. Building one is considered a new cost, sparking tortured debate at city council over funding. But cash for road repair is a normal feature of municipal spending. "We live in these systems where we fall back into the old way of doing things, because they're embedded in the institutions," Robinson says.

Seen from that perspective, solving our cities' environmental challenges is not merely a matter of technological improvements or emissions targets, but countless small changes that, taken together, can yield massive results. ■

SMARTER CITIES #3

Sidewalk's Lab for Urban Innovation



Sidewalk Labs, a subsidiary of Google's parent company, Alphabet, is working with Waterfront Toronto to build an experimental neighbourhood that incorporates many elements of smart-city planning.

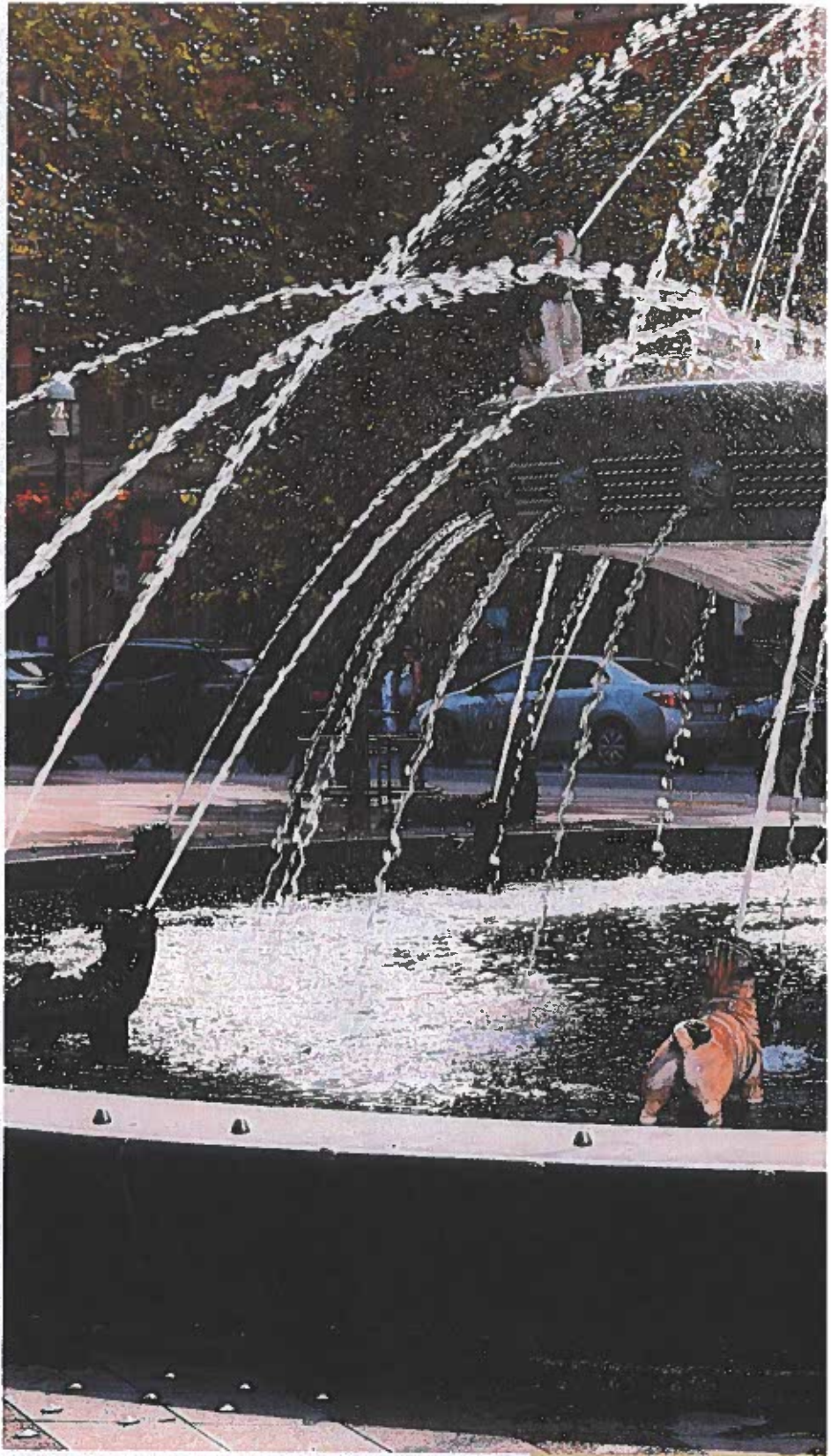
Nearly five hectares of industrial land on Toronto's eastern waterfront will become a new community served by autonomous transport, buildings that can be quickly reconfigured for different uses, robot trash pickup and an ultra-efficient energy grid powered by renewable electricity. The project has attracted the attention of many U of T professors who are interested in contributing ideas and in studying the results. Initial plans are expected to be approved by the end of 2018.

The project has generated controversy, with some people uneasy about the types and amount of data Sidewalk Labs will collect. But Mark Fox, a professor of urban systems engineering at U of T, is still excited about the plan. "What is really smart here is they identified these great ideas that have been around for a while and brought them all together in this one location. It's an amazing experiment."

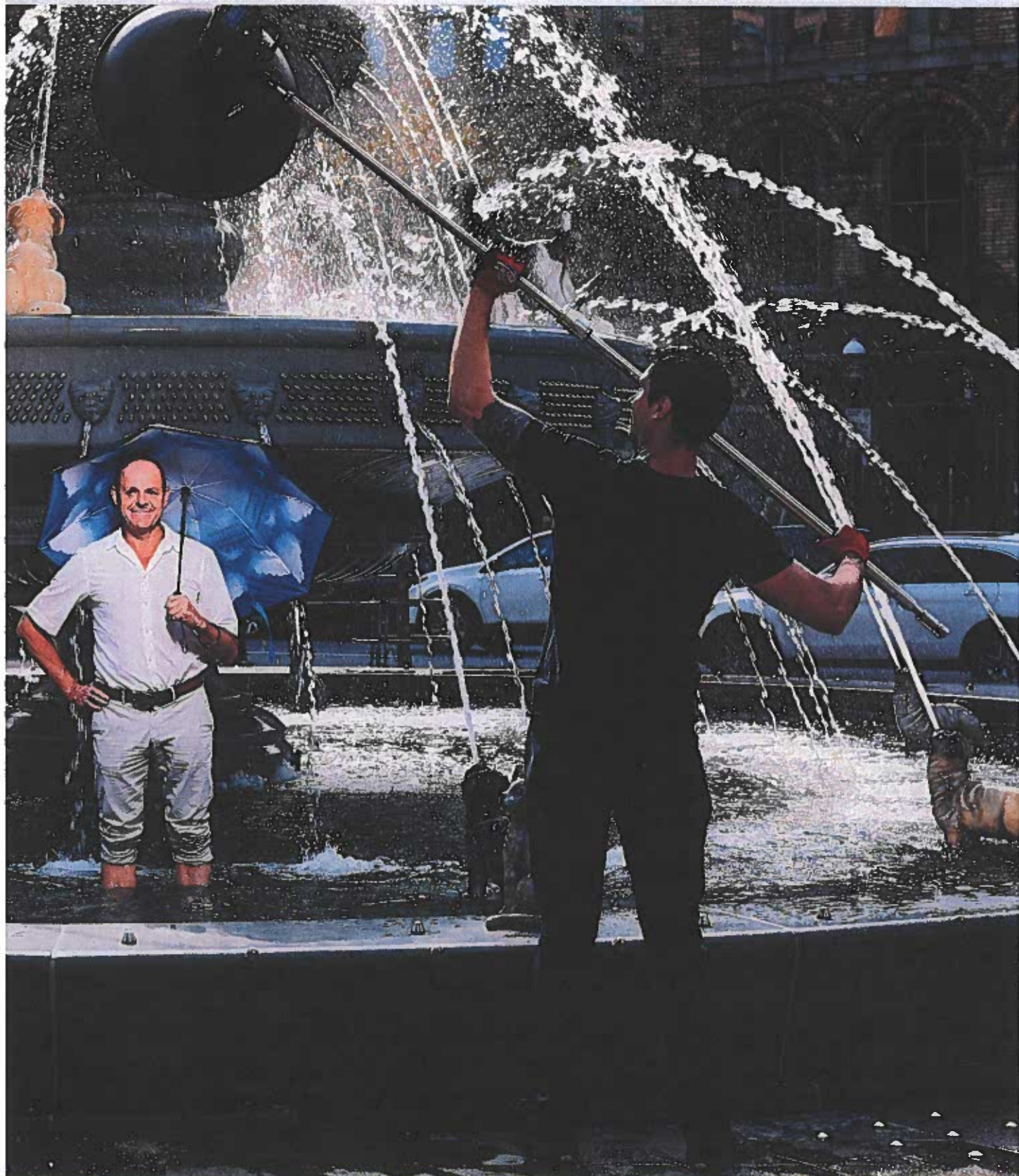
—Patchen Barss

MORE FUN

THE
CITIES
WE NEED
ARE...



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Claude Cormier
cools his dogs
in his recently
designed creation
at Toronto's
Berczy Park



Why cities can't get enough of
Claude Cormier's playful designs

BY JASON McBRIDE / PHOTOGRAPHS BY JAIME HOGGE

WHEN CLAUDE CORMIER WAS ASKED TO REDESIGN BERCZY PARK, A COMPACT WEDGE OF GREEN

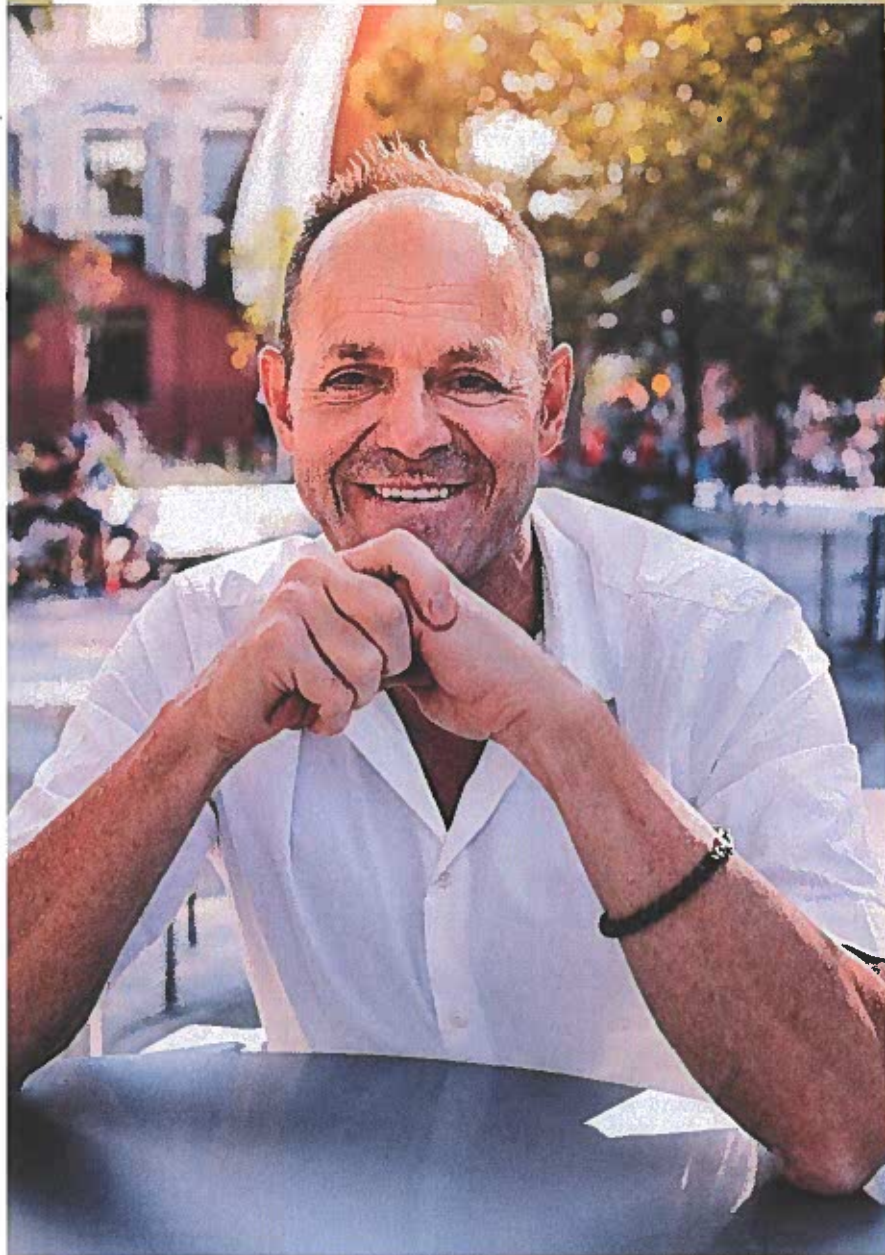
space in Toronto's St. Lawrence Market neighbourhood, there were several competing interests he and his team of landscape architects needed to please: young families, dog owners, office workers looking for a shady place to eat lunch. Five years later, Cormier (BLA 1986) stands and marvels. It's a cool and cloudy June day, but the park is thronged with mothers and strollers, picnickers and selfie-taking tourists beside a fountain adorned with dozens of cast-iron, water-spouting dogs. Real puppies nose around a patch of gravel designed just for them. Young

American elm trees stand sentry, adding harmony to the bustle. "The park has become a magnet," Cormier says proudly, spreading his arms as if to embrace it all.

If you've spent any time in Toronto and Montreal recently, you've likely spent some time in Cormier's embrace. He's one of the country's best-known landscape architects. His firm, Claude Cormier et Associés, is as celebrated for the originality and whimsy of its work as it is for its resourcefulness. That work, ranging from pocket parks to innovative installations, is spread across Ontario and Quebec and, more recently, Chicago and Houston: places such as Sugar Beach, with its bubblegum-pink umbrellas, and the surprisingly lush gardens of Evergreen Brick Works. In some cases, these creations are subtle; others are as pleasantly in-your-face as a wedding cake. A graduate of U of T and Guelph and Harvard universities, Cormier opened his Montreal-based firm in 1995 and currently has 50 different projects on the go. In 2015, Phaidon Press included the company in a coffee-table book devoted to the world's 30 most renowned landscape architects.

In person, Cormier embodies some of the best qualities of his work – he's friendly, endearing, slightly goofy, brimming with intellectual and physical energy. He's dressed, as he often is, like a darkening cloud: billowy white shirt, stone-grey trousers, black brogues. He pulls a small suitcase behind him, an accessory he's rarely without. Though he still lives in Montreal, he's in Toronto (and elsewhere) several times a month to pitch, plan and work on projects. "I like construction sites," he says. "I love to see things come together."

Cormier's popularity is both surprising and not. With cities such as Toronto growing increasingly crowded and former industrial metropolises such as Pittsburgh having reinvented themselves as beacons for the creative class, urban public space has become both more precious and more complicated. "Living spaces are getting smaller," says Gregg Lintern (BA 1984, Innis), the City of Toronto's chief planner, "and even in a winter city, people like to experience the outdoors and being in public space – for health reasons, for social reasons. Many years ago, you'd have everybody over for coffee; now everybody's going out to the coffee shop or café." Public parks, specifically, are no longer seen as merely places to picnic or play Frisbee; to developers, government officials and



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"We have a certain level of idea we fight for, and we don't give up"

Residents alike they are catalysts for community and economic development.

From the High Line in New York City to Toronto's recently opened Bentway, innovative, adaptive, strategically designed parks – situated in unusual nooks of both congested and disused neighbourhoods – are built to bring people together, jump-start local business and boost tourism. The High Line, initially conceived to resuscitate New York immediately after the uncertainty and turmoil of 9-11, has been a financial and tourism miracle: in 2016, nearly eight

million people visited (more than any other destination in the city). And the condos, restaurants and museums that have flourished alongside it will generate about a billion dollars in tax revenue over the next 20 years. Less quantifiably, such public spaces also make city-dwellers happier and urban landscapes more enchanting. As Jake Tobin Garrett (MSc in Planning, 2012), a manager at the Toronto-based charity Park People, says of Berczy Park, "Cities are for living in, but they're also for having fun and shedding the stress of our daily lives. I dare you to walk by this park without being drawn in with a smile on your face."

Cormier's public spaces can be fanciful, expensive to build and even, to some eyes, weird. When he was a kid, growing up on a dairy farm in Princeville, Quebec, he dreamt of studying plant genetics so he could invent a new flower, and his best-known projects do involve a kind of hybridization, blending disparate elements – botanical, historical, artistic – to form something singular. "The way I use history and art – I'm assembling things in a way to create a different kind of space," he says. When he conceived of Berczy's Victorian-inspired fountain with its eccentric canine adornments, he was told by skeptical city officials that dogs had nothing to do with art. In response, he and his staff combed through archives and, of course, discovered the opposite. "We did our research and found dogs everywhere in art history," Cormier says, smiling. "It goes back 5,000 years!"

Cormier's encountered such opposition frequently throughout his career – his controversial "Lipstick Forest," at Montreal's Palais des Congrès, a futuristic winter garden of 52 concrete "trees" painted bright pink, was derided by local newspapers; the cost of the umbrellas for Sugar Beach outraged some Toronto city councillors. The approval process, with all its potential setbacks and multiple stakeholders, he says, is a constant reminder that his work could be rejected. But cost versus value is something that Cormier thinks about for each project, and he is adamant that, if anything, we don't spend enough money on our parks, streets and plazas: "What is spending too much? Is it spending \$100 a square foot on the public realm that's used by everybody, or \$600 or \$800 a square foot on the condo next to it? Sugar Beach, which was initially considered too expensive, is a great example of how urban infrastructure can increase the value of the area around it," says Cormier. "When

THE WORLD'S BEST PUBLIC PLACES

What makes for a truly great civic space? Bold imagination and an element of surprise, says Claude Cormier. Designers have to take risks: "It's not just about making something pretty." In his view, these three places got it right.



Millennium Park, Chicago

For Cormier, the magic surrounding Chicago's centrepiece park begins with "Cloud Gate," the highly reflective steel sculpture by artist Anish Kapoor commonly known as "The Bean." Photo-takers have made it their first stop ever since the park opened in 2004. "People see themselves in it, they interact with it and it's beautiful to watch," he says.



The High Line, New York City

The park sits in an old, elevated train track on the city's west side that was almost torn down before concerned citizens stepped in to save it in 1999. The park opened a decade later, and the 2.4-km ribbon of green is now one of New York's top attractions. "It shows what can happen when you have a bold vision

and a beautifully crafted landscape that allows the community to come back," says Cormier. "I wish I had it in my portfolio."



Les Deux Plateaux, Palais-Royale, Paris

Artist Daniel Buren's striped "licorice" sculptures were hugely controversial when they were built in the palace courtyard in 1986. Yet the black and white marble columns of varying heights "became pedestals that people would stand or sit on to have their pictures taken," says Cormier, who loves the conflict between the 17th-century baroque palace and Buren's contemporary art. "It's like juxtaposing different languages. But by creating this clash, you make each one look more magnificent." —Scott Anderson

you do it cheaply, it's wasted, because people won't come back."

A good landscape architect must be part ecologist, project manager, visual artist, pitchman and politician. Every landscape architect who works with urban public space has to look at the built environment and assess how best to augment or enhance those forms with a combination of plant life, street furniture and public art. And every landscape architect who works with urban public space has to collaborate with developers, city officials, community residents and engineers. But a great landscape architect is also a bit of a pugilist. "You have to be ready for a fight," says Cormier, "because there will always be something on a project that you will need to stand up for. We have a certain level of idea we fight for, and we don't give up."

He's insistent that these ideas don't just blend into the background. He's been likened to landscape architects such as Frederick Law Olmsted, who designed New York's Central Park, and Martha Schwartz, who dropped a giant boulder into Toronto's Yorkville district. Like these projects, Cormier's work is defiantly visible, asserting its own presence and value. "I like things with personality," he says. "The whimsical aspects open up a different sense of perception and people respond well to it." Thanks to the success of Berczy, Cormier is now working on an amusing response to it west of downtown — this time, featuring about 20 cast-iron cats — as a small part of the massive redevelopment at Front Street West and Spadina Avenue known as The Well.

One could describe Cormier as a kind of Robin Hood of landscape architecture. The analogy's not perfect — he doesn't exactly rob the rich to give to the poor — but what he is doing is using the funds available to him to create something beautiful that everybody can enjoy. It's no secret that our major cities, from Toronto to Tokyo, are becoming increasingly unaffordable — that income and spatial inequality have become almost intractable problems. But public spaces such as Cormier's serve as compelling, vital arenas where citizens — no matter their income level or background — can interact. The more appealing those places are, the more likely those interactions. "If you design something to induce positive behaviours," Gregg Lintern, the city planner, says, "you're going to have a richer, healthier, more socially cohesive city environment."



Choosing the Right Recreation Facilities

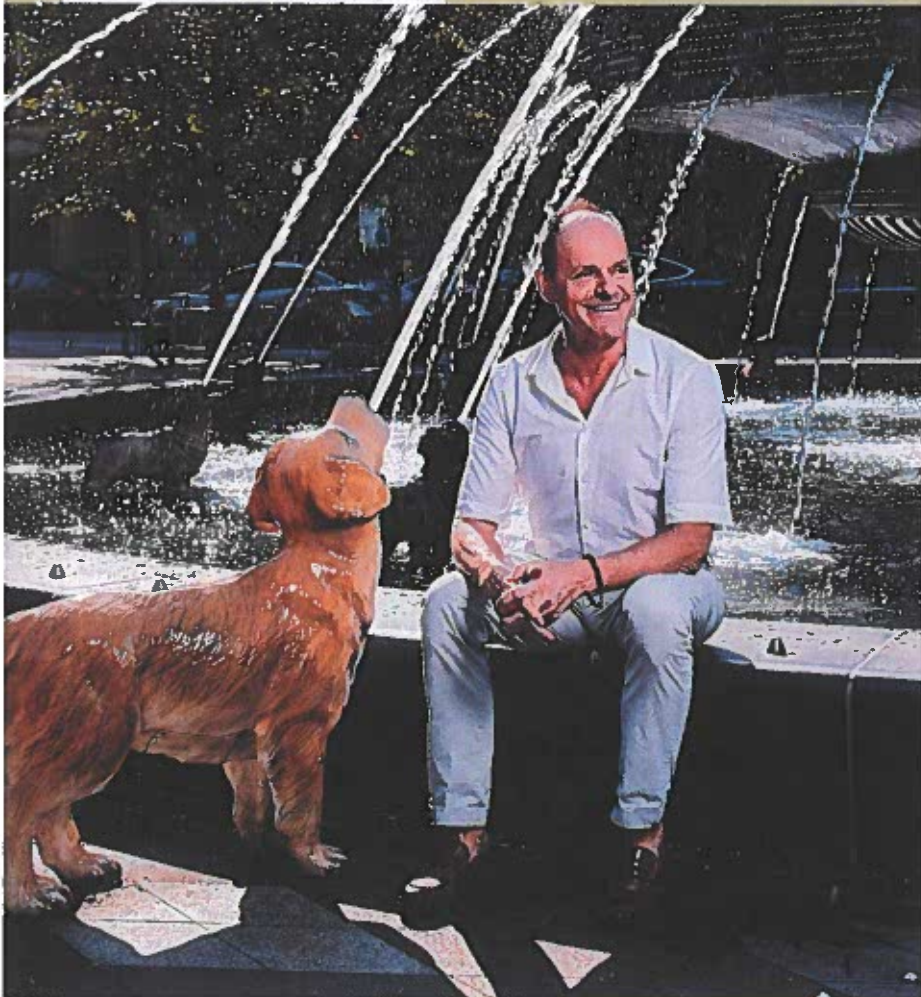


Even within Canada, a seemingly straightforward issue such as encouraging exercise varies from city to city. What works in snowy, sunny Edmonton might not work in warm, rainy Vancouver.

A database called the Canadian Active Living Environments (Can-ALE) already provides researchers and planners with estimates of the potential for physical activity for neighbourhoods across the country.

Jeffrey Brook, a professor at U of T's Dalla Lana School of Public Health, is also the scientific director of the Canadian Urban Environmental Health Research Consortium, which hosts a platform for research on urban form and human health. The platform allows researchers to drill down into the Can-ALE database by demographics, climate and other variables. It can help guide decisions on the location of parks, playgrounds and other public facilities that encourage physical fitness.

In its third year, the consortium makes it easier for researchers to collect and share data with planners to make cities healthier places to live, Brook says. —Patchen Barss



↑ This cast-iron golden retriever is named Smiley, in honour of a beloved therapy dog in Toronto

Cormier insists his first priority is the city-dwellers that live with his projects every day. "We're doing it for the people," he says. "We are working with developers who are starting to understand that if you do a good landscape, it's going to bring them value. A way to do that is through good open-space plans, good amenities, good integration with the street. Then the public feels that they have something there for them."

Cormier grabs his suitcase. He has to get to more meetings, including one for a project whose details he couldn't yet disclose except to say, "We are having fun imagining it. We are laughing. Laughing!" He looked like someone about to open a Christmas present. "But I think you can do that in many projects. You just need the guts to do it." ■