

York University Strategic Research Plan: 2013-2018

A short title

Draft Document for Consultation

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Executive Summary

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Research Vision

York University is committed to broadly based excellence in research and scholarship in all its forms. We aspire through our research to better understand the human condition and the world around us and to employ the knowledge we gain to promote social justice and the public good in Canada and throughout the world. Intensive engagement in research is a core institutional value that permeates the fabric of the University and is the foundation onto which the vibrant and exciting academic environment that is York is built.

Introduction

A Proud Tradition of Critically Engaged Scholarship

Over the past 50 years York University has developed a proud tradition of scholarship that has been defined by engagement in a critical discourse in which the pursuit of discovery and innovation is achieved with a focus on social responsibility and justice. From its beginnings as a small liberal arts college to its present standing as a diverse comprehensive research and teaching institution that is Canada's third largest as measured by student enrolment, research at York has focused not only on new discoveries and the creation of knowledge, but on how this knowledge can be employed to the broad benefit of cultures and societies.

Research at York is research with impact. In areas as diverse as the arts, humanities, business, law, and Science and engineering, York is recognized for the quality of its work. For example, York is consistently ranked internationally within the top 15 for business research, the top 40 in history and top 100 in languages, linguistics and geography. When measured by impact, research in the social sciences and humanities at York and research in science and engineering have both been shown to rank within the top 10 of Canadian Universities and top five in the province of Ontario.

York Researchers have played key roles in many of the most important discoveries and scholarship of the past half century. From the discovery of the Higgs boson to the exploration of Mars; from changing the way we think about bullying, aggression and violence especially among marginalized people and children at risk to developing novel approaches to health care delivery; from developing insight into social and political history of Canada to the environmental impact of colonial expansion on indigenous societies; from advancements in cognitive neuroscience and vision to probing the impacts of digital gameplay; from studies of the impact of slavery and the colonization process in many periods and geographical contexts across the globe to the formation and development of language policy in Canada; from generating new insights into brain development in children with autism and how bilingualism can delay the onset of Alzheimer's disease symptoms to international research on the impact of criminalizing sexual orientation and gender identity; from exploring the global plight of refugees to questioning the ways in which European political and environmental cultures translated in the Canadian

context; from mapping the spread of infectious diseases through mathematical modeling to the examination of whether bird behavior can help species adapt to the drastic changes humans are making to the environment; York researchers and scholars are having a profound impact and are undertaking visionary research of local, national and international significance.

New faculty members at York today follow in the tradition of our many accomplished scholars - including Royal Society Fellows, Killam Professors, Humboldt Fellows, Fulbright Scholars, Steacie Medalists, Molson Prize Winners, 3M Winners, Queen Elizabeth Diamond Jubilee Medalists, Trudeau Fellows, and Distinguished Research Professors - in their dedicated pursuit of new ideas, new innovation and solutions to the most challenging problems facing society today. The work of our scholars enriches the teaching, research and overall learning environment for our students - our brightest minds and next generation of leaders and thinkers.

York graduates with advanced research degrees have gained national and international acclaim in the exploration of space, the pursuit of justice, public service, the advancement of science, historical research, literature and performance. Many other York graduates have become pillars of the business, legal, political, philanthropic and arts communities and have assumed high visibility in the media and public spaces.

Through York's integrated approach to teaching and research, undergraduate and graduate students, as well as postdoctoral fellows enjoy the active mentorship of internationally recognized scholars, access to cutting-edge research infrastructure and an exciting and engaged environment for the pursuit of discovery. York hosts one of the largest cohorts of graduate students in the country and York's graduate students and postdoctoral fellows are key drivers of research and scholarly success at York. Students and fellows come to York from around the globe and are recipients of top research training awards including Vanier Scholarships and Banting Fellowships. York is committed to enabling our students to acquire, advance and apply their skills and knowledge, and to providing exceptional supervision, engagement and instruction to support a high quality educational experience.

As York moves into the future, we are committed to advancing this proud tradition of critically engaged scholarship. This growth will involve broadening the base of research at York, augmenting the intensity of research across the institution and strengthening the engagement of faculty and students in research. It also will involve enhancing the recognition that we receive for our research accomplishments, such that within the next five years York will be fully recognized and appreciated as a leading research-intensive University in Canada.

Purpose of the Plan

The overall directions for academic development for York University are set out in the University's Academic Plan "Enhancing Academic Quality in a Globalized World 2010-2015" and in the 2010 Provostial White Paper "Building a More Engaged University 2010-2020". Both plans speak to the crucial nature of research at York, and the institutional commitment for York to enhance its reputation

for scholarship and to be recognized for its accomplishments - and highlight primary goals of research intensification and recognition driven through international standards of peer review.

The purpose of this Strategic Research Plan is to support the University Academic Plan by providing a high-level framework articulating our core values and aspirations for research and scholarship. It offers overall context and direction for the development of York's research enterprise over the next five years. This plan is built upon and informs Faculty and Unit-level plans, providing a platform upon which researchers across the University are empowered to achieve their objectives.

The plan tells the story of research, scholarship and creative activity at York for both internal and external audiences, highlights our strengths and aspirations, and identifies broad opportunities for building research at York across disciplines.

A Broadly Based Process of Engagement

The success of academic plans depends on the engagement of the academic community in the planning process. From the announcement of the strategic research planning process in spring of 2012 through the presentation of the plan for Senate approval in spring 2013, the York community has undergone an intensive open and engaged discussion about the role of research at York, our valuation of research and our aspirations for the future of research at York. Guided throughout the process by an active and engaged advisory committee with representatives from around the University and broader community, the Office of the Vice President Research and Innovation has actively reached out to solicit input from around the York community, emphasizing the broadest possible level of consultation in keeping with York's practice of collegial governance. The input of faculty members, students and staff has been invited through a series of open fora, workshops and visits around the University and through an active web portal providing the opportunity for engagement in the planning process including a web based survey, summaries of what was said at all events and an interface to contribute comments and suggestions. Essential inputs into plan development were also provided directly by the Faculties through their councils and decanal representatives, as well as through the Academic Policy, Planning and Research Committee of Senate and other research leadership bodies.

With over 2000 points of contact through the consultation process, the York community has shown an enthusiastic and engaged response to the planning process that has highlighted our commitment to, valuation of, and aspirations for research at York in the context of the overall academic mandate of the University. This plan takes up those aspirations in providing broad direction for the growth and development of research at York for the next five years.

A Commitment to Quality, Academic Freedom and Social Justice

York strives for the highest academic standards and its strong commitments to academic freedom and social justice and responsibility are woven into the University's fabric. It is the unwavering support of these values by every member of the York community from which the institution derives its strength. The commitment to these values is a foundational principle of the Strategic Research Plan. It is critical to York's overall success that faculty continue to enjoy maximal liberty in the choice and pursuit of their scholarly work. By valuing research and advancement of knowledge across the full spectrum of disciplinary and interdisciplinary activities as essential and integral our academic mission of the University, York contributes to critical inquiry, scientific discovery and the social and economic development of our country and beyond. Informed and supported by the consultation process, the values and core principles shared by our research community serve to strengthen and underpin our research priorities.

York is strongly committed to intensifying and building on our research strengths across traditional and non-traditional areas of research, scholarship and creative activity, as recognized through international standards of peer review. We recognize as a community that individual research and scholarship is the foundation upon which the research enterprise at York is built. Only with this solid foundation can we expect to successfully build a reputation for research excellence. We also highlight as a community the importance of graduate students and postdoctoral fellows to the success of our research and scholarship and are committed to providing them with the best possible supports as they pursue their training.

At the same time, the York community recognizes the value of collaborative research and the need to translate discovery into action. We value innovation in all its forms and recognize the importance of leveraging the results of our scholarly activities into outputs that can provide tangible benefits to society and the world around us.

Collaborative research at York is special. York has seized on the opportunities provided within a comprehensive institution to make a long term commitment to supporting interactive and collaborative research and scholarship crossing the boundaries of traditional disciplines. York's commitment to interdisciplinarity in its strategic research development provides national and international leadership in the promotion of new approaches to research and scholarship. Paired with York's commitment to developing partnerships with the public, private and non-profit sectors and engaging external communities as partners in research, York provides a unique environment in which research that is sensitive to partners' needs can be translated into cultural, environmental and economic benefits.

Commitments to the Support of Research:

By the Institution

We believe that an active, engaged research culture is integral to the fabric of a world-class University and fundamental to the success of our faculty and students. York is committed to prioritizing the development and intensification of internationally leading research across the institution as a means of enhancing the vibrancy of academic life and generating an exciting atmosphere for learning. This begins with the support of research in our academic departments and units, where research, scholarship and creative activities are integrated into graduate and undergraduate teaching, through both highly successful and recognized individual scholarship and collaborative research activities and programs. Units also play a key role and the dissemination of scholarship in traditional and emerging forms, including new media. Moreover, York is committed to making research accessible to all Faculty, students and staff, and to providing appropriate accommodation for those with special needs.

Excellence in research is achievable only if researchers can rely on the best possible infrastructure and support mechanisms aiding their scholarly work. Despite continuing fiscal constraints faced by Canadian Universities, York remains committed to prioritizing its resources in support of the development of its research and scholarship. Further York is committed to making every effort to apply available resources efficiently and prudently. Smart use of new technologies and removal or simplification of cumbersome administrative hurdles becomes imperative in this environment in order to facilitate researchers' success.

York is committed to several initiatives to improve the institutional support of research. York's initiative on Process Re-engineering and Service Enhancement (PRASE) is specifically charged with finding efficiencies in current research administrative procedures, through reduction of bureaucracy and introduction of paperless processes. The Office of Research Services is committed to acquiring and implementing a state-of-the art grant management system allowing for optimal tracking of grant applications, external contracts, and ethics protocols. Freed-up administrators' time will be concentrated to assist research grant and award applicants. The simplification of pre-award processes will occur concurrently with the introduction of dramatic changes in post-award processes to streamline procedures that previously were cumbersome and time consuming. For example, York's newly acquired Sm@rtBuy system allows for the paperless procurement of goods at competitive prices that researchers may initiate and track securely through the Internet. It is expected that this system will soon be complemented by a new electronic travel and expense claim system which will greatly simplify the planning of research-related travel and the claiming of expenses.

York is also committed to directly supporting the development of research and scholarship through a number of programs and support opportunities accessible to all researchers, for both individual and collaborative projects. These include the availability of seed funds for research, travel, project development support and enhancing the time available for faculty to develop and complete research projects. We are committed to building a base of collegial engaged mentorship and support to assist researchers in identifying and benefiting from research opportunities. We will continue to strengthen

our highly successful research director and research officer support network, as well as the strategic programs directorate in the Office of Research Services.

We are also committed to supporting the recognition of our research and scholarly accomplishments through proactive assistance in the nomination of our scholars, students and postdoctoral fellows and visitors for prizes and awards, scholarships and fellowships and through the continuing development of externally funded research chairs, professorships, scholarships and fellowships. It is important to continue to work to enhance familiarity with our research and scholarship within and beyond the York community and to create new opportunities for interaction between York researchers and external partners. Research and scholarly events will recognize our successful faculty and students for their scholarly achievements and publicize the depth and breadth of research across the University.

As a research intensive institution, York derives an ongoing benefit from the Canada Research Chairs (CRC) Program. CRCs provide recognition and supports to many of our most accomplished researchers and emerging research leaders. At York we are committed to using the CRC program to build our research capacity and leadership in areas of research opportunity.

Recognizing that research excellence across the institution far exceeds the number of available CRCs and privately funded chairs and research professorships, York is committed to the development of an internal research chairs program, that will, with the same standards and expectations as for our CRCs, provide recognition and support for more of our outstanding existing researchers on the merits of their accomplishments. It also has the potential to provide for a continuing research intensive career path for the most proficient of our maturing Tier II Canada Research Chairs. This internal chairs program will be initiated as a centrally supported program with provisions for expansion through the development of Faculty based supports.

Lastly, as research at York informs teaching and contributes to the overall excitement in the classroom York is committed to ensuring that all of its faculty, including its most successful researchers, have the opportunity to participate appropriately in teaching at the undergraduate and graduate levels.

By the Community

During the consultation process, the York community has consistently expressed its commitment to and support for research at York. Involvement in research, scholarship and creative activity is highly valued, and is recognized to form an essential component of academic life, to be crucial to the development of our academic programming and student success, and to our academic hiring and career progression. For faculty, staff and students, research at York focuses on excellence, intensification, critical scholarship, a continually enhanced reputation and access to research opportunities for students at all stages of their education.

While much of the research activity at York is accomplished through individual scholarship, its success depends on a collegial environment with access to engaged discussion, mentorship, support expertise

and cutting edge facilities promoting the development and exchange of scholarship. There is a broad commitment across the York community to engage in and support collegial initiatives aimed at improving access to and the development research opportunities at all levels within the institution.

Through the Support of Organized Research Units, Centres and Institutes (ORUs)

One way in which York strategically promotes the development of interdisciplinarity research is through its network of Research Centres and Institutes (ORUs). These ORUs advance research and research collaboration around the University by providing a home for research development beyond traditional academic units. Steeped in York's tradition of collegial interdisciplinarity, ORUs serve as synergistic hubs for interactive research programs bringing together expertise from across disciplines. York's recently enhanced ORU policy opens up new possibilities for maximizing their research impact and provides for a support structure that promotes broader research interactions. Opportunities arising from the new policy include building comprehensive partnerships in support of ORUs and their active growth and development, increasing the resource base committed in support of ORUs and bringing likeminded groups together into broader higher-impact initiatives aiding in building the recognition for York as a research-intensive university. At the institutional level ORUs are expected to align with the demonstrated strengths of York research and its strategic growth opportunities. Similarly at the Faculty level, ORUs are an overt expression of investment in a particular research focus. Thus institutional and Faculty research plans are expected to serve as practical guides for the University's aspirations, encouraging the expansion of research engagement broadly, and in the context of ORUs. Building on strengths and opportunities will play an important role in recognizing creative synergies and interdisciplinarity among current ORUs as well as clarifying opportunities for new initiatives in newly emerging research fields.

York is committed to the continuing development and support of our Organized Research Units in ways that will increase their grounding in the institution and engagement with the external community. With targeted investments to raise their recognition and profile, ORUs will continue to be an important component of our efforts in growing internationally leading research and increasing the brand recognition of research at York.

Through Infrastructure that Enables Research Excellence

Innovative research is enabled by innovative facilities. Ensuring that our researchers and graduate students have access to appropriate state-of-the-art research space, cutting-edge equipment and technology, and a comprehensive library system is fundamental to our ability to succeed as a research-intensive university and to recruit and retain world-class faculty members and students. Over the past few years, York has made important progress in responding to the infrastructure needs of its expanding population of researchers, by seeing the completion of several new buildings and the installation of new state of the art equipment and other infrastructure. Our new Life Sciences Building features laboratories and other state-of-the-art research facilities designed to support researchers and trainees in meeting the growing demand in science and health-related disciplines such as biology, chemistry,

biochemistry and kinesiology. The Sherman Health Sciences Research Centre supports leading-edge research as a regional facility for vision science, kinesiology and psychology, housing some of the most significant and technologically advanced research platforms and specialized laboratories. Further, our York Research Tower added 84,000 square feet of research space to expand the space available to York's research centres and institutes in the liberal arts and humanities. With the expansion of York's engineering program into the newly formed Lassonde School of Engineering, we are planning the construction of a new engineering building to enhance innovation and interdisciplinary collaboration, as well as the student capacity of the current school. This past year we also added significant new research space with the opening of the Osgoode Hall Law School expansion, and Glendon's Centre of Excellence for French-Language and Bilingual Postsecondary Education.

Over the next five years, York will continue its commitment to prioritizing research infrastructure development to meet the needs of an expanding research enterprise.

Comprehensive Research Excellence across the Institution

As an institution with a broad academic mandate, research and creative scholarship at York occurs across all of the disciplines expected from a comprehensive institution with a strong grounding in the liberal arts and sciences, and particularly strong research-oriented professional schools. In providing broadly based training, even the largest universities gravitate towards focusing their research and scholarship activities in areas where their history, setting and other aspects of their situation provides them with specific opportunities and advantages in developing research in areas of need and opportunity.

For York, the development of research has occurred with a strong commitment to interdisciplinarity and an acute awareness of our commitment to critical scholarship in advancing social justice. When examined through a lens that cuts across disciplines, research at York clusters naturally around six broad themes.

Advancing Fundamental Discovery and Critical Knowledge

Analyzing Cultures and Mobilizing Creativity

Building Healthy Lives and Communities

Exploring the Frontiers of Science and Technology

Forging a Just and Sustainable World

Integrating Entrepreneurial Innovation and the Public Good

The scholarship and research within each of these themes, while informed by the disciplines, is inherently interdisciplinary and transdisciplinary in its development and application and represents broad areas in which York is demonstrating national and international leadership.

Each theme includes a broad segment of scholarship and is built upon a number of research strengths. York is fully committed to continuing to foster and support the development of research and scholarship across the breadth of these themes. In particular we are committed to supporting and enhancing the success of our recognized areas of research strength and in investing in our areas of emerging activity where national leadership and international recognition can be achieved.

Advancing Fundamental Discovery and Critical Knowledge

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- Whether in the humanities, social sciences, arts or natural sciences, pure research occupies a large sector of York's research enterprise, in and beyond these fields.
 - Many of the greatest advances in the arts, humanities, social natural and medical sciences are due to exemplary individual contributions. University-based research must provide ample space for scholars to explore uncharted territory in their areas of expertise.
 - The advancement of knowledge entails the examination and critique of existing structures and thinking, as well as the creation of new forms and expressions. Universities must nurture the drivers of innovative and critical ideas.
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Research at York begins with appreciation of the importance of fundamental research and creative scholarship. Throughout the University, scholars are pursuing fundamental investigation of the world around us. From the study of moral, political and legal philosophy to pure mathematics; from the study of molecular and subatomic interactions to understanding the human brain; from the study of the formations of cultures and languages and the origins of government to historical analysis of the development of political institutions and social formations; from the study of chromosomes to the understanding of the cosmos; basic discovery of our world provides insight into our potential.

As a publically funded institution, York is committed to maximizing the application and benefits of the research it conducts. It also recognizes that pure scholarship remains central to the research mandate of a university and a country, and needs to be appropriately encouraged and supported. The success of fundamental inquiry needs a long-term perspective to succeed and the acceptance that the road to success and fruitful applications will likely meander and be full of surprises. Much of this scholarship is pursued by individuals or small groups, with a degree of immediate focus that precludes consideration of applications and impacts.

The engagement in pure, discovery-oriented research is a particular privilege and responsibility of university faculty and students and York expects national and international leadership in such research. The quality and recognition of this foundational research is validated through international standards of peer review, prizes and awards recognizing the work and through peer reviewed research funding for the work.

At York, the advancement of fundamental discovery is sought through the formulation and exploration of critical questions pushing the boundaries of traditional modes of inquiry and scholarship. A primary function of universities is to train critical minds, new generations who are trained to think of the impossible as the not yet possible and to question the fundamental values and assumptions of our world. The promotion of critical scholarship challenging our assumptions and questioning our values helps us understand the world as we see it today and to transform it into the better place we aspire for tomorrow. Critical scholarship at York is a hallmark of research conducted in the sciences, humanities and social sciences, but also enjoys a proud tradition around the University, including in Law, Education, Fine Arts, Business and Administrative Studies. It includes strengths in moral, political and legal philosophy, the study of ethics and a focus on cognitive sciences.

For the social sciences and humanities a critical approach to research embraces reflective assessments of society, cultural change and ways of knowing. Advancing critical social and cultural theory, researchers are exploring historical change, political thought activism, the social and economic transformations of societies around the world and how culture has been and continues to be a crucial means of expression. They explore the range of moral, political, feminist and legal philosophy, ethics, and are expanding the critical analyses of gender, sexuality, age, and ability. Across disciplines, the profound commitment to equity studies is reflected in a broad range of research dedicated to understanding and transforming attitudes towards constructs of race, class, gender and power differentials in a range of social, political, and economic formations. Researchers are exploring language acquisition and theories of linguistic variation and change so that we can understand more clearly the role and impact of language in multicultural societies. Through a critical lens, researchers at York are exploring the impacts and effects of the global movement of people, by displacement or as growing diasporas, and are at the forefront of the study of the impacts of political, social, and cultural inequities and human rights violations. Enhancing our understanding of world religions, ancient and current cultural practices, and the exigencies of political and economic powers helps us make sense of a complex world. Critical inquiry allows us to hear voices otherwise silenced by historical or contemporary injustice or marginalization.

York also displays strong research leadership in discovery science across physics, chemistry, mathematics and biology, psychology and other disciplines. For example, within physics and astronomy, the astrophysics group uses observations and theory to study the origin of the Universe and how galaxies like our own Milky Way form. The Quantum Optics group has cooled atoms to near absolute zero creating Canada's first Bose Einstein Condensate. Novel precision laser spectroscopic techniques are used to measure fundamental constants and precise isotope shifts. York's researchers also are collaborating on large scale international initiatives as part of our membership in TRIUMF, Canada's National Laboratory for Particle and Nuclear Physics. More recently, York researchers have been involved in an international collaboration led by Canadians at the European Centre for Nuclear Research (CERN) to manipulate antihydrogen.

Biological research at York extends from molecules to cells, organisms, populations and ecosystems. Researchers are pioneering the use of light-logging geolocators to track the migration of birds and explore how weather conditions influence migratory behavior. Researchers push the boundaries of

genomics and proteomics – understanding how the expression of genes is regulated and determining the structure and function of proteins and other factors encoded by the genome. Researchers have developed innovative approaches to investigate the diversity and functionality of the proteome resulting from alternative splicing and post-translation modifications. Physiological, metabolic, behavioral, biochemical and genetic processes are investigated in different model systems including yeast, filamentous fungi, insects, fish and mice. Researchers in chemistry and biology are elucidating the structure of molecules and proteins by nuclear magnetic resonance spectroscopy and X-ray crystallography, and are identifying molecules and proteins with high precision by mass spectrometry

Pure mathematics is another example of a field where a researcher often proceeds into new territory only driven by the desire to probe fundamental theory. Beneficial spinoffs from advances in pure mathematics are often only realized decades later when applications are developed that were never anticipated by the originator of the theory.

Analyzing Cultures and Mobilizing Creativity

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- This theme explores culture and creativity at the intersections of social innovation and tradition.
 - It address directly York's diverse and strong expertise in the fine arts, including dance, design, film, music, theatre, creative writing, visual arts and digital arts, as well as a broad spectrum of research in liberal-arts based disciplines, including literature, languages, linguistics, other humanities and social sciences.
 - The theme also encompasses scholarship from a range of other disciplines, from education to environmental studies.
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York University is widely recognized as a major contributor to the advancement of cultural studies and creative work in arts and culture in Canada. Recognized for the vitality and diversity of its innovative research and creative scholarship, York is emerging as a global leader in cultural production and creativity research.

Drawing on the breadth and scope of expertise in areas such as communications and cultural studies, fine arts, digital arts and arts-based education, philosophy and environmental studies, languages, literature and linguistics, technical and creative writing, and translation, York brings together leading arts and humanities scholars and practitioners, cutting across traditional disciplinary boundaries to facilitate dynamic collaborations. Within this thematic area, research, scholarly and creative features are mutually informative and often interwoven, whether in the publications of scholars in our critical studies programs, the practice-based production of artists and designers in York's studio programs, or areas that traverse the two.

York's research in the areas of culture and creativity spans an extensive spectrum of disciplines and impacts a range of social, cultural and technological development in the public, private and non-profit

sectors. This diverse and interdisciplinary research draws on significant expertise at the intersection of arts and digital technologies, including digital humanities and education, among others. Researchers in this thematic area are actively engaged in internationally leading research; many are highly accomplished and recognized as leaders in their field. One such area is digital culture and digital arts. For example, York's researchers are investigating the future of narrative, emerging forms of cultural expression, interactive storytelling and interactive cinema. Within York's Augmented Reality Lab, part of York's Future Cinema Lab, research includes theoretical explorations and practical applications leading to expressive software tools. This work increasingly deals with large repositories of data, investigates interactive, immersive visualizations. The York led Centre for Innovation in Information Visualization and Data-Driven Design (CIV-DDD), the preeminent research hub for innovation and training in information and scientific visualization in Ontario, facilitates the development of the next generation of data discovery, design and visualization techniques. Other researchers in physics and engineering are pushing the boundaries of quantum computing, setting the foundation for the future of computing, while York's legal scholars are exploring IP law and policy issues predicted from next generation digital technologies.

At York creative cultural production is complemented by the critical study of cultural traditions. Scholars housed in units such as English, French Studies, Humanities, and Languages, Literatures and Linguistics excel in the study of literature, art and film in all genres from their earliest expressions to today's global spectrum of voices. In Communications Studies and Political Science researchers explore the politics of contemporary, popular and more traditional forms of cultural expression. York's tradition is to challenge the very notion of a cultural tradition, by exploring the boundaries of established forms of cultural expression and to attend to new ones. For example, linguists at Glendon College have been assisting in the development of language policy as it affects public education in Nunavut.

Research exploring art, digital media and globalization considers how artists in different cities contribute to the development of new cultural and information landscapes. Scholars in this area are documenting new cultural formations and community-based cultures – from urban parks to transitory performances in neighborhoods and virtual spaces on the Internet. Scholars are further exploring a range of diverse disciplines including architecture, visual areas and culture, environmental studies and urban studies. Research Librarians at York steward York's research assets and advance our research culture and reputation by providing important leadership and infrastructure for evolving data driven research methodologies such as those seen in the emerging digital humanities. Researchers in York's dance department are focusing on dance science, particularly injury prevention, motor learning and motor control, conditioning for dancers, and psychological aspects of injury. Further scholarship focuses on dance history and criticism, and the nature and nurture of dance with connections to the National Ballet and the National Ballet School of Canada. York's music scholars engage in highly recognized investigations, integrating academic studies and studio training across a wide range of musical cultures and traditions, including pioneering the serious study of popular music.

York's researchers explore the crucial intersections between science, technology and the arts. The Interactive Systems Research Group (ISRG) facilitates research on human-computer interaction,

computer-supported collaborative design systems, and multimodal communications for the disabled. Research within this thematic area also integrates scholarship in education and emerging trends in life-long learning technologies and digital media, considerable emerging research strength at York. Research in the design and development of play-based multimedia learning tools, simulations, and environments are transforming learning and integrating art and technology with new models of pedagogy.

Building Healthy Lives and Communities

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- This theme encompasses the study of health, from age-related ailments and disease prevention, through cognitive and physical health, to the influence of income inequality, the social determinants of health as well as the health of communities and global health.
 - It includes but is not limited to needed changes in health policy, services and systems, as well as research in the biomedical and clinical sciences and population health.
 - It Speaks to the nature of well-being and the study of how to achieve high-quality, lifelong well-being for individuals and for society, including physical, mental and social well-being.
 - Contributing disciplines include but are not limited to: biology, psychology, law, sociology, political science, anthropology, education, economics, environmental and mathematical science, kinesiology, nursing and health policy, management and eHealth.
 - This theme provides a foundation of research and scholarship that will support the completion of the next phase of York's academic development through the building of an academic health network with diverse health organizations in York region that continues vision for the development of the Faculty of Health, and sets the stage for a medical school that focuses on integrative clinical and preventive medicine, interdisciplinary service delivery and health promotion.
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York draws on a formidable range and depth of health research and associated expertise focusing on improving health outcomes and bridging new knowledge and applications to understanding, prevention and treatment of disease and injuries. From biomedical exploration to study of the social determinants of health, age-related ailments to health promotion, mental, and physical health to global health, and health policy, health data mining and management to bullying behaviors, critical disability studies, visualizing suffering verbally and visually, and situating wellness in the contexts of history and culture, York's interdisciplinary approach to health research is making a difference in improving the overall health and well-being of individuals and communities. Researchers at York explore the effectiveness of strategies for addressing inequalities in health opportunities for all people, including those who are marginalized and face increased health risks. York's health researchers seek to develop new directions in health policy and community action, as well as in healthcare diagnosis, intervention and services.

A sampling of York's integrative health research extends from the laboratory to the community. For example, our cognitive neuroscience researchers are advancing understanding of how the brain works in linking vision with behavior thereby making connections to improved rehabilitation for stroke and

patients with head injury. York researchers also offer new routes of investigation and insight into the genetic, molecular and cellular neurobiology and environmental effects on brain development in children with autism. Others are generating new insights into diabetes and its prevention through physical activity and diet. York's biologists and chemists are advancing discoveries in cancer research, developing new therapies and enhancing quality of life for cancer patients. Our faculty members are working to address discrimination by monitoring the human rights of people with disabilities worldwide. Others are exploring critical questions involving muscle health and its contribution to metabolism, mobility and quality of life, and healthy aging. York scholars are also partnering with public organizations and private sector industry to advance people-centered health and healthcare through integrated electronic health records and mobile technology, as well as create training programs and professional standards for the new health coach profession being developed at York. This initiative is a first in Canada to combine multiple skill sets in health promotion, disease and injury prevention, and behavior change. Nursing faculty members are exploring ways to improve safety through enhancing patient-centered care. York researchers are engaged in human and machine vision research in the internationally recognized Centre for Vision Research (CVR) tackling a variety of health concerns from brain disorders to visual deficits in Canada's aging population.

The health and wellbeing of individuals and communities reflects a complex interaction among social, biological, political, behavioral, environmental, economic, cultural and historical factors. York researchers in the social sciences, social work and education among others are studying the health implications of homelessness, youth culture, and community development within urban settings, criminal victimization and innovative approaches to addressing youth health. Historians are studying how concepts of health have changed over time and how humans have responded at various moments to epidemics and other health challenges in a variety of geographical settings. Further, sociology researchers are providing a critical voice in the debate over health care reform in Canada, privatization, healthy aging, erosion of universal health care including nursing shortages, and inequities in health care. Nationally leading programs in health studies, social work, disaster and emergency management, along with innovative work being conducted in human resources management on life-long well-being and work/life balance, highlight York's comprehensive approach to the study of health, with an emphasis on community engagement, social justice and critical theory informing health and well-being research. Key research also is being conducted that focuses on social and health care equity for different groups such as aboriginal/indigenous people, women, rural populations, people with disabilities, economically disadvantaged groups, immigrants, and ethnic and cultural minorities. For example, anthropologists are exploring key issues in global women's, and Aboriginal health in the context of questions of power, identity, and the critical reconsideration of biomedical knowledge.

York houses a number of Research Centers, laboratories and facilities serving to coordinate and focus research in health-related areas. For example, the Sherman Health Sciences Research Centre, a hub of vision and neuroscience research excellence, brings together researchers in York's Centre for Vision Research (CVR), kinesiology and psychology in state-of-the-art facilities up to and including functional magnetic resonance imaging (fMRI). York's new Life Sciences Building, opened in 2012, provides top-notch learning and research facilities and leading-edge technologies for advanced imaging – with two

multi-user research hubs – the Biomedical Imaging Facility and the Bioanalytical Facility - among the most innovative and unique in Canada. York houses one of Canada’s most advanced spectrometry laboratories and premier technology in proteomics. A rich concentration of health research within York Institute for Health Research (YIHR) brings together faculty from interdisciplinary teams and cross-sectorial networks encompassing a range of social, environmental, biomedical and behavioral scientists, as well as faculty members undertaking related research in disease modeling, business, law, education and the physical sciences. Glendon College houses state of the art neuropsychological testing facilities that are used in research on the detection and management of cognitive disorders in the elderly francophone population. York’s focus on child and youth research produces leading scholarship on health, education, relationships and development of infants, children, adolescents, and families. Other areas of health-related research at York include skeletal muscle health, how air and water quality and atmospheric particulate matter influence human health, the association of sustainable growth on individual and population health, how biomolecular interactions can be used to diagnose and treat diseases, and a focus on variety of health issues including women’s health, sexuality education, and LGBT activism and human rights.

External partnerships are integral to York’s research focused on health. These include working with industry leaders, regional hospitals, family health teams, public health and the Central LHIN (Local Health Integration Network). Internationally our researchers have ties not only with the United States and Western Europe, but around the globe in regions such as India, the Middle East, Eastern Europe, China, South America and Africa with a mutual goal of helping people live healthier lives and co-creating rejuvenated health systems.

York’s faculty are contributing to the development of cutting-edge health research changing the dynamics of health issues, health care services and health systems in Canada and globally, including research in citizenship and human rights, political, economic, gender and equity issues, applied mathematics, health and the environment, health governance, law and policy. Through this work York’s researchers are having a profound impact on improving the health of Canadians.

Exploring the Frontiers of Science and Technology

- Spanning from the examination of the complexity of science and engineering, to probing technological innovation, to addressing the fundamental challenges arising in our global ecosystem.
- Includes, but is not limited to, research and development in biology, psychology, chemistry, physics and computer science as well as engineering and often entails industrially-relevant discovery and creation.
- There is a wide range of contributing disciplines which include not only the mathematical and information sciences, but also the humanities, social sciences, health sciences, law, environmental studies, and science and technology studies.

York's interdisciplinary and collaborative research programs encompass a full range of pure and applied science research, including life, physical, earth, and space sciences, computing, mathematics, and engineering. Our researchers work at the forefront of discovery and application ranging from subatomic particles to exploration of Mars and beyond, from the molecular level to complex ecosystems, from the theoretical to the practical. Our strength in research allows us to be at the cutting-edge of innovation, expanding what is known and contributing to solutions for local and global issues. While this research area highlights research strengths in the Faculty of Science and Lassonde School of Engineering, it also emphasizes strong alignments with and contributions from the fine arts, humanities, social science, law, health sciences, environmental studies, and science and technology studies.

York's research in science and technology features one of the leading academic and research departments in Canada, Computer Science and Engineering. Our researchers conduct a broad range of cutting edge research including computer vision, robotics and artificial intelligence, computer networks, theoretical computer science, database systems, human computer interaction, and software engineering. Here again, York's Centre for Vision research (CVR) is on the leading edge of developing and applying technology in the areas of computational vision and robotics. Researchers integrate the fields of visual psychology, computer vision, robotics and visual neuroscience to investigate new models of human visual mechanisms and ways they may lead to intelligent machines. Just a few examples of recent research success in this area include; the first computerized motion recognition system, used in cardiology, the Selective Tuning Model for visual attention and an intelligent, visually guided wheelchair intended for physically disabled children. Additionally, York's Computer Science and Engineering department is home to the interdisciplinary and cross-Faculty Digital Media program, the only program in the Greater Toronto Area combining a unique and rich blend of technology, media and communication, drawing on the strengths of the Computer Science, Fine Arts, Cultural Studies, and Social Sciences.

Stereoscopic and 3D film innovation is another example of where York's ground breaking research is offering new routes of investigation and insight. We have a rich history of scientific research in stereoscopic vision and have recently joined with leaders in film. Bringing together a uniquely interdisciplinary team of scientists, filmmakers and industry leaders, the York-led project 3D FLIC (3D Film Innovation Consortium) is bridging fundamental research in stereoscopic perception with the development of stereoscopic 3D (S3D) film language and production, while building the capacity of the S3D production clusters in the Greater Toronto Area. York's strength in stereoscopic 3D research is further enhanced by the Stereoscopic 3D Lab @ York (S3DL), the first dedicated facility of its kind in Canada, melding art and science in the best tradition of interdisciplinary research, joining researchers in the sciences and engineering with researchers in the Fine Arts.

York also features internationally leading space science and engineering research involving collaboration with Canadian, American, and European space agencies. York's Centre for Research in Earth and Space Science (CRESS) houses laboratories where concepts for space flight instruments are developed and tested. CRESS has a track record of contributing instruments for international space exploration missions including a recent laser remote sensing instrument operated from the surface of Mars on the NASA

Phoenix spacecraft that has discovered snow in the atmosphere of Mars. Current projects include leading the development of a laser terrain mapping instrument for the NASA ORIRIS –REx asteroid sample return mission scheduled for launch in 2016. CRESS also has a significant research capacity in climate science, including atmosphere and sea ice, and this complements a broad range of environmental monitoring research at York in air, water, biodiversity, and geomatics.

Scholars in the humanities and social sciences expand our critical understanding of science and technology by exploring their social, cultural, political, philosophical and material dimensions. This research offers unique interdisciplinary perspectives on both the historical development and contemporary challenges of scientific and technological practices, discourses and commitments. Further, researchers from across the university are collaborating on projects utilizing new technologies in the digital arts, computing and engineering. Further, with the development of new technologies come new legal issues and rapidly evolving legal and social norms. Here York's legal scholars are exploring the complex legal and governance issues surrounding intellectual property and technology law and interacting with their colleagues in the sciences and engineering.

York's mathematics and statistics researchers are undertaking leading edge research with an emphasis on applications to the sciences and health sciences. For example, they are developing new mathematical models for the prediction of disease transmission and geo-stimulation of disease spread, and coordinating a number of academic-industrial collaborations in data mining, neural networks and pattern recognition. Significant contributions to this research also are being made by researchers in the life sciences, with particular emphasis on biochemistry and molecular biology, cell biology, ecology and population biology, genetics and animal and plant science. Chemical and physical sciences are a cutting-edge program that build on the most recent developments in chemistry such as proteomics and nanotechnology with a heavy focus and activity in the forefront of research.

York University's newly formed Lassonde School of Engineering is poised to have an enormous impact on the field of engineering in Canada and beyond. It reflects a modern view of engineering, taking a new approach to engineering by leveraging other world-class York University professional schools, forming key academic partnerships with the Schulich School of Business and Osgoode Hall Law School to provide students definitive interdisciplinary integration. Research development within the School will focus on transformative initiatives with clear emphasis on technology development, society advancement, innovation and commercialization, specifically addressing the advancement of energy and smart technologies, connective media, technologies for healthier lives and intelligent public safety and security services.

Forging a Just and Sustainable World

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- This theme extends our understanding of the global and international environment to exploring identity, human rights, citizenship, and the movement of peoples.
 - Research focuses on challenges posed by the social, economic and environmental transitions shaping human activity including local and international policy making with particular emphasis on environmental sustainability and climate change, urbanization, socio-political systems, the international political economy, history, security, governance and law.
 - This theme also explores public and international affairs and a broader examination of Canadian public institutions and the international environments in which they function, with particular emphasis on Canada's bilingual heritage, emerging multilingual contexts and First Peoples.
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This theme brings together renowned scholars from a wide range of disciplines to support York's leading political, environmental and sustainability research programs. Researchers in this area are asking critical questions, and developing new knowledge, solutions and technologies that will help to preserve the environment and ensure effective and equitable public policy and socio-economic development. They are also engaged in collaborative international research spanning political science, history, law, business, geography, science, philosophy, equity studies and other areas of the social sciences and humanities focusing on transnational issues, such as globalization, post-colonial criticism, security, gender, human rights and refugees. This theme also incorporates research related to Aboriginal and Indigenous peoples and nations, legal scholarship, York's strength in Canadian and international affairs, and language research.

Forging a just and sustainable world provides a home for scholarship offering new insights into areas cutting across borders and populations effectively responding to the challenges shaping human activity and changing the ways we live. Many researchers in this area are actively engaged in interdisciplinary scholarship that bridging disciplines within the natural environment. A sampling of this integrative research highlights a collaborative approach producing vital research synergies that are bringing new insights to pressing global regional, and local issues. For example York has a significant capacity in environmental monitoring research, including oil and gas sector impacts, and a broad spectrum of expertise in air, water, and biodiversity monitoring. York researchers are exploring climatic and environmental change in Europe and North America across various historical periods and showing how this has had a profound social, economic, and political impact. In the area of atmospheric monitoring and modeling, York is conducting cutting edge research in areas ranging from understanding chemical and climate simulations, through air pollution forecasting, to probing the changes occurring in the atmosphere of the Arctic and Northern regions, and global stratosphere. York researchers also lead in the area of environmental and sustainability research, with researchers applying experimental methods and simulations to investigate air composition, climate change, and Arctic sea ice, including measurements from aircraft and space.

Further, York researchers are investigating threats to natural resources and habitats: studying water quality monitoring in Canadian lakes and beyond; the health impact of climate on vector-borne and waterborne diseases; predictions of climate change by way of insect sub-fossils, monitoring migratory patterns and health of forest songbirds; study of invasive insects; molecular biology of plants; and the study of bee biodiversity vital to the pollination of wild plants and crops. Ecologists study the effects of multiple environmental stressors on different ecosystems and develop computer models to predict these effects. These studies advance our understanding of the impact of climate change, acid rain, mineral levels and invading species on the North American landscape and on the biodiversity that is essential to our existence. Researchers are at the forefront of what is known as “restoration ecology”, a field of study that uses various indicators to monitor the environment and develops intervention strategies to promote recovery of damaged ecosystems.

York researchers also are bridging ecological research and public policy with their examination of issues related to urban sprawl, and political ecology. Ultimately this research will promote improved understanding of the state of the environment and enhanced knowledge of ways to counter the cumulative effects of environmental changes, including future impacts from multiple stressors.

The nature and scale of our societal and environmental problems require the application of a broad spectrum approaches in seeking solutions. York’s Institute for Research and Innovation in Sustainability (IRIS) is a focal point of sustainability research being pursued across the University; encouraging interdisciplinary collaboration and supporting research activities addressing real world sustainability challenges York has also made a particular commitment to research on sustainable energy, reflected in our Sustainability Energy Initiative (SEI), which features the application of policy relevant research to advance sustainable energy solutions. Researchers are also closely examining the impact of non-human agents on urban societies in the past and in contemporary global suburbanism, and conducting research into worldwide suburban development examining governance models, land use, infrastructure and daily life. Important sustainability research is also conducted in the vicinity of York’s Las Nubes Centre for Neotropical Conservation and Research in Costa Rica examining issues of tropical deforestation, sustainable development and biodiversity, conservation and human well-being.

The considerable scholarship intersecting law and the environment involving York’s legal scholars at Osgoode Hall Law School touches on many important environmental and equity and human rights issues as reflected in Canadian and global environmental law, Aboriginal and Indigenous Peoples and the environment. Other emphases include natural resources law, the impact of resource development on Aboriginal treaty rights, ethical investment, governance for sustainability and sustainable finance. Questions of security, sovereignty and jurisdiction are also central to equality and the politics of the environment, especially relevant to York’s Northern and Arctic research. Along with issues of Arctic sovereignty and territorial claims, York is conducting research and applying knowledge to other world regions experiencing similar pressures and entitlement issues, and include issues of migration and borders; culture, ethnicity, gender, sexuality, sub-national divisions and civil society.

Recognizing the pressures often associated with displacement, migration and the movements of refugees, York’s researchers are examining the multifaceted dynamics of global migration. York’s Centre

for Refugee Studies (CRS), the first such center in North America and only the second in the world conducts leading edge research examining the complex issues surrounding all levels of refugee experiences, including the displacement of populations and individuals across and within borders for reasons of persecution, expulsion, violence, violation of fundamental human rights and loss of essential human security and livelihood. York's refugee research is highly collaborative, featuring ties to research centers and organizations around the globe, informing public policy development and practice by international, governmental, advocacy and service organizations. York's feminist researchers also examine transnational issues and are highly interdisciplinary in their approach, exploring issues of gender, sexuality, employment and labour markets, health, spirituality, human rights and equity in education. Further, current research by York's legal scholars examine many aspects of international, comparative, and transnational law, including the intersection of various forces of globalization with domestic law.

International research at York brings together renowned scholars from a wide range of disciplines providing answers to questions on some of the most important and intractable issues around the globe. Further, York has one of the largest concentrations of Canadian specialists in the world conducting research pertinent to understanding Canada and its place in the world. Their work spans diverse areas including Canadian environmental history and culture, Canada in North American and global political economy, the past and present of Canadian labor, and the policies and politics of language and French Canada. York's Public and International Affairs research focuses on analyzing the key challenges in Canadian public life, and Canada's public institutions and their functioning within domestic and international systems and contexts. This research is housed within Canada's first bilingual School of Public Affairs.

Integrating Entrepreneurial Innovation and the Public Good

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- Innovation relies on the entrepreneurial spirit and courage but at York is contextualized within the principles of social justice and the public good. York is uniquely positioned to meet this multi-faceted challenge and bridge these two pursuits
 - Research under this theme involves disciplines such as business, engineering, ethics and law, corporate social responsibility, corporate governance, sustainable economic development and human rights
 - This theme is closely linked to "Forging a Just and Sustainable World: as the development of knowledge and good practices must be tested from the perspective of sustainability"
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York offers a unique environment for research in professional schools in business and engineering and in technology driven Faculties such as Science and Fine Arts, where an emphasis on furthering the development of technology and markets exists within a broader community that emphasizes social justice through critical discourse as evidenced by York's research strengths in education, law, political

science, economics the other areas of the liberal arts. In particular, our exploration of capitalism, corporatization and business management is balanced at York by research that questions presumptions of market capitalism, political models and bourgeois culture. York is home to a number of the world's leading critics of contemporary capitalist society. Their research explores the violence's of capitalist and patriarchal states, societies, and economic systems, and the nature of the structures of governance from the local to the global that instantiate and sustain these violent inequities. While these two areas of emphasis may seem more oppositional than compatible, the result for York has is critical discourse providing a unique and nationally leading perspective on the development and implementation of innovation that promotes social consciousness and sustainability.

Entrepreneurship has clear ties to a business model for knowledge transfer. Entrepreneurial innovation moves beyond goals driven only by profit motives to the search for ethical ways to conduct business including that which engages the university: knowledge production. Bringing considerations of the public good to the forefront of entrepreneurial innovation is a challenge being taken up in a range of sites across disciplines and units. Some York scholars conduct research whose goal is to understand what underlies successful entrepreneurship and long term management. These researchers also seek deeper insights into the dynamic between consumer behavior and government policy. At the same time, York is recognized as a world leader in corporate social responsibility research. York's thought leadership in responsible business models is reflected in the Canadian Business Ethics Research Network (CBERN), bringing together partners from industry and academe, the goal of the network is to foster ethical approaches in those spaces where communities and industry co-exist. This same spirit informs our leading research on extractive industry practices international intellectual property regulation, trade and investment agreements, and corporate governance. Still other initiatives examine labour standards and labour relations and probe how public policy can promote social justice for workers locally and globally. Research in venture capital, private equity and business finance is complemented by research into the moral, social and economic challenges of human migration and diaspora.

Within engineering, there is major emphasis on the development of the "renaissance" engineer, who brings a sense of the public interest and corporate responsibility to professional practice. This essence is reflected in the commitment to develop research programs exploring transportation networks, energy solutions and development of new devices and technologies, while at the same time emphasizing sustainability and a green economy.

York researchers are known for putting critical insight to practical use through dynamic interactions with decision makers in the public and private sectors. From economic policy consultations to gender analysis of budgets, to intellectual property protections, to work to create informed dialogue on urban transit, we serve as entrepreneurs and catalysts for more intelligent public policy. For example, York researchers are helping to frame intellectual law and related technology discussions in Canada and providing useful policy options aimed at providing balance in policy and law-making processes Our hosting of the Law Commission of Canada, is a further example of our hands on policy engagement, as is our leadership of the Homelessness Research Network and the Refugee Research Network and our contributions to policy and economics of renewable energy through the the Sustainable Energy Initiative. A common thread through all York's initiatives is their collaborative approach to knowledge

creation and social innovation, in which academic researchers work with community partners and policy makers to advance the public interest.

Compelling Opportunities for the Strategic Development of Research

York is committed to the continuing development of its recognized areas of strength in research, scholarship and creative expression. Indeed the majority of resources supporting research at York will continue to be devoted to the broadly based support of excellence in research and scholarship that forms the basis for York's recognition as a leading Canadian research institution. Building on our research strengths through the recruitment of outstanding new researchers and students, the development of cutting-edge infrastructure, and the promotion of engaged collegial and collaborative research, will provide a strong impetus for the continued advancement of York's research profile in global university rankings.

Additionally, within the breadth and diversity of cutting edge scholarship at York are a number of areas where critical masses of scholars have coalesced to provide enhanced opportunities for leadership and recognition through strategic investment. These are complemented by emerging areas underpinned by a strong vision - where the York community has the opportunity to build towards new levels of research leadership. Development of these opportunities brings together varied perspectives, disciplines and understandings delivering innovative achievements and addressing emerging challenges. Strategically, by committing to support and build on these areas of opportunity, we are positioning ourselves to further enhance the profile and recognition of York for ground-breaking scholarship that informs our academic programming.

Digital Cultures

This is an inherently integrative and diverse research area, drawing on researchers from across York to work at the intersection of arts and science, to push technological boundaries while critically investigating the social and cultural impacts of new digital media technologies and the ways in which they are shaping and changing human activity and interaction. Research in this area supports new applications, interfaces and content creation, scientific inquiry, design, policy development and critical discourse in digital media. This opportunity area advances an existing range of cross-disciplinary research from the Fine Arts, Computer Science and Engineering, Education, Liberal Arts and Professional Studies, Health, Law, Environmental Studies and other areas from across the University.

Building on substantial investments over the past few years, York is developing a national profile and international recognition for its accomplishments in guiding the development of digital cultures. We are committed through broad coordinated investments across disciplines to extend and expand York's recognized leadership at the digital interface. Coordinating investment will propel research and strengthen industry-academic collaboration, building on our leading edge digital arts and technology

research. Support in this area will leverage York's current success in digital media and encourage continued innovation to drive our leadership

Engineering Research that Matters

Building on existing strengths in applied sciences, business management, law and engineering, York University's newly formed Lassonde School of Engineering is committed to a new approach to engineering. that leverages the specific strengths of the broader York community. Representing over \$100M in new investment and the hiring of over 70 new engineering professors, the Lassonde School will realize a long standing aspiration of York University. The development of engineering at York will cultivate entrepreneurial leadership combined with business development and management skills to enable successful and competitive future innovators. This will be fostered through relationships with the Schulich School of Business, Osgoode Hall Law School, Environmental Studies, Liberal Arts and Professional Studies, together with a strong ongoing relationship with the applied sciences in shaping future directions .Over the next five years engineering research at York will be guided by York's commitments to social justice and interdisciplinarity. Existing research foci in space and climate sciences, computation and connective media technologies will be complemented by new and expanded research programs that push exploration of smart technologies for a green environment and healthier lives, and enhance public safety and security.

Within five years, our expansion of engineering and applied science research will see York in the first tier for innovation in engineering and applied science research.

Healthy Individuals, Communities, and Global Health

Researchers at York are exploring the boundaries of innovation and scholarship in seeking to improve health outcomes at individual, organizational and societal levels through the lifespan and to apply the benefits of this scholarship in a global context. This focus aligns with York's traditional values of social justice across local, national and international contexts, for the improvement of the lives of individuals and cultures. Building on established strengths in cognitive science, mental and physical health, critical disabilities, nursing and and critical health studies, York's development of research in this area will take an interdisciplinary perspective to health. Broadly defined health research at York, begins with a focus on the individual and extends to applying the benefits of this scholarship in a global context transcending national boundaries always mindful of underlying cultural, social, legal, environmental and economic contexts. These areas of inquiry will be supported by basic research and applied theoretical approaches to address health through the lifespan and to apply the benefits of this scholarship broadly. In this work, the disciplines of public health (biostatistics, epidemiology, environment, social-behavioral science, health policy and management) intersect with the social sciences including demography, political economy, law and human rights, and sociology to address problems that can arise locally but have interconnected global implications affecting health and health equity.

As York completes its maturation into a comprehensive research intensive world class University, expansion of our research focused on health and health outcomes will extend to developing research supports and expertise that aligning in the intermediate term with the need and opportunity of developing a medical school at York. A medical school would address Ontario's evolving and unmet clinical and community health needs focusing on integrated interdisciplinary care, family medicine, community health and wellness through the lifespan. Demographics, health care gaps and the evolution of medicine provide the impetus for the development of a new kind of medical school, with emphasis on the generalist and integration of the physician within the context of the broader health care and health promotion teams. York is committed to evolving our existing relationships with our regional clinical partners, community health and regional health authorities to build on existing research linkages and partnerships to allow for a smooth integration of clinical and population health-based research into the broader York research landscape. As for engineering presently, implementation of a medical school and associated research program at York will benefit from the tremendous wealth of surrounding disciplines to provide a unique perspective and innovative approaches to solving some of the most pressing questions in health promotion, disease and injury prevention and the delivery of health care.

Leveraging existing expertise and accomplishments, York is intent on fostering development of research and scholarship promoting human health in a global context through the development of local solutions with global application and through a global perspective on individual and societal wellbeing.

Public Engagement for a Sustainable World

At a time whenever increasing human activity is pressuring the future of our environment and societies, scholars across York are exploring how to meet these challenges in a socially responsible manner. From disease migration and climate change to environmental challenges related to population growth, industrialization, war, and other factors, researchers are working across disciplines to develop a fundamental understanding of issues and to provide workable solutions for a sustainable future. Through a broad focus on urban environments and public policy, York researchers are building an international reputation for ground breaking critical and collaborative research, providing new knowledge and innovative approaches to comprehending and addressing the complexity of the urban environment in all its parts and manifestations.

Building on a rich history of research and a remarkable range and depth of expertise, York is committed to developing research programming that informs and addresses a range of challenges in urban environments including governance, planning, land use, infrastructure, economy, security, transportation energy and quality of life. Focusing additional emphasis on these strengths and growing external relationships and collaborations will enhance York's reputation as leader in developing forward looking solutions towards a sustainable future

Scholarship of Socially-Engaged Research:

Canada has slowly been awakening to a challenging innovation paradox, with investments in innovation being primarily driven by the technology sector while the opportunities and needs for innovation are expanding fastest in the social and service space. Social innovation offers the potential of improving life for individuals, communities and societies. With its long tradition in the social sciences and humanities, York has been ideally positioned to show how Universities can use academic research to fuel social innovation. In addition to leadership in community engaged research, York is also acknowledged as a leader in knowledge mobilization. As the founding member, York leads Canada's Knowledge Mobilization Network, York's leadership enhances the two-way connection between University researchers and community research partners so that grounded evidence can inform decisions about public policy and professional practice. Importantly, at York the impact of socially engaged research is appreciated broadly across the institution, from the social sciences and humanities, through business and law, to environmental studies, the sciences and engineering.

York has a continuing commitment to maximizing the opportunities and returns of socially engaged research across all disciplines. Building on our established leadership and reputation, we are committed to coordinating future investments in this area to advance York's achievements as a center of expertise on the scholarship of engagement. Thus we are committed to further increasing the critical mass of scholarship at York that is focused on socially-engaged research and on maximizing the benefits of derived therefrom. Because much of this research leads to non-traditional academic outputs, York is also committed to building increased appreciation for the academic importance of its non-traditional as well as the traditional academic outputs of this research. Continuing to invest in this area will further enhance York's reputation as a leader in research that is relevant to real world problems and enables social innovation that finds new ways to address society's persistent challenges.

A Commitment to Research in Education

The engagement of a University in Research provides an environment that exposes students first hand to the cutting edge of scholarship. This creates excitement and provides graduates with experiences at the forefront of their fields of study. As a comprehensive, research intensive institution, York is committed to the exposure of all its students to cutting edge research and scholarship. York is committed to making research accessible to its students, and providing full opportunities for students with special needs to participate in and benefit from research programming.

Exposure of undergraduates to research is promoted at York first by bringing research into the classroom, integrating the latest findings in the curriculum and engaging students. Thus, all York professors, including our most active researchers, are expected to be in contact with students at all levels and to broadly communicate the lessons of their research into the classroom. Additionally, York is committed to providing the maximal possible direct exposure of undergraduate students to the practice of research, by engaging them in research projects as part of their curriculum, and by going beyond the

curriculum to offer internships and other opportunities to participate in and develop research projects over longer periods.

York is also committed to a vigorous environment for its graduate students and postdoctoral fellows. York has one of the largest cohorts of graduate students in Canada and a significant number of postdoctoral trainees. Our graduate students and postdoctoral fellows come from around the world to participate in cutting edge research projects and world leading Master's and Ph.D. programs. Continuing to grow the size and quality of our graduate student complement, including an expansion of international students is an ongoing objective for York that is an important part of our strategy to enhance our international standing. This strategy include a strong focus on thesis based graduate students holding nationally and internationally recognized scholarships and awards, as we build towards our long term goal of having 15% of the York student population at the graduate level.

To provide an exciting and comprehensive experience York is committed to providing a leading support structure for our graduate students, including leading research infrastructure, active, accessible and engaged supervision and mentorship, an emphasis on quality and timely completion of programs, access to an array of research and professional development opportunities, and competitive financial supports. Graduate supervision is an important expectation of Faculty at York, and must be appropriately encouraged and recognized by units and the Institution. York is also committed to providing flexibility and accessibility to allow for appropriate access to its graduate programing to outstanding students from all backgrounds and situations.

Translating the Results of our Research into Action

Collaboration is a hallmark of scholarship and research at York. York scholars working in all six Strategic Research Themes collaborate with partners locally and globally. These research collaborations produce graduates and new knowledge that have a positive impact on the lives of citizens, on the environment and on the economy. By working with partners York research helps to inform public policy, social services, professional practice and the development of consumer and business products and services.

Through collaboration with partners from the non-profit, public and private sectors York will turn its research into action to benefit local and global citizens. We shall accomplish this by supporting knowledge mobilization, commercialization and social entrepreneurs.

World Leading Knowledge Mobilization Contributing to Social Innovation

York is Canada's leading knowledge mobilization university garnering extensive national and international recognition and numerous awards for its work in moving knowledge generated in the Social Sciences, Humanities, Art and Design (SSHAD) into the community and into the economy. Industries that rely primarily on the SSHAD disciplines account for almost two thirds of the Canadian

Economy, while also being a major agent of positive change within our communities, both mainstream and within marginalized sectors.

Knowledge has greater value when it is mobilized and shared by engaging faculty and graduate students with communities and organizations contributing to and benefitting from York's research. The key to developing robust research partnerships lies in both sustainable relationship building and carefully matching our research strengths and critical analysis with the complementary needs of innovators, entrepreneurs, policy makers and community groups. Ranked the top knowledge intermediary in Canada, our pan-university knowledge mobilization infrastructure supports multi-directional connections between researchers and research partners, encouraging the development of knowledge and evidence that informs decisions about public policy and professional practice. Knowledge Mobilization advances social innovation through engaged scholarship and assists our partners in the community, government and industry to address society's most persistent social, environmental and economic challenges.

York's Knowledge Mobilization Unit:

- Fosters research collaborations
- Builds capacity and develops tools for knowledge mobilization
- Supports a culture of knowledge mobilization
- Makes research and research expertise accessible to stakeholders

Working closely with partners in the community, from NGOs to the United Way York Region and government partners from the local to international, York's knowledge mobilization unit has been one of the key supports that has enabled York's success in community and socially engaged research. York is home to a large cohort of scholars who collaborate in their research and teaching with partners from the public, private and non-profit sectors. York is the national leader in large scale, collaborative SSHRC grants, which provides funding for faculty and students to work in collaboration with partners, thus maximizing the social, environmental and economic impacts of our research. Engaged scholarship provides the evidence base for knowledge mobilization, enabling social innovation, which in turn maximizes the impacts of University research. York will invest institutional and strategic resources to support engaged scholarship, further complementing York's leadership in knowledge mobilization by creating a center of expertise in engaged scholarship that will be an intellectual home for scholars who study engagement. In this manner, York will continue to move beyond engagement to true partnership with organizations from the public, private and voluntary sectors.

Over the next five years, our goal is to expand our National leadership and International profile in knowledge mobilization and socially engaged research and enhance our success and recognition in engaged scholarship (research and learning) as we assist our researchers in maximizing the impact of their works in the SSHAD disciplines. Further we are committed to driving the development of the practice of knowledge mobilization at York through our emphasis in promoting the scholarship of socially engaged research.

Research Commercialization and Industrial Liaison through Innovation York

In concert with York's commitment to research intensification, York has recently re-engineered its support network for technology transfer and research. Under the brand of Innovation York (IY), the institution is committed to providing state of the art research commercialization services to faculty members, trainees, and industry within four service streams: agreements, industry liaison, commercialization, and entrepreneurship and startup acceleration. IY provides an integrated suite of services to the York research community, in order to facilitate research, realize the commercial, economic, and social potential of research outcomes, and to create a culture of industry-engaged scholarship and entrepreneurship. IY works with faculty inventors across the University in the sciences, engineering, arts, business and health. It also derives scholarly inputs from business administration and law. IY has joined with a number of key external partners to ensure that our suite of services is robust and effective including MaRS Innovation, and ventureLAB, our regional innovation centre. IY operates services on campus and has facilities in the Markham Convergence Centre in York Region to incubate and accelerate startup companies and support them with business mentorship of MaRS Innovation and ventureLAB.

In supporting these strategic relationships York has committed to significant new investments to assist in effectively achieving knowledge and technology transfer and commercialization in collaboration with our industry, government and community research partners. Innovation York aims to build on existing partnerships and commercialization activities, in order to provide broad opportunities for faculty members and trainees to obtain regional, national, and global industry support for their own academic research and commercialization opportunities.

Enabling the Social Entrepreneur

Merging our success in technology commercialization with our leadership in knowledge mobilization, our strength in social sciences and humanities with the Lassonde School of Engineering, York will create a hybrid space where innovation in technology and management combines with social innovation to facilitate the creation of social enterprises. A social enterprise applies the discipline of business to a persistent unmet social need. A social enterprise can be a non-profit, for profit or a blended corporation. In this hybrid space York will support entrepreneurs who might:

- Develop an app that enables food bank workers to more efficiently and accurately develop a basket of food for people with food restrictions such as Celiac Disease or Diabetes
- Create an on line platform for sharing of under used community assets
- Invent and commercialize technology enabling web accessibility for people with disabilities

Products and services like these can be lucrative, but put social benefits before profits then use profits to further social benefits. Social entrepreneurs derive their inputs from students and faculty working across the University in fields such as computer science, engineering, business, administration, critical disability studies, fine arts and design, mental health services, education and communications & culture.

York will help accelerate social innovations by providing social entrepreneurs with a home at Innovation York in the Markham Convergence Centre in York Region. We will build on our deep relationship with United Way York Region to ground our social enterprise in the needs of our communities and the lived experience of their citizens. We will work with business mentors and seasoned entrepreneurs at ventureLAB, York Region's Regional Innovation Centre and part of the Ontario Network of Excellence to provide social entrepreneurs with all the supports afforded to traditional entrepreneurs so they can test and grow their business to scale to meet local and global needs.

It is in these hybrid spaces that York will pioneer novel entrepreneurial approaches to maximize the economic, social and environmental impact of our research.

Summary and Expectations

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