

Greater Montréal: An Al for Health Hub







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Top reasons to invest in Al for health in Greater Montréal



A world-leading

- Top 3 best places to invest in Al 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 Al students at Mila, the world's largest academic research lab in deep learning and machine learning
- 19,500 workers with AI skills
- 56,000 jobs in life sciences and health tech
- More than 14,000 university students enrolled in Al and data-related programs



Many opportunities for funding & collaboration

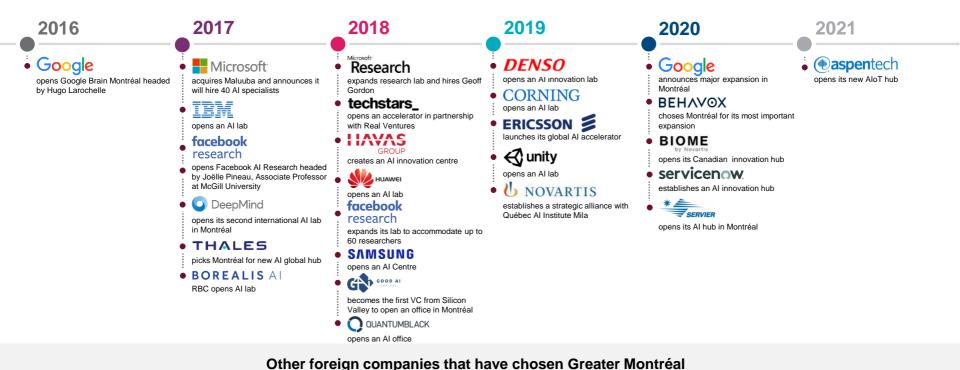
- More than \$3 billion in Al investments announced in Greater Montréal since 2016
- World leaders, including Google, Microsoft and Facebook, opened Al research labs in Montréal in the last few years
- Numerous possibilities for collaboration between researchers and the industry with Scale Al, Prompt,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



An ethical Al framework

- At the forefront of Al for good initiatives with
 Montréal Declaration for responsible Al 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

























O1
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

- 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
- Make Québec one of the Top 5 North American life sciences clusters by 2027



Source: 2017-2027 Québec Life Sciences Strategy.

O2
A Unique Interconnected & Collaborative Ecosystem





Montréal has developed an internationally-acclaimed expertise in several fields



Oncology



Cardio-vascular and metabolic diseases



Neuroscience and mental health

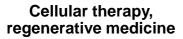


Infectious diseases



Aging





Rare diseases



Medical imaging and cytometry



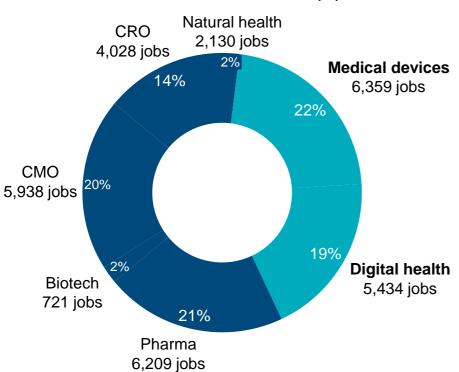
Precision medicine (genetics, genomics and proteomics)



Big Data and artificial intelligence

Québec boasts a thriving health tech sector

Distribution of jobs in Québec's life sciences and health tech (%)



Québec life sciences and health tech sector



56,000

Total jobs (80% concentrated in Greater Montréal)

Québec health tech sector

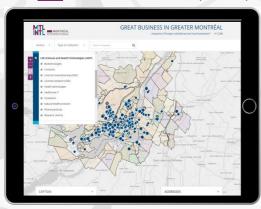
- 40%+ of all jobs and
- **50%**+ of companies

Medical devices	Digital health
151 companies	169 companies
6,400 jobs	5,400 jobs

Major hub to boost business partnerships throughout the region

Centre de recherche Hopital Maisonneuve-Rosemont Centre affilié à l'Université de Montréal

Click here to visit our interactive map of companies



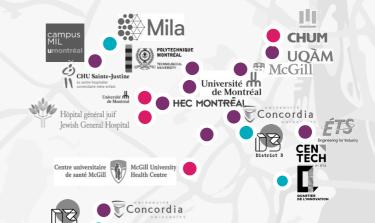








Trudeau International Airport



Innovation centre - fall 2020



- 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**:



500,000 ambulatory visits/year



220,000 ambulatory visits/year



80,000 ambulatory visits/year



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 Al accelerators and incubators to help develop tomorrow's breakthroughs in life sciences

techstars_ Montreal Al Accelerator This program focuses on advancing the development and application of Al 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 Alenabled 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 billions in VC investments between 2018 and 2020 in Montréal
- Six of Canada's ten most active VCs in 2020 are based in Greater Montréal
- Example of funding for life sciences companies:

REPARE THERAPEUTICS	raised US\$82.5 M - September 2019
Milestone. PHARMACEUTICALS	raised US\$80 M – October 2018
VENTUS THERAPEUTICS	raised US\$60 M – May 2020
MayaCare	raised US\$37 M – January 2020
ignormal dialogue	raised US\$30 M – July 2020



Mila, a thriving AI hub in the Mile-Ex neighborhood

- 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 strategic global partners within Mila:





The Mila network: access to high-level Al partners



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



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



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



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



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



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



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



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









The **Alan Turing**





One of the founders of the deep learning movement and winner of the prestigious

Founder and Scientific Director of Mila



JOËLLE PINEAU

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

Head of the Facebook Al Research lab in Montréal

facebook research



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 Alrelated 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 Al



- \$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 Al research labs from Québec, Alberta and Ontario including:







































Examples of Montréal-based companies using Al in healthcare



IMAGIA: developing radiomics biomarkers and clinical decision support systems



Diagnos: early detection of critical health issues through the use of Al



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



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



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



Myelin: Al synthesis of ASD scientific data



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



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



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



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



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



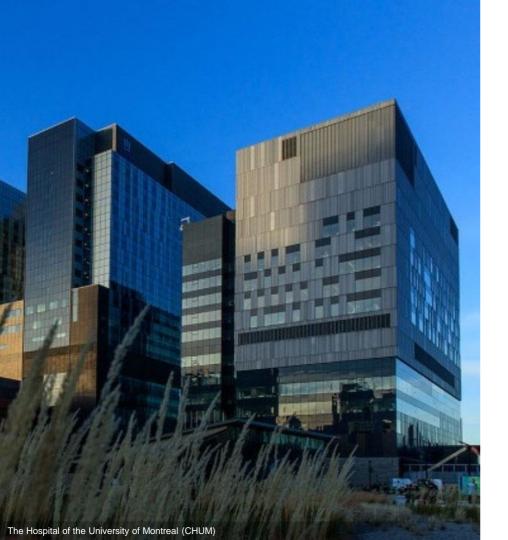
BIOS: developing neural interfaces to enable AI-based treatments on organs and nerve systems throughout the body



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



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 Al

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 Al in the health sector
- Doctors and researchers at the CHUM are pursuing
 80 projects involving artificial intelligence

Montréal is home to Canada's Al cluster headquarters



Canada's Al supply chain supercluster



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



Other health related Canadian superclusters



a cross-industry collaboration in healthcare, communications, technology



The Innovative Manufacturing supercluster: manufacturing 4.0



At the forefront of AI for good initiatives

For ethical & responsible Al



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 Al4Good lab aims to get more women working in Artificial Intelligence and other events



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



Opened an office dedicated to AI for good



TechAide Al4Good 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:
 11 university institutions and 60 colleges
- 320,000 post-secondary students, including more than 200,000 university students and 35,500 international university students
- 1st 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	POLYTECHNIQUE MONTREAL TCHNOLOGICAL UNIVERSITY	SHERBROOKE	Concordia
UQÀM	UNIVERSITÉ TÉLUQ	École nationale d'administration publique	ETS Le gérie pour l'industrie
Université de Montréal	Université du Québec Institut national de la recherche scientifique	HEC MONTRĒAL	LES CEGEPS OU QUEREC



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:

Al-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 Al and tech-related specialists

Al-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 Al 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 sectorial 2018, Technocompétences.

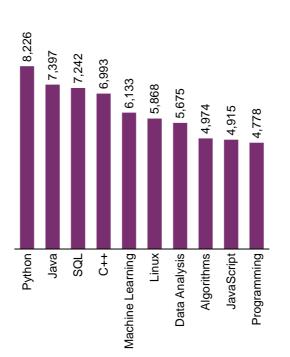
There are close to 19,500 workers with AI skills in Montréal, an increase of 22% over the past 12 months

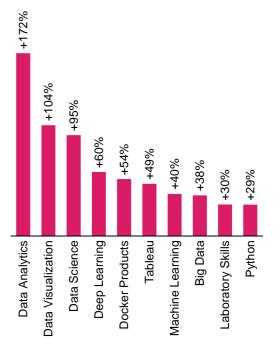
The 40 key skills taken into account to define Al workers*

Number of Al workers who have the skills below

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







^{*}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 corporate effective 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

Total benefits in % of gross annual salary	13,58 %	10,60 %	9,54 %
Total cost	56 790,50 \$	110 604,95 \$	136 919,95 \$
Total benefit costs	6 790,50 \$	10 604,95 \$	11 919,95 \$
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 \$
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 \$
Commission des normes du travail (Labour standards board) (0.07%, max. sal. of \$83,500)	35,00\$	58,45 \$	58,45 \$
Health Services Fund (max. 4.26% if global salary total is more than \$6,5M)	2 130,00 \$	4 260,00 \$	5 325,00 \$
Employment Insurance (employee: 1.18%, employer: 1.65%, max. sal. of \$56,300)	826,00\$	930,08\$	930,08\$
Québec Parental Insurance Plan (employee: 0.494%, employer: 0.692%, max. sal. of \$83,500)	346,00 \$	577,82 \$	577,82 \$
Québec Public Pension Plan (employee: 5.9%; employer: 5.9%, max. \$3,427.90)	2 743,50 \$	3 427,90 \$	3 427,90 \$
Gross annual salary*	\$50,000	\$100,000	\$125,000

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.

Source: Revenu Québec, 2021.

^{**}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.

Various incentives tailored to your project



- Strategic Innovation Fund
- <u>Canada Economic Development</u> 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)
- <u>Deduction for the Commercialization of Innovations (IDCI)</u>
- Financial assistance for job creation and training
- Tax holiday for foreign experts and researchers



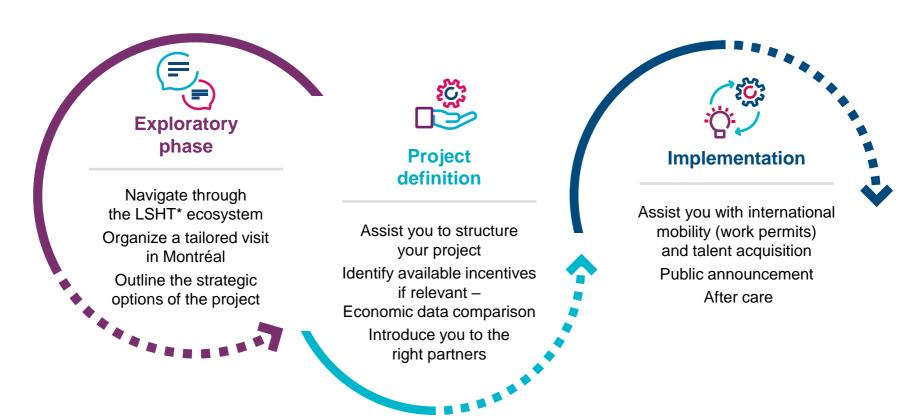
05

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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