



# Excellence, full steam ahead!

Mid-term report  
2016-2020



HEC MONTRÉAL



APOGÉE CANADA  
FONDS  
D'EXCELLENCE  
EN RECHERCHE

Québec 

## Halfway through... but not doing things halfway.



Looking back over how far we have come since the launch of IVADO in September 2016, the progress we have made is dizzying. We can be proud of everything we have accomplished and the opportunities we have created in just a few short years! These experiences have also taught us valuable lessons for our long-term success.

It is clear that the Canada First Research Excellence Fund has been a key factor in allowing a number of post-secondary institutions to focus their efforts on developing fundamental knowledge on a global scale in areas that create, and will continue to create through the application of this knowledge, long-term social and economic advantages for Canada. It is our responsibility to build on these transformative investments to strengthen the initiatives that enable Canada to excel internationally in this strategic sector.

Despite the tragic nature of the COVID-19 crisis, it is also a vector of innovation in that it has made the digital transformation of our society a priority. Our call for proposals for ways to fight the pandemic allowed us to directly fund nine groundbreaking projects that are already showing real results. This call for proposals demonstrated our ability, as well as that of our community, to adapt to crisis and support group efforts, thereby making a difference.

*"We can be proud of everything we have accomplished and the opportunities we have created in just a few short years!"*

The Montréal Declaration, which we firmly support and even helped to write, is an ethical compass to guide the development of artificial intelligence towards morally and socially desirable goals. We are committed to continuing to strengthen this ethical framework, which also promotes human rights as a catalyst for the responsible development of artificial intelligence.

As you will discover as you peruse this document, which offers just a glimpse of all that we have accomplished in record time, the second half of our term promises to be stimulating and encouraging.

### Marie-Josée Hébert

IVADO Chairman of the Board  
Vice-Rector of Research,  
Discovery, Creation and Innovation  
Université de Montréal



At this key moment in our history, we are still living out our original mission each day: to accelerate Canada's digital transformation by being a catalyst for progress in research into harnessing the power of big data to support decision-making. The entire IVADO team and our community are united behind this inspiring goal as well as our desire to leverage the potential of research in digital intelligence, particularly research at the crossroads of machine learning and operations research, which is one of Québec's greatest strengths. With the support of our community, we are also working to bring this research to society, by transforming it into concrete applications and benefits for as many people as possible.

The results we have achieved in under 4 years are far beyond our initial expectations. Thanks to the steady pace of our program delivery, we are able to focus on the deployment of major structuring research projects that you will learn more about in this report.

This approach will allow us to help consolidate national and international innovation networks, accelerate the development of national partnerships outside Québec and increase our activities with our international partners.

As we continue to support the major programs we have put into place since our creation, we will spare no effort to improve Canada's position, and Québec's in particular, as a global catalyst for developing digital intelligence.

With our strong industrial membership and a desire to increase the transfer of knowledge to organizations' specialists in these fields, we aim to mobilize national and international actors in digital intelligence to work on structuring projects in key application areas.

*"With the support of our community, we are also working to bring this research to society, by transforming it into concrete uses and benefits for as many people as possible."*

With the strength of our academic background and our credible, world-class expertise in digital intelligence, we once again reaffirm our four core values: Talent, Knowledge, Transfer, and Community, as well as our mission and our priorities.

On behalf of our entire team, our members, partners, and staff, we would like to thank the Canada First Research Excellence Fund, as well as the Ministère de l'Économie et de l'Innovation (MEI) and the Fonds de recherche du Québec (FRQ) for their belief in us and their precious support for our development!

### Gilles Savard

CEO, IVADO

## Where every possibility is granted

IVADO is a collaborative institute created by Campus Montréal (Université de Montréal (UdeM), Polytechnique Montréal (Poly) and HEC Montréal (HEC)). It is dedicated to **digital intelligence** (DI), which includes data science, machine learning, and operations research.

In its vision outlined for Canada First in 2016, and to support the emergence of a digital intelligence (DI) ecosystem capable of stimulating Québec and Canada's economic and social development, IVADO proposed a scientific strategy based on 4 pillars.



### Talent

Training highly qualified scientists and managers in digital intelligence to meet the market's increasing needs.



### Knowledge

Increasing and improving scientific research in digital intelligence.



### Transfer

Supporting learning about digital intelligence by companies and the community, technology transfer to industry and entrepreneurship.



### Community

Making Montréal the hub of a strong international network of excellence in digital intelligence.



## First things first

The grant that IVADO was awarded by Canada First is seen as the starting point for Montréal's emergence as a world leader in DI research.

Since 2016, governments, major national and international companies, and venture capital firms have invested nearly \$2 billion in this DI sector.

Guided by the values of **excellence** and **collaboration**, the IVADO team believes that data and algorithms are able to transform the world we live in and hold incredible potential for **innovation**.

## IVADO in figures

In under four years, IVADO has managed to reach or greatly exceed 41 out of 45 goals set for 2023 by leveraging the high concentration of specialists in **data science**, **operations research** and **machine learning** in Montréal.

Many of these specialists are affiliated with IVADO's 13 academic partners and 7 academic members: the Centre de Recherche Mathématique, the Canada Excellence Research Chair in Data Science for Real-Time Decision-Making, the Centre Interuniversitaire de Recherche sur les Réseaux d'Entreprises, la Logistique et le Transport (CIRRELT), the Consortium Santé Numérique, the Group for Research in Decision Analysis (GERAD), Mila and the Tech3lab.

# +90000

persons-day  
trained

# 69

fundamental  
research projects  
funded

# 109

industrial members  
and more than  
20 network  
and international  
partners

# +14000

scientists in the  
IVADO community

# 27

IVADO  
professors  
recruited

# 44

new  
research  
chairs created

# 550

DI events  
with IVADO's  
participation

# 273

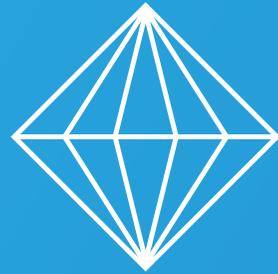
collaborative  
projects involving  
135 companies  
and 169 researchers  
from 13 universities  
(\$48 million)

# 37

international  
delegations

# 423

student and  
postdoctoral  
scholarships  
(\$19 million) awarded



# Talent



## Talent Innovation's power of attraction

IVADO's network of partners is made up of key resources dedicated to innovation and who naturally stimulate **research** and mobilize knowledge. IVADO has developed an exceptional network that is constantly changing to attract the best talent to a project as inspiring as the **digital transformation** of our society.

IVADO's training environment is also always changing. With the support of its staff, IVADO is expanding and supporting the creation of **training** programs and activities to develop **talent**, because knowledge feeds off ideas, interactions, doubts, and more questions than answers.

# +9000

persons-day  
trained

# 6

job and  
internship fairs

148 organisations  
more than 3000  
participants

# 33

training  
programs

29 schools and workshops  
4 online courses





## Talent Innovation's power of attraction

### Schools and workshops

The complete **"From data to decision"** training program explores recent advances in digital intelligence in an accessible, flexible, and independent way. Among others, we can cite the following:

- ◆ 5 editions of the IVADO-Mila Deep learning school
- ◆ 4 editions of the finance and insurance workshop with Fin-ML

### MOOC

Online courses are more accessible than ever, and their training programs respond to companies' needs. In particular, we have developed:

- ◆ Deep Learning Essentials  
A collaboration between IVADO-Mila-UdeM
- ◆ Bias and Discrimination in AI  
A collaboration between IVADO-UdeM

### Partnerships

**\$1 million**  
Future skills

**\$240 K**  
Nova Science



### Scale AI-IVADO Collaboration

The new national digital intelligence talent development program includes public and corporate training aiming at training 45,000 professionals in 4 years.



## Talent

# Humans are our greatest asset

Human capital is the heart and soul of everything we do at IVADO. The IVADO team and community, including its professors, students and researchers, are constantly pushing the boundaries of knowledge. Through the support of Canada First, its members and partner companies, IVADO has been able to attract and mobilize a unique constellation of thinkers.

## Scholarships and grants

To help support the next generation of students, IVADO has developed a program to support digital intelligence research.

**423 scholarships and grants have been awarded to 404 students and postdocs to date (+ \$19 million) including:**

- ◆ 144 research initiation scholarships
- ◆ 63 graduate scholarships
- ◆ 59 postdoctoral funding grants
- ◆ 157 scholarships and grants from all cycles resulting from structuring projects

## Professors

The first recruitment program that was launched was designed to attract **world-class human capital** to Montréal.

**27 professors recruited**

- ◆ 11 UdeM
- ◆ 8 Poly
- ◆ 8 HEC

## Chairs

Development and creation of **research chairs**.

**91 IVADO researchers hold a Chair**

**44 chairs earned in 3 years**

- ◆ 1 Canada Excellence Research Chair (CERC)
- ◆ 8 Canada Research Chairs (CRC)
- ◆ 19 Canada AI Chairs - CIFAR
- ◆ 3 FRQ-IVADO Chairs
- ◆ 13 industrial and institutional chairs

## They're part of our community!



**Laura Gagliano**

Poly, co-President of the IVADO Student Committee  
Artificial Neural Networks and Bispectrum for Epileptic Seizure Prediction



**Larry Dong**

McGill University, University of Bordeaux  
Evaluating the use of generalized dynamic weighted ordinary least squares for individualized HIV treatment strategies



**Alexandra Luccioni**

UdeM  
Using Generative Adversarial Networks to Visualize the Impacts of Climate Change



**Enora Georgeault**

HEC  
Predictive Models of Canadian Red Cross Donation Allocation in Response to Forest Fires



**Margarida Carvalho**

UdeM  
IVADO Professor



**Guy Wolf**

UdeM  
IVADO Professor



**Amal Zouaq**

Poly  
IVADO Professor



**Jian Tang**

HEC  
IVADO Professor



**Benoît Dupont**

UdeM  
Canada Research Chair in Cybersecurity and Chair in Cybercrime Prevention (Desjardins / National Bank)



**Irina Rish**

UdeM, Canada Research Chair  
Autonomous Artificial Intelligence  
+ Canada AI Chairs - CIFAR



**François Laviolette**

Université Laval, Canada AI Chair - CIFAR  
NSERC-Intact Financial Industrial Research Chair in Machine Learning for Insurance



**Foutse Khomh**

Poly  
IVADO-FRQ Chair





## Talent Scientists in the spotlight

The old saying holds true at IVADO: two heads are better than one. Since **machine learning** (ML) and **operations research** (OR) are a dynamic duo in terms of digital intelligence, we have appointed a Scientific Director and Co-Director whose skills and influence in these two areas are second to none.



### Yoshua Bengio

Recognized as one of the world's leading experts in artificial intelligence and a pioneer in deep learning.

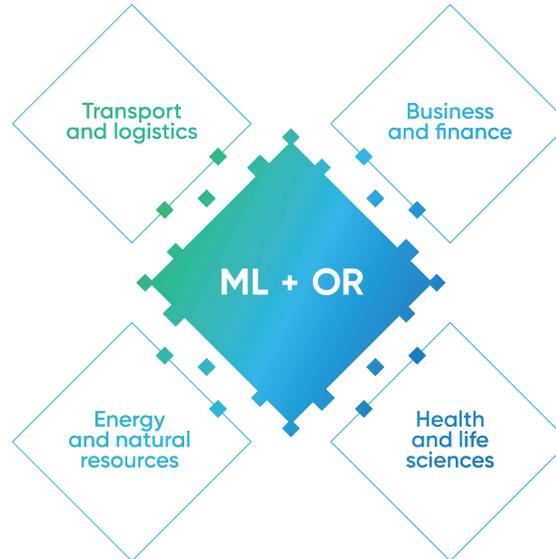
- ◆ Founder and Scientific Director of Mila, the Québec Artificial Intelligence Institute
- ◆ 2018 ACM Turing Award
- ◆ Killam Prize from CRSNG

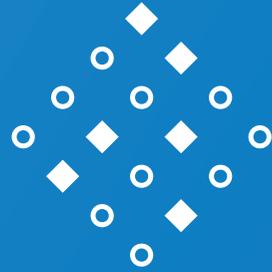


### Andrea Lodi

His work in operations research has led to many distinctions and awards and has contributed to the advancement of innovative projects.

- ◆ CERC chairholder on data science for real-time decision-making
- ◆ Award for the best article in Computational Optimization and Applications
- ◆ Google Faculty Research Award





# Knowledge



Knowledge

## Research takes centre stage

The breakthroughs in digital intelligence research supported by IVADO can be felt in several critical areas, including **health, natural resources, transportation** and **logistics, finance** and **trade**. These impacts are making waves in the research ecosystem. Among the highlights is the flagship paper "Machine Learning for Combinatorial Optimization: a Methodological Tour d'Horizon" published by Yoshua Bengio (UdeM), Andrea Lodi (Poly) and Antoine Prouvost (Poly).

# +66

prizes  
and awards

# 2 639

scientific  
publications

surpasses the goal  
set for 2023

# 69

research  
projects

valued at \$12.4 million,  
with the involvement  
of more than 140 students  
and postdoctoral  
researchers





## Knowledge Advancing health research

Digital intelligence has found a particularly fertile breeding ground in the **health** field. Research by professors affiliated with IVADO has enabled the development of major multidisciplinary initiatives that will improve people's quality of life. Nine projects (\$0.5 million in investments) were generated through an unsolicited call for projects to fight the **COVID-19** pandemic.

## Some examples of :

### Projects funded

The research of Julie Hussin (UdeM) IVADO professor and researcher at the Montreal Heart Institute (MHI), focuses on making better use of biomedical data to improve, among other things, **preventive and personalized medicine**.

CITADEL, the CHUM's Centre d'intégration et d'analyse de données médicales, is a platform that facilitates the sharing of medical data within a healthcare institution. Michaël Chassé (UdeM), an IVADO professor, is its scientific director.

### Collaborations/articles

**2019 Québec Science Discovery of the Year:** IVADO professor Sébastien Lemieux (UdeM) participated in the discovery of new medicines based on the immunotherapy work of Claude Perreault (UdeM) and Pierre Thibault (ULaval).

Collaboration and support for the creation of the **strategic cluster FRQ UNIQUE** (Unifying AI and Neuroscience - Québec) for its work at the crossroads of natural and artificial intelligence.

Joint competition with Génome Québec and the Oncopole: **"Omics Data Against Cancer"**: \$1.5 million to support cancer research through data.

Contribution to the creation of the **Consortium Santé Numérique**, which has become one of IVADO's academic members.

### Bourses et subventions



**Dang K. Nguyen**  
UdeM  
Real-time detection and prediction of epileptic seizures using deep learning on sparse wavelet representations



**Nadia Lahrichi**  
Poly  
Reactive/learning/self-adaptive metaheuristics for healthcare resource scheduling



**Elen Jackson**  
UdeM  
Evaluation of a Directed Acyclic Graph for Cysticercosis using Multiple Methods



**An Tang**  
UdeM  
Predictive model of colorectal cancer liver metastases response to chemotherapy

Professor Guy Wolf's research in applying a machine learning to single cell data mining has been used, among other things, to study cross-immunity between dengue fever and the zika virus.



## Knowledge Advancing research in transportation and logistics

In the **transportation** and **logistics** sector, which is a very dynamic industrial and academic environment, IVADO is active in networks that drive digital intelligence both locally and internationally.

## Some examples of :

### Projects funded

Under the supervision of François Soumis (Poly), Alice Wu (Poly) is working on flight planning and crew scheduling, a very complex and costly challenge in **civil aviation**.

Aurélie Labbe (HEC) and her team are using different methods of data analysis to improve **urban mobility**.

### Scholarships and grants



#### Léa Ricard

UdeM, Co-President of the IVADO Student Committee  
Modelling the probability of acceptance of a route in a carpooling context



#### Élodie Deschaintres

Poly  
Modelling interactions between modes of transport by integrating diverse data sources

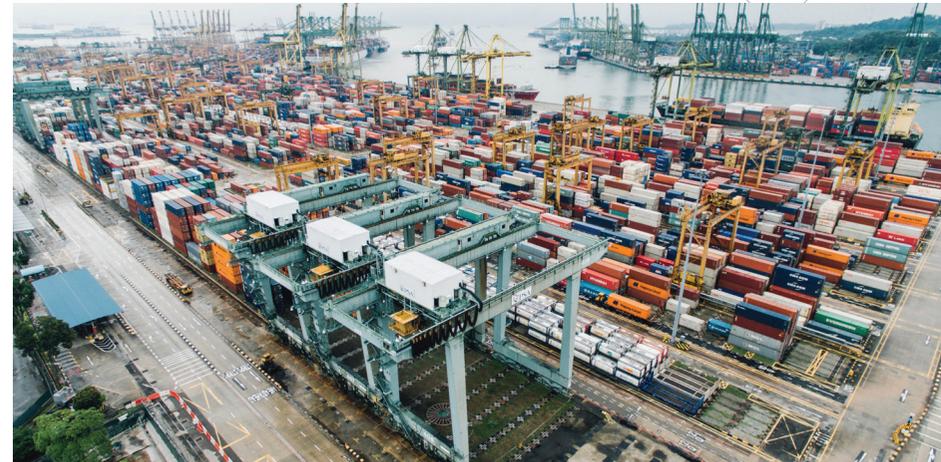


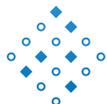
#### Joelle Cormier

HEC, communications Manager for the IVADO Student Committee  
Analysis of emergency air transport in remote parts of Québec

### Collaborations / articles

IVADO works in particular with 6 transportation companies to develop an **open-source software** containing a platform for the design, planning and simulation of public and alternative transport networks. The Chair in Transportation Transformation, led by Bernard Gendron (UdeM) and his team, develops tools, methods and strategies to optimize transportation supply and demand management to help **reduce costs and greenhouse gas emissions**. IVADO is also working with the CIRRELT team to develop hybrid operational research and machine learning models in the field of logistics and maritime and land transportation (rail and road).





## Knowledge

# Advancing research in energy, finance and trade

In these ever-changing sectors, always in search of new technology and which generate massive amounts of data, there are many digital intelligence projects in the works! Here are just a few examples.

## Some examples of :

### Projects funded

#### Energy

Michel Bernier (Poly)  
Development of a methodology for using big data from smart meters to **model a group of buildings**.

#### Finance and trade

Both Manuel Morales' (UdeM) work on the applicability of AI models in the financial sector and Geneviève Gauthier's work on using big data to better model the components of equity returns, highlight IVADO's impact on markets.

### Scholarships and grants

#### Energy

A study by postdoctoral student Martim Joyce-Moniz (Poly), on the adoption of **electric vehicles** in Québec as a result of the optimal placement of charging stations, which now allows Hydro-Québec to make better investment decisions.

#### Finance and trade

Cédric Poutré (UdeM) : Statistical Arbitrage of Internationally Interlisted Stocks

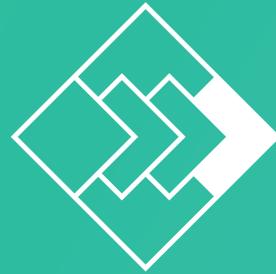
### Collaborations / articles

#### Energy

Michel Denault (HEC)'s work on improving decision-making has enabled **Rio Tinto** reach optimal hydroelectric production.

#### Finance and trade

In collaboration with NSERC-CREATE, IVADO participated in the creation and funding of Fin-ML. This Canadian network brings together researchers who work on the application of machine learning to **quantitative finance and business intelligence**.



# Transfer



## Transfer Unity creates opportunities

IVADO develops and reinforces the ties between its industrial members and the best academic resources, supported by a team of 13 partnership advisors. By fostering **collaborative research projects** and supporting structuring projects focused on interdisciplinarity and co-construction, IVADO has emerged as a key player in the rise of Montréal and Canada as a digital intelligence innovation hub.

# 19

project  
launch grants  
awarded

# 109

 industrial members

43 start-ups  
39 SMEs  
27 major companies

# 273

collaborative  
projects  
More than \$48  
million invested





## Transfer Changing the world of healthcare

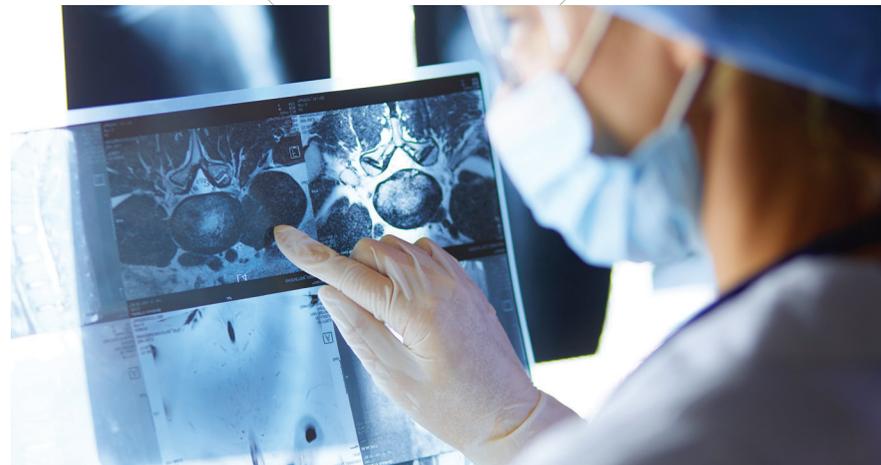
### Spotlight on some of our innovative projects!



Imagia develops digital medical innovations improving the **health of cancer patients and others with high-burden diseases**. With the Terry Fox Research Institute, Imagia was granted up to \$49M from the Strategic Innovation Fund (SIF). It led to the creation of the DHDP platform, together with the contributions from 97 consortium partners, is well over a \$200M initiative that aims to accelerate precision medicine and **advance pan-Canadian healthcare innovation**.



Nadia Lahrichi (Poly) and Anjali Awasthi (Concordia) are working on optimizing the logistics of **patient transportation and accommodation** and avoiding discontinuation of treatment in cooperation with the Québec Breast Cancer Foundation.



Andrea Lodi (Poly) and Héroïse Cardinal (CHUM) are working on improving **kidney transplant** risk assessment and optimizing donor-recipient matching as part of the Canadian Donation and Transplantation Research Program (CDTRP).



Transfer  
**Changing  
 the world of  
 transportation  
 and logistics**

## Spotlight on some of our innovative projects!

The **DEEL (DEpendable EXplainable Learning) project** is a France-Québec project that aims to certify AI algorithms for use in critical systems in the **aeronautics, automotive** and **rail** industries.

Some key indicators:

- ◆ 20 researchers
- ◆ 12 industries
- ◆ \$35 million



True North Marine and researchers from ULaval, UQTR and HEC Montréal are leading a project to optimize shipping routes around the world to balance freight costs and **reduce fuel consumption**. This initiative will improve current route planning models and reduce the carbon footprint.

Marie-Ève Rancourt (HEC), leads collaborative **humanitarian** logistics projects with the Red Cross/ Red Crescent, the UN World Food Programme and Québec food banks.

Emma Frejinger (UdeM), along with other scientists from IVADO and DIRO, proposed a new methodology using machine learning techniques to assist **Canadian National** in solving the puzzle of train configurations and container loading and optimizing its railway operations.



Transfer  
Changing  
the world  
of energy,  
finance  
and trade

## Spotlight on some of our innovative projects!

horoma<sup>ai</sup>

Start-up horoma AI is working with Hydro-Québec on **vegetation monitoring** near its power lines by developing an AI platform that will identify vegetation criteria using **mobile LiDAR data and images**.



Hydro  
Québec

Hydro-Québec is working with Sébastien Le Digabel (Poly) and Charles Audet (Poly) of GERAD on **black boxe optimization**, which is very useful for improving functions that require computer simulations that are costly to evaluate and whose characteristics are not known or usable.

TMX

The regulatory division of the Montréal Exchange is leading a project to **detect fraudulent transactions** through the design of a new AI algorithm that can detect anything that appears out of the ordinary, so that analysts can focus on these alerts. The project is carried out with Manuel Morales (UdeM), Gilles Caporossi (HEC) and Didier Chételat (Poly).

BANQUE  
NATIONALE

The Tech3Lab team at HEC Montréal studied **user experiences on transactional platforms related to the financial sector** as part of a project conducted in collaboration with the National Bank.



## Transfert

# Changing the landscape of communications

Through its support for research on **natural language processing (NLP)**, a field of AI that is omnipresent in our lives as a result of advances in deep learning, IVADO is helping to improve communications between people, organizations and cultures. As search engines, translation tools and other intelligent virtual assistants improve, our interactions become faster and simpler.

## Spotlight on some of our innovative projects!

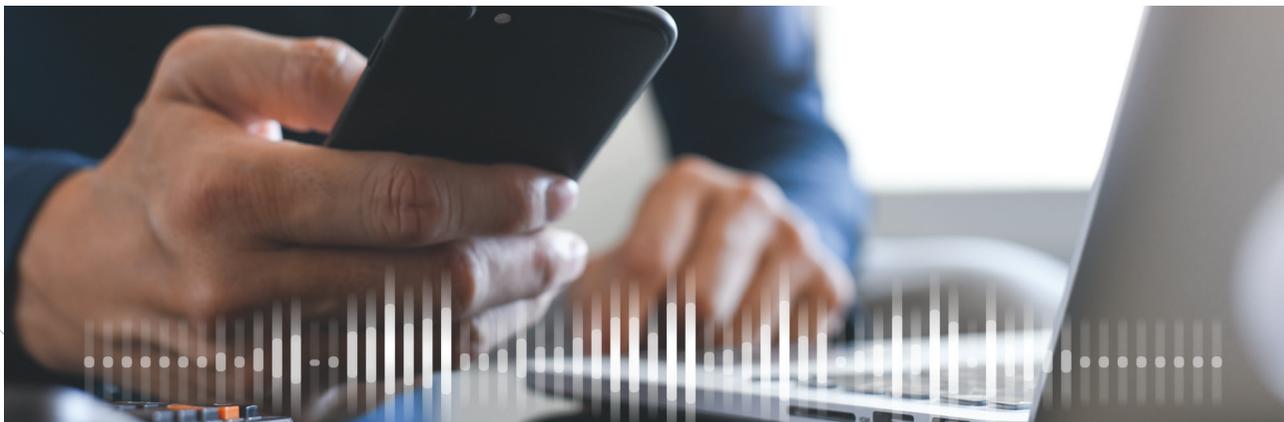
IVADO has participated in the creation of a **community of practice in NLP** bringing together 19 companies and several researchers from 5 universities. The monthly 'meet-ups' of the community allow **knowledge transfer** and present an opportunity for industrial scientists to stay up to date on the state of the art in different sub-domains. The community will also allow for the development of **consortium-type research projects** involving several companies and researchers. Such a project is currently in the development phase under the direction of Professors Alain Tapp (UdeM) and Will Hamilton (McGill), in collaboration with Leila Kosseim (Concordia) and Philippe Langlais (UdeM).



Airudi uses machine learning algorithms to **optimize recruitment processes**.

Irosoft

Irosoft simplifies **document anonymization** using applied research in computational linguistics in collaboration with UdeM's RALI laboratory.





## Transfer Stimulating business intelligence

IVADO is extremely active in promoting entrepreneurship and encourages connections between the projects it supports and the members of its network. Entrepreneurial ambitions are a natural result within its cohorts.

### Datapreneur program

- ◆ Poly-UdeM
- ◆ 39 start-ups
- ◆ More than 20 company projects per year

The postdoctoral program in **entrepreneurship** seeks to produce a marketable prototype and has 4 recipients, including:

Marc-André Renaud  
Gray Oncology: A contract with CHUM to optimize the use of **radiotherapy** resources for cancer treatment.

Selçuk Güven  
Using AI to screen and diagnose **speech and language** disorders in children.

IVADO is also involved in continuing the **problem-solving workshops** organized by the Centre de recherches mathématiques (CRM), where industry professionals work with researchers and students to solve AI issues.





# Community



## Community

### Unity makes strength in data

In less than three years, IVADO has built, mobilized and galvanized an impressive **network of expertise and businesses** that is spreading the influence of digital intelligence from Montréal and Canada around the world.

With more than 140 academic, institutional, industrial and government partners in its community, the **ecosystem's dedication** to leveraging the potential of digital intelligence for the social and economic development of our societies has far surpassed its initial expectations.

**7**  
academic  
members

**13**  
academic  
partners

**109**  
industrial  
members

**8**  
network  
partners

**14**  
international  
partners





# The IVADO community

ACADEMIC MEMBERS

PARTNERS

INDUSTRIAL MEMBERS





## Community

### Act locally

The growing international importance of IVADO's research, and its contribution to the development of Québec's AI strategy, is a testament to the fact that the Canada First grant is central to Canada's transformation into a **hub for innovation in digital intelligence**.

Attracting and retaining the world's **best and brightest international students in digital intelligence**.

Enrolment evolution from 2016 to 2019

- ◆ **+80%** at UdeM
- ◆ **+79%** at HEC
- ◆ **+68%** at Poly

The rapid increase in the number of **AI labs of international groups** that have moved to Montréal and **research projects** with global players is a testament to the recognition of IVADO's position.

Creation of communities of practice for better knowledge sharing and business networking:

- ◆ Industrialization of AI
- ◆ Agri-food industry
- ◆ Aerospace

Establishment of an **IVADO Student Committee** to respond to students' needs and strengthen social, professional and academic ties within the IVADO student community.

Significant investments in **infrastructure** and **research facilities**, including the creation of a new **DI hub in Montréal**:

- ◆ 100,000 sq. ft. in the Mile-Ex neighborhood
- ◆ Brings together Mila, Imagia, Cortaix (Thales), Boralis (RBC), Forum IA, Microsoft, Next AI, IVADO Labs and Scale AI





## Community Think globally

IVADO has managed to stand out from the crowd by measuring itself against the best in the world, thanks to its researchers' exceptional **work in digital intelligence**, and Campus Montréal has become one of the three most successful universities in the world in this field. As part of its strategy to strategically further its greatest strengths on the world stage, IVADO plans to forge even closer ties between Canadian digital intelligence players and major international partners. Here are a few **notable international initiatives** in which IVADO has participated.

Development of the International **Observatory on the Societal Impacts of AI and Digital Technology (OBVIA)**, with the support of:

- ◆ 9 universities
- ◆ 125 Canadian and international organizations
- ◆ 200 researchers in Québec

The **Mobilit.AI international forum:** a community of AI experts for critical systems in the field of transport and mobility.

- ◆ IRT Saint Exupéry
- ◆ Consortium for Research and Innovation in Aerospace in Quebec (CRIAQ)
- ◆ Artificial and Natural Intelligence Toulouse Institute (ANITI)

+6 research projects with Atlanstic2020.

Student and faculty exchanges with, in particular, the **African Institute for Mathematical Sciences (AIMS)**.

- ◆ 8 interns/5 women
- ◆ Watch the video!





## Community

### Equity, Diversity and Inclusion

The under-representation of **women, members of visible minority groups, Indigenous peoples, persons with disabilities** and members of other **marginalized groups**, as well as systemic barriers to inclusion and diversity (e.g., algorithmic and unconscious biases) are major issues in the DI field. IVADO is taking the lead on these issues in the DI community by developing and implementing an **EDI framework** that focuses on these three areas.

## Talent

Increasing the participation and voices of under-represented groups in digital intelligence in order to expand the talent and **idea** pool in the ecosystem, through initiatives such as the internship program to support up-and-coming African scientists with AIMS, the SEUR Project's 1000 Sciences section, Camp Découverte Techno, the Québec Indigenous Sciences Fair, Parité Science and AI4Good Summer Lab.

## Institutions

Consulting and working **together** to overcome structural and institutional barriers to the inclusion of these groups through education and employment, in particular through the creation of the Québec Interuniversity EDI Network, workshops and materials to raise awareness with a cross-disciplinary focus for internal and external members of the IVADO network.

## Expertise

Providing **incentives** to promote the contributions of people from minority groups and developing work on EDI topics in DI in order to improve research excellence and the quality of DI projects, by deploying initiatives such as an online course on bias and discrimination in AI developed with Mila, or funding research projects on equity issues.





## Community

# Promoting ethical digital intelligence

As the digital transformation of our society gains speed, it brings with it both positive and negative impacts. Alongside the issues of equity, diversity and inclusion, the ethical issues surrounding the use of digital intelligence tools are also a central focus of debate.

IVADO and its community take part in a number of initiatives designed to encourage the development, democratization and **responsible** and **sustainable** transfer of digital intelligence.

Here is an overview of these initiatives:

- ◆ Montréal Declaration for a Responsible Development of Artificial Intelligence
- ◆ Establishment of the Algora Lab to develop a deliberative ethics of machine learning
- ◆ Martin Gibert's research on raising awareness of current and future ethical issues related to digital intelligence, including his book aimed at a general audience, "Faire la morale aux robots"
- ◆ 4 editions of IVADO's Carrefour de philanthropie de données
- ◆ Joint sponsorship of a postdoctoral fellowship with OBVIA: "Pouvoir, inégalités et discriminations en IA"
- ◆ Support for the Montreal Speaker Series in the Ethics of AI
- ◆ Joint support, with the FRQ and OBVIA, for the creation of the Humaniteq podcast
- ◆ Support for the 2019 Cafés de bioéthique





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