

# ONTARIO UNIVERSITIES: SUPPORTING A GLOBALLY COMPETITIVE ECONOMY



**The Issue:** Through talent and innovation, Ontario will be better positioned to respond to the changing needs of the labour market, while producing the type of Ontario-made innovative solutions that will continue to help our province throughout the pandemic and beyond. These key ingredients will help Ontario and its regions compete globally, fuel economic growth and improve quality of life for all Ontarians.

## Background

- Ontario needs a strong workforce that can fill the job gaps of today and tomorrow, coupled with ground-breaking innovation that continues to drive discovery, commercialization and investment for its economic recovery.
- A highly skilled workforce with the transferrable and cross-disciplinary skills to meet the changing needs of the job market will position our province as a jurisdiction that can attract investment and compete with the best that Europe, India or China has to offer.
- Ontario is already seeing increasing levels of demand amongst certain high-quality STEM and non-STEM jobs that require a university degree, such as engineers, computer programmers and health-care professionals.
- In addition, a strong innovation ecosystem will bridge the gap from discovery to commercialization, help firms grow and scale, advance local industries and turn ideas into products, services and jobs in Ontario – ultimately attracting global talent and investment.
- The ripple effect of innovation ecosystems and university-industry partnerships is not only supporting job creation, but also attracting interest and investment from the global marketplace.
- Much like Silicon Valley, Toronto, Ottawa and Waterloo have become high-tech ecosystems, attracting companies like Amazon, Uber, General Electric and Stripe who are looking to invest in Ontario's highly skilled talent and innovation.

Due to the attractiveness of Ontario's highly skilled talent, as well as recognizing its manufacturing capacity and ground-breaking innovation, Hoffmann-La Roche Limited invested \$500 million over five years in 500 highly skilled and specialized full-time positions in the province.



**Nearly  
250,000**

Number of STEM graduates Canada will need from now until 2028, including 57,500 engineers; 72,700 computer programmers, software engineers and designers; and 37,800 managers in engineering, architecture, sciences and computer sciences, according to the Canadian Occupational Projection System.

## How Universities Are Supporting Ontario

- Ontario's universities are working to ensure the province remains competitive and attractive to investment by developing the highly skilled talent for Ontario to prosper, conducting and commercializing ground-breaking research and acting as innovation hubs, critical connectors and job creators.
- Universities are leading the development of talent, particularly in fast-growing fields, such as artificial intelligence, clean technology, life sciences, engineering and cybersecurity, providing students with the critical skills for the jobs of today and tomorrow in these research and development-intensive sectors.
  - Students are increasingly enrolling in these high-demand programs. Universities have seen a 98% increase in enrolment in math and physical science, 58% in engineering and applied science and 31% in health care since 2010.
  - To encourage the movement of research from ideas to market, universities are working to foster a culture of risk-taking and entrepreneurship, fuel the innovation pipeline and partner with industry to encourage investment in the early-stage innovation.
  - Whether it's by partnering with small businesses to help mitigate the impacts of COVID-19, working with local industry to develop made-in-Ontario solutions, or by supporting Ontarians through innovations in health care, researchers will continue to drive ground-breaking research and discovery.

## Partnering to Rebuild Ontario

Vibrant universities will continue to develop adaptable talent, help rebuild our health-care system, as well as drive innovation and regional economic development.

**It is why in order to fully unleash this potential, Ontario's universities are asking that the government – through increases to university revenue sources, such as expanding spaces in high-demand programs – make critical investments in the sector today to rebuild a better Ontario for tomorrow.**

By working together, we can navigate through this pandemic, safeguard Ontario's health and economy and build a brighter future – not just for the students we teach and the communities we serve, but for Ontario's future and all who live here.

# PARTNERING TO SUPPORT A GLOBALLY COMPETITIVE ECONOMY



Ontario's universities are helping drive the province's recovery by continuing to develop and attract ground-breaking research, innovation and talent across key industries, such as agriculture, artificial intelligence, electric vehicles, financial technology and life sciences.

From enhancing COVID-19 testing, supporting the growth of new industries, such as cleantech, and investing in talent and innovation through entrepreneurship programs, Ontario's universities are also helping address some of the province's most critical challenges through Ontario-made solutions.

Below are just some of the ways universities are partnering with government and industry to continue to foster innovation and attract investment across the province.



## ● Partnering with industry to commercialize new discoveries in health care

● To help develop effective treatments for some of the most aggressive forms of cancer, **McMaster University** launched the Centre for Discovery in Cancer Research (CDCR). The CDCR brings together Hamilton's top clinicians and scientists who focus their research on treatment-resistant cancers with high death rates to develop a better biological and genetic understanding of why cancer treatments fail. This research will help identify new forms of therapy that could save lives.

● As Ontario looks to rebuild its biomanufacturing sector, researchers at the **University of Ottawa** are partnering with industry to help increase the province's capacity to create homegrown biomedical solutions for life-threatening diseases, such as cancer and COVID-19. Together with the University of Alberta and BioCanRx, university researchers will help bring life-saving medical treatments, therapies and vaccines to Ontarians faster.

● COVID-19 testing has been critical for informing public health policies during the pandemic. Researchers at **Ryerson University**, in partnership with YYZ Pharmatech Inc., have developed a cost-effective ultra-sensitive COVID-19 testing method that can detect small traces of the virus, providing more accurate results without repeated processing and false negatives.

● Understanding how the virus that causes COVID-19 mutates can lead to more effective treatments. A team of researchers at the **University of Waterloo** have developed an artificial intelligence-based software that can help predict and identify the most likely mutations of SARS-CoV-2 pathogens. This research will help inform the creation of new tests and vaccines and safeguard against new variants and future pandemics.

● To help identify health conditions by analyzing the way we walk, researchers at the **University of Windsor** are collaborating to commercialize a flexible, self-healing insole that could soon diagnose health problems with the help of embedded sensors. The cost-effective insole is the first of its kind to provide personalized health diagnoses.

## ● Attracting talent and investment to drive innovation

● Determining how a cancer patient is responding to chemotherapy can be challenging to assess early in the treatment process. Rna Diagnostics, a **Laurentian University** spin-off company, has developed an innovative RNA disruption assay (RDA) diagnostic technology to help oncologists assess the efficacy of chemotherapy treatment early. This helps them tailor treatments to an individual's unique response, supporting the best possible outcome for patients.

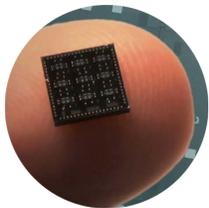
● Artificial intelligence (AI) and machine learning have the potential to accelerate innovations in health care. Deep Genomics, a **University of Toronto** spin-off company, is helping bring new treatments to market for rare and genetic diseases by leveraging AI and machine learning to accelerate drug discovery. The company has secured investments from both Canadian and international investors, making the investment one of the largest financings by a Canadian AI company.

● The deadline to finding a viable solution for nuclear waste storage is drawing closer as governments and industry look to safeguard used nuclear fuel. With investment from industry, a **Western University** researcher is helping address this challenge through expertise in electrochemical processes and corrosion to identify how impurities in the coating of existing storage canisters could affect corrosion. The research will help provide insight into a long-term storage solution for nuclear waste that is safe for both people and the environment.

● Providing space and opportunities for entrepreneurs to succeed can help foster innovation and transform industries. **York University's** innovation hub, YSpace, is connecting entrepreneurs in the agri-food industry with retailers, distributors, investors and mentors to bolster the local food industry and bring new solutions to market that meet the diverse dietary needs of Ontarians.

## ● Advancing innovation in cleantech, agri-food and artificial intelligence

- Leaks from oil and gas equipment are leading causes of provincial methane emissions. In collaboration with industry, a researcher at **Carleton University** developed a laser-based monitoring tool to help field workers determine which equipment is leaking the invisible gas. The tool has the potential to transform how the oil and gas sector can effectively measure and mitigate their emissions to help keep methane out of the air and reduce its impact on the environment.
- Advancing innovations in food and farming can help improve the lives of workers and the health of communities. A partnership between the **University of Guelph** and Bioenterprise, a network of food and agri-tech entrepreneurs, is accelerating innovation in agriculture by connecting researchers with a global network of mentors and industry partners to bring new agri-tech ideas to market faster.



- The ongoing impacts of climate change have made farming conditions even less predictable. Researchers at **Nipissing University** created a software to help farmers in northern Ontario make more informed choices about how conditions might affect their crops. The system uses sensors to provide real-time localized data about field conditions to help support healthier crop yields and sustainable farming.



- By enhancing human-computer interactions (HCI), smart devices can help provide more timely and accurate notifications to those who may need them most, such as health-care workers delivering quality patient care or farmers who need up-to-date information on weather conditions. A researcher at **OCAD University** is working on improving HCIs by making these devices more responsive to different situations and better able to assess what users need.

- As the global demand for electric vehicles (EVs) and clean energy grows, researchers at **Ontario Tech University** are working with industry to support product development, research and testing to help bring more EVs to market sooner. The university is leveraging its world-class automotive testing facility – the Climatic Aerodynamic Wind Tunnel (ACE) – to test the safety of EVs for different climates and weather patterns.

- Collecting data from CT scans can be labour intensive and draining on health-care resources. Researchers at **Queen's University** are accelerating the prediction of how cancer will spread by leveraging artificial intelligence (AI) and natural language processing (NLP). Together, AI and NLP will enable researchers and physicians to process large amounts of data quickly and help more accurately identify individual diagnoses and treatment plans to improve patient outcomes.

- The demand for clean technology in Ontario is growing as more companies look to adopt sustainable business solutions. **Trent University** is joining the Environmental and Related Technologies Hub, known as EaRTH District, to help develop Ontario's cleantech sector alongside five postsecondary partners. Trent researchers will contribute their expertise to projects in emerging areas, such as improved fuel economy for both hybrid electric and hybrid hydraulic heavy vehicles.



## ● Developing talent through research and entrepreneurship opportunities

- Opportunities to explore entrepreneurship can help students develop the problem-solving and creative thinking skills that will be invaluable when they enter the workforce as employees or business owners. **Algoma University** is helping students develop these skills by connecting them with high-potential start-ups. The program aims to provide students with real-life experiences that will yield innovative business solutions and build a talent pipeline to contribute to the region's economic development.
- Providing entrepreneurs with the tools they need to take their start-ups to the next level will help them develop the hard and soft skills they need to become business leaders. The **Brock University** LINCubator program is fostering innovation by connecting local entrepreneurs with office space, mentorship and investors to help build regional and global business talent.
- Access to global experiences can help drive research and innovation as students gain new perspectives. Students at **Lakehead University** are participating in a cross-cultural, research-based exchange program that looks to enhance small-scale farming practices in Ecuador. Through this experience, students are working with rural farmers to research and implement new water management, soil conservation and pest control practices, gaining experience that can help advance innovations in agriculture.
- Supply chains have become increasingly complex and interconnected with consumers demanding goods at a rapid pace. **Wilfrid Laurier University** created the Master of Supply Chain Management to help build Ontario's supply chain talent pipeline. Through work-integrated learning and research opportunities, the program equips students with the research, analytics and strategic management tools they need to create innovative transportation and logistics solutions.

