

Greater Montréal: AI for Health Hub



A world leading economic development agency





Content



01

Life Sciences: A Strategic Sector for Québec

02

A Unique Interconnected & Collaborative Ecosystem

03

A Deep and Growing Pool of Highly Qualified Talent

04

Attractive Operating Costs and incentives

05

Montréal International's Personalized, Free and Confidential Services

Top reasons to invest in AI for health in Greater Montréal



Global leaders, including **Google, Microsoft** and **Meta**, have made Montréal their AI R&D centre



Among the **best student cities** in the world and university capital of Canada



AI based on ethics and the common good with the Montréal Declaration and organizations such as OBVIA**



Home of **Scale AI**, Canada's AI supply chain supercluster and **ICMAI***



1st in Canada for university research funding with nearly 2B\$ par year



46,000+ jobs in life sciences and health tech in private companies



Cutting-edge expertise developed by world-renowned researchers such as **Yoshua Bengio, Joëlle Pineau, Doina Precup, Hugo Larochelle, Irina Rish** and many more!

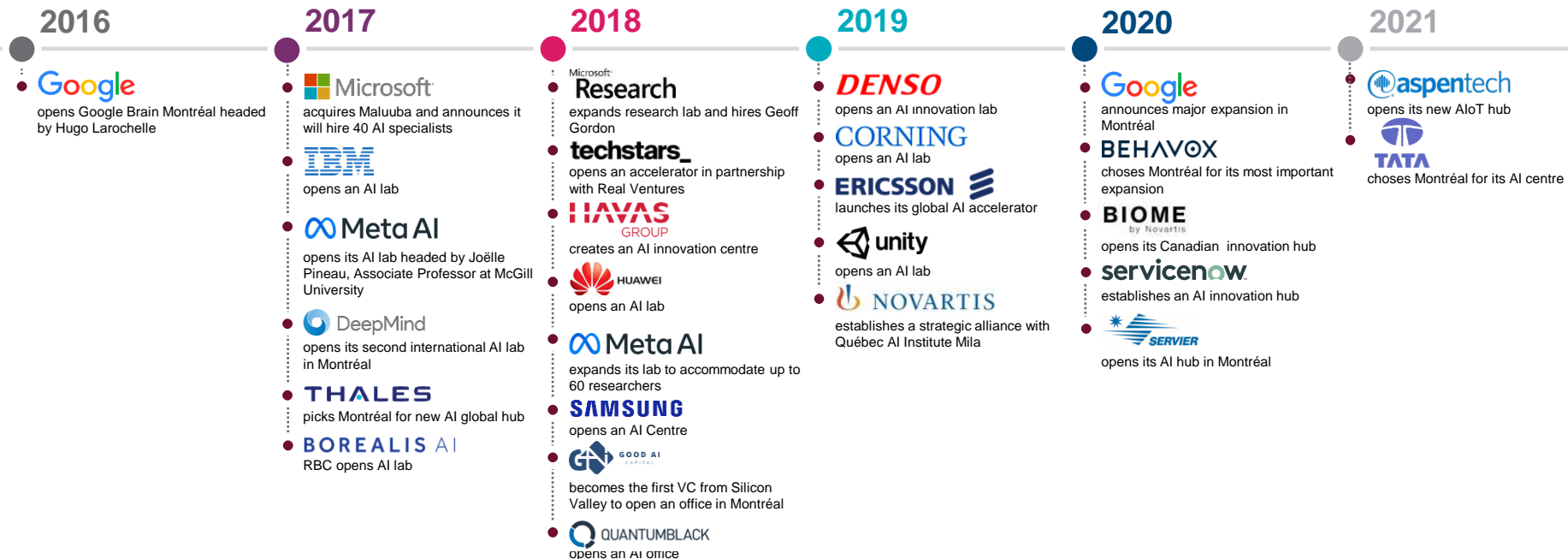


Close to **900 researchers** MSc, PhD, post-doc and applied AI students at **Mila**, the **world's largest academic research lab in deep learning and reinforcement learning**



Several thousand researchers in public organizations

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



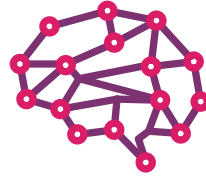
Montréal has developed an internationally acclaimed expertise in several fields



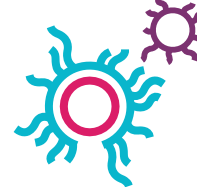
Oncology



**Cardiovascular
and metabolic
diseases**



**Neuroscience
and mental
health**



**Infectious
diseases**



Aging



**Cellular therapy,
regenerative medicine**

Rare diseases



**Medical imaging
and cytometry**



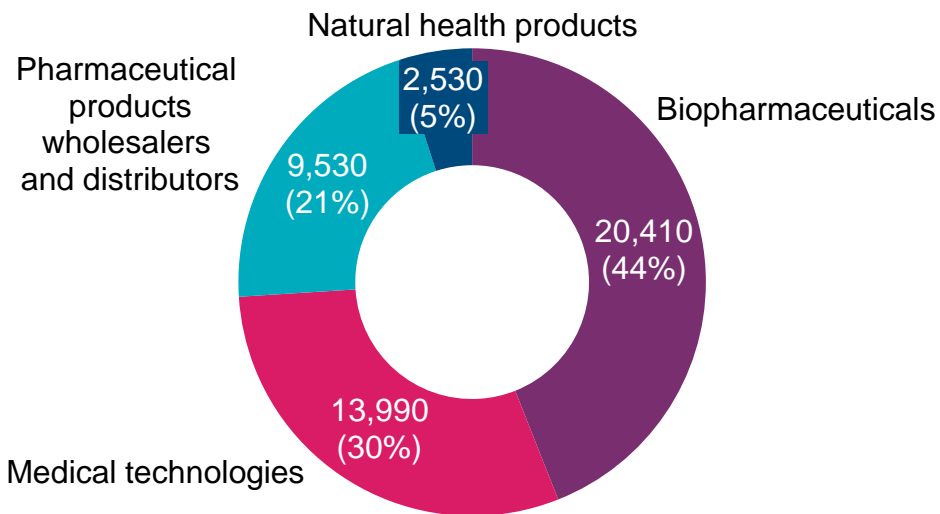
**Precision medicine
(genetics, genomics
and proteomics)**



**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



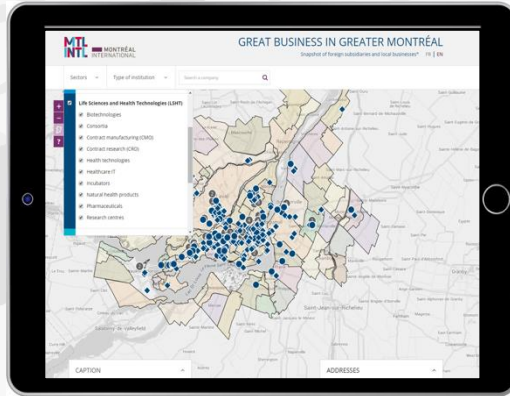
Several thousand researchers
in public organizations



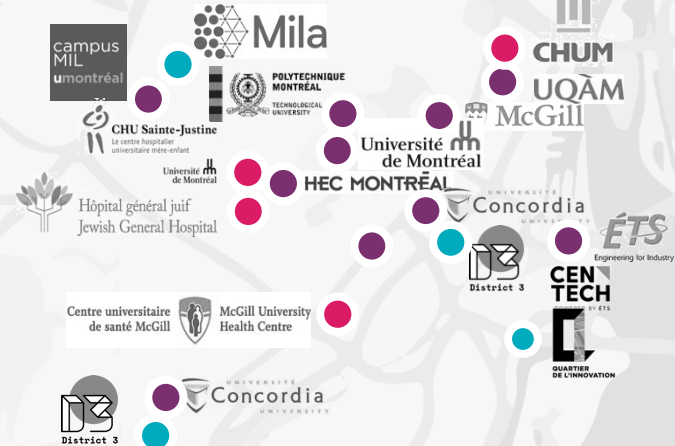
80 % of Québec's ecosystem
is based in Greater Montréal

Major hub to boost business partnerships throughout the region

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



Trudeau
International Airport



Legend

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

Numerous foreign companies have chosen Greater Montréal to expand their operations

 MERCK	 charles river	 Medtronic	 gsk	 abbvie	 McKESSON	 varian	 FRESENIUS MEDICAL CARE
 zimmer	 SANOFI	 Med Qualis KEYRUS biopharma	 SERVIER	 NOVARTIS	 BIOMÉRIEUX	 ThermoFisher SCIENTIFIC	 Innomar Strategies <small>AmerisourceBergen</small>
 PHILIPS	 Elekta	 GE Healthcare	 Roche Diagnostics	 Otsuka	 BIOS	 BIO-RAD	 HERMES MEDICAL SOLUTIONS
 Bristol Myers Squibb™	 BRACCO <small>LIFE FROM INSIDE</small>	 SANDOZ	 valneva™	 analogic	 Pierre Fabre Dermo-Cosmétique	 EOS imaging	 Cambrex
 GRIFOLS	 SIEMENS Healthineers	 Lundbeck	 Abbott	 Onco design™ <small>BIOTECHNOLOGY</small>	 3M	 Guerbet	 Dynacare™
 delmar ∞ <small>une compagnie de Holding F.I.S.</small>	 ICON	 MEDLINE	 TEVA <small>TEVA CANADA INNOVATION</small>	 LABORATORIES CANADA INC.	 GALDERMA	 PowerHealth Solutions	 DELPHARM
 INDIVIOR	 icu medical <small>human connections</small>	 DOMAIN THERAPEUTICS	 omega NICHI-HKO	 Accreon	 circle CARDIOVASCULAR IMAGING	 CardinalHealth	 CERTARA®

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

- **\$8 B+** in VC investments between 2017 and 2021 in Québec
- **Six of Canada's ten most active venture capital (VC) funds** in 2021 are based 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 neighborhood

- With close to **900 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 strategic global 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



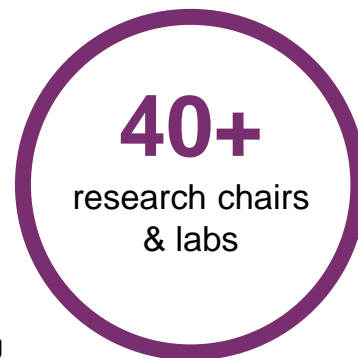
Network partners



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_
< / >

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 **50,000 international students**
- **1st in Canada for university research funding** with nearly \$2B per year



Best student city in the Americas
tied with Boston

QS Best Student Cities Rankings 2022

1	Montréal tied with Boston
2	Toronto
3	New York
4	Vancouver
5	San Francisco

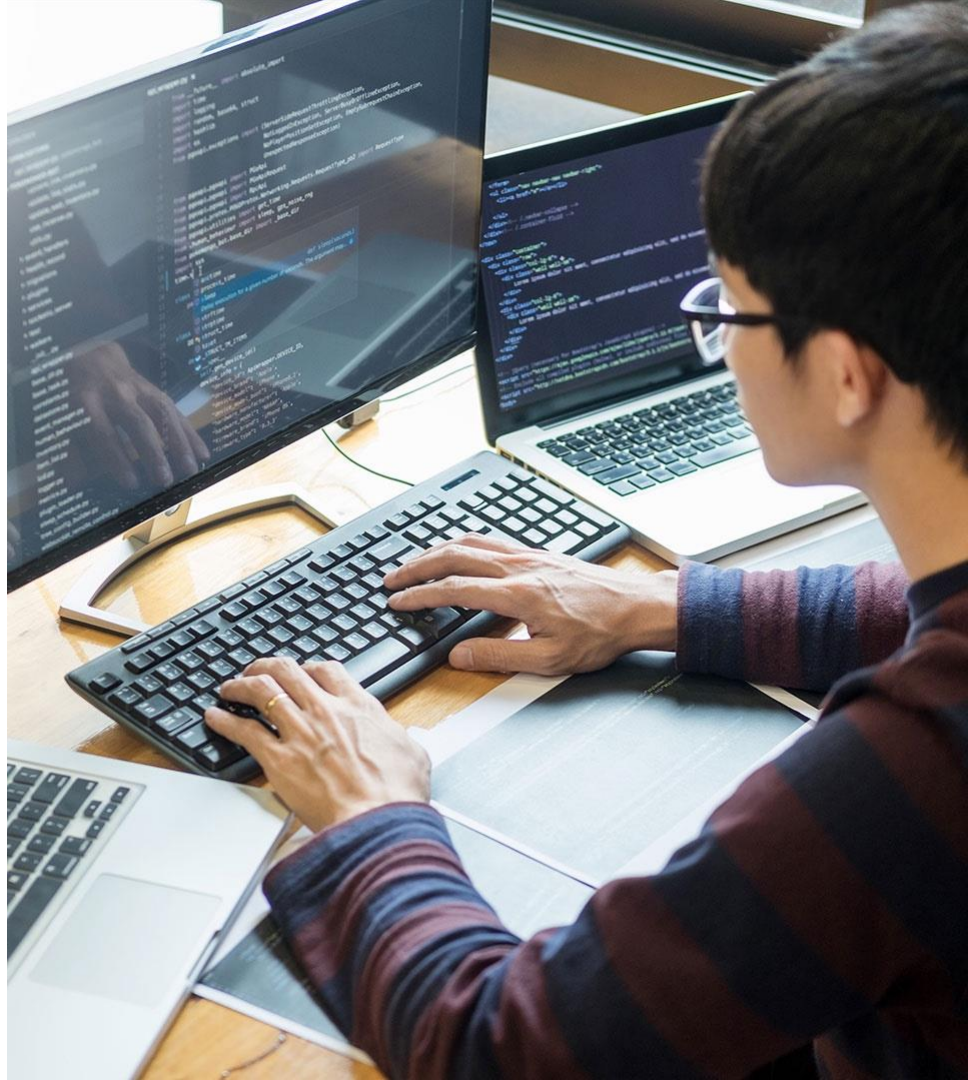


A pool of highly qualified workers

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
Total	134,500



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:

AI-related University programs	Students enrolled 2019-2020	University graduates 2019
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
Total	14,296	2,921



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
Total	118,900

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.

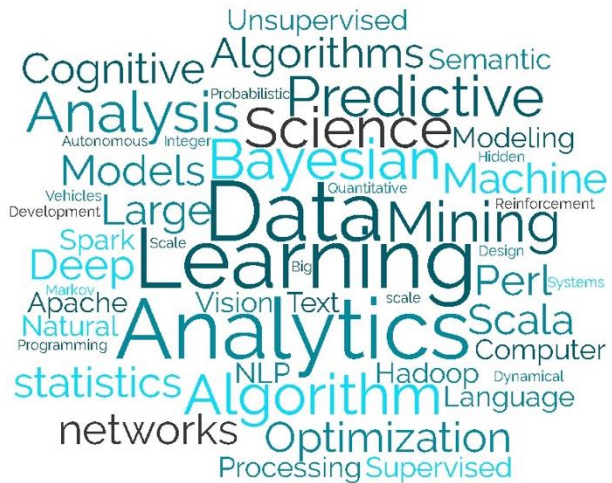
Source: National Occupation Classification (NOC) 2020, Statistics Canada 2018; Diagnostic sectoriel 2018, Technocompétences.

There are close to 19,500 workers with AI skills in Montréal, an increase of 22% over the past 12 months

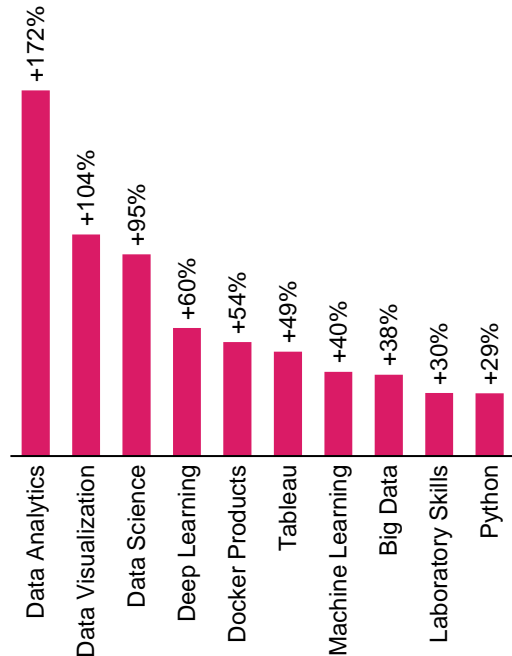
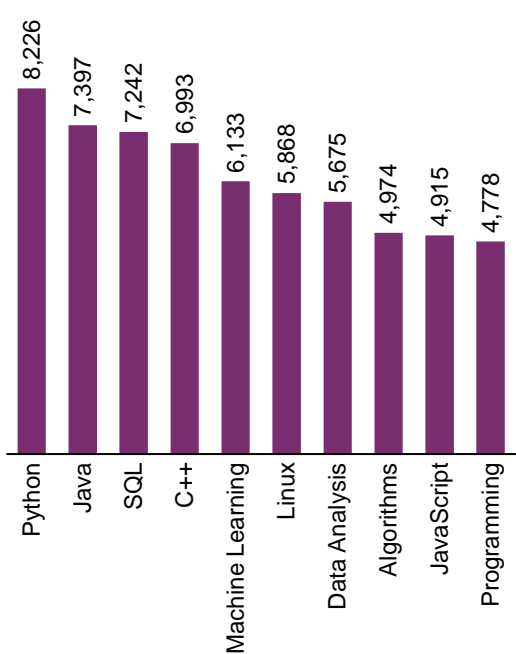
The 40 key skills taken into account to define AI workers*

Number of AI workers who have the skills
below

Fastest-growing skills among AI workers over the past 12 months



Number of Montréal LinkedIn profiles** that list the skills above: **19,398**



*Key skills identified using LinkedIn's Talent Insights tool are not cumulative or exclusive.

**Excluding profiles for the following titles: *founder, co-founder, CEO and President.*

Source: LinkedIn, Talent Insights, February, 2020.

04

Attractive Operating Costs and Incentives



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

1st clinical trials and life sciences R&D centre¹

1st Software development centre

2nd bio-pharma manufacturing²

2nd 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, 2022

Gross annual salary*	\$50,000	\$100,000	\$125,000
Québec Public Pension Plan (employee: 6.15%; employer: 6.15%, max. \$3,500)	\$2,859.75	\$3,500.00	\$3,500.00
Québec Parental Insurance Plan (employee: 0.494%, employer: 0.692%, max. sal. of \$88,000)	\$346.00	\$608.96	\$608.96
Employment Insurance (employee: 1.20%, employer: 1.68%, max. sal. of \$60,300)	\$840.00	\$1,013.04	\$1,013.04
Health Services Fund (max. 4.26% if global salary total is more than \$7M)	\$2,130.00	\$4,260.00	\$5,325.00
Commission des normes du travail (Labour standards board) (0.06%, max. sal. of \$88,000)	\$30.00	\$52.80	\$52.80
Commission de la santé et sécurité du travail (Occupational health and safety board) (0.44% in service sector, max. sal. of \$88,000)**	\$220.00	\$387.20	\$387.20
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
Total benefit costs	\$6,925.75	\$10,822.00	\$12,137.00
Total cost	\$56,925.75	\$110,822.00	\$137,137.00
Total benefits in % of gross annual salary	13.85%	10.82%	9.71%

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 0.44%. The average premium rate in 2022 is \$1.77 per \$100 of payroll.

Source: Revenu Québec, 2022.

Various incentives tailored to your project



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



- ▶ 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



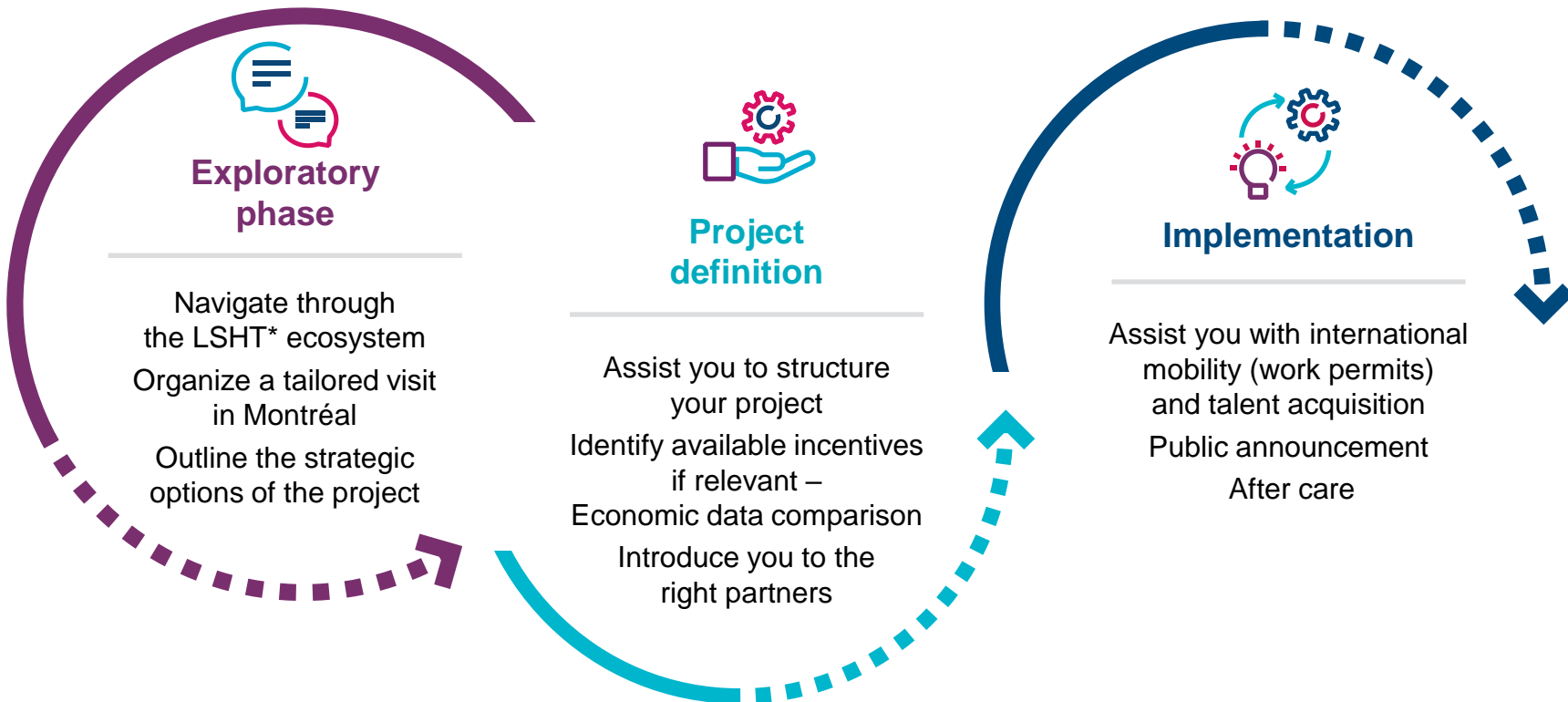
Sustainable development programs are also available at the municipal level

05

Montréal International's Personalized, Free and Confidential Services



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





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