



UNIVERSITY OF
TORONTO

OFFICE OF THE VICE-PRESIDENT,
RESEARCH AND INNOVATION

URBAN INNOVATION REPORT

AREAS OF RESEARCH

- Innovation & Entrepreneurship
 - Infrastructure & Sustainability
 - Healthy Cities
 - Socio-Economic
 - Governance & Policy
-

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U of T Urban Innovation Report – Updated March 2019
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INTRODUCTION

“We are indeed fortunate enough to live in one of the world’s truly great city-regions.... In the knowledge based economy, universities have come to be regarded as prized competitive assets for cities, regions and nation-states.... We are fortunate to have both a globally renowned research university and a world-class city region right here in Toronto.”

Prof. Meric Gertler, President, University of Toronto¹

Toronto is one of the most vibrant and multicultural cities in the world. Named one of the world’s most liveable cities by The Economist’s Intelligence Unit in their report on safe cities² and declared by the United Nations as one of the most culturally diverse cities in the world,³ Toronto’s 6 million inhabitants benefit from many economic, creative, entrepreneurial and social advantages. It provides the perfect stage on which to develop research and innovation intended to inform and aid municipalities in creating sustainable, socially innovative, economically forward thinking, healthy initiatives and policy. The University of Toronto (U of T) has the privilege of being situated in the middle of this bustling metropolis, and our researchers take full advantage of this co-location to conduct ground-breaking research and innovation.

U of T is a global leader in urban research and teaching with over **220 faculty and researchers** – our three campuses contribute to the vibrancy of the Toronto city-region and the world beyond. Our faculty members are active in local, regional, national and international research networks as evidenced by the plethora of funded scholars, research, labs and institutes with an urban focus. U of T’s newly established **School of Cities** brings together urban-focused researchers, educators, students, practitioners, and the general public to explore and address complex urban challenges with the aim of becoming a world-leading centre for innovative interdisciplinary urban research, education and engagement. The School of Cities is where diverse communities come together to spark new insights and design creative ways for cities and their citizens to thrive.

Urban-focused research at U of T spans many different disciplines and areas of study, cross pollinating ideas in order to more effectively solve a myriad of multifaceted urban issues. This research can be organized into five distinct areas of strength:

- Innovation & Entrepreneurship
- Infrastructure & Sustainability
- Healthy Cities
- Socio-Economic

¹ Speech to the Toronto Regional Board of Trade (2014). Retrieved from: http://www.president.utoronto.ca/secure-content/uploads/2014/05/The_University_and_the_City_28_May_2014.pdf.

² The Economist Intelligence Unit (2017). The Safe Cities Index 2017: <https://dkf1ato8y5dsg.cloudfront.net/uploads/5/82/safe-cities-index-eng-web.pdf>

³ United Nations Educational, Scientific and Cultural Organization (2014). A City’s good practice towards the elimination of discrimination. Retrieved from: <http://www.unesco.org/new/en/social-and-human-sciences/themes/fight-against-discrimination/coalition-of-cities/good-practices/toronto/>.

- Governance & Policy

This report showcases the ways that U of T is contributing to each of these areas of urban-focused research – from our academic departments and divisions that are engaging and educating undergraduate students, to our dedicated research clusters, that are leading the way in influencing policy, developing new ideas and systems to help move Toronto and the world’s cities to new heights of sustainability and productivity, while simultaneously improving the health, well-being and quality of life for its citizens.

The Urban Innovation Report demonstrates the University’s commitment and effort to developing Toronto’s economic and cultural value by nurturing and developing innovation, entrepreneurship and advanced thinking in one of the world’s most exciting urban centres.

The U of T website [Cities@UofT](#) includes [directories](#) to help connect users to our [programs, resources & research](#), and [people](#).

INNOVATION & ENTREPRENEURSHIP

Innovation is an important aspect of cities research and is a key indicator of economic growth and urbanization.⁴ Creative capital fuels economic and population growth in urban centres and is directly related to the innovation created—different urban areas produce different types of innovation. By investigating the relationship between the types of innovation achieved and the characteristics of the cities from which it emerges, researchers are able to gain insight into the increasing importance of the locality as a site for innovation.⁵ Questions around the meaning and value of different forms and roles of knowledge and human capital have become central to economic theory and are having significant implications for public policy, finance and social and human resources development.

“...growing evidence suggests that the contemporary global economy make cities more – not less – important as sites of production, distribution, and innovation.”⁶

The University of Toronto is where research talent, ideas and ambition converge to launch the next generation of global entrepreneurs. In the past five years, the University of Toronto has created more than 150 companies, generating more than \$500 million in investment

U of T offers strong, centralized support to its entrepreneurial community through the Innovations & Partnerships Office (IPO) and U of T Entrepreneurship.

Innovation & Partnerships Office (IPO): As the steward of the University Inventions Policy, IPO offers support and services to the entire U of T community ranging from basic informational support, through the protection and management of intellectual property, to the structuring of competitive, market-ready start-up companies in partnership with **MaRS Innovation**. IPO helps to build successful partnerships between industry, business, government, and the U of T research community. IPO also manages U of T’s intellectual property, turning ideas and innovations into products, services, companies and jobs. Working with partners in the academic divisions and MaRS Innovation, IPO’s objectives are to:

- **Protect and manage intellectual property (IP) across the U of T system**
Inventions Policy; invention disclosures; legal and business support
- **Support entrepreneurial faculty & students**
Networking opportunities; sourcing capital; recruiting executives; IP stats; etc.
- **Create companies**
Inception to investor-ready start-ups.

⁴ Wolfe, D. A. (2014). Forward to the Series, *Innovating in Urban Economies: Economic Transformation in Canadian City-Regions*. In D.A. Wolfe, ed. *Innovating in Urban Economies: Economic Transformation in Canadian City-Regions*. Toronto: University of Toronto Press. (pp. vii)

⁵ http://sites.utoronto.ca/progris/about_us/index.html.

⁶ Wolfe, D. A. (2014). Forward to the Series, *Innovating in Urban Economies: Economic Transformation in Canadian City-Regions*. In D.A. Wolfe, ed. *Innovating in Urban Economies: Economic Transformation in Canadian City-Regions*. Toronto: University of Toronto Press. (pp. vii)

- **Outreach to Campus-linked Accelerators**
Information sharing via websites; connecting entrepreneurs to resources and opportunities.

U of T Entrepreneurship: U of T has specialized entrepreneurial hubs across three campuses. Coordinated by U of T Entrepreneurship, these hubs, or Campus-linked Accelerators (CLAs) include the Rotman School’s Creative Destruction Lab; the Entrepreneurship Hatchery and Start@UTIAS in the Faculty of Applied Science & Engineering; the Department of Computer Science Innovation Lab (DCSIL) and the Impact Centre in the Faculty of Arts & Science; The Hub at the University of Toronto Scarborough; ICUBE at the University of Toronto Mississauga; the Health Innovation Hub (H2i) in the Faculty of Medicine; and UTEST, jointly administered by IPO and MaRS Innovation. These hubs assist more than 200 student-led startup teams each year. In addition to CLAs, there are several student-led entrepreneurial clubs and other initiatives. U of T Entrepreneurship supports the university’s entrepreneurial activities through funding, by facilitating communication and collaboration, and by engaging with external partners, including investors and provincial government bodies.

ACADEMIC & RESEARCH UNITS

- The **Centre for Innovation Law and Policy** in the Faculty of Law supports and facilitates the study of law and its relationship to technology, by sponsoring and cultivating research, teaching and knowledge exchange on law, legal theory, and policy related to technology, broadly understood. As a scholarly research centre, the Centre is open to interdisciplinary approaches, including law’s dialogue with the humanities. The Centre faculty approach foundational, theoretical and topical issues concerning law and technology through the rubrics of law, philosophy, political science, economics and cultural studies, with particular expertise in intellectual property, cyberlaw, privacy, and biotechnology law. *Profs. Simon Stern and Abraham Drassinower, Co-Directors*
- The **Innovation Policy Lab (IPL)** is the exciting new hub within the Munk School of Global Affairs & Public Policy whose mission is to study, teach, and apply novel methods and disciplines to the study of innovation and its impact on growth and society. Bringing together teams of researchers from across U of T, as well as from other institutions across the globe, the IPL focuses on core questions in a number of areas including innovation and growth, innovation and inequality, globalization and innovation, social innovation, new technologies and their impact on society, innovation in traditional industries, and arts and innovation. Since our aim is not only to advance basic research but also to effect change, we pay particular attention to the role of public policy in nurturing innovation, while at the same time enhancing its positive impacts on society and limiting its negative consequences. To do this effectively, the IPL faculty closely partner with a wide range of public and private organizations to co-produce educational experiences that provide a competitive edge to our students while having a real impact on innovation policy around the world. *Profs. David Wolfe and Dan Breznitz, Co-Directors*

- The [Institute for Management & Innovation \(IMI\)](#) is the centre for management education at UTM. This collaborative institute provides students with access to professional masters programs in biotechnology, accounting, innovation and sustainability, and undergraduate programs in accounting, finance, marketing and human resource management. IMI is a cross-disciplinary institute producing mission-focused managers and future leaders with a combination of management skills and depth in their chosen field. IMI also provides an academic platform to foster close interactions and sharing of expertise between the faculty, staff and students in these programs, along with our community partners. *Prof. [Soo Min Toh](#), Director*
- The [Martin Prosperity Institute \(MPI\)](#) at the Rotman School of Management houses a world leading think-tank on the role of sub-national factors – location, place and city-regions – in global economic prosperity. It takes an integrated view of prosperity, looking beyond economic measures to include the importance of quality of place and the development of people’s creative potential. *[Jamison Steeve](#), Executive Director; Prof. [Richard Florida](#), Director*
- The [Michael-Lee Chin Family Institute for Corporate Citizenship](#) at the Rotman School of Management helps current and future business leaders integrate sustainability into business strategy and practices by actively developing and disseminating useful research, tools and curricula. *[Rod Lohin](#), Executive Director*

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INFRASTRUCTURE & SUSTAINABILITY

With the world's population expected to double within the next 50 years, there will be a significant increase in the number and size of urban areas on the planet. This will create an amplified need to understand the implications and complexities of urban centres in order to increase efficiencies, manage complex logistical issues, reduce costs and improve the quality of life of inhabitants.⁷

“Urban infrastructure has become one of the most pressing challenges facing the world today. Already, the world's cities are home to more than half of the global population; emit more than 70 percent of the world's greenhouse gasses; use 80 percent of the world's energy; and drive the vast majority of the world's economic output.”⁸

Cities are now investing in the development of technology for Smart Cities, Energy Smart Grids and Intelligent Transportation Systems (ITS) to collect large quantities of data on; traffic patterns, pollution, parking spaces, water, power and light. This information is then used to conduct research, inform policy, anticipate problems and improve productivity within the city.

Within the last century, the world—and the developed world in particular—has come to depend almost exclusively on non-renewable fossil fuels and their offspring, petrochemicals, to fuel industry and economic growth. Our cities have expanded through the decades built on the assumption that oil is a relatively cheap and available resource, but that assumption is now being tested. With 50% of the world's population already living in cities of various sizes, it is predicted that the trend of urbanization will keep on increasing until 2050.⁹ It is for this reason, we must begin to develop cities within a more sustainable and long term model. Researchers, developers and scientists are focusing their efforts on developing “green” cities, looking at issues related to water, energy, building materials and the management of natural resources.

“Some cities around the world are pioneering the way, helping the development community envision alternatives to mainstream models of urban development, and focusing on creating environmentally friendly ‘cities for the people’, rather than economic growth.”¹⁰

Canadian universities are heavily involved in assisting urban authorities in Canada and beyond to address a number of issues pertaining to the management of natural resources and the development of clean technology. U of T is a leader in this space and is home to many internationally renowned research hubs working on creating sustainable solutions for urban environments.

⁷ Streetline (2014). What's a Smart City? Retrieved from <http://www.streetline.com/smart-cities/>

⁸ KPMG International (2012). Cities Infrastructure: a report on sustainability, Retrieved from <http://www.kpmg.com/ES/es/Actualidad/Novedades/Articulos/Publicaciones/Documents/Cities-Infrastructure-a-report-on-sustainability.pdf>.

⁹ Hawley, K. (2014). Transforming cities for sustainability: Facts and Figures. Retrieved from <http://www.scidev.net/global/cities/feature/transforming-cities-sustainability-facts-figures.html>.

¹⁰ Ibid.

ACADEMIC & RESEARCH UNITS

- **BioZone** is a Centre for Applied Bioengineering Research in the Faculty of Applied Science & Engineering. The Centre's multi-disciplinary team consists of internationally renowned researchers who work at the interface of biology and engineering that share a common vision: to use the most advanced and innovative biotechnology to address some of the most urgent societal needs in energy, environment and health. The convergence of these needs is clearly evident in urban settings where intensive industrial activity and increasing population density is placing pressures on both the city's environment and its inhabitants. BioZone has unique expertise that can help mitigate these issues such as: anaerobic wastewater treatment, remediation of industrial toxins, and the use of microbes and enzymes to produce green building materials from renewable feedstocks. BioZone provides a nexus where the best minds from relevant disciplines work together using state-of-the-art equipment to develop and implement innovative biotechnology to protect our environment and our health. ***Prof. Elizabeth Edwards, Director***
- The **Centre for the Resilience of Critical Infrastructure (CRCI)** is an initiative of the Faculty of Applied Science & Engineering to advance the field of infrastructure engineering and the understanding and practice of infrastructure resilience. The CRCI builds upon the University's existing world-class reputation in engineering and the built environment, bringing together expertise in research and practice from around the world, across government, academia and industry. Public outreach is achieved through regular meetings, the Sandford Fleming Fora, with stakeholders. ***Profs. Michael Collins, Constantin Christopoulos and Jeffrey Packer, Lead Researchers***
- The **Institute for Water Innovation (IWI)** focuses on the minimization of water usage, recycling practices and processes, industrial water purification for process reuse or irrigation, materials synthesis in aqueous media, materials performance and degradation in aqueous environments, supercritical water systems, water electrolysis and electrochemical applications, new sensors, and bioprocesses. ***Prof. Vladimiro Papangelakis, Director***
- **Global Cities Institute (GCI)**: Focusing on research to create sustainable, resilient, inclusive and prosperous cities of tomorrow, the Global Cities Institute within the John H. Daniels Faculty of Architecture, Landscape, and Design has been integral to the development of ISO 37120 – the first international standard for sustainable cities. In addition to its work on developing city indicators for standardized urban metrics, the GCI engages in the global smart cities agenda, the emergent field of para-diplomacy, as well as leveraging its unique and longstanding contacts with the City of Toronto (and cities throughout the world) as a bridge between academia and local government. The work of the GCI is supported by its extensive, international and multi-disciplinary list of Senior Fellows who are leading scholars in the fields of Architecture, Geography, Political Science, Urban Design, Engineering, Public Affairs, Urban Policy, and Economics. ***Prof. Patricia McCarney, Director***
- **Global City Indicators Facility (GCIF)**: As one of the anchor programs of the Global Cities Institute (GCI), the GCIF hosts a network of 255 cities across 82 countries committed to building standardized city indicators for performance management including a database of

comparable statistics that allow cities to track their effectiveness on everything from planning and economic growth to transportation, safety and education. With initial backing from the World Bank, this fully integrated University of Toronto project has resulted in the creation of ISO 37120 – the first international standard on indicators for sustainable cities. The GCIF global network, supports the newly constituted World Council on City Data – a sister organization of the GCI/GCIF – which allows for independent, third party verification of ISO 37120 data. *Prof. [Patricia McCarney](#), Director*

- The [Institute for Sustainable Energy \(ISE\)](#) at the Faculty of Applied Science & Engineering is an inclusive, multidisciplinary centre designed to bring together researchers, students, and teachers from across the university, together with partners from industry and government, with the goal of increasing energy efficiency and reducing the environmental impact of energy use and conversion in urban environments. *Prof. [Joshua Taylor](#), Acting Director*
- The [Department of Civil & Mineral Engineering](#) in the Faculty of Applied Science & Engineering offers undergraduate and graduate programs, such as the [Master of Engineering in Cities Engineering and Management \(MEngCEM\)](#), focused on the design, construction and maintenance of structures and infrastructure from the deepest tunnels to the tallest buildings. The work done in the department focuses on creating solutions that directly impact the quality of life everywhere: rebuilding deteriorating urban infrastructure; creating structures to withstand natural disasters; developing advanced technologies for complex transportation networks; supplying clean water and disposing of waste water; and building alternative energy systems. *Prof. [Brent Sleep](#), Chair*
- The [Department of Physical & Environmental Sciences](#) at the University of Toronto Scarborough offers undergraduate and professional and research graduate program in Environmental Studies and in Environmental Science. *Prof. [George Arhonditsis](#), Chair*
- The [John H. Daniels Faculty of Architecture, Landscape & Design](#) houses several urban design and landscape centres and professional programs:
 - The [Centre for Landscape Research \(CLR\)](#) provides a support structure and a culture of research aimed at enhancing the knowledge base of the profession of landscape architecture at the University of Toronto. The CLR has been collaborating in the National Centre of Excellence (NCE) in geomatics called GEOIDE through projects in visualizing climate change mitigation with CALP at the University of British Columbia and Planning at University of Waterloo. A second NCE project is examining the integration of GIS-based urban and transportation models. In addition to its funded labs, CLR has supported and fostered a variety of research activities on specific research topics developed by faculty in landscape architecture. CLR is closely associated with the U of T Knowledge Media Design Institute (KMDI). *Prof. [Robert M. Wright](#), Director; Profs. [John Danahy](#) and [Liat Margolis](#), Co-Directors*

The CLR has two research laboratories in which several faculty members collaborate:

- **Immersive Visualization**: Specializing in projective urban modeling and visualization, the Digital Media Project tackles unique projects and research questions that look into ways of adapting the disciplinary language and methods of landscape architecture through spatial computing and design-planning practice. The immersive visualization room, established in partnership with Parallel World Labs, is used as a prototype urban design decision theatre.
- The **Green Roof Innovation Testing Laboratory (GRITLAB)** is a platform for multidisciplinary collaboration to investigate the environmental performance associated with ‘green’ & ‘clean’ technologies such as green roofs, green walls and photovoltaic arrays. The GRITLAB is dedicated to the study of Green Roofs, Green Facades and Solar Technologies. *Prof. Liat Margolis, Director*
- The **Master of Landscape Architecture Program** offers a professional Master of Landscape Architecture (MLA) degree and a post-professional MLA degree. The MLA Program uses intensive studio-based courses to address the design challenges facing urban landscapes today. Complementary lecture and seminar courses in visual communication, history, theory, technology, environment, and professional practice provide comprehensive professional training and serve as a forum to examine landscape architecture’s synthetic role in design and planning at scales ranging from small urban public spaces to the region. The MLA Program benefits from a diverse range of professors and instructors, with research interests in the advancement of visual and digital media in landscape design; the history and theory of landscape architecture in contemporary urbanism; developing technology to promote successful urban and regional landscape ecology; and realizing built works through innovative creative practice of landscape architecture. Students in the program work with local organizations such as the City of Toronto Parks, Forestry & Recreation, Fort York National Historic Site, the Toronto Botanical Garden, Evergreen Brick Works, Government of Ontario Ministry of Infrastructure Real Estate Policy Branch, the Ontario Stone, Sand and Gravel Association, and the Métis International Garden Festival. *Prof. Alissa North, Director*
- The **Laboratory for Advanced Power Conversion and Systems Analysis (LAPCSA)** is a research center at the Department of Electrical & Computer Engineering in the Faculty of Applied Science & Engineering that is dedicated to conducting advanced research in the field of Electrical Energy Systems with focus on power electronics and power systems. Of particular interest is development of new power converter topologies, analytical and simulation models, control schemes, and experimental systems that form core technologies and tools to support a transition towards more sustainable electrical power systems with expanded integration of renewable energy sources. LAPCSA’s scope of expertise extends to power systems related studies that support this objective, including harmonic analysis, voltage stability, HVDC systems, renewable energy and energy storage integration, and urban microgrids. *Prof. Peter Lehn, Director*
- The **School of the Environment** in the Faculty of Arts & Sciences offers an undergraduate B.A. program in Environmental Studies and a B.Sc. program in Environmental Science. In addition, collaborative programs are offered with departments and programs such as

chemistry, earth sciences, geography and planning, human biology, physics, pharmacology and toxicology, philosophy, and psychology. Course offerings include urban sustainability and urban ecology. The School's undergraduate students are actively engaged with the local community through a fourth year Professional Experience course that involves off-campus work on an environmental project with government, NGOs, or industry that gives them practical experience of the needs and demands of professional environmental agencies. At the graduate level, interdisciplinary collaborative programs in Environmental Studies and in Environment and Health are offered in partnership with more than twenty other units at the University. Distance education and certificate programs provide opportunities for professional development, as do leading-edge workshops and seminars in areas such as Environmental Finance and Carbon Finance. Faculty are engaged in a variety of urban research projects, including the Toronto Cycling Think & Do Tank, air quality measurements at the University of Toronto Atmospheric Observatory, the politics of environmental policy making, and studies of metal emissions in urban environments and their human health impacts. *Prof. [Kimberly Strong](#), Director*

- The [Transportation and Environmental Change Lab](#) is located in the Department of Geography at UTM. Its mission is to advance current thinking on the relationship between accessibility and mobility in physical (e.g., the built environment) and virtual (e.g., Cyberspace) environments, the spatial structure of cities and regions, and the sustainability of human activities. The Lab supports basic and applied research in four thematic areas: Human Activities, Transportation & the Environment; Mobility, the Built Environment & Health; Information Technology & the Sustainability of Human Activities; The Spatial Analysis of Human Behaviour in Urban Environments. *Prof. [Ron Buliung](#), Director*
- The [University of Toronto Transportation Research Institute \(UTTRI\)](#), while housed within the Faculty of Applied Science & Engineering, has research associates from across U of T engaged in research related to urban transportation system design, planning, analysis and decision-support. UTTRI is led by *Dr. [Judy Farvolden](#), Executive Director* and *Prof. [Eric Miller](#), Director*, and is comprised of four research groups:
 - The [Travel Modelling Group \(TMG\)](#) works to improve the state of modelling practice in the GTHA, which is facing major challenges to develop, implement and operate a multi-modal transportation system for the movement of both goods and people that meets the economic, environmental and social goals of the region in a cost-effective and sustainable manner. TMG is sponsored by Metrolinx, Ontario Ministry of Transportation, the Cities of Toronto, Hamilton and Mississauga, and the Regional Municipalities of Durham, Halton, Peel and York. *Prof. [Eric Miller](#), Research Director*
 - The [Centre for Urban Freight Analysis \(CUFA\)](#) is researching ways to develop the state of freight data in the Greater Toronto Area through data collection initiatives. This is an essential first step in developing behavioural models of decision-making by the various actors involved in the freight system including shippers, carriers, logistics firms, etc. Armed with a better understanding of such behaviour, CUFA is developing forecasting models of commercial vehicle

movements that are sensitive to government policy, changes in logistics processes and changes in the global and regional economy. *Prof. [Matthew Roorda](#), Principal Investigator*

- The [ONE-ITS Network Platform](#) enables collaborative research and development activities among widely dispersed participants specifically focused on solving problems related to easing traffic congestion, enhancing safety, reducing stress, reducing fuel consumption and pollution, protecting the environment, and promoting urban sustainability. Members of the ONE-ITS Network have access to the software, transportation data and knowledge resources that have been acquired and accumulated in the system. The ONE-ITS Research Society negotiates access to resources held by transportation agencies, manages the day-to-day operation of the platform, and regulates user access to the system. *Prof. [Baher Abdulhai](#), Lead*
- [iCity Centre for Automated and Transformative Systems \(iCity-CATTS\)](#) is a research centre for analyzing and quantifying transformation within transportation systems in the era of advanced technologies and automation. iCity-CATTS is the first research centre of its kind in North America to address the large-scale impacts of disruptive transportation technologies and services on our cities. It is a multi-disciplinary multi-sector collaboration that gathers academia, industry, technology experts, and the government. *Prof. [Amer Shalaby](#), Acting Director*
- The [Asian Institute](#) at the Munk School of Global Affairs & Public Policy participates in the [Urban Climate Resilience in Southeast Asia Partnership \(UCRSEA\)](#), which addresses vulnerabilities to climate change in urbanizing areas of Southeast Asia with the goal of enhancing resilience and, hence, economic and social well-being. Individual and community vulnerabilities in the region are linked to global environmental change and to the rapid pace of urbanization and economic integration of the region. Specifically, we seek to provide vulnerable peoples in transitional states with the space to learn about and share in decisions about protecting themselves from the economic, social, and physical impacts of climate change. *Prof. [Amrita Daniere](#), Co-Director*

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HEALTHY CITIES

Improving health and well-being of urban dwellers has been a challenge as long as cities have existed, and there is still much more we can do to alleviate suffering and improve quality of life for all people. Over the last two centuries, advances in public health, and in fighting infectious diseases, have saved countless lives and have improved and extended the lives of many more. Despite these victories, global trends in increased urbanization have created new and increasingly costly health problems that will require all of our ingenuity to solve.

Megacities (cities with populations over 10 million) are growing most rapidly in the developing nations.¹¹ By 2030, the world is projected to have 43 megacities, most of them in developing regions. However, some of the fastest-growing urban agglomerations are cities with fewer than 1 million inhabitants, many of them located in Asia and Africa. While one in eight people live in megacities worldwide, close to half of the world's urban dwellers reside in much smaller settlements with fewer than 500,000 inhabitants.¹² These cities have a global impact on the growth of air travel, immigration, war and famine. As cities grow, so do the risks to population health, which will require municipal governments and policymakers to address the inadequacies in health infrastructure and systems, as well as develop ways to prevent and treat increased health issues resulting from pollution, low socio-economic groups and overcrowding.¹³

“Pollution—not disease—is the biggest killer of children in low- and middle-income countries. Globally, pollution kills more than 8.9 million people each year, most of them children, and nearly all, 8.4 million, in low- and middle-income countries. That’s 35% more than deaths from tobacco smoking, almost three times more deaths than malaria and fourteen times more deaths than HIV/AIDs.”¹⁴

The University of Toronto is ideally integrated within the Toronto Academic Health Science Network (TAHSN) which is comprised of U of T in partnership with 13 affiliated academic hospitals in the Greater Toronto Area. U of T is currently making major strides in its research on social health inequality, health policy, health systems development and disease prevention.

ACADEMIC & RESEARCH UNITS

¹¹ Rodwin, Victor G. & Michael K. Gusmano (2002). The World Cities Project: Rationale, Organization, and Design for Comparison of Megacity Health Systems, *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, Vol. 79, No. 4: 448

¹² United Nations (2018). *World Urbanization Prospects: The 2018 Revision*. Retrieved 08/24/2018 from <https://www.un.org/development/desa/publications/2018-revision-of-world-urbanization-prospects.html>

¹³ Rodwin, Victor G. & Michael K. Gusmano (2002). The World Cities Project: Rationale, Organization, and Design for Comparison of Megacity Health Systems, *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, Vol. 79, No. 4: 448.

¹⁴ Blacksmith Institute and Green Cross Switzerland (2014). *Top Ten Countries Turning the Corner on Toxic Pollution*. (pp 7) Retrieved from <http://worstpolluted.org/docs/TopTen2014.pdf>.

- [OpenLab](#) is a design and innovation shop dedicated to finding creative solutions that transform the way health care is delivered and experienced. Located at the University Health Network (UHN), Canada's largest research hospital, OpenLab builds on the collective works and experience of its predecessor, the Centre for Innovation in Complex Care (CICC). *Prof. [Howard Abrams](#), Director*
- The [Centre for Urban Health Solutions](#) (founded in 1998 as the Centre for Research on Inner City Health), is an inter-disciplinary research centre within St. Michael's Hospital in Toronto. The Centre seeks to improve health in cities, especially for those experiencing marginalization, and to reduce barriers to accessing factors essential to health, such as appropriate health care and quality housing. We are committed to developing and implementing concrete responses within health care and social service systems and at the level of public policy. *Prof. [Stephen Hwang](#), Director*
- The [Dalla Lana School of Public Health \(DLSPH\)](#) is a global leader in public health education, research and service, with one of the largest concentrations of academic population and public health researchers in Canada and more than \$30 million in research funding each year. Committed to advancing the health of individuals and populations, the School is making significant contributions to research on healthy cities and communities, including areas such as: public health policy; social determinants of health and social epidemiology and addictions that address specific public health challenges such as marginalized populations, recent immigrants, homeless, crowding and the related potential for epidemics. Because the DLSPH is located in one of the most progressive, multi-ethnic, and sustainable large cities in the world it is uniquely positioned to pursue a public health and global cities agenda. The DLSPH's Masters of Public Health program participates in the [Collaborative Masters Specialization in Community Development](#) program, which brings together graduate students and professors from a range of disciplines and professional programs with an interest in community development. *Prof. [Adalsteinn Brown](#), Dean*
 - The emerging [Healthier Cities & Communities Hub](#) at the DLSPH encompasses education, research, knowledge translation, and service activities focused on informing, designing and evaluating solutions for complex urban problems impacting population health. The Hub is currently focusing on three interrelated theme areas: Resilient Cities, Built Environment and Health- and Place-Based Interventions. *[Dr. Patricia O'Campo](#) and [Dr. Blake Poland](#), Co-Leads*
- [India-Canada Centre for Innovative Multidisciplinary Partnerships to Accelerate Community Transformation and Sustainability \(IC-IMPACTS\)](#): Scientists from the University of British Columbia, University of Alberta, University of Toronto and 11 leading institutions in India have joining forces to tackle urgent issues in both countries with a \$30-million partnership. IC-IMPACTS focuses on water safety, disease prevention and treatment, and the development of safe and sustainable civil infrastructure. It also supports new technology spin-offs and the training of more than 700 students and researchers. *Prof. [Stewart Aitchison](#), Associate Scientific Director and Theme Lead for Public Health: Disease Prevention and Treatment*

- The [Institute of Health Policy, Management and Evaluation \(IHPME\)](#), housed in the DLSPH, offers research and professional graduate programs and serves as a harmonizing forum to foster collaboration and leadership within and between healthcare communities. IHPME is committed to making the human connection in healthcare through bridging gaps between clinical, organizational and policy levels. It is a community made whole by its many moving parts—students, faculty, alumni, healthcare researchers and a variety of providers, partners and professionals in the field. With over 300 students, 200 faculty and more than 100 senior healthcare executives in adjunct roles, IHPME is a wellspring of opportunity, learning and innovation. *Prof. [Rhonda Cockerill](#), Acting Director*
- The [Institute for Life Course and Aging](#) at the Factor-Inwentash Faculty of Social Work engages in multi-disciplinary research on aging from a life course perspective. The Institute is mandated to conduct interdisciplinary research on the biological, psychological and social dimensions of the life course and aging processes, and to provide graduate and post-graduate education on the life course and aging. The strategic direction of the Institute focuses on leadership in integrating research, education, practice and policy to improve the health of increasingly aging populations. Through community-oriented methodologies, the Institute for Life Course and Aging aims to contribute to improving the health and social welfare of older adults in Canada and globally. *Prof. [Esme Fuller-Thompson](#), Director*
- [Southern Ontario Centre for Atmospheric Aerosol Research \(SOCAAR\)](#) is a world class centre for environmental research comprised of exceptional researchers and state-of-the-art facilities. SOCAAR’s goal is to produce a broad, trans-disciplinary and actionable understanding of the origins, characteristics, environmental impact, and human health consequences of atmospheric aerosol. Our research examines the source and composition of airborne particles, a key pollutant in large cities that impacts both air quality and climate. This research utilizes advanced instrumentation and modelling to make key connections between emissions of pollutants, the quality and composition of urban air, and the impact of aerosol on human health, the environment and climate. Urban health related research includes: impacts of vehicle emissions on air quality, development of inexpensive air pollution sensors, measurement and modelling to identify sources of air pollution in major cities, and exposomics as a novel paradigm to explore gene-environment associations in the continuum from personalised to population health. *Prof. [Greg Evans](#), Director*

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SOCIO-ECONOMIC

Because of the world's increased levels of urbanization, whereby large groups of people are sharing the same space, using the same resources and creating centres of cultural capital, there is an increased importance for researchers to understand the social and economic implications of cities on a national and global level.

“The cultural presence in struggles around political, economic, technical, and legal issues centered in the realities of cities can become catalysts for changes in a whole range of institutional domains – markets, participatory governance, judicial recourse, cultures of engagement and deliberations, and rights for members of the urban community regardless of lineage and origin.”¹⁵

Cities act as microcosms of the global stage and deal with a variety of facets of the social aspects of life, such as poverty, criminology, immigration, culture, ethics, education and migration of groups within cities. U of T scholars in geography & planning, applied science & engineering, computer science, information, economics, management, and law are studying how to build and manage complex technological and operational urban systems that are also humane and facilitate civic engagement, rather than hinder it.

ACADEMIC & RESEARCH UNITS

- At the [Centre for Diaspora and Transnational Studies](#) scholars and students explore the profound implications of vast global movements of people, ideas and things. The Centre, which is housed in the Jackman Humanities building, brings U of T's strengths in the humanities and social sciences to bear on questions of migration, diaspora, homelands and belonging across different ethnicities and cultures. Comparative, qualitative and historically-driven in their approaches, our experts provide critical insights on policy issues affecting multicultural societies. The Centre regularly organizes symposia, lecture series and seminars involving global thinkers. **Prof. [Kevin O'Neill](#), Director**
- The [Centre for Ethics](#) launched the event series “Ethics in the City” that explores the ethical dimensions of building tech-connected cities and communities. The series brings together a wide variety of speakers from across U of T, as well as from outside the university, to discuss the implications, complications and opportunities of society's biggest issues facing urban regions today. Videos of the events are published by [C4E Journal](#), the Centre's open-access online academic magazine. **Prof. [Markus Dubber](#), Director**
- The [Centre of Excellence for Research on Immigration and Settlement \(CERIS\)](#), under the national Metropolis project, is a cooperative partnership of Toronto's major urban

¹⁵ Saskia, S. (2012). “Culture and its Many Spaces.” In H. Anheier & Y. Raj Isar (Eds.), *Cities, Cultural Policy and Governance* (pp. xxiv). London: Sage Publications.

universities, York University, Ryerson University, and the University of Toronto, as well as three major community organizations, the Ontario Council of Agencies Serving Immigrants, Social Planning Toronto and United Way Toronto. CERIS is Ontario's leading network of researchers, policymakers, and practitioners working in the field of migration and settlement. It serves as the knowledge exchange hub for all three communities and in the interest of all migrants and the general public. As a network of stakeholder communities and a medium of knowledge exchange, CERIS aims to connect researchers, policy makers and community-based practitioners in order to organize, mobilize and share knowledge across stakeholder communities, and to contribute informed discussion, policy and service intervention towards the improvement of migrant lives and migration and settlement issues. *Prof. [Rupaleem Bhuyan](#), U of T Management Board Member*

- The [Centre for Integrative Anti-Racism Studies \(CIARS\)](#), in the Department of Social Justice Education at OISE, is the first and only Centre at the University of Toronto, and to our knowledge, the first one in Canada, to be devoted to Anti-Racism Studies in Education. CIARS's mandate is to enhance research and teaching in the areas of equity, anti-racism praxis and alternative knowledge(s) in education. Our research looks at education from an integrative perspective, that is, education as a process embedded within wider social processes. Our work takes place both inside and outside the immediate realm of formal education (e.g., research on inclusive schooling practices; social welfare, legal regulations affecting communities of colour; media representations of communities of colour). Student and faculty interests directly involve the active participation of community groups. These areas of interest include research on the judicial system, immigration, unions, community development, community-state relations and globalization and its effects on communities of colour. *Prof. [George Dei](#), Director*
- The [Centre for Social Services Engineering](#) is the first of its kind to broaden the scope of engineering research to the social services sector. Almost 10% of Canadians live below the poverty line, using a myriad of social services to meet their day-to-day needs. Balancing supply with demand in both short and long term is an ongoing challenge. Smart cities are not very smart if they ignore or disenfranchise any portion of their citizens. By collaborating and leveraging technology, the mission of the Centre is to break new ground to address this sector and do the right thing. Initiatives include the PolisGnosis Project. With the introduction of ISO 37120, that contains 100 indicators for measuring a city's quality of life and sustainability, it is now possible to consistently measure and compare cities. With the adoption of Open Data policies, cities are now publishing vast amounts of data which can potentially be used to analyse their performance. The goal of this research is to automate the longitudinal analysis (i.e., how and why a city's indicators change over time) and transversal analysis (i.e., how and why cities differ from each other at the same time), in order to discover the root causes of differences. *Prof. [Mark Fox](#), Director*
- The [Centre for Urban Schooling \(CUS\)](#) connects the Ontario Institute for Studies in Education (OISE) to urban schools and communities. The Centre conducts research on and advocates for critical practice that is focused on how to better serve historically marginalized and racialized children and youth in public schools. The Centre is working on establishing a Toronto site for the National Writing Project, the largest peer-to-peer, research-based professional development organization for urban teachers. This initiative will support critical

practitioner researchers to initiate grassroots change efforts in urban classrooms, schools, and communities. *Profs. [Tara Goldstein](#) and [Rob Simon](#), Research Leads*

- The [Department of Geography & Planning](#) is one of the oldest and largest geography departments in North America. The three-campus graduate program offers MA, MSc, and PhD degrees in Geography and MScPl and PhD degrees in Planning. Academic programs reflect the multidisciplinary nature of Geography and focus on a number of different areas including: Biogeography, Cultural and Historical Geography, Economic Geography, Environment and Resource Management, Geographic Information Systems, Physical Geography, Social Geography, and Urban Geography. The Planning Program offers a fully-accredited Masters of Science in Planning, focusing on Urban Planning and Development, Social Planning and Policy, Economic Planning and Policy, Environmental Planning and Urban Design. *Prof. [Richard DiFrancesco](#), Chair*
- The [Department of Social Justice Education](#) at OISE provides students with critical understandings of the social, historical, cultural, political, economic, and ethical contexts of education, broadly conceived. Based on the diverse intellectual traditions of the humanities and social sciences, the department is committed to multi and interdisciplinary studies in education, with a focus on equity and social justice from a variety of perspectives including history, philosophy, sociology and political science. Students may pursue studies including anti-racism, critical race theory, and Indigenous and anti-colonial studies; aesthetics, media, and communication; feminist and gender studies; class and poverty studies; francophone studies; post-colonial, diaspora, and transnational studies; queer and disability studies; cultural and philosophical contexts in education; and democracy, ethics, and social class and/or may follow traditional disciplinary inquiry. *Prof. [Njoki Wane](#), Chair*
- The [Department of Sociology](#) has a distinguished record of researching and teaching human behaviour in social contexts. U of T sociologists analyze social data and observe social patterns to address questions about our society, often focusing on urban life and the many groups that live together in cities. Sociological research has broad impact, from the development of new ideas for understanding social interactions to providing empirical bases for social policy, programs and law. Sociologists at the University are widely consulted experts working with community groups and policy-makers at municipal, provincial, federal and international levels. Faculty members in the Department specialize in the following areas, many of which include elements related to cities and urban life: Immigration and ethnicity; health and mental health; networks and community; crime and socio-legal studies, gender and family; stratification, work and labour markets, political sociology and sociology of culture. *Prof. [Scott Schieman](#), Chair*
- The [Factor-Inwentash Faculty of Social Work \(FIFSW\)](#) is ranked as one of North America's top five social work schools in productivity. The Faculty is distinguished by its emphasis on the integration of research and practice (including direct practice and policy) in both the classroom and its practicum education. The research in the faculty influences government policies at both the provincial and federal levels. The FIFSW has strong partnerships with over 400 community agencies, including collaborative research projects with many of these organizations. FIFSW faculty and students are working with a wide range

of community partners to advance social wellbeing. Relevant questions are being asked, social justice oriented solutions are being proposed, and effective professional practice models implemented due to ongoing knowledge exchange between all of the invested partners. *Prof. [Faye Mishna](#), Dean*

- The [Law, Urbanity and Justice Research Group](#) at the Centre for Ethics brings together academics and graduate students working on urban issues from a variety of disciplines such as philosophy, economics, political science, geography, law, and public policy. The group aims to study and criticize cutting-edge scholarly works concerning normative, theoretical, critical, and empirical aspects of urban planning and development and distribution of means and resources which have a spatial dimension and to examine the social, legal, and political forces that shape the urban context. It provides a platform to study classical and contemporary and critical analyses of distributive justice in the urban sphere. Its meetings offer an opportunity for scholars who work in different methodologies, to share ideas and foster new joint projects. *Organized by Ronit Schnur-Levine (post-doctoral fellow), under the supervision of Prof. [Margaret Kohn](#).*
- The [Neighbourhood Change Research Partnership \(NCRP\)](#) is a large research project housed within the Factor-Inwentash Faculty of Social Work, which focuses on urban inequality and socio-spatial (i.e., neighbourhood) polarization in six Canadian metropolitan areas: Vancouver, Calgary, Winnipeg, Toronto (including Hamilton and Oshawa), Montréal, and Halifax. The Toronto NCRP explores with its partners (1) trends in urban and neighbourhood change since 1971; (2) processes responsible for these changes; (3) the consequences of change that lead to inequality and polarization; and (4) policy and program options that address inequality and thereby improve human well-being and urban environments. Socio-spatial inequality and polarization are pressing global issues, yet difficult to understand, because they exhibit distinct national, regional, and (especially) local forms. The NCRP is particularly interested in understanding changes that result in cities that are sharply divided between wealthy and impoverished neighbourhoods. *Prof. [J. David Hulchanski](#), Principal Investigator*
- The [Urban Studies Program](#) is an undergraduate program offered through Innis College in the Faculty of Arts & Science. Urban planners, engineers, economists, geographers, architects and environmental scientists (to name a few) all study the city from their specific theoretical and philosophical perspectives. The Urban Studies Program is based on recognition of this multidisciplinary, and it aims to provide students with a multitude of lenses through which to observe, interpret and understand urban life. The Program is suited for those students who wish to study cities using several disciplinary approaches. It is also of interest to those students who wish to become involved in urban issues in Toronto. The Program offers an internship in the office of either a municipal politician, non-profit research group, or other government organization as part of its experiential learning program. *Prof. [David Roberts](#), Acting Director, 2018-19*

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GOVERNANCE & POLICY

The study of municipal governance in its various forms is central to several contemporary issues: reform of public institutions and public law; the creation and establishment of procedures and rules that lead to greater efficiency, transparency, and accountability; and the challenge of making governance more inclusive and participatory through the strengthening of democracy and civil society. While the concept of governance in cities includes the formal institutions of government, it also encompasses other formal and informal processes of community and organizational decision making and administration.

“We need to re-conceptualize cities as not only the hinges of the global urbanization movement, but as participants in world politics whose initiatives are creating unprecedented opportunities for global governance. In particular, we need to consider how city leaders are linking their municipal mandates to global agendas of diplomats and international organizations.”¹⁶

Researchers in the social sciences, law, management, and the humanities at U of T are learning about the ways in which political and social institutions, peace, and prosperity influence one another in an urban melting pot, and how they are entwined with issues as diverse as climate change, resource depletion, population pressure, migration, health care reform, international security, and international development. Similarly, our scholars are showing that ideas about leadership, decision making, or public deliberation all matter and shape the capacity of cities to govern and influence not only on a municipal or regional level, but also on a global one. They are realizing that the more we know, the better we are able to create the conditions that will promote higher standards of living, life-long learning, and better governance for all the world’s citizens.

ACADEMIC & RESEARCH UNITS

- The [Centre for Criminology & Sociolegal Studies](#) in the Faculty of Arts & Science offers an undergraduate and graduate program. The Centre’s faculty and students study crime, order and security from a variety of disciplinary perspectives and theoretical approaches. Specifically, they focus on the study of crime patterns, criminal behaviour, and the administration of criminal justice along with the study of how various types of law (e.g., criminal, civil, administrative, regulatory) and other mechanisms of social regulation are used to prevent, manage and sanction harmful conduct and effect security. The Centre also has a long-standing commitment to research and policy relating to community concerns. In the local and national media, Centre faculty are frequently consulted for insight on current debates over issues such as policing, sentencing, crime rates, punishment, security, and moral regulation. **Prof. [Audrey Macklin](#), Director**

¹⁶ Acuto, M. (2012). *Urban Diplomacy: Local Leaders, Global Challenges*. Retrieved from <http://opencanada.org/features/the-think-tank/essays/urban-diplomacy/>.

- The [Department of Human Geography](#) at the University of Toronto Scarborough offers undergraduate programs in Human Geography, Human and Physical Geography, and in City Studies. Human geography is crucial to understanding the massive changes happening in the world today, including urbanization, human-induced environmental changes, growing inequality, and intensifying migration and displacement. It is an integrative discipline which examines the spatial differentiation and unevenness produced by political, economic, socio-cultural, and environmental factors and processes, at the full range of spatial scales from the body to the family, neighbourhood, community, city region, country, and globe. [City Studies](#) is a multidisciplinary program that introduces students to concepts and skills to understand and tackle problems of an increasingly urban world. The City Studies curriculum has three areas of concentration: City-Building, Community Development, and City Governance. *Prof. [Thembela Kepe](#), Chair*
- The [Institute on Municipal Finance and Governance \(IMFG\)](#) at the Munk School of Global Affairs & Public Policy focuses on the fiscal health and governance issues facing large cities and city-regions in Canada and abroad. The Institute’s mandate is to conduct original and independent research; spark and inform debate through conferences, roundtables and publications; host visiting scholars to share perspectives from other cities around the world; and support graduate and post-graduate students to build Canada’s next cadre of municipal finance and governance experts. IMFG focuses on a range of important issues such as how measure urban fiscal health to inform local political and economic decisions, and how to pay for the infrastructure and services needed to attract and retain skilled individuals and companies. *Dr. [Enid Slack](#), Director*
- The [Institute for International Business \(RIIB\)](#) at the Rotman School of Management facilitates and coordinates research, reaches out to other parts of the University and to international partners and collaborators. The Institute disseminates research through publications, sponsorship of technical workshops and by organizing seminars and regular public forums. The RIIB research on the urban service economy aims to produce better urban and regional policies that promote competitiveness and focuses on the economics of urban areas and on urban and real estate policies as important determinants of competitiveness. *Prof. [Wendy Dobson](#) and Prof. [Ignatius Horstman](#), Co-Directors*
- The [Mowat Centre](#) is an independent, non-partisan public policy centre located at the Munk School of Global Affairs & Public Policy. The Centre undertakes collaborative applied policy research and engages in public dialogue on Canada’s most important national issues, and proposes innovative, research-driven public policy recommendations, informed by Ontario’s reality. The Centre believes a prosperous, equitable and dynamic Canada requires strong provinces, including a strong Ontario, and strong cities. The “Mowat Research Model” is the Mowat Centre’s collaborative approach to knowledge development. It ensures that the centre’s research, findings and recommendations are timely, relevant and informed by a realistic understanding of government, service delivery and Canadian society. *[Andrew Parkin](#), Director*
- The [Munk School of Global Affairs & Public Policy](#) is a professional degree granting interdisciplinary school focused on global issues. The mission of the Munk School is to

deeply integrate research on global affairs with teaching and public education to conduct research to answer questions concerning issues such as; global economy, policy, innovation, governance, global security, technology, human rights, urbanization and municipal policy and finance. The Master of Global Affairs (MGA) positions graduates to accelerate their careers in business, government and NGOs, as these sectors pursue their strategies in an increasingly interconnected and multipolar world. *Prof. [Randall Hansen](#), Interim Director*

- The [Urban Policy Lab](#) at the Munk School is a hybrid teaching and research hub that brings together students, faculty, and practitioners to improve urban policy in the Toronto region and across Canada. The Lab serves as a focal point for the School's urban initiatives and training ground for future urban policy professionals, offering students new experiential learning opportunities through a range of collaborative research and civic education projects linking the academic, government, and not-for-profit sectors. *Prof. [Gabriel Eidelman](#), Director*

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