

Why Artificial Intelligence Giants are Heading North to Montréal





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01

Top Reasons to Invest in AI in Greater Montréal



Top reasons to invest in AI in greater Montréal



Canada's **University Capital**



Montréal's **Yoshua Bengio** is the most cited computer scientist per day (Sept. 2018)



Nearly **11,000 university students** enrolled in Artificial Intelligence and data-related programs



\$1 billion + funding dedicated to university research



Joëlle Pineau, Associate Professor with the School of Computer Science at **McGill University** and the **Head of the new Facebook AI Research lab**



The **Canadian government** chose **Montréal as headquarters** for SCALE AI, Canada's AI supply chain supercluster



300 + researchers and doctoral students in fields related to **Artificial Intelligence**, the largest academic concentration in the world (MILA)



Nearly **\$1.1 billion** in AI investments announced in Greater Montréal since 2016



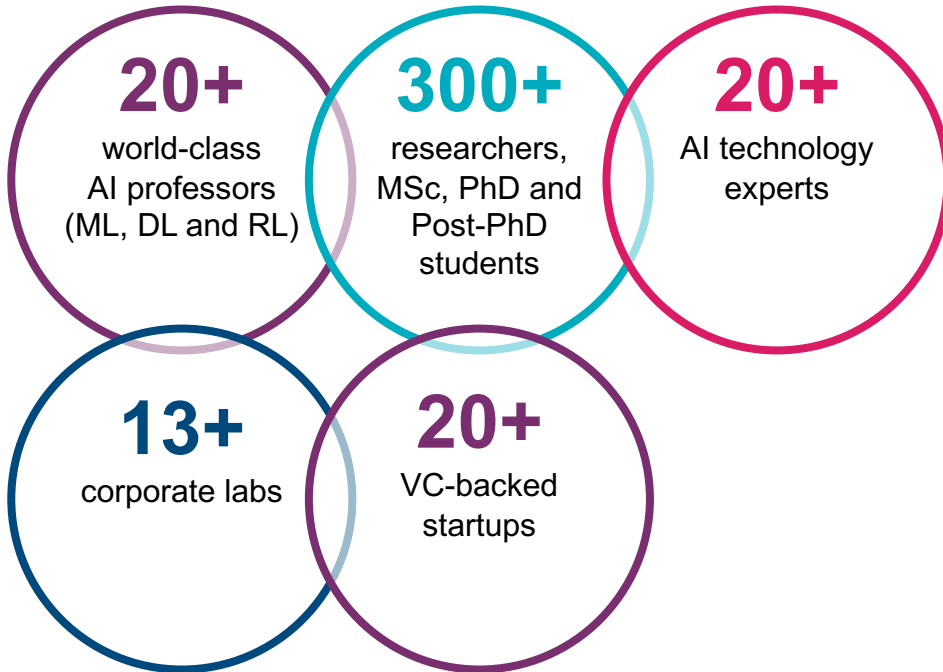
Montréal has all the major players, plus a thriving community and ecosystem

02

A World-Class Artificial Intelligence Hub



A unique, interconnected & collaborative ecosystem of AI researchers, startups and major players



Université  de Montréal



McGill

Montréal's leading researchers

- **Winner of the Turing Award 2018:** “Nobel Prize of computing”
- **The most cited computer scientist per day (Sept. 2018)**
- **Full Professor, Department of Computer Science and Operations Research, Université de Montréal**
- **Scientific Director of MILA**
- **CIFAR Program Co-Director, Learning in Machines and Brains**
- **Scientific Director of IVADO**
- **Canada Research Chair in Statistical Learning Algorithms**
- **Worked at the CIFAR research institute** alongside Yann LeCun (now at Facebook) and Geoffrey Hinton (now at Google).

YOSHUA BENGIO

a pioneer in deep learning



Montréal's leading AI researchers



McGill University is also home to leading experts in the field of reinforcement learning and robotics



Joëlle Pineau

is an Associate Professor with the School of Computer Science at McGill University, where she co-directs the Reasoning and Learning Lab. She is also the Head of the new Facebook AI Research lab. Her research centers on developing efficient algorithms for learning and decision-making in partially observable stochastic domains, and applying these algorithms to complex problems in robotics and health care.



Doina Precup

is an Associate Professor with the School of Computer Science at McGill University. She is also the Head of the new DeepMind Lab in Montréal. Her research interests include Artificial Intelligence, machine learning and the application of these methods to real-world problems.



Gregory Dudek

is the Director of McGill School of Computer Science, a member of the McGill Research Centre for Intelligent Machines (CIM) and an Associate member of the Department of Electrical Engineering at McGill University. He is also the new Head of the Samsung AI Centre. His research areas include autonomous navigation, robots that learn, mobile robotics, machine learning, robot localization, and computer vision.

Montréal's leading AI researchers



Aaron Courville

is an Associate Professor at the University de Montréal and a member of MILA. He specializes in the development of deep learning models and methods, computer vision, natural language processing, audio signal processing and speech understanding.



Simon Lacoste Julien

is an Assistant Professor at the University de Montréal and a member of MILA. His research interests include structured prediction, latent variable models, convex optimization, approximate inference, combining generative and discriminative methods/frequentist and Bayesian statistics, and applications such as NLP, information retrieval, computer vision, and computational biology.



Pascal Vincent

is an Associate Professor at the University de Montréal and a member of MILA. His research focuses on discovering fundamental computational principles that underlie the extraordinary capabilities to learn from the environment, understand it and adapt to it that characterize intelligence.



Christopher Pal

is an Associate Professor at École Polytechnique de Montréal and a member of MILA. He specializes in computer vision and pattern recognition, computational photography, natural language processing, statistical machine learning and applications to human computer interaction.



Andrea Lodi

is a Full Professor at École Polytechnique de Montréal and the Canada Excellence Research Chair in Data Science for Real-Time Decision-Making, as well as a member of MILA. His work centers on three of Montréal's key areas of academic excellence: operations research, Artificial Intelligence, and mathematical optimization.



Major public investment

\$93.5 M from the First Research Excellence Fund (2016)

\$100 M over the next 5 years for the creation of a Québec AI cluster (2017)

\$40 M over the next 5 years for the creation of a Québec AI cluster (2017)

Montréal chosen as headquarters for SCALE AI the only Canadian AI cluster to receive part of the

\$950 M supercluster initiative (2018)

\$329 M over the next 5 years to accelerate the adoption of AI in Québec (2019)

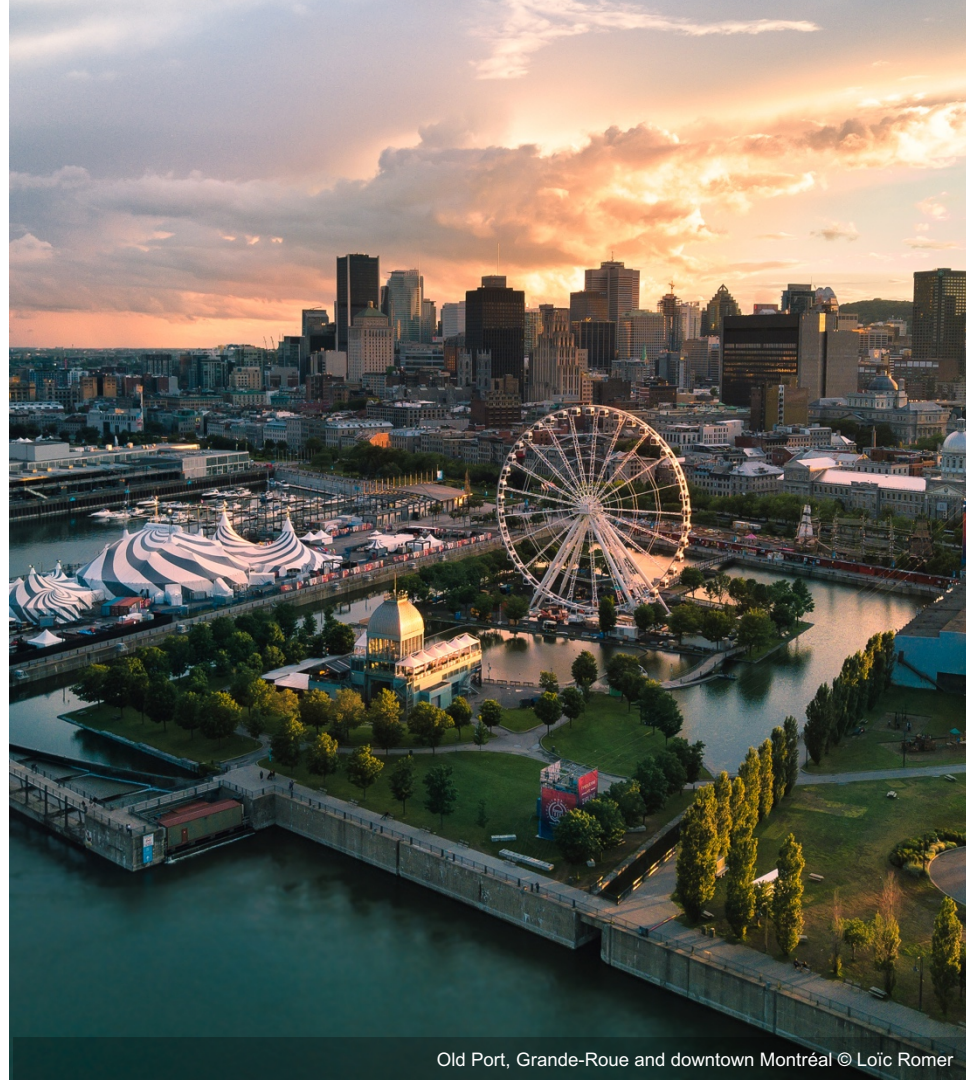
Montréal selected for Canadian AI Cluster headquarters



The Canadian government chose Montréal as headquarters for SCALE AI, Canada's AI supply chain supercluster, dedicated to building the next-generation supply chain and boosting industry performance by leveraging AI technologies.



The Québec government also chose Montréal as headquarters for AI Québec, to make Québec a leader in AI research and innovation, business startups and organizational AI adoption.



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



- More than 1,000 scientists (professors, professionals and students) with complementary areas of expertise
- #1 for publications worldwide
- Over 40 academic programs

Research centres



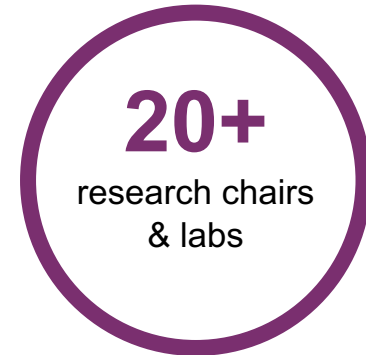
University departments



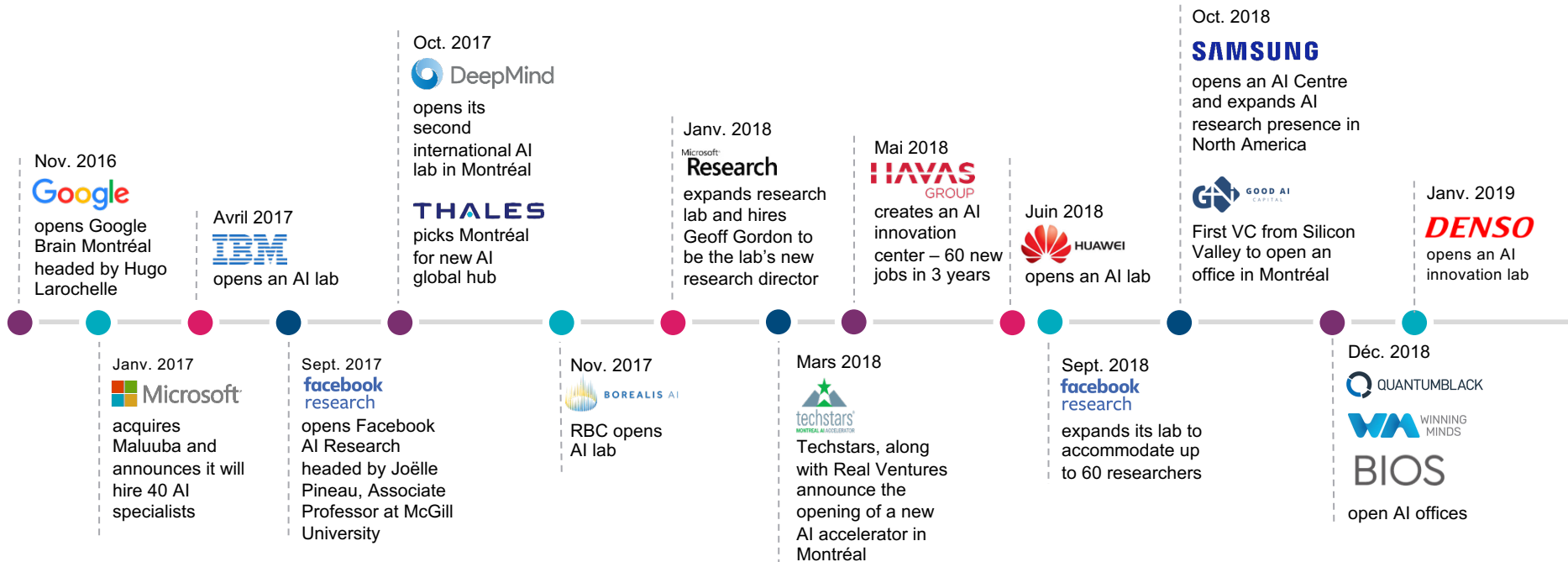
Academic partners



International partners



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





A booming startup ecosystem

- One of the top startup ecosystems in the world
- \$861 million in VC financing in Montréal in 2018 (+29%)
- 30+ incubators/accelerators
– and counting!
- 45+ coworking spaces
- Lucrative funding for Montréal's AI companies:

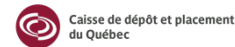
ELEMENT^{A1} raised **US\$102 M** - June 2017 - Series A

 **hopper** raised **US\$100 M** - October 2018 - Series D

mnubo raised **US\$13 M** - January 2018 - Series B

 **algolux** raised **US\$10 M** - May 2018 - Series A-1

AUTOMAT raised **US\$8,3 M** - June 2017 - Series A



Caisse de dépôt et placement
du Québec

CDPQ–AI Fund:
\$250 M dedicated to AI (2019)

Source: “Global Ecosystem Report”, 2018; “Montréal Startup Ecosystem Report”, Credo, 2016; “Midterm Report” – Smart City, February 2017; Canadian Report “Money Tree”, PwC Canada | CB Insights, 2019.

The best AI Accelerators and Incubators in the world to help develop tomorrow's breakthroughs



Techstars Montréal AI will select startups that advance the development and application of Artificial Intelligence across all industries and markets.



Powered by ETS, Centech provides mentoring, coaching and financial support to AI companies.



A partnership with HEC Montréal, CDL-Montréal will run a specialized program focused on Artificial Intelligence and data science to capitalize on Montréal's expertise in the sector.



An accelerator and founder development program for early or idea stage AI-enabled startups.



FounderFuel is an accelerator program providing 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.



A venture capital firm specializing in incubation, seed, growth financing, and early-stage startup investments. Specialized in the consumer electronics technology market, with a special interest in companies leveraging AI.



Recently ranked as the 8th best Business Incubator – Managed by a University by UBI Global. The Centre has helped establish 125 active startups that employ over 1,200 people and have raised \$110 M to date.

Sample of leading companies active in AI in Montréal

ELEMENT^{AI}

wrncH

DELVE
LABS

AUTOMAT

Dialog
Insight

stradigi^{AI}

VIA

Dataperformers



SCENT TRUNK

Aerial
WIFI MOTION ANALYTICS

MYLO

KEΔTEXT

mnubo

KINOVA

acceo

INTEMA
Technologies + Marketing

zapio

BioMindR

<kaloôm>

smooch

ACQUISIO

FAIMDATA

ARN
Robotique

Silentale

nectar

algolux

Semeon

mirametrix

OSSIACO

hey
day

CORSTEM

PERFIQT

IRYStecTM
Perception Is Reality

InnoTechnix

VENTION

fluent.ai

MIMV



Examples of Montréal companies using AI in various fields



IMAGIA: AI-driven personalized care



wrnchAI: digitizing human motion and behaviour from standard video



Algolux: using machine learning to empower cameras to see more clearly



Automat: helping companies use AI to talk to their customers, understand them and serve them better



LANDR: machine learning audio production platform, offering audio creators a suite of tools to support the lifecycle of creation



Via: helping energy companies across the globe realize the value of their data through AI and blockchain



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



EruditeAI: delivers free private tutoring powered by peer-to-peer learning and Artificial Intelligence augmentation



Myelin: Artificial Intelligence synthesis of ASD scientific data



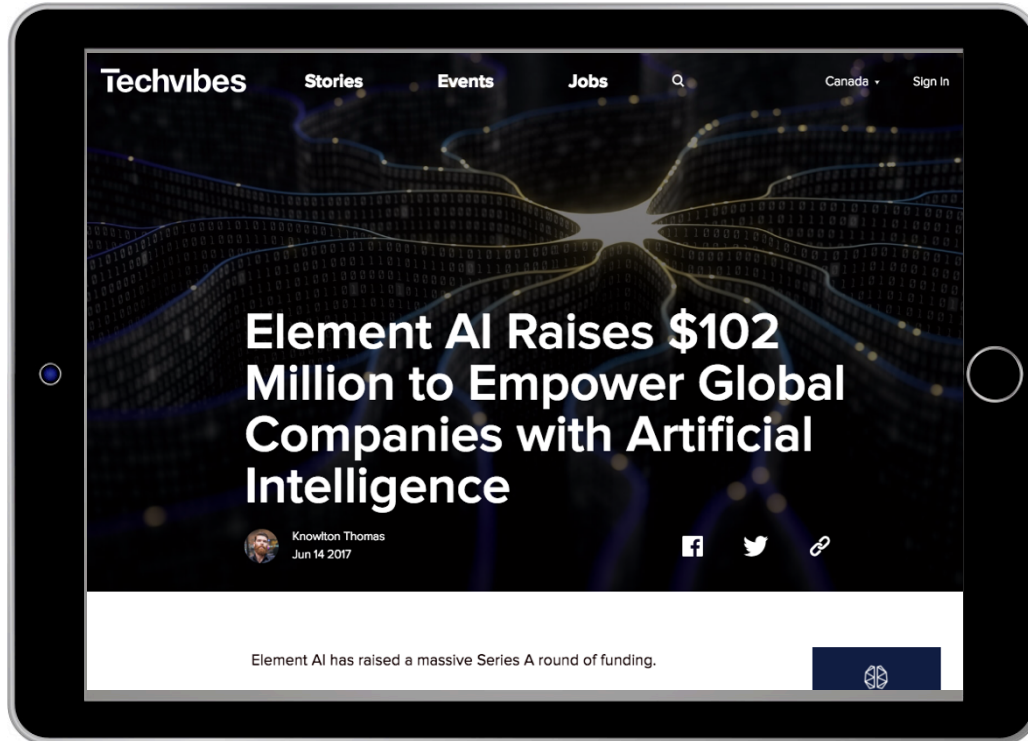
Fluent.ai: personalized intent recognition that learns from speech, behavior and context, for command and control interfaces



envision.ai: applies the science of deep learning to the art of visual media

An AI company born in Montréal in 2016 and already a world leader

One of the world's largest Series A funding rounds for an AI company



ELEMENT^{AI}

2019: + 450 employees in 5 locations



“Bringing together the best in entrepreneurship, technology and academia to create an AI-First World and elevate collective wisdom”

Stradigi AI: Backed by one of North America's largest applied research labs

stradigi AI

Stradigi AI helps enterprises quickly transform their business through Artificial Intelligence powered solutions in a configurable, scalable and secure way

“Our team provides clients and partners a full ecosystem catered to AI innovation, giving them a competitive edge”



At the forefront of AI for good initiatives

- For ethical & responsible AI



Montréal Declaration **December 4, 2018**
Responsible AI_

An initiative of the Université de Montréal

- 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.

ELEMENT^{AI} Opened an office dedicated to AI for good.



**\$100,000 RAISED FOR UNITED WAY
CENTRAIDE BY OSMO FOUNDATION, GOOGLE
BRAIN'S HUGO LAROCHELLE, AND THE
TECHAIDE AI CONFERENCE.**



Some of the organizations involved in AI and Big Data



An applied research and expertise centre in information technology, CRIM is dedicated to making organizations more effective and competitive through the development of innovative technology and the transfer of leading edge know-how.



Helps businesses take advantage of digital technology and integrate ICT into their business strategies.



An umbrella organization of Québec Universities using advanced research computing to support the research community and business sector.



Helping Québec companies increase their competitive advantage through R&D financing and partnerships with the institutional research community.

AI stands on a strong information technologies industry

- **107,500** qualified employees in IT, and **5,240** companies
- **A GDP of \$11.6 B**
- **Lowest operating costs in North America** for software development, ahead of Toronto, Boston, New York and San Francisco
- **Broadly diversified industry:**



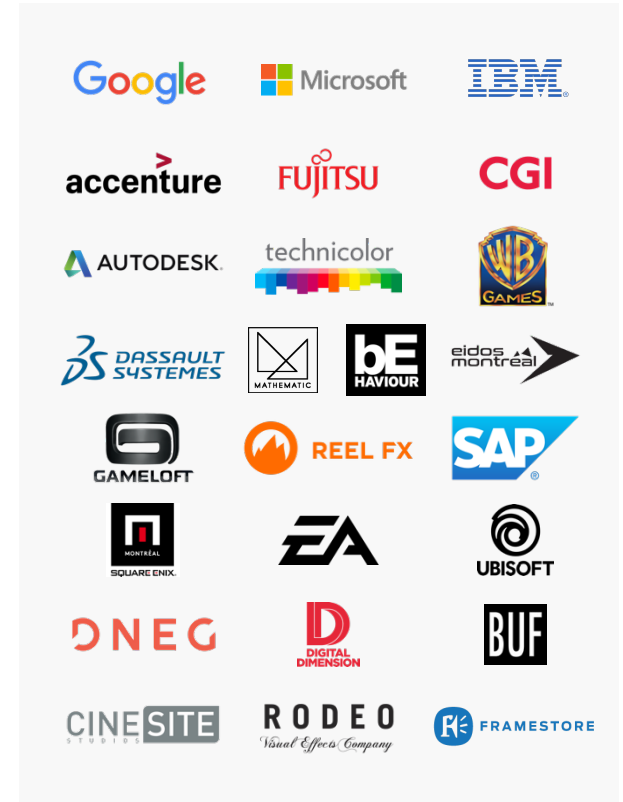
5th
video game
development
hub in the
world



1st
in Canada and
a world leader
in VFX
& animation



5th
highest tech jobs
concentration
among the largest
metropolitan areas
in Canada & U.S.



03

A Deep and Growing Pool of Highly Qualified Talent



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

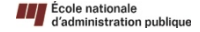
- **Canada's university capital:** 11 university institutions and 60 colleges
- **320,000 post-secondary students, including 201,000 university students and 35,500 international university students**
- **More than \$1 billion in funding dedicated to university research**
- **Best student city in the Americas:**



1	Montréal
2	Boston
3	Toronto
4	Vancouver
5	New York



Université de Montréal



A new generation ready to take over

Close to 11,000 university students are enrolled in Artificial Intelligence and data-related programs in Greater Montréal:

AI-related University programs	Students enrolled, 2016-2017
Computer sciences	7,100
Computer engineering and computer science	1,866
Mathematics	1,411
Applied mathematics	134
Probabilities and statistics	183
Total	10,694

Source : Ministère de l'Éducation et de l'Enseignement supérieur, 2017;
compilation Montréal International.



A labor pool of AI-related specialists

AI-related jobs	Employees in 2017
Information Systems Analysts and Consultants	38,100
Computer Programmers	25,500
Computer and Information Systems Managers	12,100
Computer Engineers	6,100
Software Engineers and Designers	5,900
Database Analysts and Data Administrators	2,900
Mathematicians	2,200
Total	92,800

93,000 AI-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%.**

EASE OF RECRUITMENT

According to Aon Hewitt*, Montréal ranks 3rd in North America for the lowest overall risk associated with recruiting, employing and relocating workers.

* 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.

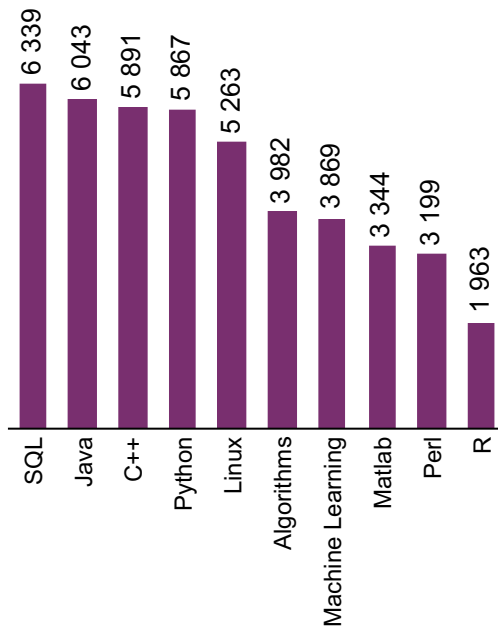
There are close to 15,000 AI experts in Montréal

The 35 key skills taken into account to define AI experts*

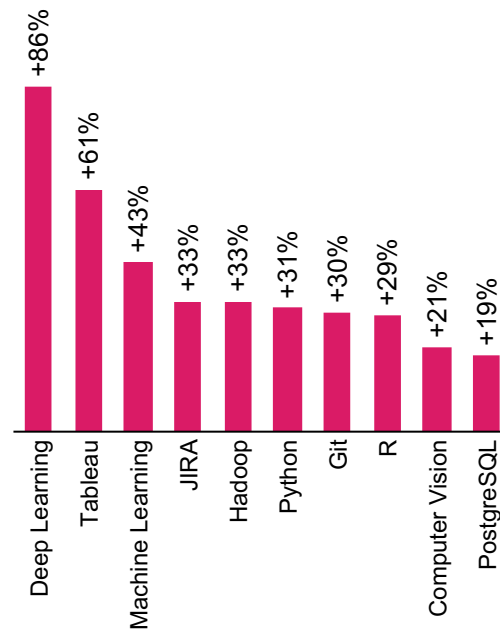


Number of Montréal LinkedIn profiles** that list the skills above: **14,810**

Number of Montréal AI experts who have the skills below (data as at March 11, 2019)



Fastest-growing skills among Montréal's AI experts over the past 12 months



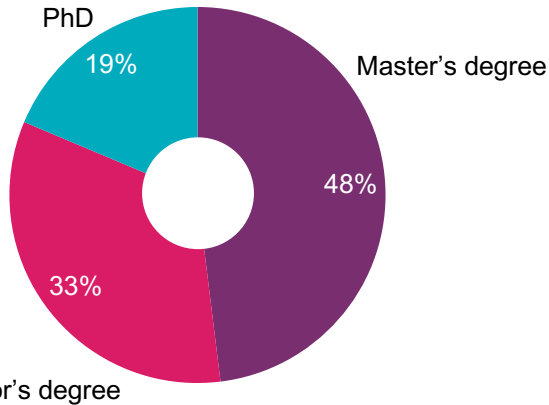
*Key skills identified using LinkedIn's Talent Insights tool are not cumulative or exclusive.

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

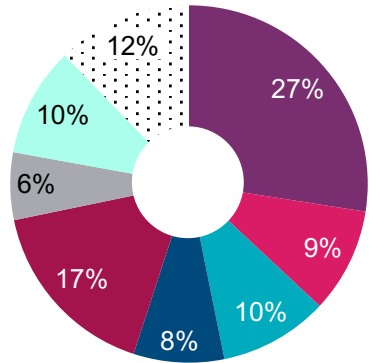
Source: LinkedIn, Talent Insights, March 11, 2019.

19% of Montréal's AI experts have a PhD and 48% have a master's degree

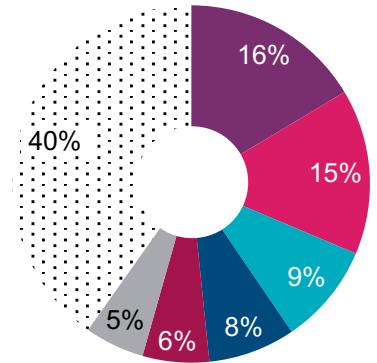
Highest level of education among Montréal's AI experts (100% = 14,810)



Main fields of study chosen by Montréal's AI experts



Main universities where Montréal's AI experts earned their degrees



- Computer Science
- Electrical & Electronics Engineering
- Computer & Software Engineering
- Mathematics & Statistics
- Business & Finance
- Engineering, others
- Science, others
- Other

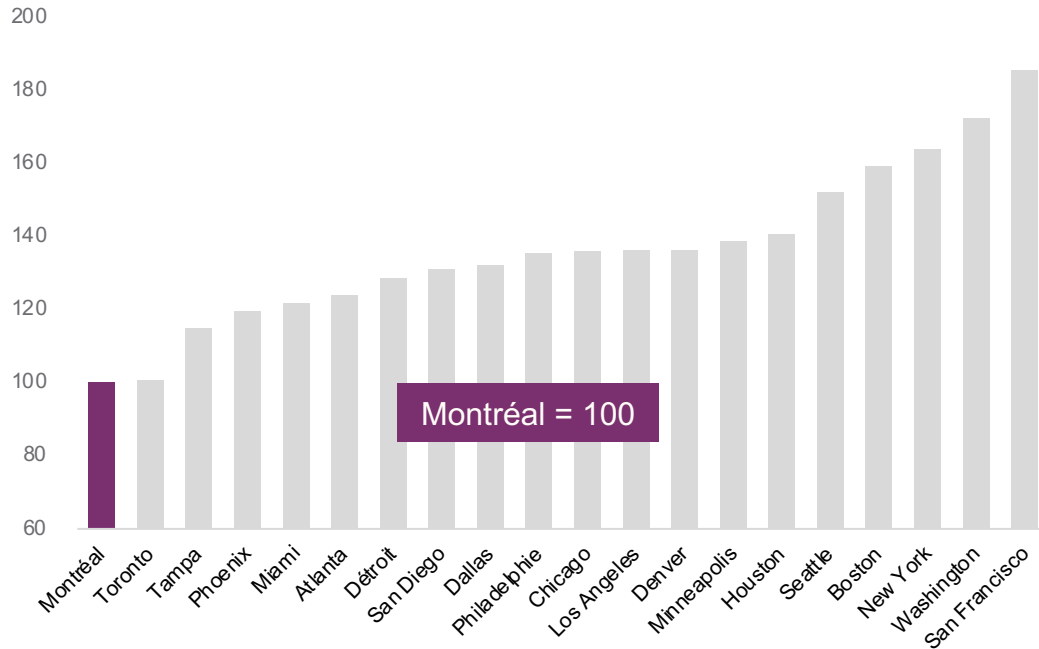
- Concordia University
- McGill University
- Université de Montréal
- École Polytechnique de Montréal
- HEC Montréal
- Université du Québec à Montréal
- Other

04

Attractive Operating Costs and Incentives



Most competitive operating costs for software development



Running a business costs less in Greater Montréal than in any other major metropolitan area in Canada and the U.S.

- **1st place ranking:** The most competitive operating costs compared to any other major metropolitan area in Canada and the U.S.
- **27% cost advantage compared** to the average of the 20 largest metropolitan areas in Canada and the U.S. (2018)

Competitive AI and IT salaries

Median annual salaries* (US\$) for AI / IT professions

	Montréal	Vancouver	Toronto	New York	San Francisco
Data Architect	\$67,413	\$71,119	\$73,156	\$99,847	\$111,850
Data Scientist	\$75,591	\$79,542	\$80,247	\$109,887	\$126,511
Software Engineer	\$72,514	\$76,427	\$77,017	\$101,799	\$117,411
Machine Learning Engineer	\$82,561	\$86,604	\$87,035	\$121,561	\$139,533
Computer Programmer	\$60,587	\$64,278	\$64,468	\$84,000	\$97,337
Computer Database Analyst	\$61,155	\$65,286	\$65,505	\$86,349	\$100,004

* Salaries based on 5 years of experience, 541500 Computer Systems Design and Related Services.
Currency exchange 2018-10-04 C\$1.00 = US\$0,7736.
Source: Economic Research Institute, October 2018.

Low mandatory benefit costs for employers

Examples of mandatory benefit costs for employers, 2019

Gross annual salary	\$50,000	\$100,000	\$125,000
Québec Pension Plan (employee: 5.4%; employer: 5.4%, max. 2,991.45)	\$2,700.00	\$2,991.45	\$2,991.45
Québec Parental Insurance Plan (employee: 0.526%, employer: 0.736%, max. sal. of \$ 76,500)	\$263.00	\$402.39	\$402.39
Employment Insurance (employee: 1.25%, employer: 1.75%, max. sal. of \$ 53,100.00)	\$875.00	\$929.25	\$929.25
Health Services Fund (1.25% if global salary total less than \$1M, max. 4.26%)	\$625.00	\$1,250.00	\$1,562.50
Commission des normes du travail (labour standards board) (0.07%, max. sal. of \$ 76,500)	\$35.00	\$53.55	\$53.55
<i>Commission de la santé et sécurité du travail</i> (occupational health and safety board - 0.47% in service sector, max. sal. of \$ 76,500)*	\$235.00	\$359.55	\$359.55
Total benefit costs	\$4,733.00	\$5,986.19	\$6,298.69
Total cost	\$54,733.00	\$105,986.19	\$131,298.69

Notes: Vacation represent a minimum of 4% of salary pursuant to the Act respecting labour standards. Some rates apply up to a maximum insurable revenue.

* The rate for the service sector (65110 - *Bureau de courtoisie; bureau de services professionnels; bureau offrant des services de soutien administratif*) is 0.47% but the rate for an employer can vary from 0.23 % to 18.87 % depending on the sector.

Paid holidays (approx. 10 days or 4%) are included in gross salary.

Source: Revenu Québec, 2019.

R&D tax credits: 15% non-refundable from the government of Canada and 14% refundable from Québec

SCENARIO 1 (\$)

Scientific research and experimental development (SR&ED) tax incentive program 2018

ASSUMPTIONS¹

- Private, foreign-controlled company, more than \$75M assets
- 20 eligible employees @ \$50,000 / year
- 100% of their work is related to eligible activities
- Subcontractor: \$200,000

	Federal	Québec	Total
Salaries	1,000,000	1,000,000	
Replacement amount @ 55%	550,000		
Subcontractors ²	160,000	100,000	
Québec R&D credit ³	- 122,500		
Exclusion		225,000	
	1,587,500	875,000	
Federal credit @ 15% and Québec credit @ 14%	238,125	122,500	360,625

Notes:

1. This model takes into consideration recent changes made to certain tax credits (2012, 2014 and 2015) and is thus valid as of fiscal 2018.
2. Only 80% of the amount paid to a subcontractor is eligible for a federal tax credit and 50% for a Québec tax credit.
3. For the purposes of calculating the combined rate of the credit, the tax credit from the government of Québec is applied against the federal tax credit.
4. For SMEs, (less than \$50M assets), there is an SR&ED tax credit exclusion on the first \$50K of R&D spending. For large companies and companies under foreign control, the exclusion applies on the first \$225K of R&D spending.

Source: Ministry of Finance of Québec, 2018.

Compilation: Montréal International, 2018.

Combination of e-business (CDAE) and SR&ED tax credits

Refundable tax credits for SR&ED and e-business:

- E-business covers up to **30%**, including **24% refundable** of employee salaries up to **\$25,000** per job per year
- SR&ED covers **15%** from the government of Canada and **14% refundable** from the government of Québec

SCENARIO 2 (\$)	Federal	Québec	Total
Combination of the Québec refundable tax credit for the development of e-business (CDAE) and the federal scientific research and experimental development (SR&ED), 2018	Salaries	1,000,000	1,000,000
	Replacement amount @ 55% ²	550,000	
	Québec CDAE credit ³	0	
		1,550,000	1,000,000
	Federal credit @ 15% and Québec credit @ 24%⁴	232,500	240,000
	Federal credit @ 15% and Québec credit @ 30%⁵	232,500	300,000
			472,500
			532,500

Notes:

1. This model takes into consideration recent changes made to certain tax credits (2012, 2014 and 2015) and is thus valid as of fiscal 2018.
2. Limited by other company expenditures.
3. The CDAE does not reduce the amount eligible for the federal SR&ED tax credit.
4. The corporate taxes paid are not sufficient to cover the 6% non-refundable part of the tax credit.
5. The corporate taxes paid are sufficient to fully cover the 6% non-refundable part of the tax credit.

Source: Ministry of Finance of Québec, 2018.

Compilation: Montréal International, 2018.



Other major incentives

Financial assistance for job creation and training

- **25%** of eligible costs for the implementation of a training program and **50%** of costs incurred for the creation of a human resource department

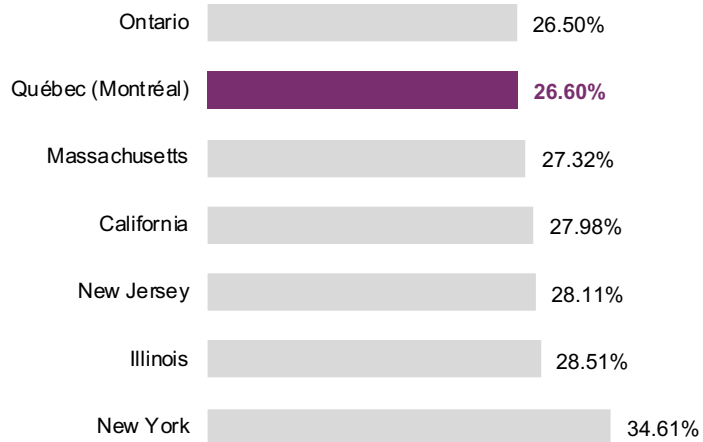
Tax holiday for foreign researchers and experts

Five-year Québec income tax exemption

- **0%** of provincial income tax on salary for the 1st and 2nd year
- **25%** for the 3rd year
- **50%** for the 4th year
- **75%** for the 5th year

An attractive tax treatment

Comparison of corporate effective tax rate (%)
Selected Canadian provinces and U.S. States, 2019



05

An Exceptional Quality of Life

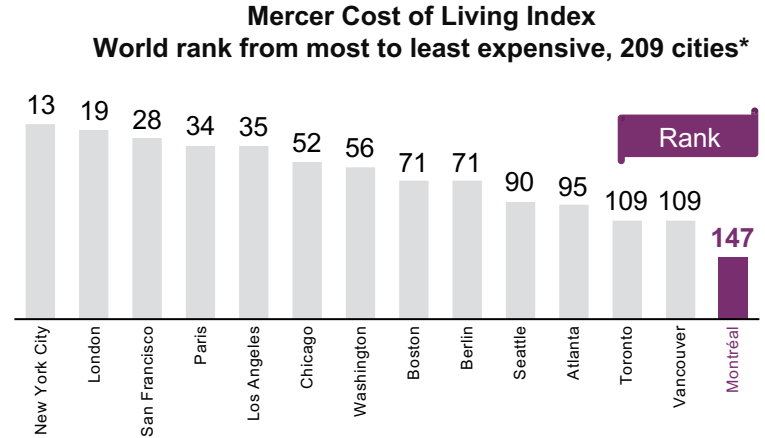
**MTL
INTL** Montréal
International





A low cost of living

Greater Montréal is **cheaper than almost all other large cities** in North America and Western Europe:



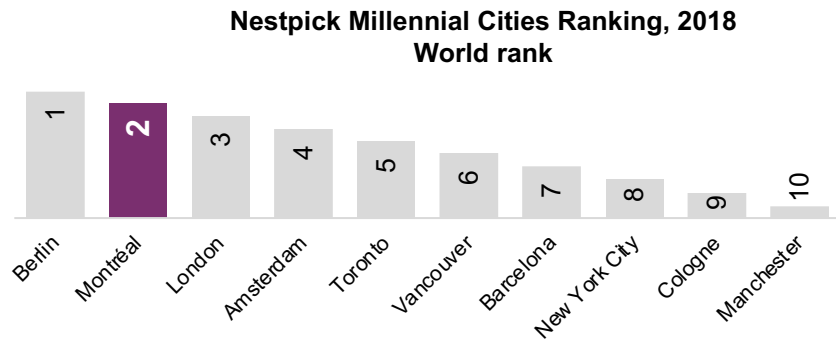
Greater Montréal offers a higher purchasing power thanks to:

- **Cheap housing**
- **Generous family allowances**
- **Low private medical insurance costs**
- **Affordable child care**

*A higher rank represents higher costs.
Source: "Cost of Living Survey", Mercer, 2018.

An exceptional quality of life

Montréal is the 2nd best city in the world for millennials:



- **Lowest homicide rate** among the 20 largest metropolitan areas in Canada and the U.S.
- **Health care provided at no cost**
- **Lowest education tuition fees** in North America
- **Vibrant cultural metropolis** with +100 festivals and 70 museums

Source: "Millennial Cities Ranking", Nestpick, 2018; "Quality of Living Survey", Mercer, 2017; Federal Bureau of Investigation, 2018; Statistics Canada, 2018.





A worldwide recognition

Best city in Canada and 6th in the world

TimeOut, 2019

Most reputable city in the Americas

Reputation institute, 2018

Best student city in the Americas

Qs best student cities 2018

Most affordable major city in Canada and the U.S.

UBS prices and earnings, 2018

Best bicycle-friendly city in North America

Copenhagenize, 2017

3rd friendliest city in the world

Rough guides, 2016

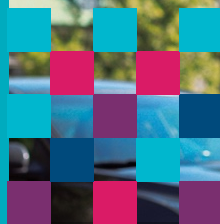
UNESCO city of design since 2006

Top host city in North America for international association events

Union of international associations (UIA), 2018

06

Montréal International's Personalized, Free and Confidential Services



Montréal international, a single point of access to a series of personalized, free and confidential services



**Long-term
strategic support**



**Economic data
and communication
services**



**Government
relations facilitation**



**Incentive programs
assistance**



**Foreign workers
immigration
assistance**



**International
recruiting missions**



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