

**DRIVING THE FUTURE THROUGH  
RESEARCH EXCELLENCE**

**STRATEGIC RESEARCH PLAN, 2020-2025**

**Ontario Tech University**

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## INTRODUCTION

Ontario Tech University has, since its founding in 2002, maintained a fundamental commitment to innovation and research excellence in applications to scientific questions and societal challenges. The orientation of this research is toward advancing scientific knowledge, improving the quality of life and work for all Canadians, strengthening the quality of public services in Ontario, especially in the sectors of health, education and justice, collaborating with business and industry in the commercialization of our research, and contributing to the Canadian economy as well as to regional economic and social development in Durham Region and Northumberland County.

Over the past two decades, the university has created a vibrant, engaged community of researchers and students, built world-class research facilities and libraries, established extensive networks of research partners, provided unmatched research opportunities for our undergraduate students, and invested in a supportive, knowledgeable research services staff. This commitment to innovation and research excellence has already yielded important and impactful outcomes in a wide range of fields. As the university prepares to enter its third decade, it is poised to become a national leader among Canada's research-intensive universities.

Ontario Tech University's **Driving the Future with Research Excellence: Strategic Research Plan, 2020-2025** provides a roadmap for the university to achieve five **Major Research Objectives** that will position it to step into this national leadership role. **Current Research Strengths** are a reflection of where the university is a research leader at present in 2020. **Strategic Research Priorities for 2020-2025** identifies complementary research areas where the university intends to be a research leader by 2025.

The Strategic Research Plan was developed in close collaboration with the Research Board of Academic Council during the 2019-2020 academic year. The process involved extensive consultation with the university's research community including public townhall meetings and an online survey, President, Provost, Senior Leadership Team, Deans, Senior Academic Team, Administrative Leadership Team, Research Working Group, Academic Council Steering Committee, and Academic Council. The 2020-2025 Strategic Research Plan complements, and is in alignment with, the university's new rolling Integrated Academic-Research Plan (IAPR) released in February 2020.

Professor Les Jacobs, PhD, FRSC  
Vice-President, Research and Innovation  
Ontario Tech University  
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## OUR MISSION

The new 2020-2025 Strategic Research Plan advances Ontario Tech University's core founding **Mission**, which aims to:

**Provide** superior undergraduate and graduate programs that are technology-enriched and responsive to the needs of students and the evolving workplace.

**Conduct** research that creates knowledge, solves problems, results in economic and social innovation and engages students.

**Facilitate** life-long learning that is flexible, inclusive and emphasizes college-university transfers.

**Develop** academic and research collaborations with industry and community that stimulate and enhance the region and university at home and abroad.

**Cultivate** a dynamic learning environment for students by promoting social engagement, fostering critical thinking and integrating experiences inside and outside the classroom.

## OUR INSTITUTIONAL PRIORITIES

The 2020-2025 Strategic Research Plan is also in alignment with Ontario Tech's **Institutional Priorities**, which are:

### **Tech with a Conscience**

**We aim** to improve the lives of humans and the planet through the ethical application of technology and innovation. It's a key component in our teaching and learning practices, administrative processes and innovative research projects.

### **Learning Re-imagined**

**We adapt** to the ever-changing educational landscape by experimenting with the most effective ways to deliver flexible and dynamic learning, giving more choices to more people.

### **Creating a Sticky Campus**

**We promote** positive social change and encourage an accessible, equitable, diverse and inclusive culture for our campus community.

### **Partnerships**

**We help** industry, community, government and academic partners be more effective by bringing them together with students and researchers to uncover innovative solutions for our partners' most pressing problems.

## **MAJOR RESEARCH OBJECTIVES**

The **Strategic Research Plan, 2020-2025** is designed to help Ontario Tech University achieve its Major Research Objectives as a research-intensive university. The university's five **Major Research Objectives** for 2020-2025 are:

### **Intensify Research Capacity Through Partnerships**

We will have achieved this objective if we have:

- Significantly increased the number of research partnerships we have with industry, public sector, and community organizations
- Extensively broadened the opportunities for our researchers to commercialize their research in collaboration with our industry partners

### **Strengthen Research Excellence Reputation Nationally and Internationally**

We will have achieved this objective if we have:

- Improved our overall ranking to be among the top 35 research universities in Canada and among the top 25 universities in terms of research-intensity
- Increased the major honours and awards received by our researchers in recognition of their excellent research contributions and scholarship

### **Optimize the Matching of Research Strengths to Opportunities**

We will have achieved this objective if we have:

- Launched new research institutes, centres, and chairs that consolidate and showcase our research strengths in the education, engineering, health sciences, information technology, social sciences, and the natural sciences
- Expanded significantly the size and research strength of our graduate student and post-doctoral fellow community while at the same time preserving our status as a national leader in providing research opportunities for our undergraduate students

### **Sharpen the impact of research on regional economic and social development**

We will have achieved this objective if we have:

- Made demonstrable and highly visible contributions to the quality of life of people living in Durham Region and Northumberland County by providing new economic opportunities and improving the natural environment.
- Increased the opportunities our undergraduate and graduate students have to be directly involved in conducting research with local industry and community partners

### **Integrate Equity, Diversity, and Inclusion (EDI) into all of our research facilities and practices**

We will have achieved this objective if we have:

- Made research a focal point for the implementation of the new comprehensive EDI plan for the university
- Taken a national leadership role as one of Canada's smaller research-intensive universities in the integration of EDI into our research

## RESEARCH VALUES

Academic freedom is the anchor for all research activity at Ontario Tech University. Our research community embodies a set of core values that inform this research activity and provide the points on the compass that guide and motivate our researchers to be:

**Inventive:** Be entrepreneurial about real world applications

**Imaginative:** Be visionary and think creatively about new research pathways

**Inspirational:** Inspire the communities where we live, work and play

**Inclusive:** Ensure equity, diversity and inclusion underpin all of our research endeavours and our research methods are fair and unbiased.

**Integrative:** Adopt problem solving methods that combine multiple perspectives and disciplinary approaches, including community-based research method

## CODE OF RESEARCH COMMITMENTS AND PRINCIPLES

Research and innovation at Ontario Tech University also adheres to a code of fundamental commitments and principles. The impetus for this code is the fact that the university is embedded within a much broader external ecosystem of research and innovation that is instrumental in ensuring our success. This ecosystem includes other universities in Canada and around the world as well as community colleges in Ontario. It also includes industry, community organizations, local government, and broader public sector organizations that are both collaborators and sponsors of our research as well as agents for knowledge sharing and its commercialization. Major research and innovation funders including agencies of the Government of Canada and the Government of Ontario provide important investments in research capacity but also set compliance standards and norms. The university is guided by a research code of fundamental commitments and commitment that reflects not only how we fit into this research and innovation ecosystem but also how we differ from other research-intensive universities.

### **Research Excellence**

*Our researchers strive to produce world-class research and technological breakthroughs that ensure a better future*

### **Tech with a Conscience**

*Our research seeks to improve the lives of humans and the planet through an understanding of the ethical, social, and policy implications of advances in technology and innovation, and their potential to enhance human health and well-being*

### **Truth and Reconciliation**

*We believe that our research must respect and advance Truth and Reconciliation with indigenous peoples*

### **Equity, Diversity and Inclusion (EDI)**

*We believe that EDI is integral to achieving research excellence at our university*

### **Community to Global Impact**

*We endeavour to deliver research that reflects and benefits our local Durham Region and Northumberland County, and contributes to the Canadian economy and environmental sustainability, while having a global reach that places our research on the world stage*

## **CURRENT RESEARCH STRENGTHS**

Ontario Tech University is currently a national leader in six multidisciplinary fields of research. In these fields, our researchers stand out in national and international funding and award competitions, secure extensive industry partnerships and sponsorship, and produce research excellence in scholarly outputs such as journal articles and books. The university has built world-class research facilities and libraries in these multidisciplinary fields that enable our research community to undertake their research programs and that ensure those scholarly outputs are discoverable around the world. The university also provides incredible opportunities for the training of graduate and undergraduate students and other highly qualified personnel such as post-doctoral fellows in these research areas of strength.

### **Energy and Environmental Sustainability**

Ontario Tech is a national leader in research on both energy and environmental sustainability. Our researchers are among the best in the world in nuclear science including small modular reactors, radiation science, radiation health and safety, simulation research, and nuclear materials management. We also are leaders in developing alternative energy sources. Our researchers have made major scholarly contributions to forms of clean energy such as biofuels, hydrogen, geothermal, wind and solar. There is also an emerging focus on human energy among our health science researchers. Our engineers are developing innovative enabling technology that is key to our electrical grid, microgrids, and energy systems in the future. We have outstanding capacity in data management and visualization about energy usage. Working with municipalities, we are building complex networks of high-power charging stations for electric vehicles. The university holds a portfolio of patents related to clean energy.

Environmental sustainability research at the university focuses on the capacity for the biosphere and human civilization to coexist. We possess key strengths in sustainability research including the community and environmental impacts caused by anthropogenic activities including applications of new and emerging technologies. Our scientists study the impacts of human activities like climate change and resource extraction on aquatic animals, microorganisms, and livestock. Our social scientists study how sustainable policies involving access to environmental resources, including clean water and energy, benefit society and the economy as well as key issues in education around developing resilience, at-risk populations, and technological change.

Students and post-doctoral fellows from the Graduate Programs of Applied Bioscience, Automotive Engineering, Electrical and Computer Engineering, Education, Materials Science, Mechanical Engineering, Nuclear Engineering, and Nuclear Technology are important contributors to this research strength.

The university has world-class facilities where this research is carried out including ACE Climatic Wind Tunnel, Aquatic Research Facility, Clean Energy Research Lab (CERL), Electrochemical Energy Materials Lab, Energy Research Centre, Borehole Thermal Energy Storage System, and

the Centre for Small Modular Reactors. The university has four Canada Research Chairs and two NSERC Industrial Chairs who focus their research on energy and environmental sustainability.

**Areas of Research Strength** include: Fuel cells; Renewable Energy; Hydrogen Production & Storage; Clean Technology; Energy Systems; Decommissioning & Site Restoration; Health Physics and Environmental Safety; Environmental Monitoring; Fluid-Structure Interaction; Sustainable Development Strategies; Energy Production, Conservation, and Storage; Transportation & Mobility; Nuclear materials management; Environmental impacts; Energy and Sustainability Education; Indigenous Resource Extraction Governance; International Environmental Governance; Nuclear energy; Radiation science; Smart grid; Small Modular Reactors; Human Energy; and Environmental remediation

## **Digital Technologies, Machine Learning, and Artificial Intelligence**

Situated in the Greater Toronto Area (GTA), which is Canada's technology hub and among the top five business and tech centres in North America, Ontario Tech faculty have developed wide-ranging award-winning research programs spanning multiple disciplines from the natural sciences, business, education, engineering, health sciences, social sciences, and information technology that include a special focus on applications of artificial intelligence.

These research programs reflect a core strength that the university has in Information and Communication Technologies (ICT) that facilitates information access and sharing that drives the advancement of a wide range of economic sectors, including 5G broadband communication, intelligent energy systems, smart cities, autonomous transportation, education, and health care. These innovative multidisciplinary research contributions create valuable opportunities for the university to train student talent who go on to employment in diverse sectors of the economy in the GTA and other tech hubs.

Students and post-doctoral fellows from the Graduate Programs of Computer Science, Information Technology Security, Education and Digital Technologies, Electrical and Computer Engineering, Modelling and Computational Science, Health Sciences (Health Informatics stream), Business Analytics and Artificial Intelligence (Proposed), and Computational Finance (Proposed) are key contributors to this research strength as well as the many undergraduate students who have research opportunities through their degree programs. The university now offers a dual PhD program with the University of Technology Sydney (UTS) in Australia.

The university has built an extensive network of laboratories at the Software and Informatics Research Centre (SIRC) where this research is carried out including SAP Next-Gen Labs – Design Thinking, Business Analytics Lab, Hacker Research Laboratory, Advanced Networking and Security Research Laboratory, Laboratory for Games and Media Entertainment Research, Applied User Experience Research Lab for Interactive Media, the Gaming and Virtual Reality Lab, Health Informatics Laboratory, MaxSIM Health, and Finance and Marketing Lab. Other research facilities include Communications, Signal Processing and Microwave Lab, Digital Culture and Media Lab, Digital Life Institute, STEAM-3D Maker Lab, Education Informatics Lab, and Visualization for Information Analysis Lab. The university also houses the Joint Research Centre in AI for Health and Wellness with UTS. Five of the university's Canada Research Chairs work in this area.

**Areas of Research Strength** include: Operations Modelling; Business Transformation; Consumer Behaviour; e-Commerce; Financial Analytics; Drones; Cybersecurity; Risk in the Global Digital Economy; Signal Processing; Digital Immersive Learning Environments; Human-ability



Enhancing Technology; Linguistic Information Visualization; Real-time Stream Processing; Computer Vision; Robotics; Augmented and Virtual Reality; Consumer Behavior; Privacy and Trust; Big Data Analytics; Internet of Things; Information & Communication Technologies; Human Machine Interaction; Digital Learning; Digital Health; Next Generation Networks; Modelling and Games; Business Analytics and AI; Data Visualization and Analytics; Software Development and AI; and STEAM Education

## **Community Wellness, Human Performance and Health Promotion**

Ontario Tech University has a strong network of researchers focused on innovative community-engaged, social justice-oriented wellness and human performance promotion research. In collaboration with a cluster of Research Chairs and a dynamic cohort of graduate students and post-doctoral fellows, this network is impactful globally in a wide range of fields. The application of this research promotes the health and wellbeing of those living, working and playing in our local communities as well as guiding decision makers to develop sustainable and healthy communities that are inclusive and support the physical, social, economic and environmental health needs of global citizenship.

This network includes students enrolled in the Health Sciences Masters and PhD and the Nursing Masters program, as well as the Graduate Programs of Applied Bioscience, Computer Science, Criminology and Social Justice, Education, Education and Digital Technology, Modelling and Computational Science, Forensic Psychology, and Social Practice and Innovation (Proposed).

A hub of research labs including the Applied Skills Acquisition in Sport Lab, Clinical Affective Neuroscience Lab, Health Informatics Lab, MaxSim Health Lab, Centre for Applied Nutrition and Cardiovascular Health Research, Human Neurophysiology and Rehabilitation Lab, Neuroimaging and Electroencephalography Lab, Health and Human Performance Lab, Motor Behaviour and Physical Activity Lab, Social Research Centre, Centre on Hate, Bias, and Extremism, Occupational Neuromechanics and Ergonomics Lab, Sport Officiating Studies, Centre for Disability Prevention and Rehabilitation, and the Biomolecular Characterization Facility are integral to this research strength. Four of the university's Canada Research Chairs work in this research hub.

**Areas of Research Strength** include: Exercise Physiology; Digital Health Monitoring; Health Informatics; Mental Health & Addiction; Adapted Physical Activity; Healthy Aging; Epidemiology; Pediatric Health; Community-based healthcare; Laboratory Medicine; Violent Crime Reduction; Disability & Injury Prevention & Rehabilitation; Digital Technology & Learning; Health-Care Simulation; High-Performance Sports; Skill Acquisition and Motor Learning; Ergonomics & Biomechanics; Implementation Science & Knowledge Translation; Health Policy, Systems and Services; Chronic Disease Prevention & Management; Intellectual & Developmental Disabilities; Therapeutic Drug Design; Community Development; Indigenous Consultation; Health Promotion; Environmental & Occupational Health; Public Health; Dementia; Nutrition; Sleep Science; Social Determinants of Health; Health Equity; Clinical Information Systems; Psychiatric Vulnerabilities; Educational Accessibility; Poverty Reduction; Healthy Aging; and the Discovery of Novel Therapeutics to Treat Disease.

## **Automotive Engineering, Transportation, and Electrification Systems**

Positioned in the automotive manufacturing heartland of southern Ontario, the university has built world-class research facilities including most notably the General Motors Automotive Centre of Excellence (ACE) climatic wind tunnel that has positioned its researchers to be both leaders in automotive research and pioneers in new mobility systems including the next generation of cars, buses, trains, drones, and even e-bikes. Our automotive engineering research and close industry collaboration is especially innovative in its recent contributions to vehicle dynamics and control, advanced powertrains, and aeroacoustics. As the research hub for the Autonomous Vehicle Innovation Network (AVIN) focused on human interactions with electric and self-driving vehicles, our industry partners include the leading Silicon Valley automotive original equipment manufacturers (OEMs). The talent pipeline in automotive tech from Ontario Tech University combined with its globally leading full scale Autonomous and Electric Vehicle testing infrastructure has made Durham Region one of the world's strongest innovation environments for companies disrupting the automotive marketplace.

Students and post-doctoral fellows from the Graduate Programs of Automotive Engineering, Computer Science, Electrical and Computer Engineering, Information Technology Security, Materials Science, and Mechanical Engineering are important contributors to this research strength.

World-class facilities supporting our research in mobility and electrification systems include ACE Climatic Wind Tunnel, Clean Energy Research Lab (CERL), Software and Informatics Research Centre (SIRC), and the Energy Research Centre. The research community includes five Research Chairs engaged in this field of research.

**Areas of Research Strength** include: Battery Charge & Storage; Assistive Mobility Devices; Intelligent Mobile Systems; Autonomous Vehicles; Vulnerable Road Users; Cybersecurity; Assistive Technologies for Learning Different; Mobility & Software Testing; Climatic & Environmental Testing; Electrification of Transportation Systems; Automotive Dynamics & Control; Vehicle Thermal Aerodynamics & Thermal Management; Automotive Structure & Chassis Design; Transit Modelling & Optimization; Wireless Communication Technologies; Data Ingestion, Analysis & Visualization; Automotive LIDAR & Radar; Precipitation Characterization; and V2X Communication.

## **Advanced Manufacturing and Materials**

Working collaborative with our extensive network of industry partners, researchers at Ontario Tech University are recognized leaders in manufacturing engineering as well as the synthesis and characterization of materials. Applications of this award-winning research have led to the development of sustainable and environmentally friendly approaches and techniques for manufacturing processes, product development and energy systems. This multidisciplinary research involving both scientists and engineers is transforming manufacturing processes in a range of sectors of the economy in Canada and abroad.

Students from the Graduate Programs of Applied Bioscience, Automotive Engineering, Computer Science, Electrical and Computer Engineering, Materials Science, Mechanical Engineering, and Modelling and Computational Science are important contributors to this research strength.

Key research facilities that support intelligent manufacturing and materials research at Ontario Tech University include the Electrochemical Energy Materials Lab, ACE, Materials Characterization Facility, and Mechatronic and Robotic Systems Laboratory.

**Areas of Research Strength** include: Fuel Cells & Electrochemistry; Corrosion Resistant Coating; Nanotechnology; Surface Science; Electronic Materials; Mechatronics & Automation; Advanced Robotics; 3D Printing; Next Generation Genomics; Sustainable Processes; Climatic & Environmental Testing; Software Testing & Simulations; Data Storage & Visualization; and Noise & Vibration Control.

### **Crime, Justice, and Forensics Sciences**

Ontario Tech University has established a distinctive national research reputation in the field intersecting forensic psychology, criminology, and forensic science. Anchored by three top-ranked PhD programs, our professors and their graduate students are making impactful research contributions that strengthen justice services in Canada. Our graduate programs are training highly qualified personnel for industry, universities and colleges, and the broader public sector.

Our top ranked graduate programs that support this research strength includes Applied Bioscience (Forensic Bioscience Stream), Criminology and Social Justice, Education and Digital Technologies, Forensic Psychology, Information Technology Security, Materials Science, Social Practice and Innovation (proposed), and Police Leadership, Corrections and Public Safety (proposed).

The unique university research facilities that support this cluster of researchers include Canada's first Crime Scene House as well as Applied Law Enforcement Research & Training Laboratory, Centre on Hate, Bias, and Extremism, Crime, Clinical Affective Neuroscience Laboratory for Discovery and Innovation, Development, Context and Communication Lab, Entomology Lab, and Forensic Materials Laboratory.

**Areas of Research Strength** include: Hate Crime; Child Testimony; Wrongful Conviction; Human Trafficking; Cybercrime; Policing; Investigation Techniques; Law & Community Engagement; Bias in the Justice System; Prosecution and Trial Procedures; Racial Profiling; Anti-Social Personality Disorders; Technology & Pedagogy; Bullying; Emotional Robotics; Technology & Crime Prevention; Law & Social Change; Critical Criminology; Online Privacy; Detection of Deception; Geographical Profiling; Sexual Violence; Psychopathy; and Body Decomposition.

## STRATEGIC RESEARCH PRIORITIES FOR 2020-2025

Ontario Tech University has set six strategic research priority areas where we aspire to be research leaders by 2025. These priority areas, which build on and are complementary to our current research strengths, are a reflection of both the major anticipated research funding opportunities – provincially, nationally, and internationally – that will be available to our research community over the next five years, and the research and commercialization needs of our diverse set of partners – industry, community organizations, and governments. These six priority areas are consistent with **Our Mission, Our Institutional Priorities, Our Research Values** as well as **Our Code of Research Commitments and Principles**. Commitment to these six priority areas in combination with all of the other valuable research activity being undertaken by our university research community will enable Ontario Tech University to achieve the five **Major Research Objectives** we have set for 2020-2025.

### Canada's Energy and Environmental Future

The vision for a zero-carbon economy is one of the most ambitious and disruptive national goals Canada has ever embraced, in large part because it requires new thinking that reaches beyond research silos and integrates advances in the natural sciences and engineering, business and the digital economy, and the health and social sciences. This vision also requires respectful consultation with Indigenous Peoples. Ontario Tech University, with its immense strength in **energy, environmental sustainability, community wellness, information and communication technology, and business information technology**, is uniquely positioned to help shape the research agenda on Canada's Energy and Environmental Future and the role of disruptive technology in the realization of that vision.

- We will be focused on developing our research and policy capacity through new initiatives such as the Brilliant Energy Institute and the Centre for Small Modular Reactors
- We will explore major new sustainability-focused research partnerships such as the EARTH District with other universities and community organizations in the region
- We will seize new funding opportunities that will support our researchers to address the complex challenges that are involved in the transition to a net-zero carbon economy, across disciplines from chemistry and physics to engineering and data science to education and social sciences

### Intelligent Manufacturing and Materials Innovation

The integration of intelligent and autonomous technologies into advanced manufacturing presents Ontario Tech with the opportunity to build on its current research strengths to establish itself as a leader in intelligence manufacturing and materials innovation among Canadian universities.

- We will improve the institutional capacity for our researchers to commercialize their research by strengthening engagement with industry
- We will build on our strengths in polymers and nanotechnology to extend the applications of this innovative research to new sectors of industry

- We will develop capacity in the applications of quantum computing in intelligent manufacturing in close collaboration with industry

## Healthy Populations and Social Justice

Ontario Tech University is co-located in Durham Region and Northumberland County with large health care institutions and health services organizations that have collectively tremendous untapped research potential. We also have a growing number of national and international collaborations in this area. Reflecting our institutional commitment to Equity, Diversity, and Inclusion (EDI), this positioning offers to the university an opportunity for research synergies that will strengthen further our contributions to health and human performance. These synergies will integrate faculty members from across the university, including data scientists, computer scientists, social scientists, health scientists, and education-focused.

- We will prioritize building a network of comprehensive research partnerships and affiliation agreements with surrounding hospitals, other health care service providers, health promotion, recreation and leisure providers, local industries and employers, as well as national/provincial/local health and sport organizations that will facilitate rapid knowledge translation and mobilization, enable the sharing of academic staff, and the submission of joint funding applications to support research
- The health of Canadians is directly impacted by scientific discovery through innovative biomedical research. We will prioritize new research projects linking human health and scientific research
- We will continue to support our research into the social aspects of population health and expand related partnerships, especially in the downtown Oshawa area

## Data Science, Digital Technologies, and Artificial Intelligence

Novel integrated technological advances are driving economic prosperity, security, and social fairness. They are reaching into diverse sectors ranging from public education and health applications to software testing and industry that are creating demands for innovative applications of data science. Enabling technology such as micro-and nano-electronics, nanotechnology, and photonics, and immersive technology such as digital simulations and virtual reality present new opportunities for impactful **Tech with a Conscience** research.

- Although theoretical research on quantum computing is decades old, business and industry applications are only now emerging as real-world quantum computers are coming online along with the technical capabilities to utilize Artificial Intelligence. An important strategic priority for Ontario Tech is developing research capacity on hybrid applications of quantum and high performance computing.
- We will continue to expand in new and innovative ways the applications for our research in enabling and immersive technologies
- We will continue to prioritize researching innovative technology-enhanced learning experiences that disrupt traditional educational expectations regarding achievement, accessibility, and skills-development from early childhood education and elementary schooling to high school and post-secondary education

## **Autonomous Vehicles and Assisted Mobility**

Building on our unique research capacities at ACE including the new moving ground plane, our leadership role in **Automotive Engineering, Transportation and Electrification Systems** and **Digital Technologies, Machine Learning, and Artificial Intelligence** has enabled the university to become a research hub in future-looking autonomous and electric vehicles while building on the historic role that the region has had in the automotive sector.

- We are positioned to be nimble and adaptive to new opportunities with automotive OEMs as well as in other emerging sectors such as aerospace and defence
- Our strengths in fields such as thermal aerodynamics and electrification are at the cutting edge of where research on autonomous vehicles is heading
- We see the university as the research and talent anchor for the development of a manufacturing hub and supply chain in the region

## **Social Innovation, Disruptive Technologies, and the New Economy**

Disruptive technologies have played an important part in the creation of the new economy, characterized by precarious employment, growing income inequality, mental health crises, and social exclusion. The research strengths in business and the social sciences have enabled the university to become a hub of social innovation and critical inquiry into this new economy. Volatility and uncertainty in communities and economic markets create ever more pressing need to address the social and EDI impact and dimensions of these changes.

- We will continue to support the expansion of our recently established research centers engaged in this work (Digital Life Institute and Centre on Hate, Bias, and Extremism) to pursue research across demographic groups seeking social and environmental justice
- We will pursue diverse funding opportunities for research into the impact of social and technological change on education, business, social and political structures, and diverse communities, including Indigenous Communities
- We will capitalize on and develop new business and industry partners to better understand and address how social innovation can help us to deal with changing economic markets