



Futurs Numériques IVADO 2025

IVADO Digital Futures 2025

22 octobre (8h30-18h) / October 22 (8:30-6:00)

Campus MIL (Université de Montréal)

Atrium et salle 1502.1

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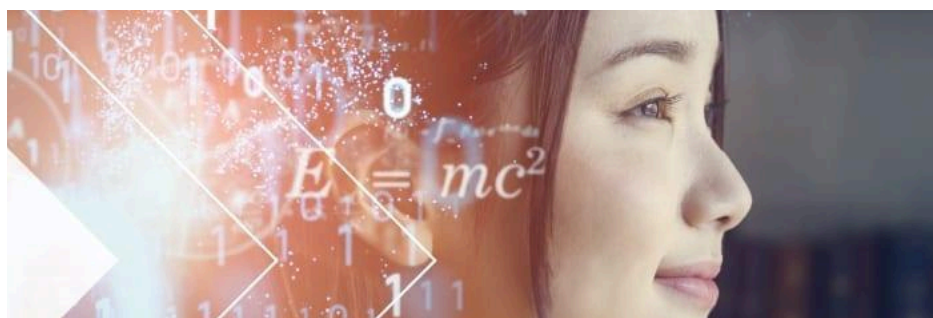
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Palais des congrès
de Montréal

Horaire général de la journée / Schedule Overview

Time	Activités / Activities	Salle / Room
8h30 - 9h00	Accueil et café <i>Welcome and coffee</i>	Atrium
9h00 - 9h15	Mots d'introduction <i>Introductory remarks</i>	1502.1
9h15 - 9h25	Présentations des services aux étudiants IVADO <i>Presentations of IVADO student services</i>	1502.1
9h25 - 10h35	Présentations orales étudiantes - EN <i>Student oral presentations</i>	1502.1
10h35 - 10h55	Pause <i>Break</i>	Atrium
10h55 - 12h00	Présentations orales étudiantes - FR <i>Student oral presentations</i>	1502.1
12h00 - 13h30	Pause lunch et séance d'affiches <i>Lunch break and poster session</i>	Atrium
13h30 - 14h40	Présentations orales étudiantes - EN <i>Student oral presentations</i>	1502.1
14h40 - 15h00	Pause <i>Break</i>	Atrium
15h00 - 15h45	Panel - Les défis et opportunités de la recherche collaborative <i>Panel - Challenges and Opportunities in Collaborative Research</i>	1502.1
15h45 - 16h00	Mots de clôture et remise de prix <i>Closing remarks and awards presentation</i>	1502.1
16h00 - 18h00	Cocktail réseautage <i>Networking cocktail</i>	Atrium



[Aller à la page web de l'événement](#)
[Visit the event webpage](#)

Horaire détaillé de la journée et liste des conférences

Schedule and speakers list

Veillez noter que les descriptions suivantes ont été conservées dans la langue originale dans laquelle sera donnée la conférence associée. / Please note that the following descriptions have been kept in the original language in which the lecture will be given.

8h30 - 9h00 (Atrium)

Accueil et café / Welcome and coffee

Accueil et enregistrement des présentateurs et présentatrices. Du café et des viennoiseries sont disponibles gratuitement. / Welcome and check-in for presenters. Complimentary coffee and pastries are available.

9h00 - 9h15 (1502.1)

Mots d'introduction / Introductory remarks

Mots d'introductions, incluant une allocution de Aaron Courville, Directeur scientifique d'IVADO / Introductory remarks, including a speech by Aaron Courville, Scientific Director of IVADO

9h15 - 9h25 (1502.1)

Présentations des services aux étudiants IVADO
Presentations of IVADO student services

Présentation des différents services, programmes et activités offertes à la communauté étudiante et postdoctorale d'IVADO / Presentation of the various services, programs, and activities offered to IVADO's student and postdoctoral community

9h25 - 10h35 (1502.1)

Présentations orales étudiantes / Student Oral Presentations

Nom Name	Niveau Level	Université University	Direction	Titre (Résumé en fin de document) Title (Abstract at the end of the document)	Secteur Sector
Hugo Cossette-Lefebvre	Postdoc	McGill	Jocelyn Maclure	AI for Discrimination without Discriminators: Discrimination theory, AI, and the challenge of the responsibility gap	Sciences humaines et sociales Humanities and Social Sciences
Andreea Musulan	Postdoc	Université de Montréal	Jean-François Godbout	AI for Electoral Manipulation	Sciences humaines et sociales Humanities and Social Sciences
Albina Tskhay	PhD	McGill	Tibor Schuster Cristina Longo	AI for Automated Causal Language Detection: Integrating Topic Modeling with Causal Claims Analysis	Sciences humaines et sociales Humanities and Social Sciences
Roxana Pena Mendieta	MSc	Université de Montréal	Benoit Baudry	AI for analyzing the evolution of code for digital arts	Sciences pures et appliquées Pure and Applied Sciences
Konur Tholl	MSc	Polytechnique Montréal	Ranwa Al Mallah	AI for Augmenting Decision-Making in Autonomous Cyber Operations	Sciences pures et appliquées Pure and Applied Sciences
Sevinj Yolchuyeva	Postdoc	Université Laval	Steve Bilodeau Venkata SK. Manem	AI for Predicting Immunotherapy Response in NSCLC Using Collagen Signatures from Digital Pathology	Santé / Health
Bruno Joyal	MSc	Université Laval	Audrey Durand	AI for DNA-encoded libraries	Santé / Health
Mael Charpentier	MSc	Université de Montréal	Margarida Carvalho Utsav Sadana	AI for Optimal Sensor Placement in Urban Environmental Monitoring	Environnement / Environment
Vihotogbé Houssou	PhD	Polytechnique Montréal	Julie Carreau	AI for Spatial pattern regression for gridded meteorological data	Environnement / Environment
Pascal Archambault	PhD	Université de Montréal	Eugene Syriani Houari Sahraoui	AI for The Farm of Tomorrow - Digital Twins for Agriculture	Environnement / Environment

10h35 - 10h55 (Atrium)

Pause / Break

10h55 - 12h00 (1502.1)

Présentations orales étudiantes / Student Oral Presentations

Nom Name	Niveau Level	Université University	Direction	Titre (Résumé en fin de document) Title (Abstract at the end of the document)	Secteur Sector
Annie Desmarais	Postdoc	Université de Montréal	Alexandre Hudon	L'IA pour guider les cliniciens face à la complexité des cas	Santé / Health
Catherine Bédard	MSc	HEC	Joé T. Martineau	L'IA pour transformer la profession infirmière	Santé / Health
Jérémy Briand	PhD	Université de Montréal	Jonathan Tremblay Guy Thibault	L'IA pour l'amélioration des modèles en sciences du sport et de l'exercice : faire le pont entre le raisonnement inductif et déductif	Santé / Health
Théo Guyard	Postdoc	Polytechnique Montréal	Thibaut Vidal	L'IA pour la collecte de débris spatiaux	Sciences pures et appliquées Pure and Applied Sciences
Sophie Morin	Postdoc	Polytechnique Montréal	Serge Prudhomme	L'IA pour le génie mécanique	Sciences pures et appliquées Pure and Applied Sciences
Ovide Kuichua	PhD	Polytechnique Montréal	Michel Desmarais Chahé Nerguizian	L'IA pour le traitement automatique des réponses courtes	Sciences pures et appliquées Pure and Applied Sciences
Pierre-Louis Lemaire	MSc	Polytechnique Montréal	Julie Carreau Youssef Diouane	L'IA pour la projection haute résolution des précipitations sous réchauffement climatique	Environnement / Environment
Maïka Lamoureux	PhD	HEC Montréal	Olivier Bahn Annie Levasseur	L'IA pour la modélisation intégrée des événements extrêmes	Environnement / Environment
Aude Marie Marcoux	Postdoc	UQAM	Lyse Langlois	L'IA pour le bien - Collecte et partage de données personnelles via téléphones intelligents : résultats d'une délibération citoyenne	Sciences humaines et sociales Humanities and Social Sciences

12h00 - 13h30 (Atrium) Lunch réseautage et séance d'affiches Networking lunch and Posters Session					
No	Nom / Name	Niveau / Level	Université / University	Direction	Titre (Résumé en fin de document) Title (Abstract at the end of the document)
Environnement / Environment					
1	Divya Sharma	Postdoc	Université de Montréal	Yoshua Bengio Alex Hernandez-Garcia	AI for Automated Carbon Capture Labs
2	Victor Rincon	PhD	Université Laval	Andrew Gonzalez Guillaume Blanchet	AI for Monitoring Essential Biodiversity Variables
3	Maryam Alipourhajiagh	MSc	Polytechnique Montréal	Julie Carreau	AI for a Probabilistic U-Net Approach to Downscaling Climate Simulations
Santé / Health					
4	Léa Kaufmann	PhD	Université de Montréal	Sébastien Lemieux	AI for predicting the biological activity of chemical compounds in cancer cells
5	Julien St-Pierre	Postdoc	Université de Montréal	Marc-André Legault Mireille Schnitzer	L'IA pour l'estimation d'effets causaux en randomisation mendélienne
6	Francisco Berumen Murillo	Postdoc	Université de Montréal	Jean-François Carrier	Responsible AI for medical physics
7	Sourav Mahato	PhD	Université Laval	Steve Bilodeau Venkata K Manem	AI for Predicting Immunotherapy Response in Advanced Non-Small Cell Lung Cancer Using Imaging Features
8	Racha Soubra	PhD	Université de Montréal	Pascale Lehoux Hassane Alami	AI for Strengthening Pharmacovigilance Systems in Fragile Contexts: Evaluating the Responsible Institutionalization of the Med Safety App in Lebanon

Sciences pures et appliquées / Pure and Applied Sciences					
9	Serena Chan	MSc	Université de Montréal	Sébastien Lemieux	AI for RNA-Seq Embeddings in Transcriptomic Profiling
10	Ramzi Zidani	PhD	Université de Montréal	Audrey Laventure	AI for accelerating functional material's characterization with self-driven exploration tools
11	Borna Sayedana	Postdoc	Université de Montréal	Pierre-Luc Bacon	AI for safe sequential decision making
12	Maxime Goulet	PhD	Université de Montréal	Audrey Laventure	AI for Accelerating 3D Printing Optimization of New Polymer Materials
13	Julien Armand	MSc	Université Laval	Audrey Durand	L'IA pour la coordination
Sciences humaines et sociales / Humanities and Social Science					
14	Anne Imouza Emma Kondrup	PhD	McGill	Éric Bélanger Reihaneh Rabbany	AI for Reducing Social Disparities in AI-Powered Medical Guidance
15	Carter Teplica	PhD	Polytechnique Montréal	Lina Marsso	AI for language model personality: understanding dialect-personality interactions in post-training
16	Eddy Damaris Nono Defo	MSc	Université de Montréal	Shin Koseki	Participation citoyenne dans la gouvernance de l'IA et la mobilité: cas de la région métropolitaine de Montréal
17	Soutongnoma Safiata Kabore	PhD	Université de Montréal	Joe Nemargut Hassane Alami	IA et navigation intérieure pour les personnes déficientes visuelles : Co-conception centrée sur les besoins des utilisateurs
18	Dane Malenfant	MSc	McGill	Blake Aaron Richards	The Challenge of Hidden Gifts
19	Lesly Nzeusseu Kouamou	PhD	Université de Montréal	Pierrich Plusquellec	AI for Workplace Well-Being: Ethical Paths for Affective Computing
20	Manon Aigoin	PhD	Université de Montréal	Samuel Tanner	L'IA pour repenser la sécurité publique : usages policiers et gouvernance algorithmique

13h30 - 14h40 (1502.1)					
Présentations orales étudiantes / Student Oral Presentations					
Nom / Name	Niveau / Level	Université / University	Direction	Titre (Résumé en fin de document) Title (Abstract at the end of the document)	Secteur Sector
Doris Voina	Postdoc	Université de Montréal	Shahab Bakhtiari	AI for fast and efficient decision-making inspired from the brain	Sciences pures et appliquées Pure and Applied Sciences
Aryan Kargwal	PhD	Polytechnique Montréal	Lina Marsso Pierre-Yves Lajoie	AI for Safe and Efficient Robot Path Planning Using Formal Methods for Navigation in Dynamic Indoor Environments	Sciences pures et appliquées Pure and Applied Sciences
Aditya Sharma	PhD	Polytechnique Montréal	Amal Zouaq Christopher J Pal	AI for Reducing Hallucinations in Language Model-based SPARQL Query Generation Using Post-Generation Memory Retrieval	Sciences pures et appliquées Pure and Applied Sciences
Alireza Ghahtarani	Postdoc	HEC Montréal	Jorge Mendoza Gimenez Martin Cousineau Amir-massoud Farahmand	Press Start to Charge: AI for Videogaming the Online Centralized Charging Scheduling Problem	Sciences humaines et sociales Humanities and Social Sciences
Meghana Bhange	PhD	ÉTS	Ulrich Aïvodji	AI For Working with the Machines: Ways to Combat and Resist Algorithmic Harms with Collective Action.	Sciences humaines et sociales Humanities and Social Sciences
Amy Hwang	Postdoc	Université de Montréal	Thomas Tannou	AI for Aging and Dementia Care: Co-creating a humanistic model to support care ecosystems	Santé / Health
Joy Hutchinson	Postdoc	Université Laval	Benoît Lamarche	AI for a better understanding of dietary patterns: insights at the intersection of novel and traditional approaches	Santé / Health
Carl Munoz	PhD	Université de Montréal	Sébastien Lemieux	AI for denoising of low-depth RNA-seq data	Santé / Health

14h40 - 15h00 (Atrium)

Pause / Break

15h00 - 15h45 (1502.1)

Panel - Les défis et opportunités de la recherche collaborative
Panel - Challenges and Opportunities in Collaborative Research

Lors de cette discussion, vous apprendrez à découvrir le monde aussi fascinant que complexe de la recherche en partenariat avec l'industrie. Nos panélistes mettront ainsi en lumière les avantages mais également les défis que posent de ce type de recherche afin de vous outiller si vous considérez ce type de parcours dans votre cursus académique ou professionnel. Un regard croisé entre [Maximilien Gaudette](#) (Scientifique de données chez MoovAI et ancien étudiant Mitacs de notre écosystème), [Loubna Benabbou](#) (professeure UdeM/UQAR ayant une riche expérience avec le milieu industriel) et [Laurent Barcelo](#) (associé et CTO chez Videns)!

During this discussion, you will learn about the fascinating but also complex world of industry-partnered research. Our panelists will highlight the advantages and challenges of this type of research to help you make informed decisions if you are considering this path in your academic or professional career. A promising exchange of perspectives between [Maximilien Gaudette](#) (data scientist at MoovAI and former Mitacs student in our ecosystem), [Loubna Benabbou](#) (UdeM/UQAR professor with extensive experience in industry partnerships), and [Laurent Barcelo](#) (partner and CTO at Videns)!

15h45 - 16h00 (1502.1)

Mots de clôture et remise de prix
Closing remarks and awards ceremony

1er prix du jury Intact Corporation Financière– meilleure présentation orale (1 000\$)
2e prix du jury – meilleure présentation orale (500\$)
3e prix du jury – meilleure présentation orale (250\$)
Prix Coup de coeur du public Palais des congrès – meilleure présentation orale (500\$)
Prix Coup de coeur de l'industrie COVEO - meilleure présentation orale (1000\$)
1er prix du jury Pratt & Whitney, une société RTX - meilleure affiche (1 000\$)
2e prix du jury – meilleure affiche (500\$)
3e prix du jury – meilleure affiche (250\$)

16h00 - 18h00 (Atrium)

Cocktail de réseautage / Networking Cocktail

Résumés des présentations orales (en ordre de passage) Abstracts of oral presentations (in order of appearance)

Bloc 1 (9h25 - 10h35)

Hugo Cossette-Lefebvre

AI for Discrimination without Discriminators: Discrimination theory, AI, and the challenge of the responsibility gap

Discrimination is typically understood as a tort where a discriminator treats a discriminator worse than others or negligently disadvantages members of a given group through a particular practice. However, the rise of algorithmic decision-making complicates this understanding. In some cases, there is a responsibility gap in that some seem to be wrongfully discriminated against by an AI system, and yet no human decision-maker can be held morally responsible for the system's impact. In response, I argue that discrimination law must be extended to cover more structural instruments to tackle wrongful discrimination, including consumer protection, product safety norms, and products liability.



Andreea Musulan

AI for Electoral Manipulation

To what extent was coordinated activity on X malicious during the 2025 Canadian federal election? Using network analysis of user behavior and the misinformation detection tool developed by our research team, we investigate coordinated efforts to spread disinformation on current key Canadian issues, such as international relations and controversies involving politicians. This descriptive snapshot of Canadian electoral politics will yield insights that have consequences for policy development during and in preparation for democratic elections. Our data collection and analysis pipeline could also be applied in real time to flag potential manipulation attempts as they emerge.



Albina Tskhay

AI for Automated Causal Language Detection: Integrating Topic Modeling with Causal Claims Analysis

Accurate detection of causal language is critical for evaluating scientific claims, yet manual annotation is labor-intensive. We developed an automated approach using TF-IDF with L1-regularized logistic regression to identify causal statements in microbiome research, achieving accuracy comparable to human reviewers with minimal training data. Applied to over 20,000 abstracts (2015-2025), the model revealed shifting trends in causal language use across subfields. This scalable method enables systematic monitoring of how causal claims shape scientific discourse. Beyond methodological advances, it raises social issues around accountability, transparency, and the risk of overinterpreting causal claims in evidence-based decision-making.



Roxana Pena Mendieta

AI for analyzing the evolution of code for digital arts

The use of algorithms and technologies to create art has been increasing over the last 30 years, giving rise to an entire field known as “digital arts”. Like any artwork, the need to preserve it arises, since it is part of our cultural and software heritage. As programming and technology constantly evolves, the process of collecting and preserving digital artworks becomes a major challenge. In this work, we collect a large corpus of source code in digital art from the last two decades. We aim to analyze this extensible collection and categorize the different art practices using AI-based solutions.



Konur Tholl

AI for Augmenting Decision-Making in Autonomous Cyber Operations

With the vast and ever evolving cyber attack space, people are not able to manually defend systems. To address this, researchers train AI models to act as autonomous defenders. Training these models is challenging, because they typically have to start from scratch, which can require substantial time and resources. Our work explores how large language models - the same kind of AI behind modern chatbots - can be used to train these autonomous defenders more efficiently. We show that integrating a large language model can improve early performance of these autonomous defenders and reduce the training time needed to make effective decisions.



Sevinj Yolchuyeva

AI for Predicting Immunotherapy Response in NSCLC Using Collagen Signatures from Digital Pathology



Immune checkpoint inhibitors (ICIs) have greatly altered the therapeutic options for lung cancer patients with superior efficacy and improved tolerability over standard regimens. With the growing utilization of immune checkpoint inhibitors, there is an urgent clinical need to discover biomarkers that can precisely identify patients based on PD-L1 expression and forecast individual outcomes such as progression-free survival (PFS). The current study aims to determine tumor micro-environment derived biomarkers for PD-L1 and PFS by utilizing whole slide imaging

(WSI) profiles and employing Artificial Intelligence approaches.

Bruno Joyal

AI for DNA-encoded libraries

My research uses artificial intelligence to create better DNA-encoded libraries (DELs), powerful tools for drug discovery. DELs link tiny DNA “barcodes” to chemical compounds, allowing scientists to screen huge collections for promising drug candidates. With generative AI, we can design DELs that are more diverse and effective, helping researchers explore chemical space more efficiently. This approach speeds up the discovery process, reduces costs, and opens new possibilities for developing future medicines.



Mael Charpentier

AI for Optimal Sensor Placement in Urban Environmental Monitoring



Statistics Canada reports rapid urban population growth accompanied by increasing environmental challenges. To boost climate resilience and population well-being, decision-making for urban green-space planning should be guided by environmental indicators. However, environmental data collection is constrained by the high cost of sensors, making full coverage unattainable. Our research therefore focuses on determining the optimal placement of sensors that enables reliable extrapolation to uncovered areas, and

is both robust and adaptable, allowing timely adjustments to maintain data relevance. This work showcases our methodology on a case study of the Parc Jean-Drapeau.

Vihotogbé Houssou

AI for Spatial pattern regression for gridded meteorological data

The project introduces a novel method for generating high resolution gridded meteorological data to support impact studies in the context of climate change. By integrating multiple statistical techniques within a unified modelling framework, it ensures precision in data production. Its framework guarantees the consistency of spatial information between the past and the future in hydrological modelling. It is applied in different watershed contexts (low or high station density, small or large watershed, mountainous or non-mountainous region) and the results are compared to those obtained with existing methods.



Pascal Archambault

AI for The Farm of Tomorrow - Digital Twins for Agriculture

For millennia, agriculture was subject to the outside world: weather and soil quality were drivers of productivity. With the advent of the Internet of Things and sensor technologies, Controlled Environment Agriculture has enabled the growth of crops indoors, making growth independent to the outside world. However, these indoor farms necessitate complex control of the crop and its environment, which require understanding characteristics that previously could not be controlled as precisely, such as the sun, nutrients, and water. To understand how to control such environments and their impact on crops, Digital Twins enable the exploration of potential configurations to improve yield.



Annie Desmarais

L'IA pour guider les cliniciens face à la complexité des cas

Le moteur d'intelligence artificielle développé dans ce projet vise à soutenir les cliniciens en santé mentale dans leur prise de décision, particulièrement lorsqu'ils sont confrontés à des situations complexes ou ambiguës. En analysant des données cliniques variées (symptômes, trajectoires, contextes), l'IA peut aider à mieux comprendre les profils des patients et à proposer des pistes d'intervention. L'objectif n'est pas de remplacer le jugement humain, mais de le soutenir pour améliorer l'efficacité et la qualité des services. Ce projet soulève des enjeux importants liés à l'éthique, à la transparence des algorithmes et à l'équité d'accès à des soins personnalisés et de qualité.



Catherine Bédard

L'IA pour transformer la profession infirmière

Au Québec et ailleurs dans le monde, les infirmières sont souvent mises à l'écart des projets de transformation numérique. Or, nous avons besoin d'elles pour améliorer les soins et adopter l'IA en santé. Ainsi, notre projet de recherche vise à explorer l'impact de l'IA sur les rôles, identités professionnelles et dynamiques de travail des infirmières afin de guider les gestionnaires et décideurs vers des pistes d'action concrètes qui permettront d'adresser l'enjeu d'acceptabilité sociale.



Jérémy Briand

L'IA pour l'amélioration des modèles en sciences du sport et de l'exercice : faire le pont entre le raisonnement inductif et déductif

La multidisciplinarité en sciences de l'exercice entraîne une diversité des données collectées et de leurs analyses, introduisant certains biais et ralentissant autant l'avancement des connaissances que la collaboration interdisciplinaire. L'IA permet d'exploiter des volumes inédits de données et, via le raisonnement inductif, d'identifier des tendances s'intégrant aux cadres théoriques. Le raisonnement déductif permet itérativement d'améliorer la précision, la représentativité et la généralisabilité des modèles théoriques.



Pour appliquer ce processus aux sciences de l'exercice, une gestion optimisée des données et un raisonnement scientifique rigoureux sont essentiels. Cette présentation fournit des lignes directrices pour orienter l'utilisation de la modélisation dans ce domaine.

Théo Guyard

L'IA pour la collecte de débris spatiaux



SCORPION (Sequencing via Combinatorial Optimization for Rendezvous Planning and Intelligent Orbital Navigation) est un projet porté par la NASA visant à construire un planificateur de mission pour ramasser des débris en orbite à grande échelle avec une flotte de satellites collecteurs. Différents facteurs (grande dimension, débris en mouvement, ...) rendent ce problème extrêmement complexe. Combiner des méthodes d'Intelligence Artificielle et de Recherche Opérationnelle semble une voie

toute tracée pour construire un plan de mission minimisant le carburant dépensé, le temps de vol total, ainsi que le nombre de satellites collecteurs impliqués.

Sophie Morin

L'IA pour le génie mécanique

Comment un ingénieur sait-il comment va fonctionner une structure ou un mécanisme avant de le construire en vrai ? La réponse évidente, c'est qu'il fait un calcul ou une simulation à l'ordinateur, mais comment vérifier la fondation mathématique du logiciel pour justifier avoir confiance aux résultats ? Question qui se demande de plus en plus vue l'adoption des techniques d'apprentissage automatique chez le génie. Je soulignerai la raison pour laquelle une des telles techniques a souvent de la difficulté à atteindre une solution précise, et l'idée clé de l'amélioration que je développe avec mes collaborateurs.



Ovide Kuichua

L'IA pour le traitement automatique des réponses courtes



Nous développons des méthodologies qui permettent aux systèmes d'intelligence artificielle de corriger automatiquement des réponses courtes avec la même fiabilité qu'un enseignant, à partir de très peu de données et sans coûteux entraînements supplémentaire. En combinant intelligence artificielle, linguistique computationnelle et psychométrie, notre approche délivre rapidement des notes cohérentes et transparentes, même pour des classes géantes dépassant le millier d'étudiants. Applications : réduction drastique du temps de correction, feedback instantané aux étudiants, soutien aux cours en ligne massifs, secours aux écoles sous-dotées où la surcharge des évaluations retarde le calendrier universitaire... Enjeu sociétal majeur : soutenir l'enseignement mondial, démocratiser l'accès à une évaluation équitable.

Pierre-Louis Lemaire

L'IA pour la projection haute résolution des précipitations sous réchauffement climatique

La modélisation climatique de haute résolution, permettant d'anticiper l'évolution des événements météorologiques extrêmes (e.g., pluies torrentielles), est extrêmement coûteuse en ressources de calculs. Il en résulte une disponibilité limitée de simulations, incluant seulement certains scénarios d'émissions de gaz à effet de serre. Ce projet vise à émuler par l'IA, la simulation long terme des précipitations à haute résolution sur le Québec. Nous observons que les performances des modèles d'IA se dégradent lorsqu'évalués dans un climat sous réchauffement climatique. Nous proposons en conséquence d'y intégrer des connaissances issues des sciences atmosphériques afin d'améliorer la robustesse de leurs projections sous réchauffement climatique.



Maïka Lamoureux

L'IA pour la modélisation intégrée des événements extrêmes

Les changements climatiques sont des enjeux complexes qui exigent des approches interdisciplinaires. Les modèles d'évaluation intégrée (MEIs), tels qu'AD-MERGE, permettent d'analyser les politiques climatiques et de générer divers scénarios. Toutefois, ils demeurent limités par de fortes incertitudes. Les méthodes classiques pour intégrer l'incertitude (analyses de sensibilité, Monte Carlo, LHS) offrent des repères, mais ignorent souvent les événements extrêmes rares (« black swans »), comme un basculement de la circulation thermohaline. Nous visons à explorer comment l'intelligence artificielle pourrait aider à mieux considérer de tels événements extrêmes.



Aude Marie Marcoux

L'IA pour le bien - Collecte et partage de données personnelles via téléphones intelligentes : résultats d'une délibération citoyenne

Qu'est-ce qui est acceptable (ou non) en matière de collecte et de partage de données personnelles recueillies sur le téléphone intelligent des individus par des SIA? Pour répondre à cette question encore trop peu investiguée, la méthode de la délibération citoyenne sera mobilisée comme choix épistémologique et méthodologique dans le cadre de cette recherche qualitative et inductive menée auprès d'un groupe de citoyens diversifiés. Les recommandations citoyennes issues de ce projet viseront à légitimer, dans le contexte sociétal du Québec, des dispositions politiques et légales, mais aussi des directives pour le secteur privé, liées au principe de la protection de la vie privée des citoyens face à l'intrusion des SIA.



Bloc 3 (13h30 - 14h40)

Doris Voina

AI for fast and efficient decision-making inspired from the brain



While many applications in science and technology require precise, rigorous AI, in other cases quick, approximate estimates are more practical—and sometimes even preferable. Humans excel at using heuristics that enable fast, intuitive judgments until more deliberate reasoning is needed. This duality between rapid, intuitive thinking (System 1) and slow, analytical thinking (System 2) is well described in Daniel Kahneman's "Thinking, Fast and Slow". Our work investigates how to implement such fast versus slow learning in AI by testing

architectures and principles that could yield energy-efficient, heuristic reasoning alongside more systematic, deliberative cognition.

Aryan Kargwal

AI for Safe and Efficient Robot Path Planning Using Formal Methods for Navigation in Dynamic Indoor Environments

Indoor navigation must remain safe and efficient even when layouts shift or people move unpredictably. Our framework combines probabilistic scene graphs, formal conformance testing, and learning-assisted planning to achieve this. Missions and rules are expressed as temporal-logic specifications and monitored at runtime, allowing unsafe actions to be corrected through shielded replanning. A logic-based heuristic provides guarantees, while a semantic heuristic improves responsiveness. The system adapts to door

state changes, crowd movement, and uncertain object presence. Beyond performance, it addresses social concerns of trust, safety, and human comfort by ensuring that robots behave responsibly in shared environments.



Aditya Sharma

AI for Reducing Hallucinations in Language Model-based SPARQL Query Generation Using Post-Generation Memory Retrieval



Natural language to SPARQL translation is essential for unlocking efficient and accurate access to knowledge graphs (KGs). While large language models (LLMs) are widely used for this task, they often hallucinate or produce out-of-distribution errors when generating KG elements such as URIs. These plausible but incorrect outputs create major barriers for deploying LLMs in real-world information retrieval. In this talk, I will present PGMR (Post-Generation Memory Retrieval), a modular framework that augments LLMs with

non-parametric memory for precise KG element retrieval. Experiments demonstrate that PGMR reliably reduces errors and, in many cases, nearly eliminates URI hallucinations.

Alireza Ghahtarani

Press Start to Charge: AI for Videogaming the Online Centralized Charging Scheduling Problem

We study the online centralized charging scheduling problem, where electric vehicles (EVs) arrive dynamically and must be charged within capacity and time constraints. To address this, we reformulate the problem as a gamified environment inspired by video game mechanics, where charging blocks are placed sequentially under temporal and capacity limits. This gamification reduces model complexity, improves generalization, and enables learning through local movement actions. We design heuristics and develop a neural agent trained with supervised learning and Dataset Aggregation. Experiments demonstrate that gamified learning significantly enhances load balancing and robustness compared to vector-based approaches across various EV arrival scenarios.



Meghana Bhange

AI For Working with the machines: Ways to Combat and Resist Algorithmic Harms with Collective Action



Algorithms deployed in our everyday life also come with the potential of causing harm. Our project explores how users, by coming together and strategically coordinating their actions, can mitigate these harms. We explore strategies under Algorithmic Collective Action, Protective Optimisation Technologies, and Response From Below, focusing on ways communities can improve and contest algorithmic decisions. These include auditing AI outputs in everyday life, opting out of harmful decision-making, and collective interventions and recourse strategies. This can empower communities to regain their agency in digital spaces.

Amy Hwang

AI for Aging and Dementia Care: Co-creating a humanistic model to support care ecosystems

Technological developments in aging and dementia care are increasingly integrating AI (e.g., smart homes, care robots, intelligent wheelchairs). While ethical debates often focus on privacy, consent, bias, and equity, the relational nature of care necessitates inquiry into how AI may influence, or be influenced by dynamic, socio-technical care ecosystems. Using co-creation workshops, our working group of 13 researchers, clinicians, and lived experience experts co-created a set of AI AgeTech personas and scenarios, and a guiding model for designing humanistic AI AgeTech innovation. AI agents may become actors in care ecosystems and influence how care roles, relationships, and arrangements are negotiated.



Joy Hutchinson

AI for a better understanding of dietary patterns: insights at the intersection of novel and traditional approaches



How people eat is complex. In research, complexity is often sacrificed in favour of interpretability, like commonly used diet quality scores. Artificial intelligence offers the potential to explore the complexity of how people eat but may not be as interpretable. This study combined two methods: a diet quality score and artificial intelligence, to explore how dietary patterns differ by socioeconomic status among adults in Québec. Combining approaches provided novel insights into dietary patterns that were interpretable and preserved complexity. This approach could be applied to develop better targeted policies and programs to improve nutritional well-being and health in Québec.

Carl Munoz

AI for denoising of low-depth RNA-seq data

RNA sequencing is a powerful but expensive technology. Reducing the sequencing depth decreases the price, but it also decreases the data quality. As such, we are developing machine-learning-based denoising models to increase data quality while maintaining lower costs. Currently, we have developed a neural network that denoises low-depth RNA-seq and recovers most information lost. We are also developing a Bayesian normalizing-flow-based framework as an additional method that better captures uncertainty caused by depth reduction. This research has the potential to change RNA-seq standards by reducing costs for all applications, including data acquisition or individual costs for personalized medicine.



Résumés des présentations par affiche Summary of the poster presentations

Environnement / Environment

1 - Divya Sharma

AI for Automated Carbon Capture Labs



Combating climate change with carbon-capture technology increasingly requires high-throughput experimentation, where synthesis and testing have become bottlenecks. Self-driving autonomous labs can play a huge role in accelerating scientific discovery by automating the human-intensive tasks, as well as proposing new experiments. We present our work on optimizing the efficiency of Gas Diffusion electrodes (GDEs) using the AdaCarbon automated laboratory. We deploy a physics

aware Gaussian Process model and a DL computer vision to learn from the

multi-modal data generated by the experimentation loop. The predictions from these models are used to propose new experiments and traverse the multi-dimensional parameter space.

2 - Victor Rincon

AI for Monitoring Essential Biodiversity Variables

The project aims to establish a reference framework for monitoring Essential Biodiversity Variables (EBVs) using AI and remote sensing, integrating empirical plot data with high-resolution imagery. Algorithms such as Random Forest, CNNs, and Deep Learning will be applied to estimate EBVs across multiple levels (genetic, population, community, trait, and ecosystem), trained and validated with Barro Colorado Island's long-term tree census and remote sensing records. Expected outcome is a reproducible and scalable system that standardizes EBVs measurement, strengthens global biodiversity monitoring capacity, and supports conservation science and policy decision-making by bridging empirical data and remote sensing with AI-driven modeling.



3 - Maryam Alipourhajiagha

AI for a Probabilistic U-Net Approach to Downscaling Climate Simulations



Climate models are limited by heavy computational costs, often producing outputs at coarse spatial resolutions, while many climate change impact studies require finer scales. Statistical downscaling bridges this gap, and we adapt the probabilistic U-Net for this task, combining a deterministic U-Net backbone with a variational latent space to capture aleatoric uncertainty. We evaluate 4 training objectives, afCRPS and WMSE-MS-SSIM with 3 settings for downscaling precipitation and temperature from 16× coarser resolution. Our main finding is that WMSE-MS-SSIM performs well for extremes under certain settings,

whereas afCRPS better captures spatial variability across scales.

4 - Léa Kaufmann

AI for predicting the biological activity of chemical compounds in cancer cells

Predicting in silico the effect of existing compounds on cancer cells can enable efficient virtual screening of candidate therapeutics. We develop a deep neural network predicting the expression profile of a treated target cell line given four modalities in input: (1) an embedding of the compound's structure, (2) an embedding of a reference cell line, (3) the expression profile of the reference line treated with the same compound, and (4) an embedding of the target cell line. The embeddings will be derived from open-source foundation models. The prediction validation will be facilitated, as no de novo synthesis will be necessary.



5 - Julien St-Pierre

L'IA pour l'estimation d'effets causaux en randomisation mendélienne



La randomisation mendélienne est une approche largement utilisée pour comprendre l'étiologie des maladies et pour le développement de médicaments. L'objectif de ce projet de recherche est d'identifier les variables génétiques qui induisent une hétérogénéité dans la réponse à certains traitements et médicaments, afin d'identifier des sous-groupes de patients susceptibles de bénéficier le plus d'un traitement donné ou présentant un risque accru d'effets indésirables, améliorant ainsi l'efficacité des traitements tout

en minimisant les risques potentiels.

6 - Francisco Berumen Murillo

Responsible AI for medical physics

Medical physics is a specialized discipline that applies physics to medicine, covering diagnostic and therapeutic procedures. In clinical settings, medical physicists ensure the safe and accurate use of radiation, such as in medical imaging and radiation therapy. Artificial intelligence (AI) is rapidly transforming the field, and its evaluation and integration in radiation-based applications is a key responsibility of the medical physics team. Responsible development, including early involvement of medical physicists in the design of AI tools, as well as uncertainty quantification, model explainability, fairness assessment, and robust reporting, is essential to ensure AI enhances patient care without compromising clinical standards.



7 - Sourav Mahato

AI for Predicting Immunotherapy Response in Advanced Non-Small Cell Lung Cancer Using Imaging Features



Lung cancer is the leading cause of cancer-related deaths worldwide. While immunotherapy has revolutionised treatment, only a small proportion of patients benefit from it. Our project aims to address this issue by using artificial intelligence (AI) to predict which patients with lung cancer will respond to immunotherapy. By analysing CT scans, we aim to identify new imaging-based features beyond current standards. This could help doctors better match patients to the right treatments, improving outcomes and avoiding unnecessary side effects.

However, to ensure true precision medicine, challenges such as data variability and fairness must be addressed in AI healthcare.

8 - Racha Soubra

AI for Strengthening Pharmacovigilance Systems in Fragile Contexts: Evaluating the Responsible Institutionalization of the Med Safety App in Lebanon

This project explores how artificial intelligence (AI) can support safer use of medicines in fragile health systems like Lebanon's. It focuses on the Med Safety app, a digital tool designed to help patients and health professionals report side effects of medications. The study examines how such tools can be responsibly integrated into existing systems - considering challenges like public trust, digital inequalities, and ethical use of data. By identifying the conditions needed for successful and fair adoption, the project aims to strengthen health surveillance and promote safer, more transparent healthcare for all.



Sciences pures et appliquées / Pure and Applied Sciences

9 - Serena Chan

AI for RNA-Seq Embeddings in Transcriptomic Profiling

Gene embeddings capture co-expression patterns from RNA-seq data, enabling deep neural networks to model gene functions and regulation. This project compares the use of raw expression values with ranking-based embeddings, inspired by natural language processing, across tasks including cell line identification and masked token pretraining. Preliminary results show similar performance for identification, while expression profiles outperform ranked embeddings in masked pretraining, with largest errors at mid-ranked genes. Ongoing work will evaluate downstream tasks and explore hybrid architectures to integrate both representations, aiming to capture complementary transcriptomic features and improve prediction accuracy across tasks throughout precision medicine and drug discovery.



10 - Ramzi Zidani

AI for accelerating functional material's characterization with self-driven exploration tools



This work tackles the challenge of efficiently characterizing low-dimensional and complex 2D/3D materials, such as carbon nanotubes and polymer blends, which are vital for next-generation electronics and photonics. Traditional methods to study these materials are slow and limited, but the team's hyperspectral imaging systems capture both spatial and spectral data quickly over large surfaces. By integrating self-driving lab approaches with AI-based navigation and feature recognition,

these tools could drastically speed up innovation in nanotechnology, renewable energy, and smart devices. Societal impacts include more sustainable innovation, improved device performance, and the democratization of high-throughput material analysis beyond specialized laboratories.

11 - Borna Sayedana

AI for safe sequential decision making

We study the concentration of cumulative rewards in Markov Decision Processes (MDPs) in both asymptotic and non-asymptotic settings. We present a unified framework covering infinite-horizon (average and discounted rewards) and finite-horizon scenarios. Our asymptotic results include the law of large numbers, central limit theorem, and law of iterated logarithms, while non-asymptotic bounds involve Azuma-Hoeffding-type inequalities and a finite-sample law of iterated logarithms. These findings provide rigorous tools for reinforcement learning and decision-making in high-stakes applications, including safety-critical systems, financial markets, and healthcare, where understanding reward/cost concentration is crucial.



12 - Maxime Goulet

AI for Accelerating 3D Printing Optimization of New Polymer Materials



This project explores how artificial intelligence (AI) can accelerate the optimization of 3D printing for plastic-like materials, such as (poly)caprolactone (PCL). Traditionally, determining the best printing settings for a new material requires slow, repetitive experimentation. Instead, we trained AI models on hundreds of printed samples to predict optimal parameters. This approach helps researchers and industries adopt novel, sustainable materials more quickly, reducing development time, cost, and waste. By streamlining the trial-and-error process, our project shows how AI can support greener innovation and responsible

manufacturing, highlighting its growing role in accelerating scientific discovery and driving sustainable technological progress.

13 - Julien Armand

L'IA pour la coordination

Le déploiement croissant d'agents autonomes (recommandation, tarification dynamique, trading) soulève un défi majeur : ces agents apprennent de l'environnement sans toujours tenir compte des autres. Pour être optimaux, ils doivent pourtant se coordonner implicitement. Mon projet modélise ces interactions par la théorie des jeux pour identifier quand la coordination émerge ou échoue. Cette dynamique des systèmes multi-agents influence des domaines clés : elle peut optimiser l'investissement équitable et écoresponsable ou encore améliorer la diversité et la qualité des contenus, mais elle peut aussi engendrer des risques systémiques, tels que l'instabilité financière ou la collusion sur les marchés.



14 - Anne Imouza / Emma Kondrup

AI for Reducing Social Disparities in AI-Powered Medical Guidance



With the rapid progress of Large Language Models (LLMs), the general public now has easy and affordable access to applications capable of answering most health-related questions in a personalized manner. However, evaluations that fuel these motivations highly lack insights into the social nature of healthcare. We provide an analysis of LLM answers to a series of medical questions spanning key clinical domains, where we simulate these questions being asked by several patient profiles. Our results show that LLMs generate

responses that systematically differ between social groups. Particularly, indigenous and intersex patients receive advice that is less readable and more complex.

15 - Carter Teplica

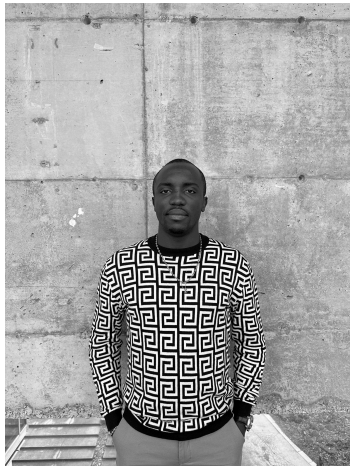
AI for language model personality: understanding dialect-personality interactions in post-training

An important but understudied perspective is that of language model personality: how can we ensure that models have desirable "personality" traits like agreeableness, curiosity, and ethical integrity? We fine-tune language models on 2 new datasets of low-level vocabulary differences between regional English dialects, and then evaluate the models on several personality and regional identity characteristics. In most cases, models show strong biases towards region-consistent behavior: e.g., models tuned on British English answer demographic questions similarly to humans from Britain. We discuss implications for broader questions about model personality and training dynamics.



16 - Eddy Damaris Nono Defo

Participation citoyenne dans la gouvernance de l'IA et la mobilité: cas de la région métropolitaine de Montréal



Dans un contexte où l'IA transforme les pratiques de planification et de gestion de la mobilité urbaine, de nouvelles politiques émergent pour encadrer ces changements. Si celles-ci visent à répondre aux défis liés à la mobilité, elles soulèvent également divers enjeux. En particulier, elles reposent largement sur des approches technocratiques, i.e. fondées principalement sur l'expertise technique, les données et les solutions technologiques. Or, ces politiques ne répondent pas toujours aux besoins réels des citoyen(ne)s, qui sont pourtant directement concernés.

Ces derniers sont souvent peu ou pas représentés dans les processus décisionnels. Face à cette situation, cette recherche propose de décrire les utilisations actuelles de l'IA dans la mobilité, puis d'identifier les acteurs impliqués dans la gouvernance de l'IA et la mobilité, pour enfin recenser les leviers qui faciliteraient la participation citoyenne dans cette gouvernance.

17 - Soutongnoma Safiata Kabore

IA et navigation intérieure pour les personnes déficientes visuelles :

Co-conception centrée sur les besoins des utilisateurs

Cette étude vise à co-concevoir une technologie de navigation intérieure inclusive pour les personnes ayant une déficience visuelle (PDV) au Canada. Par une approche qualitative, participative et phénoménologique, quatre phases ont permis d'identifier les besoins prioritaires : groupes de discussion, ateliers de co-crédation, simulations réelles et validation technique. L'analyse thématique a révélé quatre enjeux majeurs : accessibilité physique et numérique, sécurité de navigation, protection des données. Les participants ont exprimé le besoin de systèmes adaptatifs et personnalisables. L'étude souligne l'importance d'impliquer les PDV comme co-concepteurs pour garantir des solutions dignes, sécuritaires et véritablement accessibles.



18 - Dane Malenfant

The Challenge of Hidden Gifts



The Challenge of Hidden Gifts shows why AI often fails to cooperate. In a simple game, each player can unlock their own door for a small reward, but the bigger reward is only received if everyone succeeds. This requires dropping a shared key; an unobservable act that benefits others. Most methods failed to learn this hidden act of cooperation. However, by remembering past actions and how their actions influence another player's learning, success was possible. Applications include

robotics and logistics where communication is not viable, but risks arise if AI systems share dangerous resources instead of benign ones.

19 - Lesly Nzeusseu Kouamou

AI for Workplace Well-Being: Ethical Paths for Affective Computing

Affective computing, the ability of AI systems to recognize and interpret human emotions, is increasingly being introduced in workplaces to support employee well-being, improve communication, and assist in stress management. Yet, these technologies raise critical ethical questions. How do we ensure privacy when emotions are tracked? How do we prevent bias when algorithms interpret complex human states? This presentation explores the potential benefits of affective computing for healthier workplaces while highlighting the ethical principles - fairness, transparency, and respect for autonomy - that must guide its responsible use. It invites reflection on building trust between humans and emotionally intelligent machines.



20 - Manon Aigoïn

L'IA pour repenser la sécurité publique : usages policiers et gouvernance algorithmique



L'intelligence artificielle transforme progressivement la sécurité publique. Pourtant, l'utilisation d'outils algorithmiques dans les services policiers pose des questions majeures : biais, transparence, responsabilité humaine. Mon projet de recherche analyse comment ces technologies sont mises en œuvre dans les pratiques policières au Québec. Il vise à comprendre les écarts entre les intentions politiques, les discours sur

l'innovation et les usages réels sur le terrain. L'objectif : proposer des recommandations concrètes pour encadrer ces outils, prévenir les dérives, et renforcer la confiance citoyenne. Ce travail contribue à une gouvernance plus éthique et responsable de l'IA en sécurité publique.