



Partnering for a Better Future for Ontario's Regional Economies

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Introduction

A globally competitive Ontario is built on the strength of its regions. Cultivating local ecosystems of talent and innovation helps create the type of environment that enables people to find jobs in their hometowns and communities, and attract investment from industry looking to partner with local businesses and help them scale.

Ontario's regions expand beyond municipal boundaries. Whether it's the Toronto-Waterloo Innovation Corridor; boosting the automotive and manufacturing sectors in Southwestern Ontario; or driving 79 per cent of the province's natural resources in the North – Ontario's regions aren't marked by clear borders.

Communities, cities and towns collaborate with local industry and postsecondary institutions to share resources and infrastructure that help develop talent and drive innovation to address challenges. These partnerships work to strengthen the region as a whole.

Ontario's universities are embedded in their local communities, employing thousands of residents and supporting businesses through the economic activity of students, the university and faculty, alike. They are conducting ground-breaking research that leads to new technologies and helps build sustainable economies.

But their impact extends much further than the place where they're located.



This booklet features some of the ways Ontario's universities are helping to drive regional economic development, and create an environment where businesses, both large and small, can thrive.

Our institutions are developing the talented workforce and driving the innovation that's needed to be competitive in a rapidly changing economy. Students graduate with adaptable skills and leave university ready to be innovative employees and job creators – interwoven into the fabrics of their communities and situated throughout Ontario.

Our researchers are helping stimulate many regions' ability to innovate, invent and advance local industry. Their ideas are being transformed into new products, services and companies that help businesses grow. They're also working with others to form cross-regional partnerships that address large-scale provincial and global challenges.



Talent and innovation is already attracting investment to Ontario. At \$5.8 billion, the province leads the country in direct foreign investment, placing it third in North America. In 2016, it spent \$15.3 billion in research and development.

But economic imbalance still exists within the province. Disruption, new technologies and demographic shifts are changing the way we live, work and play every day, which have varying impacts on the different industries and regions that comprise Ontario.

By working in partnership to catalyze economic activity throughout the province and enable these ecosystems to retain talent, drive innovation and attract investment, we can help turn this disruption into opportunity for all of Ontario's communities.

Together, government, industry and universities can build an Ontario that boosts local economies and benefits all its regions – one that is open for business and well-positioned to become a global leader in the new economy.



Developing the Next Generation of Innovators and Job Creators

Ontario's local businesses and industries need access to the next generation of talent to help drive economic development across the province.

Through partnerships with employers and small businesses, Ontario's universities are providing work-integrated learning opportunities for students in surrounding industries. These opportunities provide them with valuable preparation for the workforce, while businesses and industries benefit from students' innovative and critical thinking skills to help solve their challenges.

Work-integrated learning opportunities, such as, business cases, hack-a-thons and research projects, help develop adaptable and resilient life-long learners, equipped with the skills to become Ontario's future leaders – the innovative workers who are prepared for the roles we haven't yet imagined.

Students also have access to a network of entrepreneurship programs and activities to help them become job creators in their own communities. Through campus incubators and accelerators, they work with business and industry leaders to develop new products and services that help advance sectors, find efficiencies and scale start-ups.

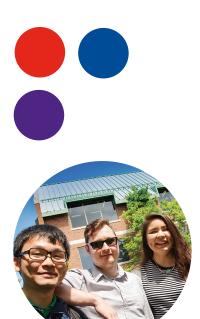
ONTARIO'S UNIVERSITIES



A talented workforce to drive industry

From steel and mining to automotive and gaming, work-integrated learning opportunities expose students to local industries and the unique challenges that these industries face.

Ontario's universities are partnering with employers to help give students practical work experience and ensure they graduate with the knowledge to work in regional sectors and local businesses. Their skillset will help increase economic activity across the province.



Engineers learn, earn and support advanced manufacturing in Sault Ste. Marie

An industry-university partnership in Northern Ontario is showing students they don't need to leave their communities to pursue an education and secure a well-paying job. Algoma University, in partnership with Laurentian University and local industry, is offering the Pathway to Engineering program, helping students transition from school to work and towards becoming Professional Engineers without having to leave the region. Algoma Steel is one industry partner, providing placements for students and helping develop a skilled workforce in the local steel and advanced manufacturing industry.



Preparing students for future work in mining

Many engineering graduates at Laurentian University are often immersed in the mining industry during their studies, providing them with a strong learning environment in preparation for future work in the sector. Hard-Line Solutions, a local mining supply company, recently provided funding to support the Mechatronics program at the Bharti School of Engineering at Laurentian. The funds will be used to enhance student experiences through lab renovations and upgrades, new computer workstations, multimedia equipment for interactive teaching, and student field trips to company facilities. The company also hires graduates of the university and partners with fourth-year engineering students on capstone projects.

Driving London's growing gaming industry

London, Ontario is home to nearly 15 gaming companies, one of the largest clusters of video game production in the country, and a rapidly expanding digital creative scene. The industry employs more than 9,000 people in the region. To support this growing demand, Western University is helping to develop the next generation of talent in the digital creative arts to support local industry. The university offers game design degree programs and courses, and partners with local companies such as Big Blue Bubble, Canada's largest independent mobile gaming company, to offer work-integrated learning opportunities for students.





An entrepreneurial spirit for future innovators

Fostering an entrepreneurial spirit in students is critical to developing a skilled and innovative workforce that can create and adopt new technologies, develop new products and help small, local businesses scale.

Ontario's universities continue to find ways to instill this spirit within students through a broad range of opportunities. Below are some of the ways universities are encouraging entrepreneurship among students and introducing them to opportunities to commercialize ideas.

Grad students help improve medical imaging and advance health care in Ontario's North

Thunder Bay has become a regional hub for health services in Northwestern Ontario with the sector remaining the city's leading employer. To help advance health care in Ontario's North, Lakehead University is partnering with the Thunder Bay Regional Health Research Institute to develop and commercialize the next generation of medical imaging detectors that will improve patient outcomes. The project provides training opportunities for Lakehead graduate students to work with researchers at the Health Research Institute and develop higher-quality images from the medical imaging detectors. These images could be used for clinical procedures, such as, diagnostic imaging and radiotherapy, ultimately with the aim of improving outcomes for patients in the region's hospitals and beyond.



Helping the regional hospitality industry

The small plastic toiletry containers typically used in hotels are often too small to be recycled, causing an estimated 750 million to be thrown into garbages across Canada every year. In response, Wilfrid Laurier University business students launched a start-up to create eco-friendly alternatives. EarthSuds, based in Laurier's tech incubator, Launchpad, developed a tablet that turns into liquid shampoo in the shower. It also has tablets for conditioner and body wash. By packaging it in reusable metal tins, EarthSuds will help the hospitality industry reduce - if not eliminate - the single-use packaging associated with hotel room toiletries. The start-up is in negotiations with The Inn of Waterloo and hopes to market EarthSuds to big hotel chains.











Building Regional Capacity for Innovation

Fostering a region's culture for innovation and entrepreneurship is critical for its economic development. Building strong innovation ecosystems can help local regions and communities address specific challenges, advance their industries and boost economic activity.

Ontario's universities are collaborating with businesses and the public sector to help build these strong communities. By sharing infrastructure and innovation spaces, leaders i postsecondary, government and industry are brought together to develop new technologies and products.

These partnerships facilitate linkages and share resources, helping attract investment from both inside and outside the province.

University researchers are also continuously engaging with small businesses and industry or projects that help find solutions to their unique problems. Oftentimes, the solutions that help advance the local industry have positive ripple effects on the larger, more complex sector-wide issues facing the province.

With small and medium-sized enterprises making up 99.7 per cent of Ontario businesses these partnerships truly fuel the backbone of the province's economy and help drive regionaconomic development.

ONTARIO'S UNIVERSITIES



Addressing regional challenges through partnerships

Much of Ontario's economic activity and investment is currently concentrated in its urban hubs. However, by partnering with local businesses and municipalities, Ontario's universities are working to support all the province's regions and drive regional economic development in communities across Ontario.

Their reach and research extends to the province's rural, remote and economically distressed regions in order to help catalyze economies throughout. These collaborations lead to cost-effective resource-sharing and best practices, solving challenges within a sector and boosting regional economic activity.

Partnering to build climate resilience in Niagara

An innovative project is helping the Niagara region build climate resilience through efficient and cost-effective collaboration. Niagara Adapts brings together seven municipalities - Grimsby, Lincoln, Niagara Falls, Niagara-on-the-Lake, Pelham, St. Catharines and Welland – in partnership with Brock University's Environmental Sustainability Research Centre (ESRC). The project leverages resources and expertise to support collaborative planning and implementation to help protect the environments of a region known for its agri-business sector.













Boosting Eastern Ontario's economic activity

Mapping Eastern Ontario's entire economic and agricultural activity is leading to a visual treasure trove of information for the Ontario East Economic Development Corporation. Carleton University's Immersive Media Studio (CIMS) has developed an in-depth, interactive 3-D map of the region's economic assets to help the commission better understand and stimulate economic activity. The studio started by mapping Eastern Ontario's breweries. showing locations and detailed, high-definition visualizations of the companies' exteriors and interiors, layered with data on what they produce and what factors into their supply chain - so that, for example, their needs could be matched to hops producers in the regions. The research team is now mapping agricultural and food industries, before moving on to manufacturing, tourism and transportation operations - connecting producers and distributors within the region's industries, and taking a sector by sector approach to regional economic development.

Farmers in Northern Ontario are accessing real-time. localized data about field conditions to make more informed decisions about their harvests, protect their crops and drive economic growth in Northern agriculture. GeoVisage, developed by Nipissing University researchers, is a remote, online software that uses sensors to provide data on air and soil temperature, relative humidity and other important metrics for farm scale decision-making. The software incorporates real-time and historical data from seven weather stations and also supplies soil maps, yield maps and field imagery. By partnering with local industry and businesses, the researchers are helping farmers in Northern regions, including Temiskaming Shores, Verner and Cochrane, drive economic growth within their sector.









Helping increase accessibility in the workforce

Project We Count addresses barriers to participation and employment for persons with disabilities in the rapidly growing data economy. Developed at OCAD University, the project tackles bias and exclusion of persons with disabilities in data systems and ensures that these systems (including artificial intelligence, smart technologies, data-driven decision-making and data analytics) recognize, understand and serve people with disabilities by creating innovative machine learning strategies and addressing data gaps. Project We Count will increase knowledge, establish skills, develop inclusive data tools and create a forum where the Canadian disability community can help shape the rapidly evolving data economy and participate in the workforce.

Improving the automotive sector in the Durham region

One of the biggest changes of the next decade will be the rise of autonomous vehicles (AV), as the industry fast-tracks AV testing and evaluates market opportunities for consumers. But, full AV capability requires the ability to re-fuel or re-energize AVs without the need for human interaction. To develop North America's first autonomous AV charging platform, Scarborough-based advanced-energy storage and charging leader eCAMION was attracted to the researchers and facilities at Ontario Tech University. The partnership has created new opportunities for eCAMION to accelerate the development and commercialization of charging technologies, and advance the AV industry in the Durham region.









Developing green technology to clean up tailing ponds

For eight years, Carbonix, an emerging Canadian technology firm, has been working with chemists at Trent University to develop a method of converting waste material from the production of crude oil into activated carbon that can clean the tailing ponds at the oilsands of Fort McMurray. With the help of Trent researchers, Carbonix recently received \$3.1 million in funding to scale up their operations. With partners like SGS Lakefield Research and Suncor, their goal is to continue to help clean tailing ponds in hard-rock mines and former mining sites throughout Ontario.

The development of medical imaging and monitoring methods has profoundly impacted the diagnosis and treatment of cancer. But current techniques have limitations. Tumours need to be a specific size to be visible. Being able to detect cancer cells, even before there are enough to form a tumour, is a challenge that researchers around the world are looking to solve. The solution may lie in nanotechnology. Researchers at the University of Waterloo have developed an efficient quantum sensor that is promising to outperform existing technologies in monitoring the success of cancer treatments. When applied to dose monitoring in cancer treatment, its enhanced ability to detect every photon means a health practitioner could monitor the dose with incredible precision - ensuring enough is administered to kill the cancer cells, but not too much that it also kills healthy cells.











Finding new solutions for the automotive sector

An electric motor from Ford Canada is under examination in a lab at the University of Windsor's Ed Lumley Centre for Engineering where researchers are working to make it more efficient. Local companies and original equipment manufacturers are drawn to the university's facilities and expertise to help address challenges to the rapidly changing automotive industry. Together, the university and industry partners are finding solutions in alternative metal forming, vehicle efficiency and vehicle-to-vehicle communication, helping to build the vehicles of tomorrow

Helping local businesses scale and attract investment

Innovation parks, regional innovation centres (RICs) and incubators can be found throughout Ontario.

These shared spaces bring together leaders in the postsecondary sector and industry with the shared goal of transforming ideas into products that help businesses grow and increase profits. They also help identify alternative markets for discoveries that might have applications beyond their initial purpose.

Whether it's helping to advance the Greater Peterborough Area's progress in green technology or working on large-scale problems at one of Canada's largest technology parks at Kanata North - every Ontario university is connected to an innovation park, RIC or incubator.

These hubs allow key players to share cutting-edge infrastructure and equipment, while fostering idea generation and innovation to drive the development of new products, services and companies, and even lay the groundwork for future industries - those that have yet to emerge.







Advancing biotechnology with sweet corn

From cosmetics to food supplements and drugs, potential applications for nanoparticles in sweet corn are now being explored and marketed by a start-up called Mirexus Biotechnologies, based in Guelph's industrial park. The discovery of the active ingredient in these nanoparticles – PhytoSpherix – was fortuitously made in a University of Guelph lab, when researchers decided to explore these nanoparticles that were byproducts from a chemical procedure. Skin care products containing PhytoSpherix are already being sold by Veriphy Skincare. Now investigating markets in nutraceuticals and drugs. Mirexus expects to grow to 72 full-time positions within 10 years.

Developing prototypes for firefighters

Longan Vision – a start-up that builds augmented reality visors for firefighters – goes through multiple iterations of a single component, designing and producing and testing and re-designing. It's just one of the companies benefiting from access to McMaster University's rapid prototyping makerspace, complete with a range of 3-D printers, a laser scanner and other fabricating equipment. The new collaborative location for Hamilton's entrepreneurs and innovators brings together The Forge and Innovation Factory – McMaster's business incubator and accelerator, both of which support the Hamilton region.





Collaborative spaces and programs to connect with industry

Kanata North is Canada's largest technology park and the birthplace of many gamechanging technologies. Last fall, the University of Ottawa opened an office in the heart of Kanata North to strengthen the local innovation ecosystem. Through this office, the university is bringing innovation and research out of the labs to the doorstep of local industry, helping our companies grow, create good new jobs and remain globally competitive. Working closely with industry, uOttawa offers ongoing upskilling and training to meet the specific needs of this community. Access to talent is a priority for this partnership. Last year, more than 270 uOttawa students had co-op placements with 60 Kanata North companies.





Accelerating the growth of start-ups and SMEs in **Eastern Ontario**

Busy safety managers can quickly identify hazards, assess risks and communicate work instructions to workers thanks to a web app developed by Rillea Technologies. The company works with manufacturers, labs, schools and hospitals to ensure workplace safety. It's a graduate from Queen's University's Partnerships and Innovation acceleration and mentorship programs that help entrepreneurs advance their ideas and accelerate the growth of their companies. Queen's works closely with many regional partners, including St. Lawrence College, the Kingston Economic **Development Corporation and Invest** Ottawa to strengthen the regional innovation ecosystem and accelerate the growth of start-ups and SMEs in Eastern Ontario.



Advancements in cybersecurity to protect businesses

Cybersecurity is relevant to every modern business, from protecting personal information and financial transactions to emerging technologies like autonomous vehicles. Ryerson University's new national centre for innovation and collaboration in cybersecurity, Rogers Cybersecure Catalyst, will help Canadians and Canadian companies both large and small, seize opportunities and tackle the challenges in this fast-growing area. This collaboration with industry, governments and academic partners will promote training and certification, research and development and commercial innovation. The centre will create more than 790 skilled jobs in the field and support the growth of Canadian cybersecurity companies.







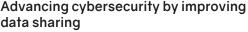




Becoming a global leader in mass timber

Cross-laminated timber (CLT), a mass timber product, is a material increasingly employed in low-carbon construction projects, as it reduces construction waste, provides efficient heating and cooling, and has positive effects on greenhouse gas reduction. Through its Academic Wood Tower, the University of Toronto is demonstrating the benefits of building with mass timber and supporting the development of a skilled workforce across the forestry, construction and architecture and design sectors. With its supply of sustainably grown and harvested timber. Canada is well-positioned for success in CLT, and the university is contributing to this renewable, made-in-Canada design solution. The Tower is just one example of how the university is collaborating with companies in the forestry sector to stimulate demand in Canada's mass timber industry. Through its membership in the Mass Timber Institute, a private-public collaboration among researchers, industry and governments, the university is linking its research efforts to the needs of industry in Northern Ontario





A Toronto start-up is improving data privacy by solving problems associated with sharing Big Data. Developed with the help of Innovation York, York University's innovation space, Bitnobi has created a privacy-protected, data-sharing platform, which keeps raw data at the source and sends aggregate data only to the end user. Innovation York provides services to researchers, students and industry, fostering commercialization and entrepreneurship, and maximizing the economic and social impacts of research and innovation. In 2018-19. Innovation York facilitated more than 170 work-integrated learning activities, and more than 235 start-ups, small businesses and community organizations received support.

Supporting the clean-up of brownfields across Canada

Plants have many different ways to remove, transfer, stabilize or contain contaminants in soils. Researchers at the Royal Military College of Canada are studying this ability in order to use plants to help clean up the hundreds of brownfields – sites of former gas stations and industrial facilities contaminated with petroleum products and chemicals – that exist in communities throughout Canada.





Driving a Globally Competitive Ontario

Many of the innovations taking place in communities and regions throughout Ontario are having a global impact. Partnerships between Ontario's universities, industry and government are helping businesses grow, making new discoveries and developing new technologies and products. These collaborations help build Ontario and drive the province's global competitiveness to attract attention and investment.

Programming and facilities to help businesses scale

● The Automotive Centre of Excellence (ACE) research and testing facility at Ontario Tech University is used to test automotive and aerospace products in extreme weather conditions. It provides space for key players in these industries to bring their ideas to market readiness. The facility includes one of the largest and most sophisticated climatic wind tunnels in the world − wind speeds can reach 300km/hr with temperatures that range from −40 to +60°C.





- Few start-ups turn into global-scale firms. Wilfrid Laurier University's Lazaridis ScaleUp Program is combining the latest research with one-on-one mentorship to help companies scale. The 40 companies involved in the first four cohorts of the program accessed more than \$375 million in capital and created more than 1,100 jobs over two years.
- Toronto is North America's fastest-growing tech market. The University of Toronto's innovation and entrepreneurship network is helping grow this market, attracting tech companies such as LG, IBM, UBER

the past decade.

• Hundreds of companies and thousands of student success stories begin at the University of Waterloo's entrepreneurship ecosystem.
Through work-integrated learning opportunities and programs, the world's largest co-op education program and a vibrant start-up culture, the university has attracted more than \$7.4 billion in investment.



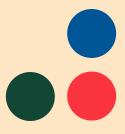
Turning ideas into globally competitive companies

• Diagnosing disease in developing parts of the world can be a challenge. But unique sample collection and preservation kits are helping health workers safely store saliva, urine, blood and tissues at room temperature for days, even months. Developed at **Brock University**, Norgen Biotek Corporation's kits are attracting the



attention and investment from companies in the U.S., Europe, Brazil, Japan and Malaysia.

● The world's first fully compostable coffee pod is an example of how the University of Guelph's Bioproducts Discovery and Development Centre (BDDC) develops renewable materials for consumer products. The BDDC brings together researchers and industry partners, including Loblaw Companies Ltd., to commercialize biomaterials, and has attracted millions of private- and public-sector dollars.



 To help prevent E. coli outbreaks, Queen's University researchers and industry partners came together to develop the world's first automated and portable system for water testing, where results could be delivered on the spot. With the help of commercialization facilities at the university, TECTA-PDS grew from lab to start-up to a global pacesetter in E. coli testing – attracting investment worldwide. Today its products are used in 25 countries.



Flybits, which enables enterprises to deliver highly personalized consumer experiences that drive digital engagement, is being used around the world by customers in banking, insurance, travel and hospitality. The company was developed through the Digital Media Zone (DMZ) at Ryerson University, which bridges academic and entrepreneurial worlds by encouraging students to work together and take innovation to the next level: patents and commercialization.

Commercializing new technologies

- Determining a breast cancer patient's response to chemotherapy at an early stage of treatment could allow doctors to more quickly determine the correct course of action. Laurentian University researchers, in partnership with Health Science North, have commercialized a technology that can measure the effectiveness of chemotherapy as early as a patient's first treatment. Licensed to Rna Diagnostics Inc., it is improving patient treatment and outcomes around the world.
- A Hamilton-based company is able to advance a new approach to cancer therapy due to international investment. Fusion Pharmaceuticals. spun off from the Centre for Probe Development and Commercialization at McMaster University, is using the investment to advance its work and grow operations in Hamilton.
- X-Ray Diffraction (XRD) is a non-destructive method of testing materials used in the manufacturing of cars, airplanes, power turbines and the construction of bridges and buildings, amongst others. A new \$3.7-million partnership between the University of Windsor and a local manufacturing company is working to advance XRD for applications worldwide.

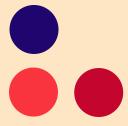
Developing talent to compete in a global economy

• In order to help business students build a strong professional skill set to compete in a global economy,

Nipissing University encourages them to take part in a certificate program called iLEAD. Business students can use the certificate program to earn credits towards their degree through directed study, workplace internships, service work or international placements.



- From data visualization to digital entertainment and wearable technology, the Digital Futures program at OCAD University is preparing students for the digital workplace through work-integrated learning opportunities and independent study. The program has attracted some of the world's top corporations, and is overseen by an advisory board that includes Apple, IBM, Microsoft, RBC and the Toronto Arts Foundation.
- Many managers receive little formal training before entering the management role. Fellow.app, developed by a **University of Ottawa** graduate, is helping them focus their relationships with employees and never lose sight of commitments. With the help of its location in Ottawa's high-tech core and a partnership with Shopify that helped test its product, the start-up recently attracted \$8.75 million in equity investment.
- Emerging as one of Southwestern Ontario's most active start-up accelerators, Propel Entrepreneurship at **Western University** provides co-working space, seed funding, and





mentorship for students and entrepreneurs while hosting pitch competitions, a summer incubator, and workshops for start-ups at all stages of growth. Each year, Propel registers hundreds of student start-ups and attracts millions in "follow-on" investments for Propel graduates.

Advancing industry to make Ontario competitive

- A recent collaboration with natural resource firm R&B Cormier and Algoma University's bioscience and technology building, known as the Convergence Centre, allowed the company to conduct high-end remote-sensing work for a forest measuring project. The Centre opens its space to manufacturing businesses, helping them find solutions to industry challenges.
- To help Ontario remain a leader in the connected and autonomous vehicle (CAV) sector, the Ottawa L5 CAV testing facilities was launched - the first integrated CAV test environment of its kind in North

America. Carleton University researchers and students are working with industry and government partners to support CAV research and development, commercialization and testing.

- Diabetes-related complications can place unnecessary burden on the health-care system, due to ongoing treatment, long hospital stays and workplace disability. Lakehead University researchers are working with academic, manufacturing and industry partners to commercialize a new technology to accelerate the healing of diabetic foot ulcers. Called DermGEN, it is expected to attract investment and create employment opportunities in Thunder Bay.
- By acting as a catalyst for innovative solutions to global problems and bringing together industry, researchers and government, Cleantech Commons in Peterborough is set to become an engine of regional economic growth, commercialization and entrepreneurship, attracting new companies to the region. The innovation park is a partnership between Trent University and the City of Peterborough.
- The Environmental Sciences Group uses advanced technologies to deal with newly emerging contaminant problems. Founded by researchers at the Royal Military College of Canada, the ESG has become a leader in environmental issues and the Arctic ecosystem. Its environmental cleanup standards are still being used today.

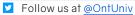
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