RESEARCH IMPACT

The University of Toronto is a globally recognized, comprehensive, and research-intensive institution.

Exceptional performance and reputation across a breadth of disciplines
- Earned the highest share of 1st rank in Canada on subject or field in all major world university rankings
- #1 in Canada and top 30 in the world on the majority of world university rankings
- #1 in Canada and one of the 10 most influential universities in the world alongside Harvard, Oxford, Stanford, and Cambridge, measured by top 10% cited publications in 22 broad disciplinary fields

Award winning researchers
- #1 in Canada for share of major national and international research honours

Research funding
- #1 in Canada for highly competitive research funding from:
  - Canadian Institutes of Health Research (CIHR)
  - Natural Sciences and Engineering Research Council (NSERC)
  - Social Sciences and Humanities Research Council (SSHRC)

An innovation and startup powerhouse
- North American leader in number of:
  - New startups
  - New invention disclosures
  - New licenses and options

Our impressive performance is a reflection of the excellence of our faculty, our graduate and undergraduate students, our postdoctoral fellows and their collaborations with leading researchers and institutions world-wide, as well as our strong partnered research.
EXECUTIVE SUMMARY

For nearly two centuries, University of Toronto faculty, students, postdoctoral fellows and staff have been extending the boundaries of knowledge and providing answers to some of the world’s most important questions. The U of T Strategic Research Plan is a strong yet flexible framework that will engage the research community and our partners in the challenges that face humanity—and it will ensure that our scholars can continue to do the outstanding work they already do in a climate that will enable them to thrive. Today’s issues, in combination with an increasingly complex funding environment, often require that we build on excellence in traditional disciplines and seek out complementary knowledge and expertise in other fields and in collaboration with partner organizations.

This Strategic Research Plan highlights the scope of the scholarship at U of T and identifies seven thematic areas that are designed to facilitate excellence and collaboration both within U of T and with partner organizations, as well as address issues of local, national and global importance:

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The Plan also identifies five Strategic Objectives to support and advance the U of T community’s leadership in research and innovation, fostering of collaborations and partnerships, equity and diversity, integration of research and teaching, and strengthening of institutional supports.
Our vision for the future is challenging but clear: to create the most supportive environment possible so that our researchers, scholars and learners can do what they do best—advance understanding and apply new knowledge.

For nearly two centuries, University of Toronto faculty, students, postdoctoral fellows and staff have been extending the boundaries of knowledge and providing answers to some of the world’s most important questions.

How can we better promote health and cure disease? How do our diverse communities negotiate understanding across differences? How did we get here, and what are the fundamental features of the physical universe? How is human activity affecting the environment and influencing climate change? What does it mean to be human? How do we understand and embrace different ways of knowing, and how do we infuse our research practices with such knowledge? Can we create societies that advance health, dignity and justice for all? How do we enable sustainable economic development? How can we use new technologies to communicate, innovate, engage with our fellow citizens, and build a better world?

U of T is among the world’s top research-intensive institutions and among the top 10 public universities in the world that excel across the full scope of disciplines. The extraordinary breadth and depth of academic excellence across our three campuses and partner hospitals is visible in the local, national and global impact of their research. Our impressive performance is a reflection of the excellence of our faculty, our graduate and undergraduate students, postdoctoral fellows and their collaborations with leading researchers and institutions worldwide, as well as our strong partnered research. Our researchers, scholars and innovators are internationally recognized for their ground-breaking contributions. Our faculty author or co-author more articles than their colleagues at most other universities in North America. The Toronto Academic Health Science Network (TAHSN), composed of the University of Toronto and its affiliated hospitals and their research institutes, is a leader in Canadian health care research, innovation, and delivery, and is one of the largest, most productive academic health science clusters in the world. TAHSN works collaboratively to advance and sustain a shared academic mission of providing high quality patient care, conducting innovative research, offering world renowned top-quality education programs, and participating in knowledge transfer activities.

Fundamental research

Increasingly, public and private funders of research expect to see immediate impact from investments in research, with clear evidence of linkages between the academic activities of scholars and the larger goals of society beyond the university. However, impact and value are
realized in different ways and over timescales that vary from the immediate to decades or longer. Knowledge of the kind universities produce is at the root of social progress, inclusiveness, economic growth, better health, and a higher quality of life, and society entrusts universities to undertake the research that generates and preserves such knowledge. Fundamentally, our progress as humans has been driven by valuing knowledge for its own sake. New approaches to solving problems would not be possible without strong foundations in basic and theoretical investigator-led research. For instance, magnetic resonance imaging (MRI) is a practical implementation of nuclear magnetic resonance spectroscopy, which was developed for use in fundamental chemistry research. The accuracy of Global Positioning System (GPS) readings is based on Einstein’s theories of special and general relativity. And when Till and McCulloch demonstrated the existence of pluripotent stem cells in 1961, they could not have foreseen how Medicine by Design would eventually harness the exceptional expertise at U of T and its partner hospitals to undertake transformative research in regenerative medicine and cell therapy. Indeed, discoveries that are unanticipated or serendipitous can be the most valuable, as they will often have unexpected implications for society far beyond their immediate impact. In addition to being the foundation for life-changing products and technologies, investigator-initiated science plays an even more fundamental role in our lives: it satisfies our basic human need to understand the universe and our role within it.

We must also consider that the most immediate effect of basic and investigator-driven research on social and technical innovation may be through the education and experience that students receive, and that they then take with them to organizations within government, private industry and civil society. For many if not most professors, the opportunities for long-term immersion in important intellectual problems are a key motivation to devoting a lifetime to research. U of T is, and will remain, an institution where the pursuit of fundamental and disciplinary knowledge serves as the foundation of our research strategy.

Research impact

The University’s institutional vision Towards 2030 re-affirms the central role of excellent disciplinary and interdisciplinary research within the University as well as the need to leverage those strengths to nurture successive generations of Canadian scholars, leaders, innovators and citizens. While U of T remains an educational institution at heart, it is also our obligation as public stewards of knowledge to ensure that the scholarship we generate and maintain engages and is made available to the broader community. Impact may be defined in different ways, not least of which is the impact to be gained from listening to and involving the perspectives of the people and groups with whom we work and want to engage with our scholarship—and from being inclusive of those perspectives and ethical in the way we conduct research. The benefits we accrue are both to our partners in society and to scholarship itself. At the local level, we collaborate with community agencies, organizations and municipal governments to work on the issues they face, and we are identifying experiential learning opportunities for our students to become engaged in the communities within which they learn and live. At the provincial and national levels, we seek out opportunities for our scholarship to inform public policy debates that affect people in every region of the country. Globally, we partner with institutions and
organizations that can help us extend our reach and impact to understand and address the significant challenges that our planet faces.

**An innovation and startup powerhouse**

Research that feeds innovation, entrepreneurship and commercialization is thriving at U of T. In all sectors and across all of our campuses, our faculty, postdoctoral fellows and students are turning ideas into products, services, jobs, and companies that are contributing to the Canadian economy and improving lives around the world. We are a North American leader in the number of new IP-based startups, in the number of new invention disclosures, and in the number of new licenses and options. On average, U of T and its partner hospitals file one patent every three days on behalf of our researchers. U of T researchers and students are also engaging in innovating social enterprises, such as testing cutting-edge 3D printing technology to create high-quality, better-fitting prosthetics in developing countries and developing an online platform that helps refugees navigate Canada’s complex health care system. We lead in Canada and are among global leaders in rankings of top universities working with the world's most innovative companies. U of T is known for its culture of innovation, research partnerships that span the globe, a multitude of collaborations with private sector and public sector organizations, and a vibrant entrepreneurship culture. The U of T Entrepreneurship community provides mentorship, expertise, space, and networks for all stages of the innovation pipeline and provides the skills and resources entrepreneurs need to effectively pitch ideas, find collaborators, and build and scale their businesses.

**Research strategy**

This Strategic Research Plan sets the stage for the next five years with the identification of research themes, examples of subthemes, and strategic objectives. It is strongly informed by the plans of our academic divisions, affiliated partners, government and community stakeholders. It aligns with the institutional priorities articulated in U of T’s *Towards 2030* plan, the President’s *Three Priorities*, the *International Strategic Plan*, the *Administrative Response to the President’s Advisory Committee on Divestment from Fossil-Fuels*, and the *Final Report of the Steering Committee for the U of T Response to the Truth and Reconciliation Commission of Canada*. While much remains to be done, we look forward to engaging with Indigenous communities to advance Indigenous scholarship at the University.
STRATEGIC RESEARCH THEMES

The U of T Strategic Research Plan identifies seven thematic areas that engage the research community and our partners in solving fundamental questions as well as in finding solutions to some of the most pressing challenges that face humanity. The key to the success of this strategy is to support the excellence of investigator-led research, basic and applied, both for its intrinsic value and so that it can remain responsive to new areas of priority as they arise. Through emphasis of key thematic areas, we can support our traditional strengths in disciplinary research and help create the novel approaches and breakthroughs that are needed to address issues of local, national and global importance. These clusters of scholarship emerged from the work underway in many different disciplines and divisions at U of T. While the themes represent areas of scholarship where U of T and its partners already have considerable strength, they will require sustained support in order to have a lasting impact. The seven themes represent broad areas of overlapping significance and interaction and, as such, scholarship in each will have consequences for all the others. They can provide us with opportunities to increase the impact of our research, for example, by informing public priorities and policy, and they dovetail with the various “grand challenges” programs, the United Nations 2030 Sustainable Development Agenda and the Paris Agreement on climate change—all projects in which the international research community is currently concentrating resources and talent.

Responding to new challenges

The themes and sub-themes are not meant to be exhaustive of all the excellent work going on at the University—nor are they meant to be prescriptive. They are meant to offer students, professors, divisions and our partners examples of strategic entryways into the critical fundamental research undertaken by our scholars, which may not have a foreseeable direct application, as well as the interdisciplinary and multidisciplinary networks and collaborations that depend upon outstanding disciplinary work. At the same time, the themes give the flexibility required to respond to new challenges as they arise. They integrate with the work of the University’s cross-divisional units and initiatives, which support the impact of current research by creating interdisciplinary hubs that concentrate on large, globally significant issues. New challenges and thematic areas will continue to be identified and addressed in an ongoing way. The themes also embody the two strengths of the University that result from our twin teaching and research missions: our ability to apply new knowledge to advance education and practice and our commitment to mobilize our extensive and diverse intellectual resources, in collaboration with community partners of all kinds, to the benefit of society.
DISCOVER: Our Understanding of Humanity and the Universe

Scholars from every academic corner of U of T are exploring foundational principles and discovering answers to fundamental questions.

The freedom to engage in fundamental, exploratory and critical scholarship across the humanities, social sciences, and sciences—scholarship that is not necessarily guided by a specific goal other than the sheer need to understand ourselves and the world around us, or to evaluate received understandings—is a foundational principle of the research-intensive university. Blue skies exploration generates new knowledge and underpins excellence in all cross-disciplinary and problem-based research, often leading to advances not anticipated by goal-oriented investigation. For example, U of T researchers working to discover the properties of gravity waves, how neurons operate, new tools in geometric analysis, the grammars of Indigenous languages, how culture and language influence learning, and the philosophical and political underpinnings of human rights are bringing to light insights and understanding that are intrinsically valuable and important. Researchers and students from every academic corner of U of T are conducting basic research, enriching our understanding of fundamental questions: from the mathematical principles underlying physical reality; to how molecules and particles interact; to the origins of life, species, consciousness and disease; to the beginnings of our planet and the universe in which it resides. If history is any guide, whatever we discover will very likely radically affect the future of how we think about ourselves, our world and our place in the cosmos.

Examples of Sub-Themes

ENRICHING FUNDAMENTAL KNOWLEDGE
The pursuit of fundamental, discipline-based knowledge is the foundation of academic scholarship—and it is the foundation on which breakthrough discoveries are built and a necessary precursor to the applied research that directly impacts society. U of T physicists, chemists, astronomers, cosmologists and earth scientists are actively engaged in efforts to advance our understanding of the fundamental principles that underlie the structure and evolution of the physical universe and its constituents. Our medical researchers, life scientists and philosophers are challenging how we think about life, its interconnectedness, and the conditions under which it thrives. Mathematicians and statisticians are providing the language and the tools with which we explore and articulate fundamental relationships. Our historians, archaeologists, palaeontologists, and anthropologists are plumbing the depths of humanity’s past, bringing to light fascinating new knowledge about how our species and the diversity of human cultures came to be. Our scholars working with Indigenous epistemologies and with critical understandings of the social, historical, cultural, political, economic, and ethical dimensions of education and research are challenging assumptions about what we think we know and how we know it. Our sociologists, political scientists, economists and linguists are asking probing questions about human behaviour and its impacts on our world and on our societies. In exploring the artistic and cultural dimensions of human experience, U of T arts and
humanities scholars are using their expertise, their insights and their abilities to develop creative ideas to explore the complexity and variety of the human experience. U of T investigators in every field are pursuing their own research and are collaborating with each other across disciplines to investigate questions that are, at root, driven by our very human need to understand the meaning of our own existence—and that may also give us the insights we need to help solve some of our greatest challenges.

MIND, BRAIN AND THE HUMAN
Different cultural and religious traditions throughout history have had divergent views on human nature, but most have maintained that humans are unique and distinct from non-humans. U of T neuroscientists are examining the differences and similarities between our cognitive capacities and those of artificially intelligent systems and what that might tell us about the distinctiveness of the human mind. Studies in many disciplines, including the history and philosophy of science and technology, linguistics, music and neuropsychology are questioning the nature and status of human rationality and creativity. Cognitive scientists at U of T are bringing together research in computer science, philosophy, psychology, psychiatry, linguistics, and neuroscience to extend the reach and impact of their work. U of T’s psychologists, sociologists and anthropologists are studying the social aspects of what it means to be human and are making fascinating discoveries about how we interact with each other. The exploration of the assumptions that underlie our human identities in literature, philosophy, psychology and anthropology suggests to our humanists and social scientists that we are not who we have imagined ourselves to be, and that perhaps our problems are partially a consequence of that misunderstanding. U of T scholars in biology, the applied sciences and engineering, artificial intelligence and computer science, mathematics, medicine, law, psychology and neuroscience, political science, sociology and philosophy, among many other disciplines, are debating the nature of these most human characteristics, revealing important implications for our social, political and economic institutions and helping us understand just what makes the human mind unique.

PLANET EARTH AND THE COSMOS
Observations of space are critical to advancing many key scientific issues that have long interested physicists and cosmologists: the early expanding universe, the formation of stars and galaxies, the movement of planets, the discovery of extra-solar planets and prospects for life elsewhere in the universe. The latest instruments for space-based observations have opened up new electromagnetic windows not available to ground-based astronomy. Here on Earth, several very powerful and extremely large telescopes, such as the Square Kilometre Array, are under development. A new era of space exploration also requires a new generation of space-related technologies. From spacecraft to the next generation of micro and nano-satellites, from autonomous rovers to the critical tools for monitoring the surface, oceans and atmosphere, and from human life-support systems to strategies that enable long-term human space travel, U of T earth scientists and engineers are asking fundamental questions and generating the new knowledge that will push technology beyond its current limitations. The advent of high-performance computing and big data analytics has also provided the essential approaches to
analyze the wealth of new data that is being collected, and has given us the ability to perform detailed computer simulations of the evolution of our solar system and galaxy. The more our knowledge of the solar system, our galaxy and the rest of the universe grows, the more we understand how the Earth formed and how life here arose.

**ORIGINS OF DIVERSITY**

Fields as diverse as medicine and the life sciences, anthropology, archaeology, palaeontology, linguistics, the study of languages and literatures, history, sexual diversity studies, women and gender studies, psychology and cognitive science raise profound, fundamentally human questions ranging from the origins of life, species, consciousness and disease, to the origins of language, art, science, civilization, culture and the full range of human diversity. For most people, questions of origins and diversity hold personal significance and speak to the multiple identities we all hold, so their exploration is necessarily multifaceted. U of T scientists and social scientists are nurturing collaborations with U of T humanists and artists as they explore our evolving place within the world. With a shared curiosity, our investigators are focusing on the origins of human diversity, including the first appearance of anatomically modern humans, as well as the origins of art, writing, language, society and the vast array of distinct human cultures that exist today. They are also studying humans and their primate cousins in all their biological and social dimensions, examining the factors that have affected the evolution of humans and other animals, and tracing the factors that generate, maintain or change contemporary genetic, physiological and behavioural variation. U of T researchers who deal with institutions and models of social behaviour cross-culturally are establishing higher-level theories about the similarities and differences between human communities and cultures as they model within their own work the value of collaboration and transdisciplinary research. Questions of origins resonate across all disciplines and among the general public because they directly confront the mysteries associated with our existence, our past and, perhaps mostly importantly, the possibilities for our collective future.

**SUSTAIN: Societies, the Environment and Natural Resources**

*Human activity is a major cause of environmental change and the rate of that change has accelerated dramatically over the last century.*

Understanding the dynamics of both natural and human-made changes in the environment requires knowledge spanning many disciplines. Water, air and soil pollution; climate change; the depletion of natural resources; species extinction; and waste disposal are challenges that are partly a result of an incomplete understanding of environmental systems and processes. The University of Toronto has a long and outstanding record of research and innovation in matters related to energy, the environment, climate change and natural resource management, including: ground-breaking research on Earth’s climate history and modelling the future impact of human-induced global warming; innovative studies of contamination in the Athabasca Oil Sands region showing the possibility that future risks to humans and wildlife posed by surface
mining activity is underestimated in environmental impact assessments; research that could help in understanding the geochemical processes involved in waste disposal and groundwater clean-up; and collaborative research with international partners to explain increases in ozone-depleting chemicals in the lower stratosphere of the Northern Hemisphere, despite the decades-old ban on chlorofluorocarbons. U of T researchers are also pouring their energies into the engineering and commercialization of cleantech and energy-efficiency breakthroughs, including: the world’s most energy-efficient light bulb; environmentally friendly biodiesel fuel; a way to clean biogas waste and convert it into fertilizer; the means to improve the cost-competitiveness of solar power; and next-generation photovoltaic cells, using colloidal quantum dot technology. U of T researchers are also trying to understand how the technical, social, policy, and political challenges of implementing potentially costly environmental solutions can be overcome; how institutions can foster the application of critical thinking, rigorous science and new technology to a given problem; and how the principles of sustainable development—including how social, environmental, ethical and economic issues are intimately interconnected—question traditional models of economic growth. U of T scholars in fields such as Indigenous studies, near and middle eastern studies, medieval studies, classics, history and critical literary studies familiarize contemporary audiences with historical and cross-cultural ways of thinking about humanity’s relationship to nature, and recognize that some of our contemporary ecological problems—and possibly their solutions—have their roots in the practices of other times, places and cultures.

Examples of Sub-Themes

SUSTAINABLE ENERGY AND CLEANTECH
The world—and the developed world in particular—has come to depend almost exclusively on non-renewable fossil fuels and their offspring, such as petrochemicals, to fuel industry and economic growth. This dependence has had a tremendous impact on the global economy and has been a catalyst for conflict. Our cities have expanded built on the assumption that fossil fuels are a relatively cheap and available resource, but that assumption has been tested, and many countries have recognized that we must eventually abandon our reliance on them. U of T researchers in disciplines such as chemical engineering and applied chemistry, electrical and computer engineering, and forestry are collaborating with partners in the private and public sectors to develop world-leading cleantech solutions, such as new battery technology and fuel cells, solar energy and fuels, energy storage, smart grid technology, renewable energy systems, monitoring systems, and alternative biofuels. U of T investigators in architecture and building science are researching low energy passive solar housing, high performance/low environmental impact buildings, durability, life cycle analysis, systems integration, sustainability and resilience, as well as research about best practices for the design, construction, commissioning and maintenance of municipal infrastructure. Researchers are also formulating forward-thinking ideas to resolve the institutional, behavioural and regulatory issues that must be part of any solution to our sustainable energy challenge. As part of this effort, we are using our own campus as a living laboratory to test out new technologies, designs and strategies for behaviour change to reduce both our demands on the planet’s resources and our contributions to polluting emissions.
SUSTAINABLE SOCIETIES
A sustainable society is one whose level of consumption reflects environmental and resource balance, and that assures its citizens equality, freedom and a healthy standard of living without compromising the needs of future generations. U of T scholars are working within and at the confluence of disciplines to study what makes a society sustainable, including such issues as the governance and planning of development; decarbonization policy; the impacts of democracy, business and innovation on conservation; the global response to climate change; environmental education and behaviour change; the commodification of nature; urban sustainability; and the environmental health of vulnerable populations. They are also studying how non-polluting, renewable resources can provide the power to drive sustainable energy systems; how efficient farming techniques and technologies can improve yields; how reduced consumption helps reduce resource use and eliminates waste; and how the protection of natural habitats and critical ecosystems protects the quality of our air, water, and soil. A sustainable society also provides equal access to basic needs like nutrition, shelter, education and health care. Our scholars are looking at how economic systems can be made more transparent, ethical and built on fair and equitable practices; how political systems can be made more democratic and participatory and governments accountable; and how companies can employ more sustainable methods of production and distribution. As with food, air and water, the state of our land, waterways, forests and the natural resources they contain affect the overall health and wellbeing of people and local economies. Scholars at U of T are finding that managing our resources fairly, equitably, and sustainably will require creative thinking and leadership at all levels of society and in partnership with Indigenous peoples to mobilize policy within Canada and the international community. Sustainable, long-term and equitable solutions for a sustainable society are only achievable if we can better understand the complex interactions among people, our institutions and cultures, and the natural environment.

GLOBAL CLIMATE CHANGE
Climate change and its causes is a controversial topic that tends to polarize debate. However, from the perspective of science, there is no doubt that our climate is changing, and will likely continue to do so long into the future. Still, there are many differences of opinion on what needs to be done, how quickly, and who will pay. As the causes of climate change and its impact on the environment, human health and society have come to be much better understood—what is clear is that what we do today can have enormous long-term effects on climate. Detecting and quantifying these changes presents major challenges to remote sensing and imaging from space, and U of T’s earth, climate, and atmospheric scientists are collaborating with our mathematicians, computer scientists and engineers to develop measurement concepts, biosphere information retrieval techniques, monitoring tools, and sophisticated computational models for quantifying change and its effects on terrestrial carbon and water cycles. Researchers at U of T are looking at the physical processes underlying climate change as well as possible technical solutions to some of its associated problems. All of these issues also have clear relevance for public policy, the health of humans and ecosystems, and the economic wellbeing of Canadians. Our researchers are also engaging their broad expertise in an
examination of climate change in the context of urban planning, building design, economics, poverty and social justice, ethics, education, traditional Indigenous and historical ecological knowledge, global governance, and environmental policy and law. Climate change is something that affects us all in many different ways, and addressing it requires the concerted efforts of a wide range of disciplinary perspectives from the physical and applied sciences, the social sciences and the arts and humanities.

PROMOTE: Healthy People, Healthy Communities, and a Healthy World

*Improving health and wellbeing has long been a human imperative, and there is still much we can do to alleviate suffering and improve quality of life for all people and their communities.*

Over the last two centuries, advances in public health, disease prevention, basic medical sciences and the health professions have saved countless lives and have improved and extended the lives of many more. Despite these successes, global trends have created new and increasingly complex health problems that will require all of our ingenuity to solve. U of T investigators on our campuses and within our affiliated teaching and research hospitals work collaboratively to ensure people can remain active and healthy throughout their lives, to advance high quality patient care, and actively translate knowledge for the benefit of all Canadians and people worldwide. As U of T researchers and trainees seek to develop personalized and regenerative therapies that offer hope in the treatment of heart disease, cancer and the replacement of failing organs, they are also trying to find improved ways to help those at immediate risk from hunger and malnutrition, HIV/AIDS, malaria, tuberculosis and emerging infectious diseases. U of T health scientists and practitioners, social scientists and humanists are asking how education, knowledge of human development and an understanding of the broader biologic, social, cultural and environmental determinants of health can help us devise better ways of preventing disease in the first place. Our faculty are addressing the importance of physical inactivity, a leading cause of many chronic diseases and how physical activity and sport can be an important part of disease prevention. U of T researchers are conducting basic and translational research that spans applications of novel biomaterials to applications of music, the arts and humanities in the health sciences. Rehabilitation scientists, computer scientists and biomedical engineers are making advances in assisted living technologies, neuro-robotics and brain-computer interfaces that are enabling users and improving quality of life. Interdisciplinary researchers drawn from across the divisions of U of T and our affiliated hospital and community partners are world leaders in the pursuit of solutions to the challenges of keeping people and communities healthy, many of which are as much cultural, social, political and institutional as they are scientific, biomedical or technological.
Examples of Sub-Themes

HUMAN DEVELOPMENT AND HEALTH THROUGH THE LIFESPAN
Understanding the linkages between early childhood development and later-life health, learning and social flourishing may be crucial to preventing illness and ensuring that we not only age well but remain active, healthy and productive members of our communities. U of T scholars, educators and investigative teams from across disciplines and divisions—such as obstetrics and gynaecology, physiology, ecology and evolutionary biology, public health, and applied psychology and human development—are collaborating to ensure that health through the lifespan is at the forefront of the research, education, technology development, and social policy agendas, so that people can maintain optimal health and quality of life, whatever age they happen to be. U of T faculty are at the forefront of research into how biological endowment, economic status, diet, access to opportunities for recreation and physical activity, opportunities for social interaction and community involvement, education and ongoing learning, the availability of healthcare and mental health supports, community services and infrastructure such as transportation and appropriate housing, and, not least of all, historical and social processes such as colonization and systemic marginalization, affect the health and wellbeing of individuals and communities. Reducing the impact of social challenges requires research, policy as well as practice to recognize the dynamic interplay with individual risk. Youth coming out of foster care are at risk of becoming homeless because they lack resources and supports, a problem that is particularly acute for Indigenous youth. Older Canadians are living longer and with fewer disabilities than the generations before them, but the majority of seniors today also live with at least one chronic disease that must be managed. U of T experts are looking at how cancer, cardiovascular disease, and dementia impose particularly significant personal, social, and economic burdens, and they are examining ways our current health care system can better promote health and prevent disease rather than focusing on treating it after the fact. To curb the social and economic costs associated with disease and chronic illness, the focus will need to take into account the social, economic and environmental contexts of disease and illness.

MOLECULAR MEDICINE AND THE BIOLOGY OF DISEASE
The completion of the Human Genome Project in 2003 signalled a new era of medicine based on a detailed understanding of human biology and on the underlying genetic, molecular and cellular mechanisms of disease. But as scientists have learned, genetics are only one part of the picture. Molecular medicine and the biology of disease embrace a vast array of phenomena with wide applications, from regenerative medicine, tissue engineering, systems biology, and genomic medicine. Precision medicine is a promising medical approach that involves using an understanding of a patient’s genotype and epigenetics to tailor their medical care. U of T researchers are looking for specific biomarkers to aid in the early and more robust detection and prevention of common conditions such as cancer, cardiovascular disease, obesity, diabetes, autoimmune diseases, and asthma. U of T is integrating engineering and scientific approaches, such as in stem cell therapy, regenerative biomolecules, tissue engineering and the use of biomaterials, new drug discovery, synthetic biology, among many other possibilities, to open
new paths to the treatment of disease and injury, and these insights are being greatly facilitated by our integrated system of specialized research facilities dedicated to basic and applied research, clinical translation, advanced manufacturing, and commercialization. How expensive new treatments will be, and whether our current health care system will be able to ensure non-discrimination and equitable access while delivering them cost-effectively, are still open questions that will have consequences for all of us individually and as a society. U of T and its affiliated hospitals have an outstanding record of achievement in biomedical, biochemical, pharmaceutical, and clinical research, and U of T humanists and social scientists are on the forefront of examining the emerging ethical, legal, social, and public policy issues raised by these new approaches.

**GLOBAL HEALTH, PUBLIC HEALTH, AND HEALTH SYSTEMS**

Global health encompasses research and practice that tackles health issues that transcend national borders and that focus on improving health and achieving health equity for all people, everywhere. Building on national public health efforts and institutions, global health has achieved extraordinary improvements—global life expectancy in the last 40 years has increased more than in the preceding 4,000 years. Child mortality rates are down in some countries by 75%. As child deaths decline and the effects of smoking and other risk factors increase, chronic diseases are emerging as a major global challenge but they create a heavy economic burden by increasing the demand on health care and social systems and by reducing productivity. As international travel increases and greater numbers of people migrate from one region of the globe to another, emerging health trends abroad could become part of life anywhere, including here in Canada. And we have much to learn from our urban immigrant, Indigenous, and northern communities, as they grapple with health issues that are specific to their life experiences. In partnership with these communities, U of T researchers in medicine, pharmacy, nursing, and social work are addressing the complex factors that underlie health inequities to create better health outcomes for all. A challenge across the world is the sustainability of health systems and health services. U of T is a leader in research that addresses questions of accessibility, quality and efficiency of health services. The main engine of improved health worldwide over the last 40 years has been knowledge, much of which has come from academic research. In collaboration with partners from the community, the non-profit, corporate and civil society sectors, and other academic institutions, U of T researchers across sectors are creating new knowledge to generate meaningful solutions to the most complex problems we face today as a global society, changing the trajectory of global health towards faster declines in death and disability and more productive lives.
ENGAGE: Language, Culture, Art, Values

Language, culture, art, values are not only ways human beings express themselves or relate to each other—in a fundamental sense they define us as human beings.

In the face of great social, cultural and technological change, do we risk losing some of that humanity? The importance of constantly engaging our humanity—and our fellow human beings—through listening, our cognitive faculties, languages, literatures, cultures, art, and values cannot be overstated if we are going to negotiate the challenges we face as a species. U of T students, researchers, scholars and performers who examine the cultural, historical, philosophical, linguistic, literary, and artistic dimensions of human experience are helping us understand the diversity and complexity of our changing world. As distances shrink via new communication and social technologies, and global competition mounts, knowledge of these aspects of our experience bridges cultures and engenders new relationships. By learning about the ideological practices and processes that have shaped and continue to structure the lives of people historically and cross-culturally, it becomes possible to transform and change inequitable practices. By embracing and understanding difference, and by applying multidisciplinary tools to critically examine our deepest assumptions and biases about other people, U of T researchers are helping to fight racism and anti-LGBTQ discrimination, work for equity and inclusion, understand different ways of knowing, and promote openness and peace. Investigators that engage with issues of pedagogy, representation, performance, and recording are giving us better purchase on our shared experiences as human beings, and on our history. Our scholars who are interested in the world’s languages and literatures, the study of particular cultures and eras, communications, education, and visual and cinema studies are placing our era of digital media, social networking and the rapid transmission of ideas in its proper cultural and historical contexts. U of T also has a rich community of researchers investigating cognitive systems—including those in computational neuroscience and machine learning, computational modelling of human learning, language, vision, audition, and knowledge representation—and they are applying the results of their investigations to mental health research, the cross-cultural study of mind and consciousness, and the study of the cognitive underpinnings of creativity and art. Our educational scholars, psychologists and other brain/mind researchers investigating cognition—the very defining boundaries of the human—are also finding themselves able to address important questions of fairness, suffering, human dignity, equity and social justice.

Examples of Sub-Themes

COMMUNICATING IN THE DIGITAL ERA

Fundamental to our identity as human beings is our ability to engage and communicate, particularly through our ability to find, construct, and convey meaning through language, art, and other symbolic means. Technologies such as the printing press, the telephone, radio, television, and film radically changed how we communicate with each other, and digital technologies have given us new methods for trading information and telling stories, and in so
doing have re-made our culture and our world. U of T scholars across disciplines are examining how digital tools—such as the internet and social media, online games and applications, multimedia and virtual reality, productivity applications, cloud computing, interoperable systems, and mobile devices—are influencing the creative convergence of art, science, technology, business, and education and are changing how and what we communicate. The exploration of these modes of narrative and meaning making, along with their social, political, epistemological, technological and ethical implications, is an essential activity in trying to understand the future possibilities of our world. Our researchers are also looking at how new technologies are being applied in an ever expanding variety of contexts, including political discourse and radical cultural critiques, Indigenous language preservation, art and literature projects, eHealth innovations in diagnostics and treatment, computational biology, information policy research, and computer-human interaction and social networking. Our faculty are internationally renowned for their insights into the impact of new communications technologies, and for their ability to develop creative ideas, from writing symphonies to documenting the evolution of living languages, that enable people to communicate, create, learn, share, and collaborate. The impact of U of T researchers and students is realized through their partnerships with community groups, as well as cutting-edge creative endeavours and scholarship.

VALUES IN PERSONAL AND PUBLIC LIFE

Values are an integral part of every culture. Being part of a culture or religion that shares a core set of values creates expectations and predictability, without which members might lose much of their personal and cultural identities and sense of worth. For many people, their values tell them what is good, beneficial, important, useful, beautiful, desirable or constructive. Our values guide us in deciding what to do, helping to solve common human problems, and over time becoming the roots of revered cultural traditions. U of T scholarship in such areas as philosophy, literary studies, political science, and Indigenous studies is centrally engaged with profoundly influential and enduring statements of value in personal and public life. The exploration of such matters as the role, validity, and transmission of values, who should be responsible for attending to issues of public concern or what is a fair resolution to a dispute is fundamental to solving both social and technical challenges. More broadly, addressing questions about the perspectives of different cultures—for example, how Indigenous voices and knowledge systems contribute in creative, transformative and critical ways to the dialogue on values—is essential to comprehending how cultures interact, and to building understanding, creating opportunities for communication, and promoting peace. Personal and public values arise as critical questions in the work of U of T scholars across such diverse areas as classics, languages and communication, bioethics, cognitive psychology, public policy, democratic theory and practice, global justice and human rights, constitutionalism and the rule of law, history of thought, morality in literature, and the study of religion. Scholars at U of T who study values in personal and public life are making critical contributions to their fields and helping to generate a deeper understanding of human behaviour and society.
ART, DESIGN, PERFORMANCE, AND THE HUMAN IMAGINATION

U of T has been setting the stage for creativity in the arts and design from its inception. Our faculty, staff, students, and graduates figure prominently in the ranks of leading writers, performers, researchers, and administrators across artistic pursuits and around the world. Scholarship at U of T in the performance and figurative arts intersects with our very human impulses to record, document and imitate, themes that make the University of Toronto an exciting laboratory of ideas and practices. The acts of representation and performance cross cultures and embrace not only how images, sounds, structure, design and language relate to the world at large, but also how they relate to us, as both individuals and societies, and how we generate and make use of these and other representations. The research of our art and architectural historians engages a wide range of periods and regions, and incorporate, for example, anthropological, economic, popular cultural, political, postcolonial, Indigenous, and historiographical approaches, generating diverse understandings of the rich range and deep history of human artistic production and reception. Our fundamental and creativity-driven research in music at U of T focuses on understanding music and sound in a global context as expressive cultural communication and encompasses humanities and social sciences, music composition and performance, and interdisciplinary fields such as music technology and digital media, and music and health sciences. As professionals, our faculty play a pivotal role, for example, in the production of the built environment bridging the technical and social, the practical and theoretical. As researchers they are critically engaged with the forces of urbanization and technological change, the challenges of environmental sustainability, and the struggle for cultural expression. Our scholars in theatre, drama, and performance study the relationship between the artists who create written texts intended for production, the artists who turn scripts into performances, and the audiences who experience the resulting theatrical event. Whether examining the multi-faceted forces of globalization, exploring new approaches to inter-cultural dialogue, or pushing the frontiers of digital media production, our vibrant arts research community draws from the humanities, social sciences, and creative arts to contribute their insights, creativity, and commitment to some of the most pressing issues and exciting opportunities of our time.

ADVANCE: Governance, Diversity, and Social Justice

*Effective governance and inclusive engagement are prerequisites for human prosperity, wellbeing, and social justice.*

Governance refers to structures and processes that are designed to ensure accountability, transparency, responsiveness, rule of law, stability, equity and inclusiveness, empowerment, and broad-based participation. Governance also represents the norms, values and rules of the game through which public affairs are managed in a manner that is transparent, participatory, inclusive, and responsive. In a broad sense, governance is about the cultural and institutional environment in which citizens and stakeholders interact among themselves and participate in public affairs. It is more than the rules and organs of the government: just governance begins
with the willingness of all parties to listen to each other. The study of governance in its various forms is central to several urgent contemporary issues: legal reform and the strengthening of democratic and civil society institutions; the creation and establishment of procedures and rules that lead to greater efficiency, transparency and accountability in decision making; negotiating understandings across difference; and the challenges of decolonization and making governance more inclusive, participatory, respectful of diversity and responsive to issues of autonomy, equity and social justice. Governing for peace, prosperity, inclusion, and justice presents colossal policy challenges: according to the United Nations, more than one third of our world’s citizens currently live in poverty and over 20 countries are engaged in civil wars, with many more suffering from nearly constant low-level political violence. In Canada, First Nations peoples continue to suffer the legacies of institutionalized racism and colonialism. Although the links between political institutions and governance on the one hand, and social justice, equity, peace and prosperity on the other may be relatively clear, how they relate to each other and play out in practice are complex, and U of T scholars who study these relationships are finding that the institutions that foster peace and prosperity in one culture, geographical location or historical period may be detrimental in another. Moreover, we have little understanding of how to promote the development of effective institutions, laws, governance and regulatory frameworks in jurisdictions that don’t have them. Researchers in political science, criminology, law, management and the humanities at U of T are learning about the ways that political and social institutions, diversity, social justice and peace influence one another, and how they are entwined with issues as wide-ranging as climate change, resource depletion, population pressure, migration, health care reform, international security and development, and gender, ethnic, class, and cultural identity. And U of T scholars whose work is grounded in Indigenous philosophies, spiritual beliefs, traditions and practices are contributing to historical and alternative understandings of how governance, treaties, the environment, and cultures relate to each other.

Examples of Sub-Themes

THE KNOWLEDGE ECONOMY AND THE GLOBAL VILLAGE

Canada’s resource-dependent economy of the past has been undergoing a paradigm shift over the last century to an innovation-powered “knowledge economy”—one based on the provision of high-value services, knowledge products, highly qualified personnel, and, increasingly, social innovation. 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, social and human resources development, and our nation’s looming innovation, productivity and prosperity challenges. In an era when countries are scrambling to increase access to postsecondary education, U of T investigators are critically challenging how the ever-increasing globalization and proliferation of information and knowledge affects the boundaries between public and private life. They are exploring questions such as the relationships between mass media, civil society, and private enterprise and whether the convergence of media affects freedom and democracy. Will the knowledge economy create wealth and opportunities, not only for mature economies but also for those in the Global...
South? U of T scholars are learning that full global economic recovery will depend not only on understanding what triggers a financial crisis but also on recognizing opportunities for change, so that we may build a more sustainable, humane, and just knowledge economy.

**PEACE, CONFLICT, INCLUSIVENESS, AND JUSTICE**

The beginning of the 21st century has seen the development of new kinds of conflict, in which adversaries are less clearly defined and sources of hostility are based on major discrepancies between the social, cultural, and political systems of the combatants. Scholars at U of T are working within and beyond the traditional purview of international affairs in an effort to identify the deep causes of strife—from poverty and disease, inequality, resource scarcity and weapons proliferation, to competing claims for justice and failures of foreign-policy decision making. Other scholars who study human behaviour from the disciplinary perspectives of political science, transnational studies, history, classics, philosophy, the study of religion, medieval studies, economics, law, anthropology, psychology, biology, ecology, and neuroscience, have also taken up the task of understanding diversity, inclusiveness and their contributions to peace. Preventing conflict, more than understanding its cause, requires understanding the types of institutional arrangements that can lead to diversity, inclusiveness, and social justice. U of T researchers are studying the roots of peace and conflict in our own culture through studies of wide-ranging phenomena, such as imperialism in ancient China, India, Greece and Rome and the colonial legacies of Canada and other nations. And they are leading innovation by proposing new and more respectful ways of engaging communities, building partnerships, promoting self-determination and marshalling institutional expertise to stop conflict before it starts.

**LAW, ETHICS, AND THE DIGITAL INTERFACE**

What is right and what is just? What is in the best interest of the public good? What are our obligations as individual citizens and as members of organizations in a world where our collective actions can have global consequences? Historically these difficult questions have been at the heart of democratic life. Current issues relate to how we craft laws around digital surveillance, how we identify fake news propagated through social media, and considering how internet censorship and surveillance impact the openness of communications or threaten human rights. Trying to provide answers is of strategic importance to modern Canada’s governance, security, prosperity, and wellbeing. At U of T, humanists and social scientists have realized that the best and most sustainable solutions will come from uniting scientific and technological insights with the results of basic research in bioethics, geography, history, law, literature, political science, criminology, philosophy, sociology, and other disciplines. The study of successful public institutions has led to the insight that they serve their societies most effectively and humanely when they have the creative capacity to break away from the administrative application of policies and traditions and instead publicly re-imagine and realize new social arrangements. Legal and management scholars, philosophers, psychologists, and sociologists at U of T are undertaking this very kind of re-imagination and asking how societies can fairly and equitably utilize and allocate knowledge in the digital age, where the rights and
INNOVATE: Technologies for the Future

New technologies and advanced materials, processes and engineering techniques have enabled society to realize new and innovative ways of doing things while at the same time serving as a lens through which to understand our humanity.

And there is no end in sight to this accelerating technological revolution. New knowledge and new technologies, with their tremendous capacity to permanently alter our social and physical landscapes, are intimately intertwined with questions of values, ethics, equity and social policy which, in turn, cannot be disentangled from the fundamental science behind the technologies. U of T researchers are actively engaged in this dialogue between values and technology as they help to create new materials and processes for sustainable manufacturing, new paradigms in computing, and more powerful ways to process information and manipulate data. Artificial intelligence, machine learning, big data analytics, virtual reality, 3D printing, quantum optics, nanoscience, and synthetic biology are redefining possibilities in health care, finance, manufacturing, and entertainment. Our researchers are exploring fundamental properties like superconductivity that might one day lead to advances in sensors, imaging, and myriad other technologies, as well as how the interface of humans and technology impacts human behaviour, health, and cultural expression. Intellectual property, including the negotiations over who gets to reap the financial and other benefits from it, is also central to the ways societies utilize and allocate new innovations in science and technology. Our conceptions of new and emerging technologies and the roles they play in our society must include all of these considerations. The implications are important not only for the way we address the ethical, legal and social issues, but also for how we do science and engineering and how we design the institutions that oversee them. U of T researchers are world leaders in the development and application of emerging technologies and applying these innovative approaches to solving some of our most pressing issues. But they are also profoundly questioning whether we conceive, design or plan technologies with full recognition and consideration of human capacities and limitations or expect humans to adapt to the technologies. Human interactions with complex technologies is an area of growing concern, and one with which our scholars in the humanities, social sciences and the basic and applied sciences are deeply engaged.

Examples of Sub-Themes

SIMULATION AND IMAGING
The arts and humanities have long been concerned with how human beings create new worlds by imagining and imaging them—worlds come alive in performance and through various modes, techniques and technologies of representation. Simulation, imaging, and visual reality techniques are now used routinely in disciplines as varied as neuroscience, structural chemistry,
geophysics, and electrical and computer engineering. Remote sensing, digital imaging, and simulation technologies are also relied upon to amass, analyze, and communicate technical data—for example, to create maps of Earth from orbit and geophysical maps of the Earth’s interior, maps of the genome and three-dimensional models of molecules. These technologies have migrated back to the arts, from film-making and design to gaming and virtual reality. Biophysicists, earth scientists, computer scientists, and, indeed, researchers from disciplines within every division at U of T are collaborating to create new kinds of representation, and to study the many applications of simulation and imaging technologies, including computational photography, semantic image retrieval, non-realistic image rendering, image-based modeling, image-based navigation, robotic-vision, bio-imaging, intelligent vision-based interfaces, and automated medical image analysis. Given that digital imaging technologies have become so prevalent, U of T scholars are also asking how they are changing the way we document our personal lives, how we communicate with each other, what we think of privacy and security, and how we see ourselves.

**DATA, ANALYTICS, COMPUTATION, AND ARTIFICIAL INTELLIGENCE**

The massive processing power of today’s computers, as impressive as it is, has not yet been able to quench our ever-growing thirst for speed and computational capacity. Computer chip engineers and manufacturers could not have predicted the proliferation of personal computing devices, the internet, or the vast quantities of complex and connected data that would be generated by social media, online financial transactions, an expanding scientific research enterprise, and a vast array of interconnected sensors, among many other sources. The quantities and kinds of data at our disposal have only fuelled our need for ever more powerful computers, networks, digital storage, and analytical methods. U of T researchers are world-leaders in advancing next-generation computing, analytical tools, and artificial intelligence in such areas as computer vision, computational linguistics and natural language processing, knowledge representation and reasoning, cognitive robotics, and machine learning. Harnessing the quantum mechanical properties of atoms and photons, U of T researchers are studying how quantum cryptography could ensure cybersecurity. Our researchers are integrating the University’s traditional strengths in data analytics, security, and privacy to develop cyberphysical frameworks that will underpin the next generation of applications in a multitude of areas including, for example, health, the financial sector, advanced manufacturing, transportation, and autonomous vehicles. Along with helping to create new technologies, U of T scholars are studying how these transformative innovations interact with society, ensuring that Canada’s policy framework can keep pace with changing technology and customer needs. With so many possibilities yet to be explored, U of T researchers are at the forefront of a revolution that promises to solve our need for speed and power, change the way we do science, conduct business and financial transactions, provide healthcare, communicate with each other, and secure our information.
ROBOTICS, AUTONOMOUS TECHNOLOGIES, AND ADVANCED MANUFACTURING

U of T has top researchers in the fields of intelligent robotics, mechatronics, autonomous vehicles and systems, sensing technologies, and every area of advanced materials and manufacturing, from nanotechnology to tissue engineering—technologies that are poised to make an enormous impact on our daily lives through such applications as self-driving cars, unmanned aerial vehicles (drones), robotic surgery, assistive and rehabilitation devices, sensor agents for search and rescue, terrestrial and space exploration, surveillance, and advanced manufacturing. At the same time, global interest in robotics is intensifying in many corners: governments, corporations and venture capitalist firms are expanding their robotics portfolios, industry is concerned over the lack of skilled workers, economists debate the impact of robots and automation on jobs, and policymakers are increasingly concerned with issues ranging from how autonomous systems will impact our privacy and security to the ethics of using robots around vulnerable populations such as the elderly and people with disabilities. Meanwhile, robotics clubs, competitions, and maker communities are on the rise as a new generation grows up with access to inexpensive robotics equipment and open source tools. U of T is at the forefront of this revolution, and our research in these areas is attracting leading thinkers, experts and innovators from around the globe. Our world-class facilities test new ideas that have the potential to save lives, boost productivity and efficiency, and reduce environmental impact.

BUILD: Community and Liveable Societies

*Although the meaning of “liveable society” may differ depending on whom you ask, a community’s quality of life is influenced by the built and natural environments; the rule of law and accountable governance; overall economic prosperity; health and access to affordable health care, housing, social stability, equity, and educational opportunities; and, the possibilities for artistic, cultural, linguistic, entertainment and recreational participation and enjoyment.*

Are citizens able and empowered to participate in the processes that will ultimately govern the societies in which they live? Do people feel proud of the societies they live in, and are they sufficiently engaged to care about how their societies look, how they are organized, how they function, and how they treat the most vulnerable? As more people seek refuge from the pressures of conflict, poverty, and lack of economic opportunity, and as work becomes more mobile, the question of who gains membership into which societies becomes increasingly relevant. U of T scholars in such disciplines as history, medieval studies, and classics, or whose research is grounded in Indigenous knowledge and practice, have shown us that many of the things we take to be the hallmarks of just and liveable societies have roots in societies of other places or times. Our researchers in architecture, urban planning, geography, political science, cinema studies, philosophy, Buddhist studies, and many other areas are collaborating on projects designed to explore the interactions of politics, art, design, and culture in historical and contemporary urban environments. And our scholars in 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.

**Examples of Sub-Themes**

**LIVEABLE CITIES**
The world is experiencing the greatest migration in human history: the movement of people from rural areas to the city. Over 50% of the people alive today live in cities, and more are following every day. By 2030 that figure is projected to be over 60%. At the same time, much of the existing infrastructure is failing to adequately serve its citizens, including transportation, housing affordability, health care, and social services. With so many living in urban settings, it is urgent that we gain a better understanding of how cities work, and their impact on human health and prosperity. In trying to understand cities and the impact of increasing urbanization, U of T investigators in civil engineering, critical development studies, medicine and public health, social work, architecture, global affairs, management, geography and planning, education, and entrepreneurship are coming together in multidisciplinary centres and networks to look at poverty and prosperity, urban sprawl, transportation networks, pollution and the environment, demographics, health services delivery, recreation, culture, innovation, and education in the urban context. They are also asking some fundamental questions about the sustainability and resiliency of urban living. Even with the best urban planning, public policy, and a prosperous economy, costs come not only to the local environment but to the planet as a whole. Ideas of what makes a city liveable preoccupy the discourse on urban issues in Toronto, and the work of U of T students and researchers in this area has a direct bearing on the dynamic and cosmopolitan environment in which they find themselves.

**HUMAN RIGHTS AND DIVERSITY**
Any search for justice is based upon identifying values that are viewed as so critical to the wellbeing of humanity and the character of being human that they have come to be institutionalized as “human rights”. Many of the basic ideas that animate the modern human rights and humanitarian movements developed in the aftermath of the Second World War, culminating in the adoption of the Universal Declaration of Human Rights (UDHR) by the United Nations General Assembly in 1948. Despite the Declaration, however, there is still no universal agreement as to what should be regarded as a human right, and the notion of human rights itself has been the subject of ongoing intense philosophical debate and criticism for millennia, as our scholars of ancient Islam, China, Africa, Greece, Rome, as well as the age-old Indigenous traditions of North America and elsewhere can attest. Human rights and humanitarianism scholars at U of T are moving beyond these debates by asking questions surrounding the allocation, distribution and protection of sovereign authority; the role that culture, minority and Indigenous rights and the right to self-determination play in the promotion of a just international legal order; the relationships between international economic, social, equality and labour rights, and the right to development; and around the validity of the international legal commitments to the liberalization of trade, services, and development. The globalization of human rights and humanitarian law is creating huge expectations that globalization in general
can be harnessed for the greater good. At U of T, scholars are asking if international human rights law can reinvent itself as a law of social inclusion and, in the process, redraw the boundaries of political community and the nature of political association.

**MIGRATION, INTERNATIONALIZATION, MULTICULTURALISM, AND IDENTITY**

Marshall McLuhan’s vision of the global village may be here, but how does a global society function while preserving human dignity, justice, and identity? U of T scholars in the humanities, law, medicine and public health, global affairs, the study of languages and cultures, public policy and governance, sociology, education, and psychology are exploring issues of immigrant inequality in the labour force, the impacts of permanent and temporary migrant workers on developed economies, the migration patterns of highly skilled labour, the social construction of ethnicity, the accommodation of refugees, the impact of migration on health, and how the integration of second generation immigrant parents inform Canada’s identity and Canada’s future. Our scholars are also studying the forces that drive refugees to seek asylum, as well as human trafficking and security, and are asking whether immigration policies in Western democracies meet principles of justice and good governance. Our scholars are participating in the national conversation on how Canadian society and individual Canadians can make good on the calls to action articulated by the Truth and Reconciliation Commission of Canada. As Canada and societies the world over grapple with balancing the sometimes clashing values of respect for diversity and equality with respect for cultural and linguistic differences, U of T scholars are encouraging dialogue among policymakers, government and nongovernmental organizations, and members of immigrant and non-immigrant communities alike.
STRATEGIC OBJECTIVES

Our aim is to continue to be among the handful of comprehensive, research-intensive universities in the world that excel across the breadth of areas of scholarship. Our vision for the future is challenging but clear: to create the most supportive environment possible so that our researchers, scholars, and learners can do what they do best—advance understanding and apply new knowledge.

To do so, and in keeping with its mission, the University of Toronto will continue to promote high quality research. We remain committed to:

- Providing an environment conducive to research;
- Emphasizing peer-reviewed research, publication, and related professional contributions in defining the career expectations of professorial staff;
- Preparing the next generation of research leaders through our graduate programs;
- Ensuring that all our undergraduate and professional students have opportunities to engage in research and innovation experiences;
- Maintaining a capacity to respond selectively to new fields of research as they emerge;
- Fostering collaborations with peer institutions, industry, business, the professions, public sector institutions, and governments;
- Fostering equity, diversity, and inclusiveness;
- Providing information, library and research services, and infrastructure of the highest international standards;
- Supporting the continued development of open access, open data, and open science; and,
- Communicating and celebrating the value of our research and innovation achievements.

We recognize the strategic advantage of our tri-campus structure, and that all three campuses have distinguished themselves as innovative research leaders. It is also important to recognize that U of T cannot achieve all of its goals alone, and that our success very much depends on solid and supportive partnerships among our academic divisions, our affiliated hospitals and hospital-based research institutes, and numerous governmental, non-governmental and other partners, organizations, and institutions.

Our strategic objectives are informed by key societal challenges. We collaborate with key funding partners in supporting the design and implementation of research programs. These programs are essential to attract and retain outstanding researchers, to strengthen existing areas of excellence, to develop new ones, and to strengthen synergies between teaching and research. With our partners, U of T has also built a robust research and knowledge transfer enterprise—one that puts us in an exceptional position to be leaders in the creation of strong national research networks that, with ongoing public support, will strengthen Canada’s position in the global knowledge economy.
It is the role of the University to work with its own governance structure, divisions, affiliated partners, students, postdoctoral fellows, faculty and staff, as well as with other universities, governments, non-governmental organizations, private sector partners, and individuals to provide all members of our scholarly community with the tools they need to be successful and competitive. As well, in *Answering the Call: Wecheehetowin, the Final Report of the Steering Committee for the University of Toronto Response to the Truth and Reconciliation Commission of Canada*, the University has committed to seeking out opportunities to engage with Indigenous partners and, together, lead the process of reconciliation. Within our administration, training, practices, and policies we are committed to reflecting and embracing Indigenous knowledges, practices and perspectives, as well as supporting Indigenous scholars and communities to conduct the research they seek to pursue.

These commitments and relationships form the backdrop to our strategic research objectives that will guide our actions and performance measures. The objectives also complement those of the academic divisions, which will continue to develop their own more detailed plans, goals, actions and performance measures.

1. **NATIONAL AND GLOBAL LEADERSHIP IN RESEARCH AND INNOVATION**

Excellence and leadership in research and innovation is what allows us to have the broadest and deepest impact not only in scholarship but also out in the world at large. We will continue to benchmark our success in terms of the outcomes of our funded research programs, the number and quality of our research partnerships, and international recognition as appropriate to academic unit, discipline and activity. We will also measure our success in innovation, entrepreneurship, and all the other ways knowledge is creatively mobilized and applied, as well as capturing the impact of our research in society.

U of T is also a North American leader in the number of new IP-based startups, in the number of new invention disclosures, and in the number of new licenses and options. We will continue to seek leadership in these metrics, and we will continue to strive to be among the top universities working with the world’s most innovative companies. Leadership includes expanding opportunities for students to participate in a wide variety of entrepreneurial events and activities, and U of T will continue to build upon its already robust culture of innovation, entrepreneurship, research partnerships that span the globe, and a multitude of collaborations with private sector and public sector organizations.

We are committed to supporting our research community so that the University of Toronto continues to lead through:

- Garnering the highest share of funding from the Tri-Agencies, Canada Foundation for Innovation, Canada Research Chairs, and private sector partners, and the highest share of Canada Excellence Research Chairs;
• Holding the highest share of national and international awards and honours among Canadian universities;
• Achieving the highest share of Highly-Cited researchers among Canadian universities;
• Placing in the Top 25 universities as ranked by top research-based global rankings;
• Ranking as one of the only public universities in the world that excels across a broad range of areas of scholarship; and,
• Placing highly in global innovation and entrepreneurship rankings and surveys that reflect our successful research-based startups, new invention disclosures, and new licenses and options.

Leadership includes and supports expanding opportunities for students to participate in a wide variety of research and entrepreneurial opportunities and activities at the University of Toronto and with our partners locally, nationally, and internationally.

Our rankings in global university league tables, our share of funding across national research funding programs, our share of national and international awards and honours among Canadian universities, our share of highly-cited researchers among Canadian universities, and our placement in global innovation and entrepreneurship surveys recognize that U of T’s broad range of program offerings and research activity have a major economic and social impact, locally and globally. They are in keeping with U of T’s Strategic Mandate Agreement with the Province of Ontario and with our role as a globally recognized, comprehensive, and research-intensive institution with a distinct leadership role in Ontario’s postsecondary education system. They also recognize that U of T’s broad range of program offerings and research activity have a major economic and social impact, locally and globally.

2. FOSTER COLLABORATIONS AND PARTNERSHIPS, AND ENGAGEMENT

Given the tremendous expertise of our faculty in topics that affect humanity and the planet, the University can play a role in addressing the issues we face by engaging with communities through collaborations and partnerships, listening, and, in turn, advancing solutions that are sustainable, equitable, and that promote diversity and social justice. We are committed to maximizing the impact of U of T researchers’ discoveries and insights and supporting and facilitating the mobilization of those insights out to society.

Through engagement in meaningful collaborations and partnerships with colleagues, partners and communities locally, nationally, and internationally, we can further our understanding of research and innovation needs. Given that many research problems are complex and require the expertise of different disciplines, and that often the most meaningful innovations occur where disciplines overlap or meet, we will also continue to support opportunities for division-crossing, and multidisciplinary and interdisciplinary engagement and research. Collaborations and partnerships also allow us to leverage complementary research strengths and gain access to unique capabilities to foster learning and accelerate discovery.
We will continue to develop strategies to increase and demonstrate our presence as an engaged university through participation in partnered research programs and cross-divisional knowledge mobilization events and symposia. Establishing evidence of engagement and impact will require working with divisions to select, develop and evaluate measures that are appropriate to the field of inquiry and the specific activity, examples of which include:

- Increasing the number of collaborations and partnerships and the amount of associated funding;
- Increasing the number of Social Sciences and Humanities Research Council (SSHRC) Partnership Grants, Natural Sciences and Engineering Research Council (NSERC) Collaborative Research and Development Grants, Strategic Research Network Grants and Strategic Project Grants, and other partnership programs;
- Increasing the number of government, NGO and industry partnerships, including international; and,
- In collaboration with our academic divisions, defining new approaches to measure research engagement impact.

3. ADVANCE EQUITY, INCLUSION, AND DIVERSITY ACROSS RESEARCH AND INNOVATION

The University of Toronto grounds its commitment to and responsibility for diversity, inclusion and equity in its public mission as well as in its devotion to the pursuit of excellence. Often our best work gets done when we come together with colleagues in socially, culturally and intellectually vibrant environments. As an institution we will work to ensure an environment where students, postdoctoral fellows, faculty and staff are given the support needed to realize their goals and aspirations as they relate to research and innovation. Through continual examination and monitoring of practices, policies, and programs we will aim to ensure that equitable and inclusive principles prevail. Guided by the calls to action relating to Indigenous Research Ethics and Community Partnership arising out of the University of Toronto’s Response to Canada’s Truth and Reconciliation Commission, we will not only strive to be a welcoming place that respects and promotes Indigenous worldviews, methodologies, and ways of knowing, but we will also seek to create the conditions and spaces that will allow Indigenous knowledge and practice to thrive. With respect to research ethics, training that recognizes historical patterns of unethical research practices must be available to all scholars, including students, seeking to work in partnership with an Indigenous community.

We will foster meaningful and reciprocal engagement and collaboration by employing principles and practices that promote diversity, inclusion, and equity. Some of the metrics for our success can include:
• Meeting the goals laid out in the University of Toronto Canada Research Chair Equity, Diversity and Inclusion Action Plan;
• Participation and success rates across designated groups in internal and external research funding and entrepreneurship programs; and,
• Development of Indigenous community research partnerships of priority and benefit to those communities.

4. SUPPORT INTEGRATION OF RESEARCH AND INNOVATION IN STUDENT CURRICULAR AND CO-CURRICULAR EXPERIENCE

The research and teaching missions at the University of Toronto are inextricably linked. Research and innovation activity should, as appropriate, actively engage undergraduate, professional, and graduate students. Research intensity and diversity at U of T, as well as research-informed pedagogy, should enhance the entire educational mission and position the University as the “go to” place for future students, researchers, and innovators.

We will continue to assist in highlighting and developing research- and innovation-related online resources and courses that provide students with specific information on the scholastic and career benefits of research and innovation experience, how to get involved in research and innovation, research and innovation opportunities (including practicum experiences), funding sources and programs, and course offerings. The U of T innovation and entrepreneurship community will continue to provide mentorship, expertise, space, and networks for all stages of the innovation process for students and faculty.

Health, safety, and ethics are important parts of research training, and we are committed to making relevant resources available in a way that is user-friendly and transparent to students.

Some of the metrics we will use to measure our success:

• The proportion of undergraduate students who obtain research opportunities;
• The proportion of graduate students receiving external support and awards;
• Engagement of professional program students in research opportunities; and,
• Engagement and impact of student innovation and entrepreneurship activities and opportunities.

5. STRENGTHEN THE INSTITUTIONAL SUPPORTS THAT FOSTER RESEARCH AND INNOVATION EXCELLENCE

We will continue to create and refine the tools, policies, best practices, and procedures that facilitate research and innovation of the highest standards of ethics, integrity, and accountability including supports that facilitate compliance with the financial and regulatory
requirements of our sponsors. The University ranks at a high level internationally and the services that we provide must continue to support this achievement.

We will continue to be responsible stewards of the funds we receive; to respect human and animal subjects in research; to ensure that our faculty, students, postdoctoral fellows and staff work in safe environments; to recruit the committed volunteers who work on our ethics and review boards; to process with due care and efficiency our high number of research grants and partnership agreements; and to cultivate a culture where those things matter and are respected. We are also committed to developing a structure, protocol and training for ethical review of Indigenous-related research and articulating guidelines for undertaking of research in and with Indigenous communities.

Examples of ways we will monitor our progress:

- Develop and assess goals and metrics on the quality and level of support for faculty and academic divisions; and,
- Monitor the quality and amount of training and professional development opportunities and resources for research ethics and safety through innovative means.
ISRP development and approval

Through a consultative and broad-based process, in 2017 we reflected upon our institutional achievements, and engaged in discussions with members of the University community on the development of a new SRP to cover the coming 5-year period. As a result of this process, a draft of the Strategic Research Plan 2018-23 was circulated in the fall of 2017 and we embarked on a second round of broad-based consultations. The resulting Plan will be presented and discussed with University of Toronto governance in January 2018.