

# Greater Montréal: AI for Health Hub



# The world's best economic promotion agency at your service





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# Top reasons to invest in AI for health in Greater Montréal



## A world-leading AI hub

- **Top 3 Best Places to Invest in AI in North America**
- **Google, Microsoft, Facebook, Novartis**, and many more major companies developed AI research labs in Montréal
- Cutting-edge expertise developed by researchers such as **Yoshua Bengio, Joëlle Pineau, Doina Precup, Hugo Larochelle** and **Irina Rish**



## A highly qualified workforce

- **Canada's University Capital**
- **600+** researchers MSc, PhD, post-doc and applied AI students at Mila, the world's largest academic research lab in deep learning and machine learning
- **19,500 workers** with AI skills
- **46,000+ jobs** in life sciences and health tech in private companies
- **Several thousand researchers** in public organizations



## Many opportunities for funding & collaboration

- **More than \$3 billion in AI investments announced in Greater Montréal** since 2016
- World leaders, including **Google, Microsoft** and **Facebook**, opened AI research labs in Montréal in the last few years
- Numerous possibilities for collaboration between researchers and the industry with **Scale AI, Prompt**, and others

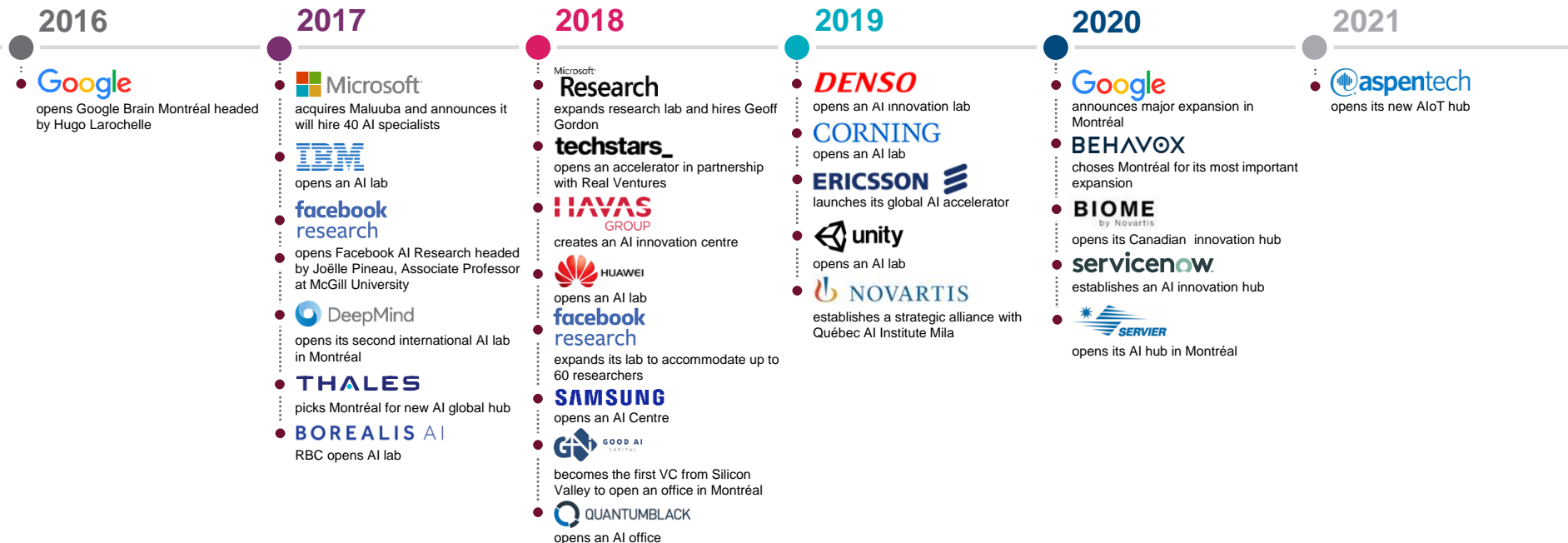


## An ethical AI framework

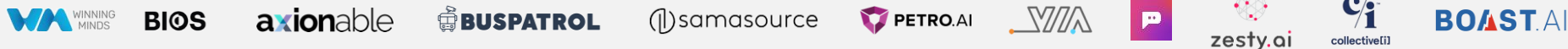
- At the forefront of AI for good initiatives with **Montréal Declaration for responsible AI development**
- Home of the International Centre of Expertise for the Advancement of Artificial Intelligence (**ICEMAI**) and the International Observatory on the Societal Impacts of AI and Digital Technology (**OBVIA**) fostering responsible AI



# A few of the world leaders developing their AI expertise in Montréal



## Other foreign companies that have chosen Greater Montréal



# 01

## Life Sciences: A Strategic Sector for Québec



# Québec's ambitious Life Sciences Strategy

## Two priority niches to position Québec internationally

- 1 Precision medicine
- 2 Big Data in the health sector

## Four key objectives

- 1 Increase Investment in research and innovation in all life sciences
- 2 Foster the creation of innovative companies and ensure their growth
- 3 Attract new private investment
- 4 Further integrate innovation into health and social services network

## Two goals

- 1 Attract **\$4 billion** of private investment in Québec by 2022
- 2 Make Québec one of the **Top 5** North American life sciences clusters by 2027



# 02

## A Unique Interconnected & Collaborative Ecosystem





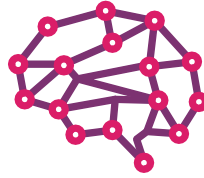
# Montréal has developed an internationally acclaimed expertise in several fields



**Oncology**



**Cardiovascular  
and metabolic  
diseases**



**Neuroscience  
and mental  
health**



**Infectious  
diseases**



**Aging**



**Cellular therapy,  
regenerative medicine**

**Rare diseases**



**Medical imaging  
and cytometry**



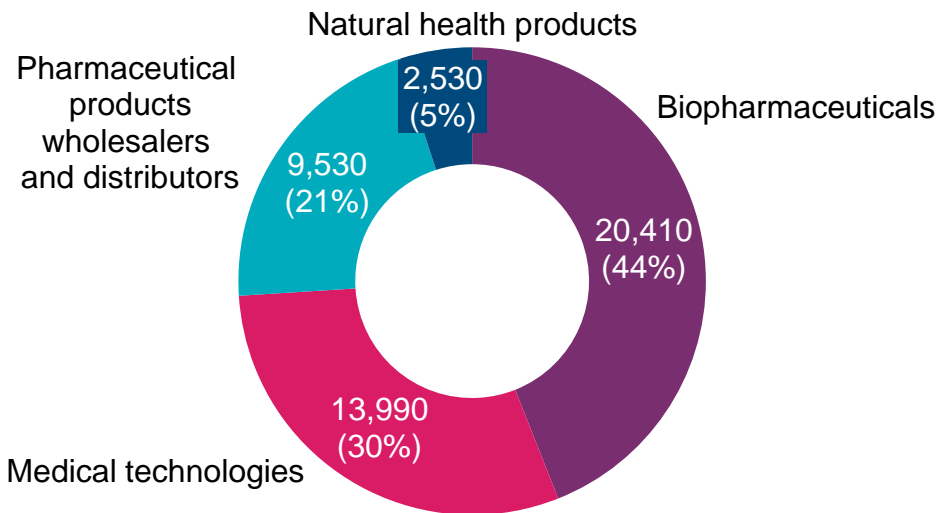
**Precision medicine  
(genetics, genomics  
and proteomics)**



**Big data and  
artificial intelligence**

# Québec's life sciences and health tech ecosystem is among the largest in North America

**Distribution of jobs in the LSHT industry  
in Québec in 2020**  
(in number of jobs and %)



**1,000+ companies**



**46,000+ jobs**  
in private companies



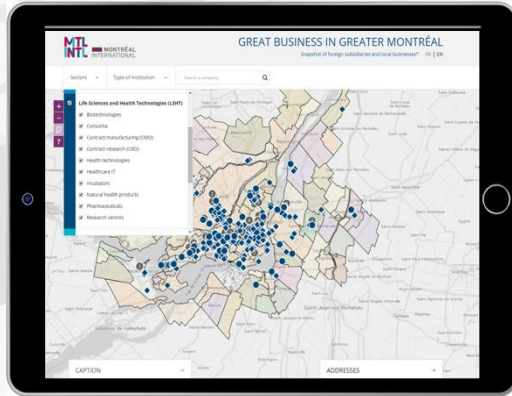
**Several thousand researchers**  
in public organizations



**80 % of Québec's ecosystem**  
is based in Greater Montréal

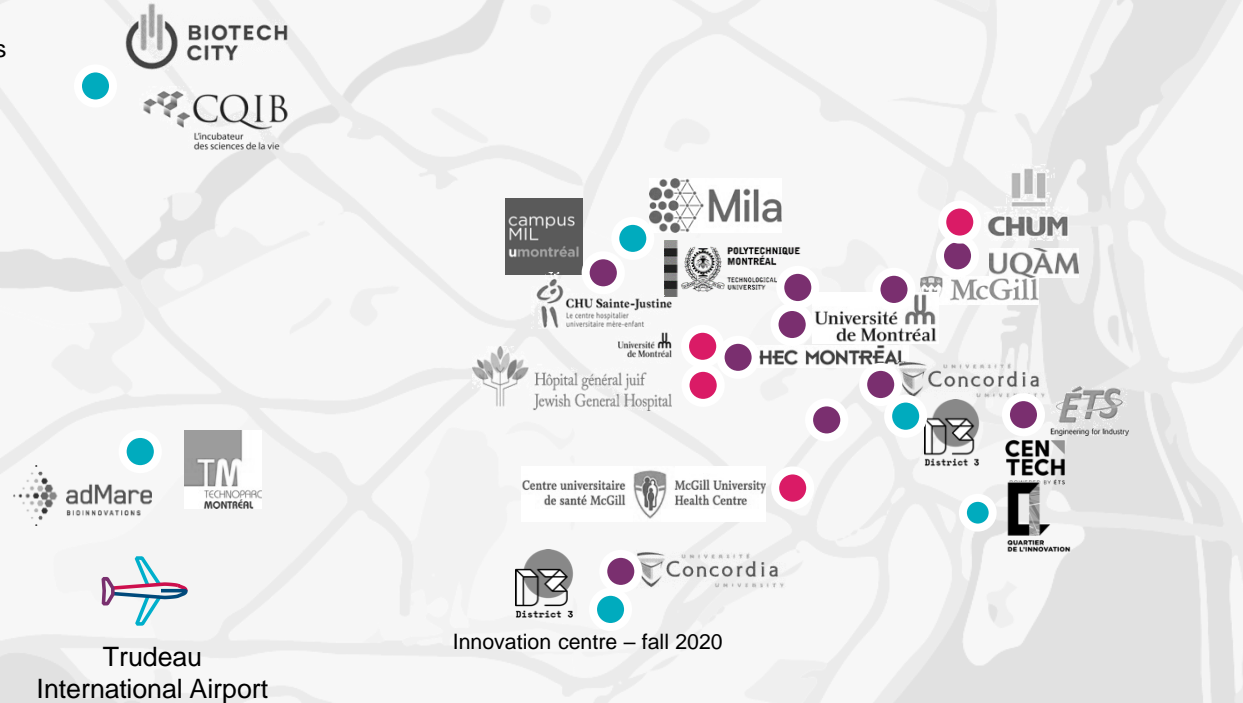
# Major hub to boost business partnerships throughout the region

Click [here](#) to visit our interactive map of companies



## Legend

- Industrial Park / innovation cluster
- University Hospital Centre
- University



# Numerous foreign companies have chosen Greater Montréal to expand their operations



# World-renowned scientific excellence centres and infrastructures

Montréal is reputed for its **collaborative approach**  
(Research – Industry – Government)

Recent major investments in **cutting-edge infrastructures**:




**Centre hospitalier  
de l'Université de  
Montréal (CHUM)**

500,000  
ambulatory  
visits/year



**McGill University  
Health Centre  
(MUHC)**

220,000  
ambulatory  
visits/year



**CHU Sainte-Justine,  
Mother & child  
university Hospital  
Centre**

80,000  
ambulatory  
visits/year

Research centres		
		
		
		
		
		
		

# Examples of flagship programs to accelerate discovery, development and commercialization

## Pharma/biotechs



**adMare BioInnovations:** Life Sciences & Health Technology Innovation Hub including the Néomed Innovation Centre, hosting subcontractor research organizations, biotech companies and consultants



**IRICoR:** Accelerating discovery and commercialization of highly innovative therapies in oncology by strong partnerships with industry



**CQDM:** Development of breakthrough tools and technologies that enhance biopharmaceutical R&D productivity



**C3i:** One-stop shop for the development, translation and commercialization of ground-breaking cancer immunotherapies treatments



**CATALIS:** Office mobilizing all stakeholders involved in early clinical research in Quebec

## Health Tech



**Transmedtech Institute:** Transdisciplinary and intersectoral open innovation ecosystem or living lab – To develop next generation medical technologies



**CENTECH:** The ÉTS business incubator and accelerator, ranked among the 20 top performing university incubators in the world. One of two key sector is medical device



**DISTRICT 3:** Startup accelerator and entrepreneurial community located within Concordia University



**MEDTEQ:** Consortium for industrial research and innovation in medical technology



**Health Tech Campus/Campus des technologies de la santé (CTS):** Accelerator for medical technology companies

# Top AI accelerators and incubators to help develop tomorrow's breakthroughs in life sciences



This program focuses on advancing the development and application of AI across industries and markets



Recognized as one the world's top incubator programs by UBI Global's Top 20 University Business Incubators for 2019–20. The program for AI startups is run in partnership with Thales



A partnership with HEC Montréal, this program focuses on AI and data science to capitalize on Montréal's expertise in the sector



This program provides structured and unstructured mentoring and coaching by proven entrepreneurs over a four-month residency program for two cohorts of 8 to 10 companies per year



This program is for early or idea stage AI-enabled startups



This program specializes in the consumer electronics technology market, with a special interest in companies leveraging AI



Recognized as one the world's top incubator programs by UBI Global's Top 20 University Business Incubators for 2019–20. It offers programs for startups at every juncture of their growth



Program for digital health created by Centre québécois d'innovation en biotechnologie (CQIB) and Campus des technologies de la santé (CTS)

# Strong venture capital funding from various players in Québec

- More than **US\$2.7 billion in VC investments** between 2018 and 2020 in Montréal
- 6 of the 10 most active VCs in Canada in 2020 are based in Montréal
- Example of funding for life sciences companies:



raised **US\$185 M** (2021)

raised **US\$37 M** (2020)



raised **US\$100 M** (2021)

raised **US\$60 M** (2020)



raised **US\$82.5 M** (2019)



raised **US\$80 M** (2018)



raised **US\$30 M** (2020)

## Private venture capital



## Institutional partners





# Mila, a thriving AI hub in the Mile-Ex neighbourhood

- With **600+ researchers**, Mila is the **world's largest academic research lab specialized in deep learning and reinforcement learning**
- A collaborative ecosystem of AI researchers, startups and major companies
- Examples of global strategic partners within Mila:



# The Mila network: access to high-level AI partners



Creating digital solutions to optimize health care delivery, reduce costs and improve health outcomes



Development of AI tools to accelerate understanding of the behavior of molecules when confronted with a virus or bacteria for the creation of new vaccines and drugs



Take advantage of deep learning for drug design and make these technologies more widely available to R&D organizations



Opening of Novartis Biome Canada, an innovation centre that uses the AI ecosystem to accelerate the use of health technologies



Design of an evolving AI-based question-and-answer telemedicine platform to establish a preliminary diagnosis and collect all relevant results



Using AI to understand the biological mechanisms of disease, the design of molecules, or the prediction of clinical responses and safety profiles to facilitate clinical testing



Valorization of the unexplored data generated in order to transform the way therapies are developed



Leveraging machine learning and advanced computational methods to accelerate drug discovery and development

# A unique centre of excellence: IVADO (Institute for Data Valorisation)



More than **1,400** scientists  
(professors, professionals and  
students) with complementary areas of  
expertise

Close to **150**  
members and partners

Over **270**  
collaborative  
research projects

## Research centres



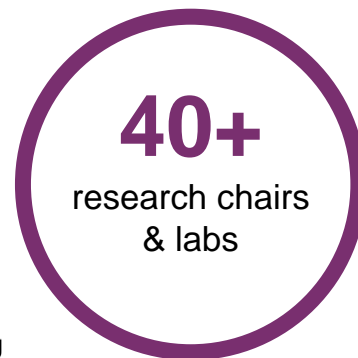
## Network partners



## Academic partners



## International partners



A portrait of Yoshua Bengio, a man with grey hair, smiling. The background is a solid magenta color.

## YOSHUA BENGIO

One of the founders of the deep learning movement and winner of the prestigious Turing Award 2018

*Founder and Scientific Director of Mila*

A portrait of Joëlle Pineau, a woman with dark hair, looking to the side. The background is a solid teal color with faint white mathematical diagrams on the right side.

## JOËLLE PINEAU

Co-director of the Reasoning and Learning lab at McGill University

*Head of the Facebook AI Research lab in Montréal*

A portrait of Irina Rish, a woman with long dark hair, smiling. The background is a solid magenta color.

## IRINA RISH

Associate Professor at the Université de Montréal and world renown AI scientist

*Holder of a new \$35M Canada Excellence Research Chair and core member of Mila*





# The International Centre of Expertise for the Advancement of Artificial Intelligence (ICEMAI) launched in Montréal

- Spearheaded by Montréal International as part of the **Global Partnership on Artificial Intelligence (GPAI)**
- It is one of the two centres of expertise along with the centre in Paris who will work closely with the GPAI Secretariat, housed at the **OECD**
- ICEMAI will support two of the four themes the GPAI will be working on: **responsible use of AI** and **data governance**
- It will also analyze measures to strengthen our national capacity to **commercialize** and **adopt AI-related technologies**



- **\$15M investment** by the Government of Québec and the Government of Canada
- **A collaboration of industry, the scientific community and civil society:**



Government of  
Canada's  
Advisory Council  
on Artificial  
Intelligence

*In addition to local and international experts*

# Digital Health and Discovery Platform (DHDP), a Canadian initiative to accelerate precision medicine through Big data and AI



## Digital Health & Discovery Platform

- **\$49M Federal Government Awards to Terry Fox Research Institute and Montréal's Imagia** led Consortium to Accelerate Medical Breakthroughs
- The joint project aims to unlock data-driven discoveries in cancer and other diseases to unleash the full potential of personalized healthcare
- This award, together with \$108M in cash and \$165M in in-kind contributions from consortium partners, supports the DHDP that will combine Canadian expertise in AI and precision medicine

- **97-members across 9 provinces:** 31 healthcare institutions, 9 SMEs and 10 large enterprises, 7 universities, 22 research foundations, granting agencies and NGOs, and all 4 major Canadian AI research labs from Québec, Alberta and Ontario including:



# Examples of Montréal-based companies using AI in healthcare



**IMAGIA:** developing radiomics biomarkers and clinical decision support systems



**My Intelligent Machines:** accelerating post genomic research by leveraging AI & bioinformatics



**QUANTUMBLACK:** using data, analytics, and design to optimize how drugs are brought to market



**InVivo AI:** facilitating accurate toxicity screening in the earliest phases of drug discovery



**Corstem:** medical imaging analysis and computer vision, using machine learning



**Informed experiments:** distilling the complexity of gene interaction networks with AI algorithms to accelerate cancer research



**Precision analytics:** predictive analytics and cloud computing to handle large datasets



**Diagnos:** early detection of critical health issues through the use of AI



**Mr Young:** AI-powered chatbot designed to help cope with anxiety



**Myelin:** AI synthesis of ASD scientific data



**Innovie Health:** AI solution to drive the most accurate care management strategy for healthcare system



**AFX Medical:** AI-powered radiology tools intended to treat brain disease



**BIOS:** developing neural interfaces to enable AI-based treatments on organs and nerve systems throughout the body



**Zilia:** combines imaging, spectrometry and AI for the detection of biomarkers involved in ocular, neurological and systemic conditions



# Key initiatives at CHUM to facilitate data access and the use of AI

## Data lake project CITADEL

- **The Center for the Integration and Analysis of Medical Data (CITADEL)** of the Centre hospitalier de l'Université de Montréal (CHUM) is one of the initiatives adopted to facilitate learning, teaching and communication:
  - 20 integrated information systems
  - 19.4 million episodes of care
  - 3.6 million patient data

## School of AI in Healthcare (SAIH)

- Devoted to the study of the social, legal and ethical implications of **AI in the health sector**
- Doctors and researchers at the CHUM are pursuing **80 projects involving artificial intelligence**



# Montréal is home to Canada's AI cluster headquarters



**SCALE AI**

Canada's AI supply chain supercluster



**Forum  
IA Québec**

Québec's AI organization fostering the development of Québec's AI ecosystem



**Other health-related  
Canadian superclusters**



a cross-industry  
collaboration in healthcare,  
communications, technology

**NGen**

Next Generation  
Manufacturing Canada

The Innovative  
Manufacturing supercluster:  
manufacturing 4.0





# At the forefront of AI for good initiatives

- **For ethical & responsible AI**



< >  
Montréal Declaration  
Responsible AI\_  
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An initiative of the Université de Montréal

**Since December 2018**  
more than 1,900 signatures  
from citizens and 108  
organizations

- **Research centres with AI for good initiatives**



Fostering a dialogue on the socially responsible use of AI and the development of social and environmental applications.  
Montréal's AI4Good lab aims to get more women working in Artificial Intelligence and other events

HumanIA

Directing AI towards the common good through humanistic and multidisciplinary studies and research

inven.T  
Centre d'innovation technosociale

Catalyst for technosocial and responsible innovation projects



TechAide AI4Good Conference and Hackathon 2020

**SINCE ITS OFFICIAL LAUNCH IN 2016,  
TECHAIDE HAS RAISED \$1.34M FOR  
CENTRAIDE**

# 03

## A Deep and Growing Pool of Highly Qualified Talent



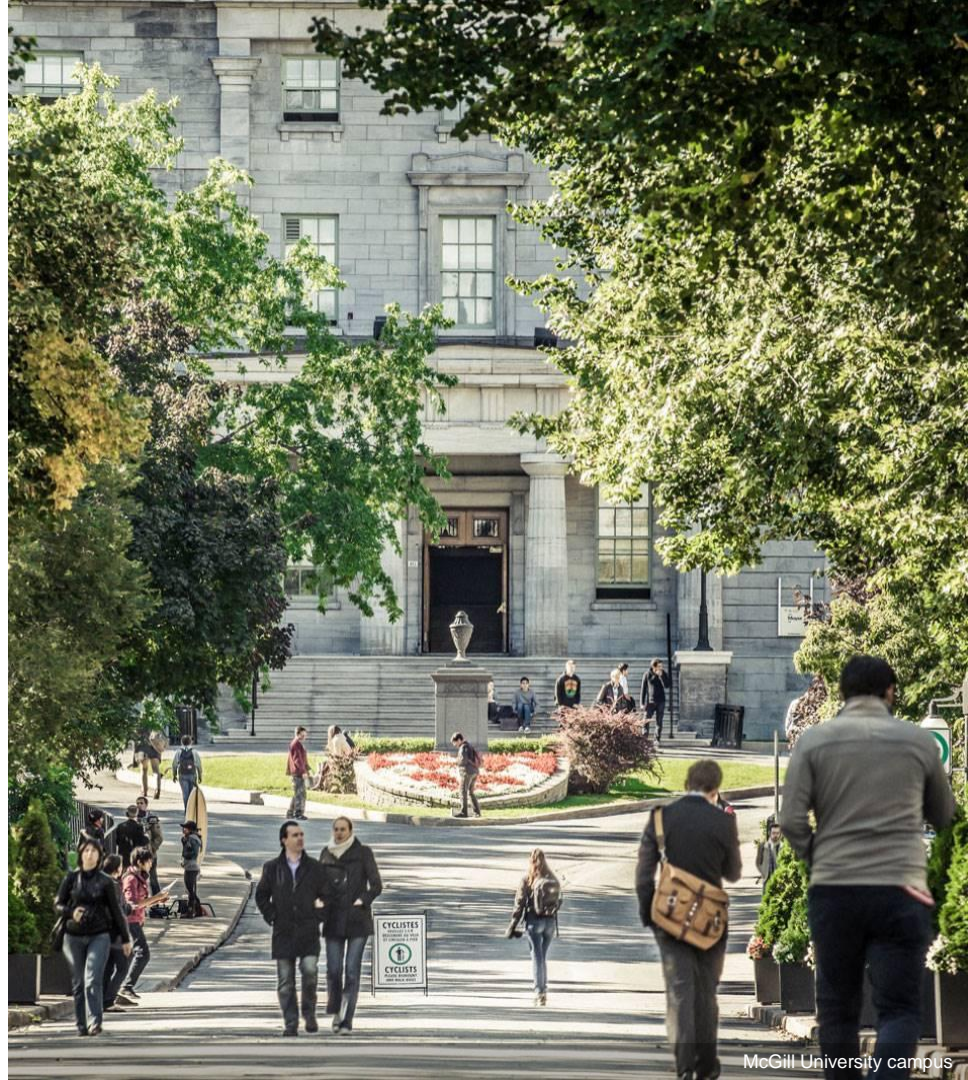


# The best student city in the Americas and Canada's university capital

- **Canada's university capital:**  
15 university institutions and 60 colleges
- **320,000 post-secondary students,**  
including **more than 200,000 university students**  
and **35,500 international university students**
- **1<sup>st</sup> in Canada for university research funding**  
with \$1.34+ billion yearly



Best student city in the Americas tied with Boston  
QS Best Student Cities Rankings 2022



McGill University campus

# A pool of highly qualified workers

## Life sciences and STEM-related occupations in Greater Montréal

### Employees in 2019

Life sciences professionals (including chemists, chemical engineers and biologists, etc.)	12,800
Other engineers (including Industrial, manufacturing and computer engineers)	15,900
Computer and information systems professionals	96,700
Mathematicians and statisticians	3,200
<b>Total</b>	<b>134,500</b>





# A new generation ready to take over

**More than 14,000 university students** are enrolled in artificial intelligence and data-related programs in Greater Montréal:

<b>AI-related University programs</b>	<b>Students enrolled 2019-2020</b>	<b>University graduates 2019</b>
Computer Sciences	10,181	2,061
Computer Engineering and Computer Science	2,328	464
Mathematics	1,416	313
Applied Mathematics	168	33
Probabilities and Statistics	203	51
<b>Total</b>	<b>14,296</b>	<b>2,921</b>





# A labor pool of AI and tech-related specialists

AI-related jobs	Employees in 2020
Information Systems Analysts and Consultants	46,500
Computer Programmers	40,300
Computer and Information Systems Managers	8,000
Computer Engineers	6,500
Software Engineers and Designers	4,400
Database Analysts and Data Administrators	9,900
Mathematicians	3,300
<b>Total</b>	<b>118,900</b>

**118,900 AI and Tech-Related specialists employed in Greater Montréal**

Montréal's workforce of + 2 million is among North America's most dynamic and offers a high degree of stability with turnover rates well below North American averages. **The turnover rate for the IT industry is 11%**

\* Overall workforce risk includes relocation and expatriation; mergers, acquisitions and partnerships; absenteeism; employee health and well-being programs; internal relationships; employment in general; globalization; cultural differences; and talent sources.

Source: National Occupation Classification (NOC) 2020, Statistics Canada 2018; Diagnostic sectoriel 2018, Technocompétences.



# 04

## Attractive Operating Costs and Incentives



# Competitive operating costs among the 20 largest metro areas in Canada and the U.S.

**1<sup>st</sup>** clinical trials and life sciences R&D centre<sup>1</sup>

**1<sup>st</sup>** Software development centre

**2<sup>nd</sup>** bio-pharma manufacturing<sup>2</sup>

**2<sup>nd</sup>** medical devices manufacturing plant

Source: fDi Benchmark, 2020.

1: Research, discovery, design, development or testing of biotechnology or pharmaceutical related products and/or medical devices.

2: Companies in this industry develop and manufacture therapeutic products and in vitro diagnostics using biotechnology.





# Québec offers corporations an attractive tax treatment

## Comparison of effective corporate tax rate (%) Selected Canadian provinces and U.S. States, 2021

Québec (Montréal)	26.50%
Ontario	26.50%
Massachusetts	27.32%
California	27.98%
New Jersey	28.11%
Illinois	28.51%
New York	34.64%





# Advantageous salaries for pharma companies

Median annual salaries\* (US\$) for seven typical occupations in **pharma**

	Montréal	Toronto	Raleigh	Chicago	Boston	Newark	San Francisco
Laboratory Technician	\$43,144	\$45,999	\$47,043	\$52,770	\$57,904	\$55,750	\$62,112
Laboratory Supervisor	\$65,066	\$69,318	\$76,291	\$86,913	\$91,064	\$93,936	\$101,127
Scientific Researcher	\$66,609	\$70,967	\$77,654	\$88,356	\$92,564	\$95,576	\$102,818
Pharmaceutical Detailer	\$67,589	\$71,946	\$87,509	\$91,903	\$101,244	\$99,874	\$108,007
Laboratory Head	\$73,911	\$78,875	\$82,156	\$92,862	\$100,224	\$96,082	\$117,247
Biochemist	\$81,293	\$86,506	\$101,658	\$112,220	\$116,355	\$124,745	\$128,745
R&D Manager (technical)	\$106,358	\$112,837	\$144,945	\$148,619	\$161,382	\$172,031	\$177,461

\* Base salaries based on 5 years of experience, for the Pharmaceuticals industry (NAICS 3254).  
 Currency exchange based on the monthly average of May 2021: US\$1.00 = CA\$1.2126.  
 Source: Economic Research Institute Inc., June 2021.

# Advantageous salaries for medtech companies

## Median annual salaries\* (US\$) for ten typical occupations in **medtech**

	Montréal	Toronto	Raleigh	Dallas	Minneapolis	San Diego	Boston	San Francisco
Quality Assurance Specialist	\$53,226	\$56,865	\$64,008	\$66,835	\$69,898	\$70,235	\$76,867	\$81,966
Clinical Liaison	\$54,887	\$58,662	\$63,651	\$68,292	\$69,685	\$72,026	\$74,789	\$83,097
Project Management Specialist	\$55,615	\$59,646	\$63,363	\$67,690	\$67,293	\$69,523	\$76,853	\$82,299
Regulatory Affairs Specialist	\$62,505	\$66,982	\$73,888	\$78,783	\$77,122	\$80,116	\$88,644	\$94,956
Manufacturing Engineer	\$68,290	\$72,564	\$83,694	\$91,962	\$88,976	\$93,911	\$97,815	\$104,287
Field Service Manager	\$72,362	\$76,404	\$91,794	\$96,812	\$96,483	\$99,235	\$108,584	\$118,101
Mechanical Engineer	\$76,023	\$80,536	\$95,517	\$104,745	\$100,393	\$106,178	\$110,255	\$118,086
Project Leader	\$78,257	\$83,523	\$102,382	\$108,053	\$105,484	\$110,388	\$118,172	\$128,516
Software Developer	\$77,046	\$81,550	\$99,087	\$104,234	\$100,897	\$106,539	\$111,951	\$125,225
Production Manager	\$83,956	\$89,461	\$105,907	\$113,545	\$109,576	\$113,695	\$122,580	\$133,606

\* Base salaries based on 5 years of experience, Medical Device Manufacturing (NAICS 3391).  
 Currency exchange based on the monthly average of May 2021: US\$1.00 = CA\$1.2126.  
 Source: Economic Research Institute Inc., June 2021.

# Low mandatory benefit costs for employers

## Examples of mandatory benefit costs for employers, 2021

Gross annual salary*	\$50,000	\$100,000	\$125,000
Québec Public Pension Plan (employee: 5.9%; employer: 5.9%, max. \$3,427.90)	2 743,50 \$	3 427,90 \$	3 427,90 \$
Québec Parental Insurance Plan (employee: 0.494%, employer: 0.692%, max. sal. of \$83,500)	346,00 \$	577,82 \$	577,82 \$
Employment Insurance (employee: 1.18%, employer: 1.65%, max. sal. of \$56,300)	826,00 \$	930,08 \$	930,08 \$
Health Services Fund (max. 4.26% if global salary total is more than \$6,5M)	2 130,00 \$	4 260,00 \$	5 325,00 \$
Commission des normes du travail (Labour standards board) (0.07%, max. sal. of \$83,500)	35,00 \$	58,45 \$	58,45 \$
Commission de la santé et sécurité du travail (Occupational health and safety board) (0.42% in service sector, max. sal. of \$83,500)**	210,00 \$	350,70 \$	350,70 \$
Workforce Skills Development and Recognition Fund - Québec Training Law 1% (1% of their total payroll in training for employers with total annual payroll over \$2M)	500,00 \$	1 000,00 \$	1 250,00 \$
<b>Total benefit costs</b>	<b>6 790,50 \$</b>	<b>10 604,95 \$</b>	<b>11 919,95 \$</b>
<b>Total cost</b>	<b>56 790,50 \$</b>	<b>110 604,95 \$</b>	<b>136 919,95 \$</b>
<b>Total benefits in % of gross annual salary</b>	<b>13,58 %</b>	<b>10,60 %</b>	<b>9,54 %</b>

Note: \*Paid vacation represents a minimum of 4% of salary and is included in gross salary. Some rates apply up to a maximum insurable revenue.

\*\*The rate for the service sector (65110 - *Bureau de courtage; bureau de services professionnels; bureau offrant des services de soutien administratif*) is 0.42%. The average premium rate in 2021 is \$1.77 per \$100 of payroll.

Source: Revenu Québec, 2021.

# Various incentives tailored to your project



Canada

- ▶ Strategic Innovation Fund
- ▶ Canada Economic Development for Québec regions
- ▶ Tax credit on SR&ED
- ▶ Mitacs Acceleration program for talent
- ▶ Support for technology innovation



Québec

- ▶ ESSOR Fund for Major Projects
- ▶ Tax credits for Large Investment Project
- ▶ Refundable Tax credit on R&D
- ▶ Tax Credit for Investments and Innovations (C3i)
- ▶ Deduction for the Commercialization of Innovations (IDCI)
- ▶ Financial assistance for job creation and training
- ▶ Tax holiday for foreign experts and researchers



Sustainable development programs are also available at the municipal level

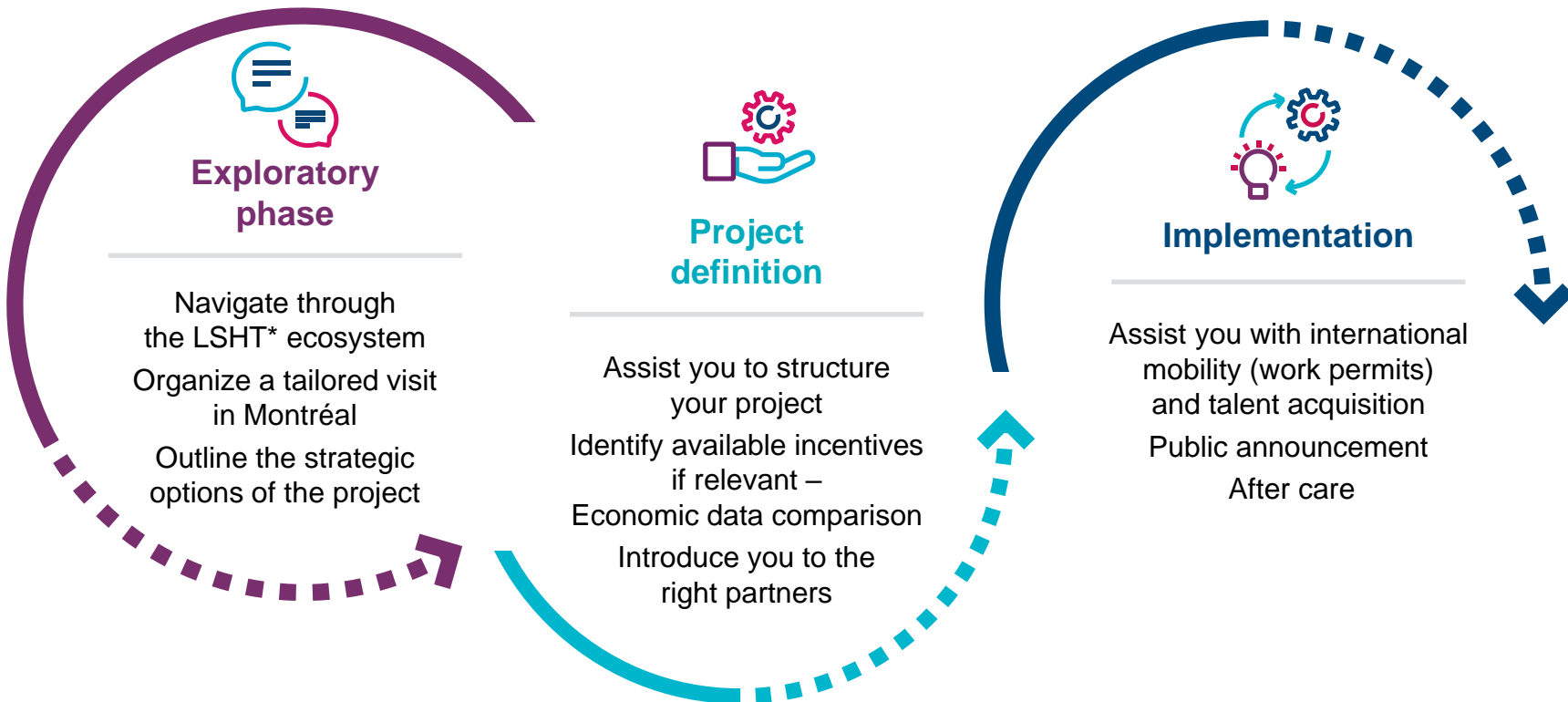
# 05

## Montréal International's Personalized, Free and Confidential Services





# Your development in Montréal: Montréal International can assist you through the whole process





## Contact us



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