



Discover Canada's Leading Health Research & Education Cluster

HAMILTON, ONTARIO

synapseconsortium.com





Leading Canadian Life Science Innovation

Hamilton is emerging as a driver of Canada's life sciences sector.

An innovative hub home to dynamic private companies, research hospitals, and leading academic and research institutions, Hamilton's life sciences cluster is ready for exponential growth.

Hamilton's world-class capabilities in research and discovery, clinical trials, health care education and life science commercialization have captured global attention. Within the last decade, Hamilton has seen a significant increase in new company formations, capital investment, and attraction of specialized talent.

The creation of the Synapse Life Science Consortium in 2016 marked an inflection point for Hamilton, when its anchor organizations came together to work as one to strategically promote, advance and facilitate life sciences innovation and investment in the region. Together, Synapse's partner organizations employ 35,000 people.

Hamilton has created the conditions for strategic collaborations to catalyze and accelerate commercialization efforts by innovative life science companies. This environment has attracted global multinationals such as medical device giant Stryker and nurtured home-grown successes such as Fusion Pharmaceuticals. Hamilton's life science cluster is supporting scaling companies to develop the next generation of innovative health technology. That vision is what drives the members of the Synapse Consortium.



The Synapse Consortium represents Canada's leading health research and education cluster. A strategic broker to the ecosystem, Synapse facilitates initiatives that support the commercialization of health innovation and attract investment to the Hamilton, Ontario region.

To learn more visit
www.synapseconsortium.com

or contact us at
info@synapseconsortium.com



In 2021, more than 200 life science organizations in Hamilton collectively contributed \$5.7 billion to the economy. Hamilton boasts more than 6,700 professional scientists, researchers and clinicians, and over 50 research institutes and centres, who collectively conducted \$460 million on innovative research.

Collaborative, diverse, and open-for-business, the city possesses a critical mass of life science infrastructure, assets, and expertise required for companies seeking to compete in Canada and around the globe.

“Hamilton is quickly gaining an international reputation as a life sciences leader”, says Norm Schleeahn, Director, Economic Development at the City of Hamilton. “From a talented workforce to rich research capacities to strong partnerships between academia and industry, life sciences continues to be a large economic driver for the City of Hamilton and major contributor in building a stronger, more technologically advanced economy.”

From talent to funding, and from lab space to commercialization support, all the necessary ingredients can be found in Hamilton. Companies are seizing the opportunity to be part of a growing and dynamic “goldilocks-sized” city competing on a global scale – small enough to be nimble in supporting operations and growth, and yet not too large to be lost amongst the noise. Will yours be involved?



Fusion Pharmaceuticals: Capitalizing on Nuclear Research

Fusion Pharmaceuticals is a precision radiopharmaceutical drug development company that emerged out of IP developed at McMaster University and the Centre for Probe Discovery and Commercialization. Its initial public offering in 2020 raised more than USD \$212 million, the second-largest ever for a Canadian biotech company. This followed a \$105 million Series B capital raise, amongst the largest in Canadian biotech history. It was named Ontario's Life Sciences Company of the Year in 2018.

McMaster and Fusion are now working together to build a radiopharmaceutical manufacturing facility at McMaster Innovation Park (MIP) to serve a global market by 2024.

"Hamilton — based largely on McMaster's research and innovation — is quickly becoming one of Ontario's largest life sciences clusters, and we need to ensure we are prepared to accommodate the commercialization activities, and subsequent job creation, of our researchers and local partners," said Karen Mossman, Vice President Research at McMaster and chair of MIP's board of directors.

The company formed in 2015 out of the research of McMaster professor Dr. John Valliant and the work of the Centre for Probe Development and Commercialization (CPDC). Building on McMaster's decades-long leadership in nuclear medicine, the CPDC has completed more than 50 radiopharmaceutical discovery, development, and manufacturing programs and brought more than a dozen products into clinical development.

Valliant, now Fusion's CEO, says the history-making investment in Fusion will only raise awareness about is happening in Hamilton.

"We are nimble and fast in Hamilton and that's a significant advantage. Hamilton has great people, research and technology and is building its ecosystem based on that success. This is definitely the time for all this to happen in Hamilton."



A History of Setting the Pace for Change

A culture of discovery, research excellence and a commitment to collaboration has laid the foundation for Hamilton's success, anchored by its academic institutions and research hospitals.

McMaster University is consistently ranked amongst Canada's most research-intensive universities, including #1 between 2017-2020, with a total sponsored research income of \$371.6 million in 2020. It also ranked No. 2 in medical and science grants in the country. The university's global reputation included being named among the Top 100 universities in the world since 2003, helping to attract leading researchers to the region.

The university is home to dozens of research centres and institutes working in human health and life sciences.

Hamilton Health Sciences (HHS) is the 4th ranked research hospital in Canada with 10 sites and specialized expertise in cardiovascular, stroke, burns, neurosurgery, pediatrics, gastrointestinal, high-risk obstetrics, cancer, orthopedics, and rehabilitation services. It is the most comprehensive hospital network in Ontario, and the only one in the province that cares for all ages, from gestation to end-of-life.

St. Joseph's Healthcare Hamilton has a national reputation for outstanding patient care and innovative medical and surgical treatments. It is well known for excellence in respiratory care, kidney and urinary care, mental health and addictions, surgical services, cancer surgery, as well as women's and infant-care.



The Research Institute of St. Joe's Hamilton operates across five research pillars with an annual budget exceeding \$28 million and oversees the work of more than 700 researchers, staff, students and fellows.

Mohawk College is the fourth-largest research college in Canada in 2020 and a leading specialist in digital and mobile health. MEDIC (mHealth & eHealth Development and Innovation Centre) is Canada's only Technology Access Centre with a focus on digital health, including an e-health "living lab" that enables MEDIC to support digital health companies from design to deployment.

With a strong foundation in place, key additions have solidified Hamilton's place as a life sciences powerhouse. Innovation Factory, a regional accelerator; The Forge, a business incubator funded by McMaster University; and the Bay Area Health Trust, a unique arm's length for-profit entity that benefits McMaster and HHS, have built an ecosystem that nurtures the commercialization of ideas.

The Synapse Pitch Competition, founded in 2013 by Innovation Factory, has become Ontario's premier life science pitch competition. Through training and mentorship the competition assists innovators to bring their ideas to market, leverage Hamilton's research infrastructure and intellectual property, and attract investment. More than 100 companies have come through the Synapse Competition, winning \$500,000+ in funding from the competition and have gone on to raise \$50+ million.

Empirica Therapeutics: Translational Cancer Discoveries

Empirica Therapeutics was founded in 2018 on the ground-breaking work of Dr. Sheila Singh, a pediatric neurosurgeon at McMaster Children's Hospital and Canada Research Chair in Human Cancer Stem Cell Biology at McMaster University.

Her lab, which brings together multidisciplinary scientists from several Canadian universities, has become a discovery engine and a translational pipeline for therapies aimed at aggressive and treatment-resistant cancers. With the help of the McMaster Industry Liaison Office, Singh has secured patents, found commercial partners and attracted the attention of the global biotech sector.

In June 2020, Empirica was acquired by Philadelphia-based Century Therapeutics and the company has maintained an important presence at McMaster Innovation Park as Century Therapeutics Canada.

"We have a very differentiated set of skills in Hamilton that have poised us for success in the biomedical and biotechnology sector," said Singh.

"The good news is that the scientists who have made the seminal discoveries and spun out companies currently at MIP are here training the next generation of research scientists at McMaster University."



The success of the competition in bringing together anchor institutions led to the creation of the one-of-a-kind Synapse Life Science Consortium in 2016.

The Consortium acts as a single voice for the life sciences sector in Hamilton, offering a strategic broker to investors, researchers, clinicians, and entrepreneurs.

“The Synapse Consortium is built around amazing anchor organizations that laid the groundwork for the life sciences cluster in Hamilton”, says David Carter, Executive Director at Innovation Factory. “Now they are collaborating in such a way that removes barriers and creates a path of least resistance that makes things happen quickly and efficiently.”

“The power of the Synapse Consortium is bringing those players together to act as one, telling the great story that is Hamilton and what is happening here, and taking a concierge approach to helping start-up companies find what they need and scale-up companies to grow.”

“The consortium opens doors to big institutions for entrepreneurs in a way that doesn’t happen in other cities”, says Carter.



Catalyzing Research & Innovation

Access 50+ World-Renowned
Research Institutes in
Hamilton Advancing
Knowledge in Life Sciences





Centre for Microbial Chemical Biology (CMCB) – features six core labs (High-Throughput Screening Lab, Chemical / Synthesis Lab, Protein Lab, NMR Lab, Mass Spectrometry and IT/ Bioinformatics Lab) that enable chemical biology research, drug discovery and basic research applications.
<http://iidr.mcmaster.ca/cmcb/>



Centre for Probe Development and Commercialization (CPDC) – leads the discovery, development, and distribution of radiopharmaceuticals. full range of scientific, technical, regulatory and business expertise combined with the specialized infrastructure required to translate radiopharmaceuticals to the clinic and provide them to the commercial marketplace
www.imagingprobes.ca



Centre for Surgical Intervention and Innovation (CSII) – a not-for-profit research incubator that supports research and development of IP generated by researchers in the field of medical robotics and related technologies.
www.csii.ca



Clinical Research Laboratory and Biobank (CRLB) – the largest biobank in Canada, with a state-of-the-art research facility providing comprehensive central laboratory services to support global clinical studies and innovative research.
www.crlblab.ca/



Escarpment Cancer Research Institute (ECRI) – works to improve care for cancer patients by focusing on clinical trials, quality health care and knowledge translation research, and transitional (bench-to-bedside) research.
<https://ecri.mcmaster.ca/>



Farncombe Family Digestive Health Research Institute – an integrated group of clinical and basic scientists dedicated to understanding the impact of digestive health and nutrition on disease across the life span.
<http://farncombe.mcmaster.ca/>



Firestone Institute for Respiratory Health (FIRH) – based out of St. Joseph's Healthcare, FIRH conducts clinical research and epidemiological studies to increase understanding of respiratory health and disease and improve patient care.
www.fhs.mcmaster.ca/firh/



GERAS Centre for Aging Research – aims to make life better for older adults by bringing the best research to the frontlines of care as quickly as possible.
www.gerascentre.ca



Hamilton Regional Laboratory Medicine Program (HRLMP) – one of the largest integrated laboratory service programs in Canada, HRLMP provides laboratory support and clinical testing for clinical trials and research studies in the Hamilton area.
www.hrlmp.ca



Institute for Infectious Disease Research (IIDR) – leads research into antibiotic resistance, the discovery of new antibiotics and alternatives, immunity, vaccinology and mathematical modelling of infectious disease from molecules to populations.
<http://iidr.mcmaster.ca>



Mayer Institute – delivers world-class, evidence based diabetic foot wound care and education.
www.themayerinstitute.ca/



McMaster Immunology Research Centre (MIRC) – enables ease of collaboration and integration of basic and translational research themes, and is characterized by impact discoveries of immune mechanisms and new approaches towards therapeutics in disease. specialized equipment and pharmaceutical manufacturing capacity that have made McMaster a Canadian leader in the development of immunotherapies, including life-saving vaccines to combat cancer and infectious diseases such as tuberculosis.
<https://mirc.mcmaster.ca>



INSTITUTE FOR RESEARCH ON AGING

McMaster Institute for Research on Aging (MIRA) – examines the biological, behavioural, technological and environmental factors that affect how people age.
<http://mira.mcmaster.ca>



McMaster Manufacturing Research Institute (MMRI) – one of Canada's most advanced and best equipped research laboratories, combines research excellence with state-of-the-art equipment to meet the sophisticated research and development needs of leading manufacturers.
www.eng.mcmaster.ca/mcmaster-manufacturing-research-institute-mmri



NUCLEAR OPERATIONS & FACILITIES

McMaster's Nuclear Reactor – the first university-based research reactor in the British Commonwealth, it is the world's largest producer of two critical rare medical isotopes (iodine-125 and holmium-166) used to treat cancers.
<https://nuclear.mcmaster.ca/>



Medical Technologies Innovation Centre (MTIC) – provides an interactive collaborative space for research and innovation. In partnership with industry, the community and experts in engineering, education and health, MTIC supports quality patient care in a rapidly evolving healthcare landscape.
www.mohawkcollege.ca/ideaworks/medical-technologies-innovation-centre-mtic



mHealth & eHealth Development and Innovation Centre (MEDIC) – an established leader in digital health, working alongside governments, health agencies, hospitals, clinicians, researchers and NGOs in Canada and around the world.
www.mohawkcollege.ca/ideaworks/mhealth-ehealth-development-and-innovation-centre-medic



Population Health Research Institute
 HEALTH THROUGH KNOWLEDGE

Population Health Research Institute (PHRI) – a world leader in large clinical trials and population studies and Canada's premier cardiovascular research institute. With a staff of 350, PHRI oversees more than \$150 million in clinical trials each year.
www.phri.ca/



Thrombosis and Atherosclerosis Research Institute (TaARI) – is working to reduce death and disability from thrombotic diseases by conducting research into the pathogenesis, prevention, diagnosis and treatment of thrombosis and vascular disease.
www.taari.ca/



Urologic Cancer Centre for Research & Innovation

Urologic Cancer Centre for Research & Innovation (UCCRI) at St. Joe's – pushing the boundaries of urological oncology through research and education.”
<https://research.stjoes.ca/uccri>



Bay Area Health Trust: Nurturing Green Shoots

Bay Area Health Trust (BAHT) operates a business development arm that operates life science businesses and invests in growth oriented opportunities with the goal of returning value to its beneficiaries, Hamilton Health Sciences and McMaster University.

BAHT's Green Shoot Healthcare Innovation Program was launched in late summer 2020 in collaboration with Synapse. Its goal is to support the commercialization of novel innovation emerging from HHS through non-controlling investments from BAHT.

It has provided key support to Mariner Endosurgery, which has developed an advanced surgical navigation system, and neurotechnology developer VoxNeuro, among others.

It has also licensed the McMaster Molecular Medium, a temperature-stable storage medium for viral samples that inactivates and stabilizes coronavirus specimens. BAHT has submitted the technology for regulatory approvals in Canada and the U.S. and is working to secure a patent.

In 2021, BAHT moved into a larger, dedicated building in the Hamilton innovation district that will serve its future growth.



Innovation Starts in Hamilton

When it comes to commercialization of research, supporting first- and second-generation companies, and nurturing green-shoots, Hamilton is a “Goldilocks” sized city.

“We are small enough to all know each other and work together and pull in the same direction,” said Jeff McIsaac, Dean of Research at Mohawk College. “But there is also a critical mass of world-class facilities and assets here.”

Doors open quickly and easily in Hamilton, facilitated by the Synapse Life Science Consortium.

“The community-oriented vision of Synapse is catalyzing results”, says Darren Lawless, Assistant Vice-President, Research, Innovation & Partnerships at McMaster.

“There is no doubt that Hamilton is the place to go for start-ups, scale-ups and world-class companies of all sizes. With McMaster University, Hamilton Health Sciences, St. Joseph’s Healthcare, Mohawk College and other key players all working together in a blended ecosystem, why would innovators and researchers go elsewhere?”

McMaster Innovation Park (MIP) shines as the crowing jewel in Hamilton’s life sciences ecosystem.

Situated on 58 acres near the university, MIP offers everything from a desk in an incubator to wet lab space to build-to-suit opportunities for biomanufacturing.



A place of talent

Hamilton's story is one of economic transformation, built on a foundation as a heavy manufacturing powerhouse to one encompassing strengths in life sciences, technology, education, transportation and the arts.

Hamilton is at the heart of a health and life sciences corridor that stretches from Toronto to Buffalo and includes Canada's largest pool of talent – nine million people live within an hour's drive. The city features a terrific quality of life, nestled within the natural beauty of the Niagara Escarpment and framed by more than a hundred waterfalls. A bustling restaurant and arts scene is anchored by SuperCrawl, a globally recognized musical festival that attracts 250,000 people each September. It also ranked No. 2 on Foreign Direct Investment Magazine's list of mid-sized Americas City of the Future.

Hamilton's institutions graduate thousands in engineering, life sciences, digital health and medicine, many who stay in the city for its cultural offerings, natural and architectural beauty, and great quality of life.

Together, the university and college have 62,000 students enrolled, with more than 50 per cent representing STEM-related programs.

This talent pool fuels the growth of made-in-Hamilton success stories, such as Fusion Pharmaceuticals, Triumvira Immunologics and Empirica Therapeutics. Access to high quality talent also convinced medical device giant Stryker to maintain its Canadian headquarters in Hamilton and to invest \$100 million in a new facility to support its growth.

Hamilton Ecosystem: Responding to a COVID Crisis

Hamilton was a key player in Ontario's and Canada's COVID-19 response, pitching in with prototyping and manufacturing of personal protective equipment (PPE), testing and vaccine development.

The Centre of Excellence in Protective Equipment and Materials (CEPEM) at McMaster brought together scientists, engineers and clinicians to help Ontario-based companies shift production efforts to answer a critical shortage of PPE during the pandemic. Canada's first and only research hub dedicated to PPE, CEPEM is also doing research into next-generation devices using new materials and coatings to improve performance and shelf life, while also exploring the use of sensors in PPE.

The McMaster Molecular Medium (MMM) is a temperature-stable storage medium for viral samples developed by researchers from the Disease Diagnostics and Development (D3) group at St. Joseph's Healthcare Hamilton. MMM inactivates the virus so it cannot replicate and potentially infect a lab technician. It improves pandemic testing by keeping viruses viable for up to 14 days and also allows for the ability to pool specimens, boosting testing capacity and returning results faster.

The MMM story underlines the power of Hamilton's life sciences ecosystem. The technology originated by researchers at St. Joseph's Healthcare was licensed to Bay Area Health Trust (BAHT). Through a partnership deal, MMM is now available for research use from Cedarlane Corporation, a leading Canadian research reagents supplier with customers in over 140 countries.

"Profits come to all the players and there is a beautiful, symbiotic positive feedback loop that comes out of it. Now, we want to see that model replicated," said Peter Kalra, CEO of Bay Area Health Trust.

Other pandemic successes include packaging company Whitebird Inc.'s pivot to develop a suite of domestically manufactured PPE for Canadian care providers. McMaster's start-up, Elarex Inc., is helping vaccine manufacturers reduce spoilage by developing a novel formulation that eliminates the need for vaccines to be stored at extreme cold temperatures. Start-up FendX Technologies is securing a patent for an antimicrobial coating that repels the adhesion of pathogens and inhibits their growth on surfaces.

RANKING WORLD CLASS ECOSYSTEM



Ranked research-intensive university in Canada (2020) – McMaster University



Ranked college industry research income as share of total in Canada (2020) – Mohawk College



4th Ranked research hospital in Canada, Hamilton Health Sciences



Research institutes and centres

INNOVATIVE RESEARCH ACTIVITIES



Annual research spend
\$462 Million



Research projects currently underway
3,982



Total patent contributed past 5 years
405

FUNDS RAISED BY HAMILTON'S PRIVATE COMPANIES IN PAST FIVE YEARS

\$623,900,000

CLASS INNOVATION



Ongoing clinic trials, by phase

Number of
Publications
8,700



Total number of Employees

36,649

Total number of Researchers

6,709

Operating Budget

\$5.7 Billion



Total facilities Space

10.4 million sq ft

Total lab Space

1.4 million sq ft

Facilities space under
Development:

2.8 million sq ft



eye3 Concepts: 'Takes a Village'

eye3 has developed a rugged, handheld detection device to test for THC and alcohol. It requires a single saliva sample and results come in less than a minute.

"This technology fills a large gap in a growing market," said Kate Riley, CEO and Director of eye3. The drug screening market is worth USD \$4 billion and growing by 17 per cent a year. It's estimated it will be a USD \$13.5 billion market in 2027.

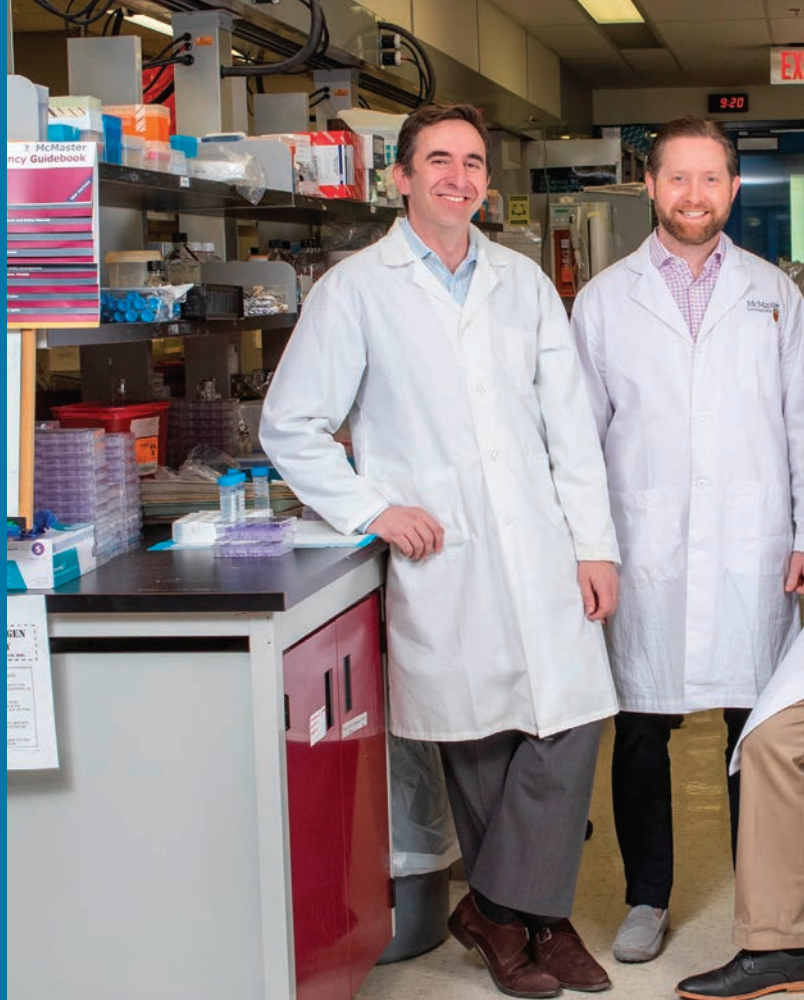
"Existing solutions take a long time to process and in some cases, can't detect the low thresholds that some jurisdictions want," says Riley.

The company is growing rapidly, doubling the size of its research team, along with product development and regulatory teams. Company founder David Wilson found the mentors, connections, facilities, talent and service providers he needed in Hamilton.

All research is taking place at McMaster and a search is underway for local office space.

"There is a real opportunity in Hamilton and there is momentum in an ecosystem that speaks to each other. Everyone was willing to pick up the phone and rally the resources for him. He got access to the channels he needed to grow," said Riley.

"It's always said it takes a village to raise a child. But it also takes a village to grow a company and we've found that village in Hamilton."



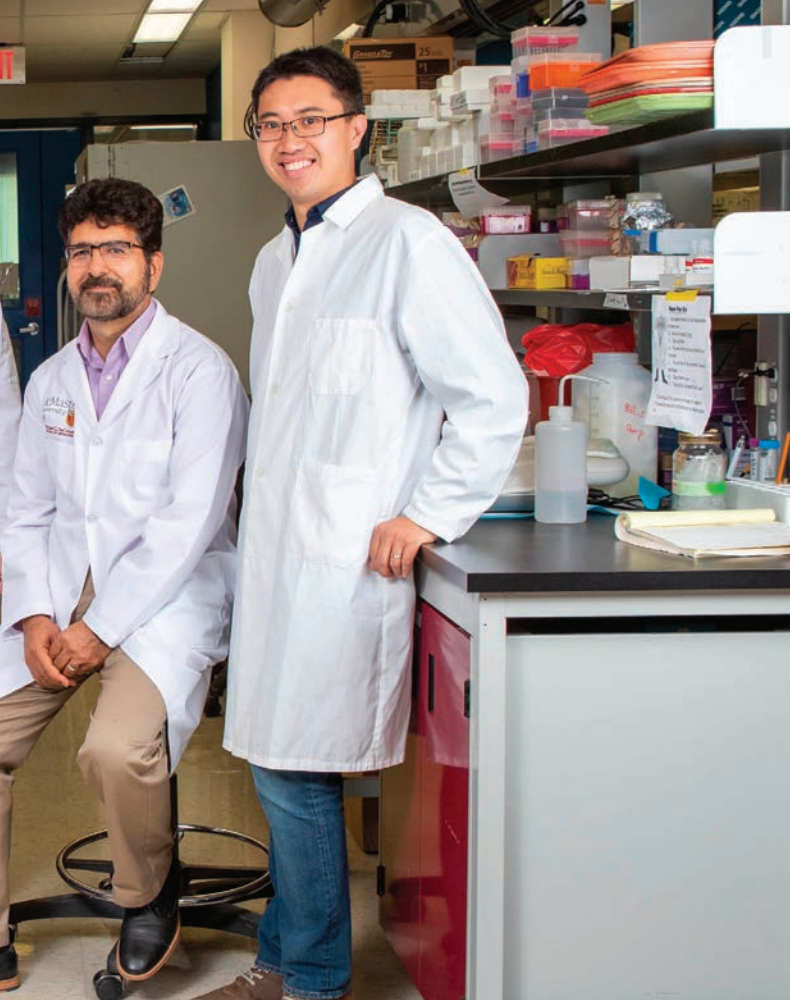
A place of partnerships

Hamilton is a national leader in post-secondary partnerships with industry. McMaster University and Mohawk College are consistently among Canada's best research institutions and its two world-class research hospitals – Hamilton Health Sciences and St. Joseph's Healthcare Hamilton.

The university, led by the expertise of the McMaster Industry Liaison Office, is a long-time powerhouse when it comes to commercialization of research, including through licensing and royalties, patents issues and start-ups created.

In September 2021, the university launched the McMaster Seed Fund, an early-stage investment vehicle that will offer up to \$500,000 to innovative start-up companies that are spinning out from McMaster's research. These start-ups have the potential for significant economic or societal impact in the Hamilton region and beyond.

"While many of our researchers have enjoyed great success with start-ups, they all would agree that the most daunting task is securing the initial funding," said Karen Mossman, McMaster's Vice-President, Research.



An investment committee of entrepreneurs, investors and sector experts, all external to the university, will make investment decisions.

In addition, Hamilton's regional accelerator, Innovation Factory, is managing a \$6-million investment from the Canadian government to accelerate the commercialization of life science innovations through the Southern Ontario Pharmaceutical and Health Innovation Ecosystem (SOPHIE). As a result, 45 Ontario-based life sciences companies work directly with an academic or hospital partner in the Hamilton ecosystem to leverage the facilities and infrastructure needed to accelerate their commercialization efforts.

"Synapse's strategic vision, collaborative approach and concierge services for investors, researchers, clinicians, and life sciences entrepreneurs, start-ups, scale-ups and unicorns are unique and transformational," says Jeff McIsaac, Dean of Research at Mohawk College.

"I've yet to see anything like what Synapse does anywhere else. It is incredibly powerful."

[Continued on next page]

Altus Assessments and ProFitHR: Testing Success

Innovative character tests designed by McMaster professors are helping medical schools choose and train the best candidates are now licensed by two private companies.

Altus Assessments provides research-based, reliable and validated methods for identifying, selecting, and nurturing exceptional learners. A key assessment is Casper, an online situational judgment test that presents applicants with a series of hypothetical scenarios that gauge non-academic skills, such as professionalism, communication, ethics, empathy, collaboration, and motivation. Casper has been in use by McMaster's School of Medicine since 2010.

When other schools expressed interest in using Casper, founders Prof. Kelly Dore and Prof. Harold Reiter, with help from McMaster University's Industry Liaison Office (MILO) and Innovation Factory, commercialized the concept.

Now, Altus assessment tools are in use at more than 400 schools around the world and taken by more than 200,000 applicants a year, including more than 90 per cent of all those applying to Canadian and American medical schools.

Altus recently acquired One45, an assessment platform start-up out of the University of British Columbia, and now has 140 employees in Canada and Australia.

Another test used at McMaster's medical school since 2004, the Multiple Mini Interview (MMI), was commercialized through ProFitHR, located at McMaster Innovation Park. The MMI uses many short independent assessments, typically in a timed circuit, to obtain an aggregate score of each candidate's skills. Today, MMI is used at nearly all medical schools in Canada, and in one-quarter of all medical schools in the United States.

The Synapse Consortium proves that putting egos aside and working together drives momentum, says Dore. "I think one of the coolest things is that we've been able to put ourselves on the map, not due to one entity, but by asserting our superpowers collectively and bringing them together for a common mission."

Mariner Endosurgery: Finding Local Champions

Mariner Endosurgery specializes in soft tissue surgical navigation for general abdominal and gynecological laparoscopic surgery.

Its platform LaparoGuard achieved FDA approval in 2018 and it is now in operating rooms at Hamilton General Hospital, Buffalo, NY and northern Europe.

The platform uses cameras and trackers embedded in the instruments that calibrate the exact position of the tools and provide crucial information to the surgeon on a screen. It sounds audio and video alarms when a safe buffer zone is encroached.

Mariner emerged out of the vision of Hamilton surgeon Dr. David Langois. The company was incubated inside The Forge and Innovation Factory, took second place in the Synapse Life Science Competition in 2016, and was able to secure a round of early financing through the Angel One Network.

The start-up also received investment from the Bay Area Health Trust, and has worked closely with research and surgeons at Hamilton Health Sciences and St. Joseph's Healthcare to develop and refine its product.

"All of that help and support was critical. A lot of people took a risk to back us and champion us. And the Hamilton Health Science Foundation was our first customer," said Mitch Wilson, CEO.

When a delegation from Norway hosted by the Synapse Consortium came to Hamilton, the team at Mariner Endosurgery met a surgeon from Oslo University Hospital who is now using LaparoGuard.

"We wouldn't have made it without all the players in the Hamilton ecosystem. We would have died on the vine without Innovation Factory, The Forge and Synapse. They validated our technology, our market and they validated our business."

A place of assets

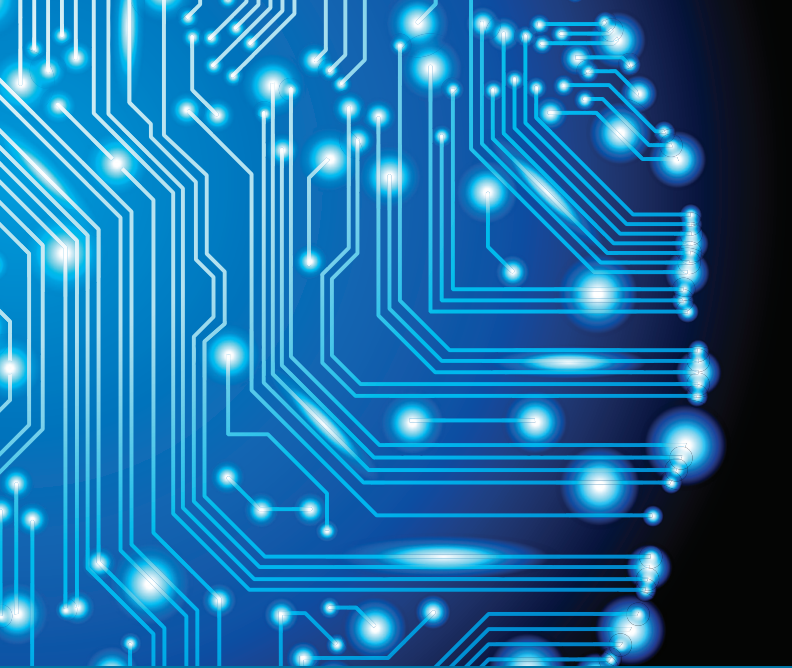
Hamilton's innovation infrastructure and intangible assets are a key differentiator as a place to do business.

Hamilton is ideally located at the heart of a globally renowned health innovation corridor that stretches from Toronto to Buffalo, serving as a gateway to the North American market. Hamilton has Ontario's largest port, the busiest overnight express cargo airport in Canada, sits at the fulcrum of Canada's rail network, and is connected to an enviable network of highways. The city has 11.8 million square feet of life science infrastructure, including 1.38 million square feet of laboratory capacity dedicated to research, teaching and clinical work.

Hamilton is also blessed by the legacy of generous philanthropists who have supported health and life sciences in the city, including Charles and Margaret Juravinski, Michael DeGroote, Michael Lee Chin, David Braley, Marnix Heersink and the Ron Joyce.

The Juravinski's created a \$100 million endowment in 2019 that supports collaborative research across HHS, SJHH and McMaster. One of Canada's largest-ever planned legacy gifts established the Juravinski Research Institute to improve treatment of age-related diseases, cancer, lung and respiratory care, and mental health.

"Hamilton has all the necessary pieces, from fundamental research to clinical trials, and from business development to angel investors, to commercialize ideas," says David Carter, Executive Director at Innovation Factory. "The effort in developing and pulling together this ecosystem has paid off and is now poised to attract large, domestic and international players who need what Hamilton has to offer."



A place for the future

Dr. Sheila Singh is a pediatric neurosurgeon and co-founder of Empirica Therapeutics, a McMaster start-up developing novel cancer therapies.

Singh says Hamilton's scientific community has a legacy of great discoveries in radiochemistry, clinical epidemiology, molecular probes, and immuno-oncology.

Thanks to strong support for scientific entrepreneurship, that research is being commercialized and the cycle is growing stronger because those innovators are staying in Hamilton to train the next generation of scientists. After Dr. Singh's company was acquired in 2020 by Century Therapeutics, the Canadian subsidiary established its primary research activities out of McMaster Innovation Park.

"We have a very differentiated set of skills in Hamilton that have poised us for success in the biomedical and biotechnology sector," said Singh. "The good news is that the scientists who have made the seminal discoveries and spun out companies currently at MIP are here training the next generation of research scientists at McMaster University."

"I would definitely welcome any investors to come and take a look at the world-class science being done here and the incredible innovation being applied to how we've been able to translate those discoveries to patients."

Success Stories

Adapsyn Bioscience has a proprietary platform that applies patented algorithms, proprietary artificial intelligence, and machine learning to genomic and metabolomic data from microbes to sift through thousands of compounds a year with the goal of identifying and developing novel drugs. Adapsyn has completed a round of financing that was co-funded by Pfizer R&D Innovate and Genesys Capital. In addition, the company announced a research collaboration with Pfizer Inc., in 2018 that entitles the Hamilton company to potential preclinical, and regulatory milestone payments of up to \$162 million, as well as royalties on potential future sales of any product that may be derived from this collaboration.

Allarta Life Sciences is a Hamilton company out of McMaster that is providing cell-based therapies for diabetes and other endocrine disorders. The company holds a number of patents in the U.S. and Canada and secured \$2 million in seed funding for pre-clinical trials. Next up is closing a Series A round.

Reliq Health Technologies is a rapidly growing telemedicine company focused on developing innovative remote patient monitoring and care solutions. Reliq's iUGO CARE platform uses wearables, sensors, voice technology and intuitive mobile apps and desktop software that deliver constant, real-time monitoring data that prevents costly hospital re-admissions and ER visits. The publicly traded company just announced a 200 per cent increase in sales for its most recent quarter, exceeding \$1.5 million.

Triumvira Immunologics is an immunotherapy company co-founded in 2015 by Dr. Jonathan Bramson at McMaster University. It is developing novel T-cell therapies that are safer and more efficacious than current cancer treatments. All the company's research happens in Hamilton and its lead candidate is undergoing clinical trials. Triumvira, which completed a \$55 million USD Series A financing round in 2020, ranked fifth on BioSpace's NextGen Bio Class of 2021, a list of up-and-coming life sciences companies in North America.

ToeFX: 'Big Welcome Mat' in Hamilton

A Hamilton company is battling the most pervasive and stubborn infection in the world – onychomycosis or toenail fungus.

ToeFX uses a non-invasive and non-toxic light-based (photodisinfection) therapy to treat toenail fungus in clinical settings. Its system is fully approved in Canada and found in more than 60 clinics. The hope is to secure FDA approval in 2022.

ToeFX has aspirations to serve a global market, said Monika Yazdanian, CEO and Co-Founder of ToeFX.

“There is a stigma to this infection and people hide it. One woman in our clinical trial has hid it from her husband for five years. That takes a psychological toll.”

The company has benefitted from the resources and guidance at McMaster and its incubator The Forge, as well as Innovation Factory. ToeFX won the 2021 Synapse Life Sciences Competition and that provided great exposure and credibility to the company, says Yazdanian.

“The prize money is very significant for a start-up. It's the help that you need. We are using it to advance our IT strategy and regulatory work.”

ToeFX was also named among the 2021 recipients of the Ontario Bioscience Innovation Organization's Capital Access Advisory Program.

“Hamilton brings it all together. And there is a great deal of goodwill here. This is a very friendly city and people want to do what they can to help you. They are rooting for you,” said Yazdanian.

“The infrastructure is here in Hamilton. It's a big city but there is a lot of room. A big welcome mat is out here.”



Hamilton's Future: Reaching the Next Level of Success

Hamilton's role as a centre for life sciences innovation and commercialization in Southern Ontario will be strengthened exponentially with a massive build-out of the McMaster Innovation Park.

Leveraging Hamilton's research and innovation ecosystem, anchored by McMaster University. It is positioned to be Ontario's premier life sciences hub, connecting industry to applied research capabilities – bringing local innovation to a global audience.

Upon completion the 58-acre MIP will have a staggering 3.5 million square feet of space, with 1.3 million square feet dedicated to a Life Sciences Innovation Megahub – a hub that will include wet labs that will lead discovery, provide start-up spaces to develop prototype and test products, along with early-stage production facilities and full-scale biomanufacturing.

“The Park is Ontario's fastest-growing life sciences hub and the heart of Hamilton's potential to be an epicentre in the field,” says Karen Mossman, Vice-President, Research at McMaster and chair of MIP

“MIP gives our researchers a natural pathway to commercialize their work and the necessary infrastructure to spin out their research to create start-up companies. I really believe MIP is a game-changer in our ability to attract and retain industry and all of the talent that’s affiliated with that.”

“Now is the time to take root in Hamilton, invest in Hamilton, and be part of its next chapter,” says Ty Shattuck, CEO at MIP

“Hamilton is transforming from a city renowned for its deep research capabilities to one that is a rich talent-centric generator that is creating jobs and innovative ventures out of that research. Our goal is to maximize the full potential of our ecosystem so that we can leverage the true benefits of life sciences and biotechnology; moving start-ups to scale-ups and launching biomanufacturing.”

“This is what makes MIP and the city of Hamilton so unique. Our strategic location, existing life sciences cluster, and our commitment to work together will drive our growth in biomanufacturing”, commented Shattuck.

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VoxNeuro: “Hamilton is a Beachhead for US Expansion”

VoxNeuro is a neuroscience and health tech company, co-founded by McMaster linguistics professor Dr. John Connolly, that has developed technologies to objectively measure real-time cognitive functions to support care for those with dementia and cognitive dysfunctions, concussions, and other brain disorders.

Working with MILO, The Forge, Innovation Factory, and Bay Area Health Trust, the VoxNeuro team was able to successfully secure intellectual property, develop relevant connections with champions in the healthcare industry, and land funding. Its software platform recently secured Health Canada and FDA approvals and the company is assembling plans to roll out to clinics across North America.

In 2020, VoxNeuro was selected by a panel of venture capitalists and digital health leaders as one of 11 companies to participate in the Canadian Technology Accelerators Digital Health Program that connected VoxNeuro with resources to help facilitate its U.S. expansion.

“The city and its life sciences community has fostered a culture of innovation and collaboration, and it has a palpable ‘build-it’ mentality that is inspirational to be a part of,” said James Connolly, CEO.

Hamilton’s location, close to both Toronto and Kitchener-Waterloo in Ontario and to New York state is a strategic advantage for VoxNeuro.

“Hamilton not only serves as our headquarters but also acts as a beachhead for our expansion into the U.S. market.”

Canada's Global Nexus for Pandemics and Biological Threats

If history teaches us anything about infectious diseases, it's that there will always be a "next" biological threat. And while that may be inevitable, the subsequent human and economic devastation is not.

That's why McMaster University has created Canada's Global Nexus for Pandemics and Biological Threats – leveraging its national and global leadership in infectious disease research, its tradition of evidence-based solutions, its world-class roster of interdisciplinary experts and its network of partners across universities, governments, and not-for-profit organizations – to ensure the world is better prepared. Canada's Global Nexus brings together researchers from multiple disciplines to improve disease surveillance, vaccines, rapid diagnostics and testing, crisis management in long-term care, antimicrobial resistance, disease detection and modelling, public policy, and public trust and education.

Under the leadership of infectious disease expert Dr. Gerry Wright, Canada Research Chair and global expert in antibiotic resistance research, Global Nexus will make its home at McMaster Innovation Park.

The new 350,000-square-foot facility will provide space and infrastructure for pharma-grade drug screening and production platforms, ambulatory clinical space and biosafety Level 3 facilities.

"This is Canada's chance to seize the moment," said Wright. "This initiative will recruit global talent, boost global health security, train graduate students, provide jobs and economic growth and make Canada a global destination for investment and innovation."



Innovation and commercialization in Southern Ontario

All those advantages are what brought regenerative medicine innovator CCRM to Hamilton and to MIP where collaboratively they will build a biomanufacturing campus. That is a major step in a \$1.75 billion plan to grow the footprint of MIP by 2.8 million square feet in the next five to 10 years. This will include custom-built biomanufacturing facilities and global centres of excellence and the conversion of existing facilities to offer opportunities for earlier-stage companies to scale their business.

"MIP is at the heart of the future of Hamilton's life science cluster", said Alex Muggah, Director, Synapse Life Science Consortium. "It demonstrates all the pieces are in place to commercialize local research, capture national and international investment and establish Hamilton as a leading life sciences cluster in Canada and globally."

The vision of MIP to become a globally recognized life sciences mega-hub, is underpinned by the talent generation engines of McMaster University and Mohawk College.

All the competitive assets of Hamilton are coalescing at a time of a generational change for the city, built on its strong foundation in education and health. Hamilton is growing rapidly, and is expected to reach a population of 750,000 by



CCRM: Investing \$580M to Build a Biomanufacturing Future

The Centre for Commercialization of Regenerative Medicine (CCRM) and McMaster Innovation Park are partners in building a \$580M biomanufacturing campus at MIP focused on regenerative medicine-based technologies and cell and gene therapies.

The facility will be run by a new subsidiary, OmniaBio Inc., which will operate the largest contract development and manufacturing facility for these therapies in Canada. Up to 2,000 people will be employed at the 400,000-square-foot facility by 2026.

"Today, entrepreneurs, leading global companies and investors in the life sciences industry increasingly see the Toronto-Hamilton-Buffalo region as a global-calibre life sciences corridor," said Ty Shattuck, CEO at MIP.

"MIP is at the epicentre of that region and of Hamilton. Our prolific global leadership role in life sciences innovation is part of what drives life changing partnerships with exciting organizations like CCRM."

Regenerative medicine, including cell and gene therapy, is a booming biotech field. It harnesses the power of stem cells, biomaterials, small molecules, and genetic modifications to repair, regenerate, or replace diseased cells, tissues, and organs and combat devastating diseases such as heart disease, diabetes, and cancer.

"There's an enormous global demand for biomanufacturing," said Michael May, President and CEO of CCRM. "Canada can be a leader in manufacturing cell and gene therapies for patients worldwide, but especially here at home. We want Canadian citizens first in line to receive therapies as they become approved by Health Canada."

The future is in biomanufacturing because if you can't produce products, then innovation has to go elsewhere, says Darren Lawless, Assistant Vice-President, Research and Partnerships at McMaster.

"Hamilton's expertise in manufacturing sets it apart. It's literally in the city's DNA. We know how to build here. The fact we have the blend of fundamental research, technical knowledge, support for innovation and advanced manufacturing expertise is the sweet sauce of Hamilton."

2035. Its diverse economy is capitalizing on access to its international airport along with its designation as a federal foreign trade zone, which aids in the tariff- and tax-free importing and exporting of goods.

The city is also bidding to host the 2030 Commonwealth Games, has a massive entertainment consortium project in the heart of downtown on the horizon, and will soon see shovels in the ground on the biggest infrastructure project in its history – a \$3.4 billion light rail transit line.

Its close proximity to Toronto makes it part of a massive regional economic engine, yet Hamilton remains a distinct entity from its towering neighbour to the east.

An engrained "can-do" attitude in Hamilton led to it being coined the Ambitious City 100 years ago. Today, that attitude is leading the transformation and renaissance that is shaping the city's future.

"The city has found a way to reinvent itself by bootstrapping innovation, collaboration and building on the culture of the Ambitious City that has carried it throughout its history," said Keanin Loomis, President and CEO of the Hamilton Chamber of Commerce.

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Now is the time to take root in Hamilton

“The pandemic has brought home how critical they are to our social and economic well-being. Now the future of the city is built on life sciences.”

Pulling all the life sciences players together to act with a singular vision and commitment is the Synapse Life Sciences Consortium. Whatever the idea and at whatever stage it may be, Synapse will be there to support companies to the next level of success.



The Synapse Life Science Consortium is the formal regional cluster organization for the life sciences ecosystem in the greater Hamilton region. Synapse supports

initiatives and projects that magnify the impact of collective action across the cluster ecosystem, and accelerate the commercialization of life science innovation.

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