APPLIED AI INSTITUTE CONCORDIA

ACTIVITIES 2022 - 2025

AI2

CONTENTS

1 INTERDISCIPLINARY, VALUES-DRIVEN INSTITUTE

2 ENGAGED LEADERSHIP

3 DISTRIBUTED RESEARCH

4 EQUITY AND JUSTICE

5 PUBLIC INTEREST SCHOLARSHIP

6 INTERDISCIPLINARY IN THEORY AND PRACTISE

7 APPENDIX

EXECUTIVE SUMMARY

The Concordia Applied AI Institute (AI2) is a multi-disciplinary applied research unit representing more than 120 Faculty members and their graduate students from the 4 Concordia University Faculties: Arts and Science, Fine Arts, Gina Cody School of Engineering and Computer Science, and John Molson School of Business.

AI2 affiliate researchers are currently organized into 3 multi-disciplinary, overlapping clusters:

AI & Science

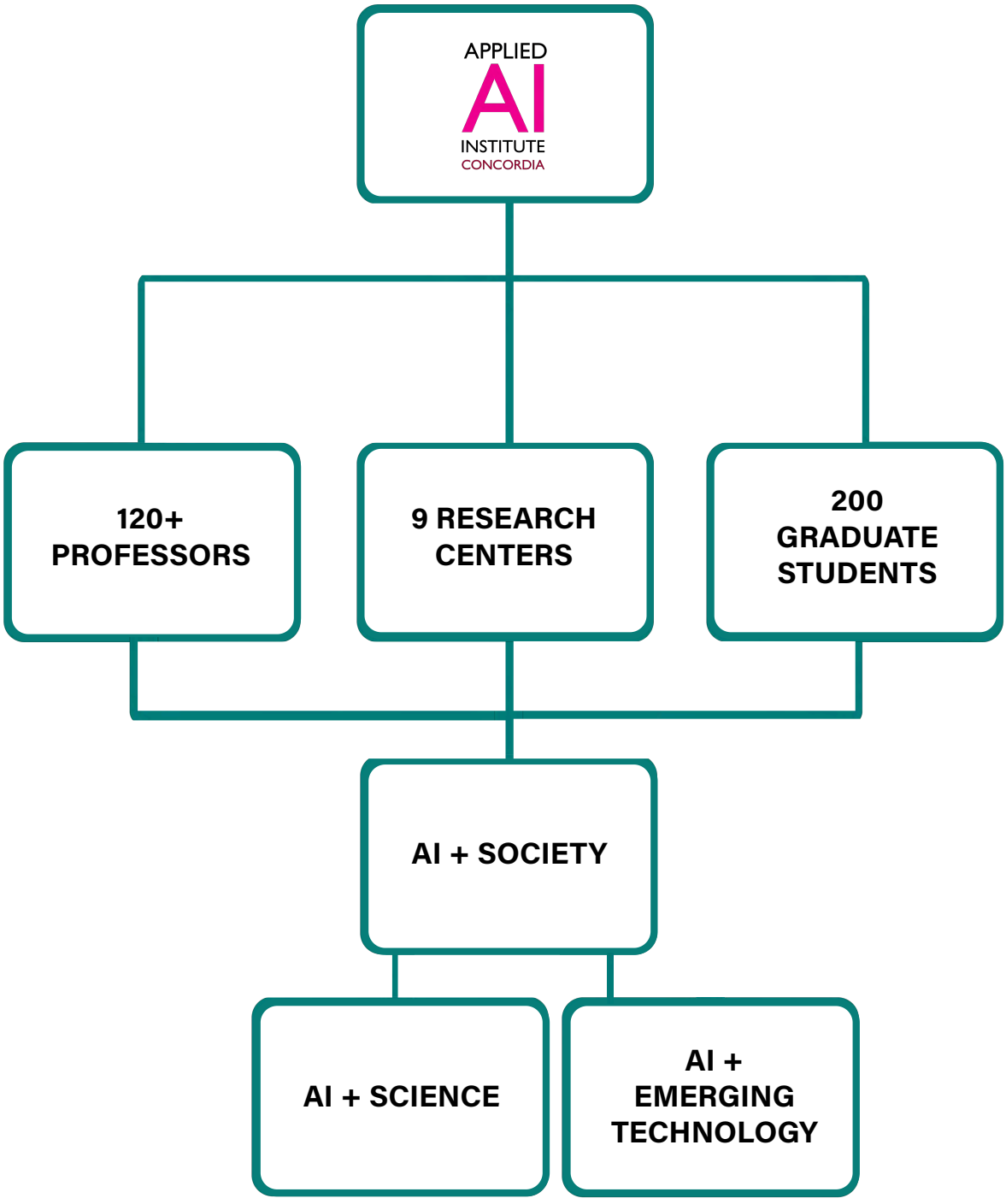
AI & Technology

AI & Society

Through these clusters, researchers investigate cross-discipline AI applications in fields as diverse as supply chain planning (Dr. Contardo), antimicrobial peptides (Dr. Mansbach), smart buildings and cities (Dr. Eicker, Dr. Amayri, Dr. Liu), robotic surgery (Dr. Rivaz), synthetic biology (Dr. Shih), software engineering (Dr. Chen), and AI & Humour (Dr. Bobker).

This report introduces you to the range of initiatives and research undertaken by our staff, affiliate researchers, graduate students, as well as our community and industry partners. We are thrilled to showcase what we've been up to in our short history as an institute.

AI2 CLUSTERS



NOTE FROM CO-DIRECTOR

Our Institute started over a little over three years ago to secure Concordia University's place in Montreal and Canada's fast moving AI ecosystem. I am happy to report that we have accomplished that goal, moving from a promising opportunity set forward by our Founding Directors to an Institute growing in scope and reputation everyday.

There is no manual for creating an AI Institute especially finding Concordia's own place. No small task as AI has gone in these three years from an emerging research area to perhaps the defining research subject of our times. The Institute started before ChatGPT made AI a topic of daily conversation. Our success demonstrates our team's excellence to navigate these opportunities while defining our own unique contributions.

Our initial guide was the name itself, the Applied AI Institute. Our Institute has distinguished itself by, as we say at Concordia, getting our hands dirty. Other Institutes approached the theoretical challenges of artificial intelligence, dabbling in more existential questions, but our work has been always about the space between abstract models and real-world applications.

Applied AI is interdisciplinary AI. One of Concordia's strengths is our ability to work together and that reflects in the Institute ourselves. Our leadership is shared between two faculties. Our staff comes from community research, computer science, neuroscience, and cultural studies. AI's worldly encounter demands such a diverse approach because solutions are not merely technical, as we have all learned after ChatGPT.

Responsible AI has become a cornerstone of the Institute because of our interdisciplinary approach. Our technical research team, one of our many growth areas, is distinguished because of its open-mindness and engagement with our other projects such as our work on Feminist AI, Affecting Machines, that offers guidance on ethical design or how many women and queer figures have shaped the foundations of Computer Science. These engagements, discussions about how to build AI responsibly, define our impact research and distinguish our applied approach in such a fast-moving field.

Impact research has become a core part of the Institute's mission. The demand for applied AI has created a unique research opportunity to match governments, firms, non-profits with the Institute and Concordia's talent. Applying AI is the research opportunity and in our short time we have delivered major projects to build, deploy and upskill organization on AI solutions while training our graduate students and creating new opportunities for Concordia's faculty. In a short time, we have built a model of impact research with an impressive internal team with a strong success record that both helps accelerate responsible AI adoption in Quebec and Canada. But the Institute's work extends beyond our success in impact research.

Our Institute enhances capacity to do AI research to all Concordians. We co-organize events, sponsor working groups, and support our faculties grant applications, all to ensure that we accelerate AI research across all four faculties. Our technical research team has helped faculty integrate AI into their research projects, letting researchers drawn on our expertise to deliver results. We are not simply trying to boost AI, but aware of its social impacts, trying to find meaningful opportunities as well as support critical work questions how AI might perpetuate the status quo. Our knowledge mobilization has convened critical conversations about policy, AI and society at the same time helping advance discussions on the links between AI and sustainability. We brought our community to meaningfully discuss AI, no small feat when the topic seems to change daily.

We have tried to advance values-based research at the Institute too. Our efforts to work in public sector AI applications comes from a belief in the values-fit. Concordia is a public interest institution that can help governments enhance delivery of public benefits. We have worked closely with community organizations and tried to advance AI literacy in Montreal. These efforts demonstrate our broad approach to AI, knowing that sometimes people don't have a choice when AI is applied and that we seek to enhance the technologies governance and social benefits.

The Institute over the years have kept five loose guiding principles:

Distributed Research that considers collaboration, mutual aid, and academic freedom as drivers of success

Equity and Justice acknowledging that bias is structural as well as statistical

Inter-disciplinarity in theory and practise, knowing that data is social and technical

Public Interest scholarship to ensure that AI improves, not entrenches the status-quo

Engaged Leadership caring for AI's community and consequences

These principles become the chapters of this annual report, well tri-annual report. We show each of these values defined our work, our efforts, and our success. The Institute is a strong, capable research engine at Concordia. Our work in Impact Research, Internal Research Services and Values-Based Research act as a driver for AI research success at Concordia. Our values continue to guide our work. Most importantly our team is remarkable and a resource that we hope Concordia will count on for years to come.

Fenwick McKelvey

Associate Professor in Information and Communication Technology Policy in the Department of Communication Studies

MANAGER REPORT

The Applied AI Institute has solidified its role as a leader in applied, responsible AI. With over $6.25M in secured funding from research grants, service contracts, and educational programs, the Institute has proven its capacity to translate academic drive into real-world impact.

Key achievements include the continued success of our AI Adoption Team launched through initial $850K in service offers towards AI adoption in the Quebec public sector; the development of a multiyear $3.6M research partnership funding strategy aimed at building links between Concordia research and Quebec industry ; and a growing partnership with the Concordia Center for Continuing Education (CCE) and Ericsson, which led to co-designed training programs delivered by 12 Concordia researchers with support by 18 graduate students. A further pan-Canadian training program in partnership with Bold New Edge, CCE, and the federal supercluster Digital is now underway.

Beyond financial growth in emerging partnerships, the Institute has contributed to redefining how Concordia engages with government, and civil society as it relates to AI as an emerging social paradigm. We have supported critical AI frameworks both here in Montreal through embedding Responsible AI principles across our offerings. Our work with organizations such as the Global Index on Responsible AI and the Media Journalism Research Center confirms our leadership in ethical innovation.

The Applied AI Institute is not a future promise; it is a proven engine of innovation. With strategic reinforcement, we are confident in our ability to triple our industry footprint and position Concordia as a global hub for applied, ethical AI.

Alex Megelas

Manager, Operations, Strategic Initiatives, and Partnerships

ORGANIZATIONAL STRUCTURE

Operating under the Office of the Vice-President, Research, Innovation, and Impact (OVPRII), we coordinate research across all four Concordia faculties, institutes, and schools as well as business, civil society, governments, and the Montreal AI ecosystem.

AI2 co-directors receive guidance from the Steering Committee and Institutional Council.

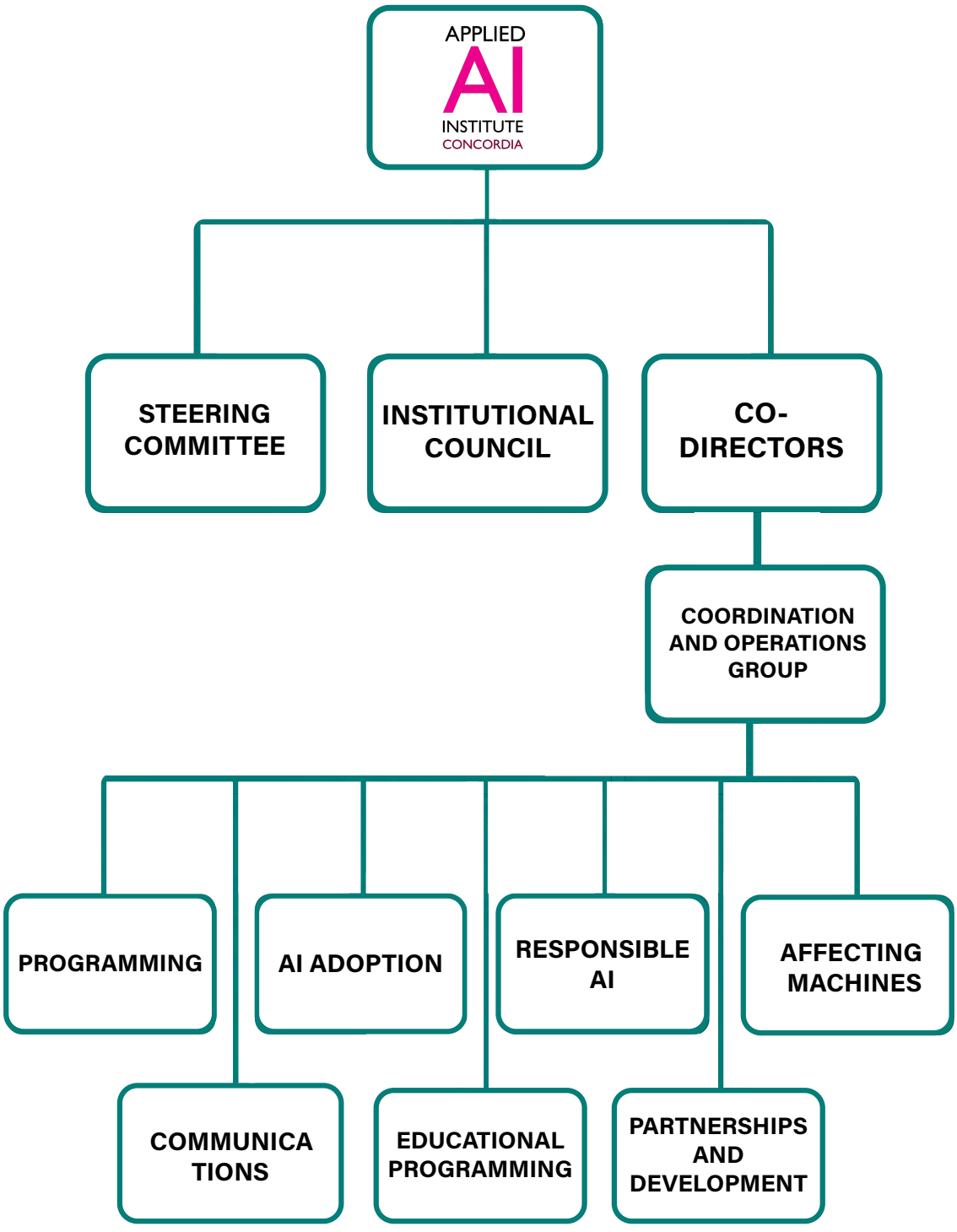
Operationally, we use an internal management model developed with support from a Concordia Human Systems Intervention MA student, prioritizes high communication and interconnectedness. While the team is made up of area specialists responsible for their individual mandates, we maintain team communication through two interconnected mechanisms:

1. The Coordination Group (CoG) meets biweekly and serves as the institute's governing body. It brings together our co-directorship with leadership team to review priority issues and redirect action to working hubs.

2. The Hubs are fixed working groups focused on specific areas: Operations and Finance; Communications; Partnerships and Development; Communications; Educational Programs; AI Adoption; and Affecting Machines. Each hub is lead by an area specialist who chairs meetings and designs agendas, supported by staff members whose mandates relate to the discussion topics. Hubs meet every 2 weeks, with decision making and documentation managed through AI2 infrastructure.

This model aligns with our guiding principles while providing guidance and accountability at the Institute.

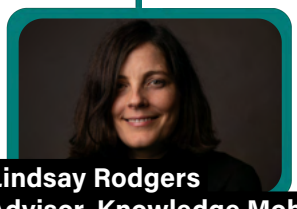
ORGANIZATIONAL STRUCTURE



OUR TEAM

Fenwick McKelvey
Co-Director

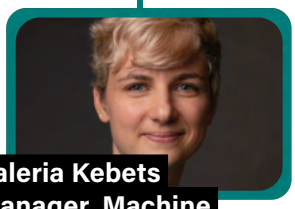
Nizar Bouguila
Co-Director



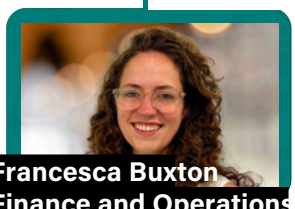
Lindsay Rodgers
Advisor, Knowledge Mobilization

Alex Megelas
Manager

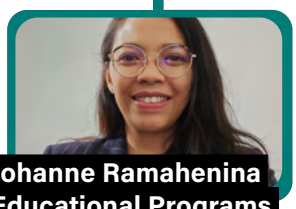
Deborah Ahenkorah
Responsbile AI Specialist



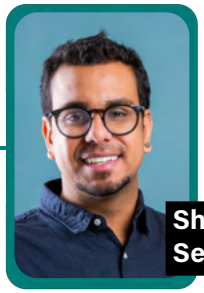
Valeria Kebets
Manager, Machine Learning Projects



Francesca Buxton
Finance and Operations Specialist



Johanne Ramahenina
Educational Programs Lead



Shubhang Khattar
Senior AI Developer

Prisca Rakotamanga
Senior AI Engineer

STEERING COMMITTEE

Alessandra Renzi

Communication Studies, Faculty of Arts and Science

Rilla Khaled

Design and Computation Arts, Faculty of Fine Arts

Leila Kosseim

Computer Science and Software Engineering, Gina Cody School of Computer Science and Engingeering

Maggie Cheng

Management, John Molson School of Business

WE ARE AN INTERDISCIPLINARY, VALUES-DRIVEN INSTITUTE

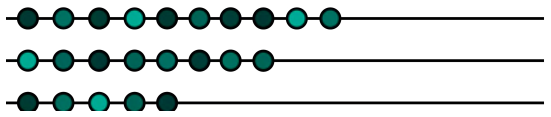
The Applied AI Institute is committed to impactful research and responsible AI adoption. This work is framed by our guiding principles:

- Engaged leadership caring for AI's community and consequences
- Distributed research that considers collaboration, mutual aid, and academic freedom as key drivers of success
- Equity and justice acknowledging that bias is structural as well as statistical
- Inter-disciplinarity in theory and practice, knowing that data is social and technical
- Public interest scholarship to ensure that AI improves, not entrenches, the status-quo

ENGAGED LEADERSHIP CARING FOR AI'S COMMUNITY AND CONSEQUENCES

We believe in engaged leadership. This means working closely with stakeholders across academia, industry, government, and community organizations to support the responsible development and adoption of AI.

Our approach is holistic, assessing not only the technical feasibility of a project, but also its social and ethical impact. In this section, we highlight our efforts to foster cross-sector collaboration, build trust, and ensure that applied AI research serves the public good.



at a glance

137
students engaged

36
research assistants

14
programs

55
poster presentations

BUSINESS DEVELOPMENT IMPACT

Our business development efforts bridge cutting-edge research with real-world applications, catalyzing collaborations across government, industry, and civil society.

In the past year, the Institute has secured over $1.5 million in externally funded applied AI research projects through strategic partnerships with key public sector stakeholders at local, national, and international levels. These partnerships span research, AI adoption tool development and training, demonstrating growing trust in our ability to align research expertise with public needs in responsible AI adoption, public interest technologies, and data governance.

Our track record in interdisciplinary research activation, high-impact contract acquisition, and strategic implementation continues to position the institute as a key driver of Concordia's innovation agenda.

Key partnerships include:

- Developing AI tools for Quebec government ministries
- Disbursing research commercialization funds through Prompt
- Expanding our educational partnerships with Ericsson
- Creating a cross-Canadian AI/ML training program for manufacturing with Bold New Edge and the Digital AI federal supercluster

AI ADOPTION TEAM

In collaboration with the Quebec public sector, the AI2 AI Adoption team develops AI solutions for a wide range of use cases. These solutions, built using open-source tools, are tailored to the needs of the clients as they aim to automate tedious processes. This interdisciplinary team of professionals, research assistants and Concordia faculty contributes directly to Concordia's real-world educational and research mandates.

We provide end-to-end AI solutions, working closely with clients from initial feasibility to full deployment. Our work develops in two phases. We work with clients to determine the feasibility of their projects, including an analysis of the ethical dimensions, and move on to implementing AI technologies.

PHASE 1

Feasability Study

- Needs assessment & data evaluation
- Exploration of modelling approaches
- Mock-up of AI tool interface
- Algorithmic Impact Assessment

PHASE 2

Implementation

- Data preparation & preprocessing
- Model training & fine-tuning
- Deployment within client infrastructure
- AI application design & development

KEY PROJECTS

In collaboration with the Quebec Ministry of Labor, developing an AI system to support the analysis of collective agreements.

We are developing an AI system designed to facilitate the examination of collective agreements. This project aims to systematically capture and structure detailed data regarding employment terms and conditions throughout Quebec's organizational landscape, thereby generating comprehensive statistical analyses and identifying emerging patterns. This technological solution will streamline processes that are presently labor-intensive and characterized by significant redundancy.

In partnership with the Quebec Ministry of Cybersecurity and Digital Affairs, developed a proof-of-concept platform using AI for document classification, database querying via chatbot, and text summarization.

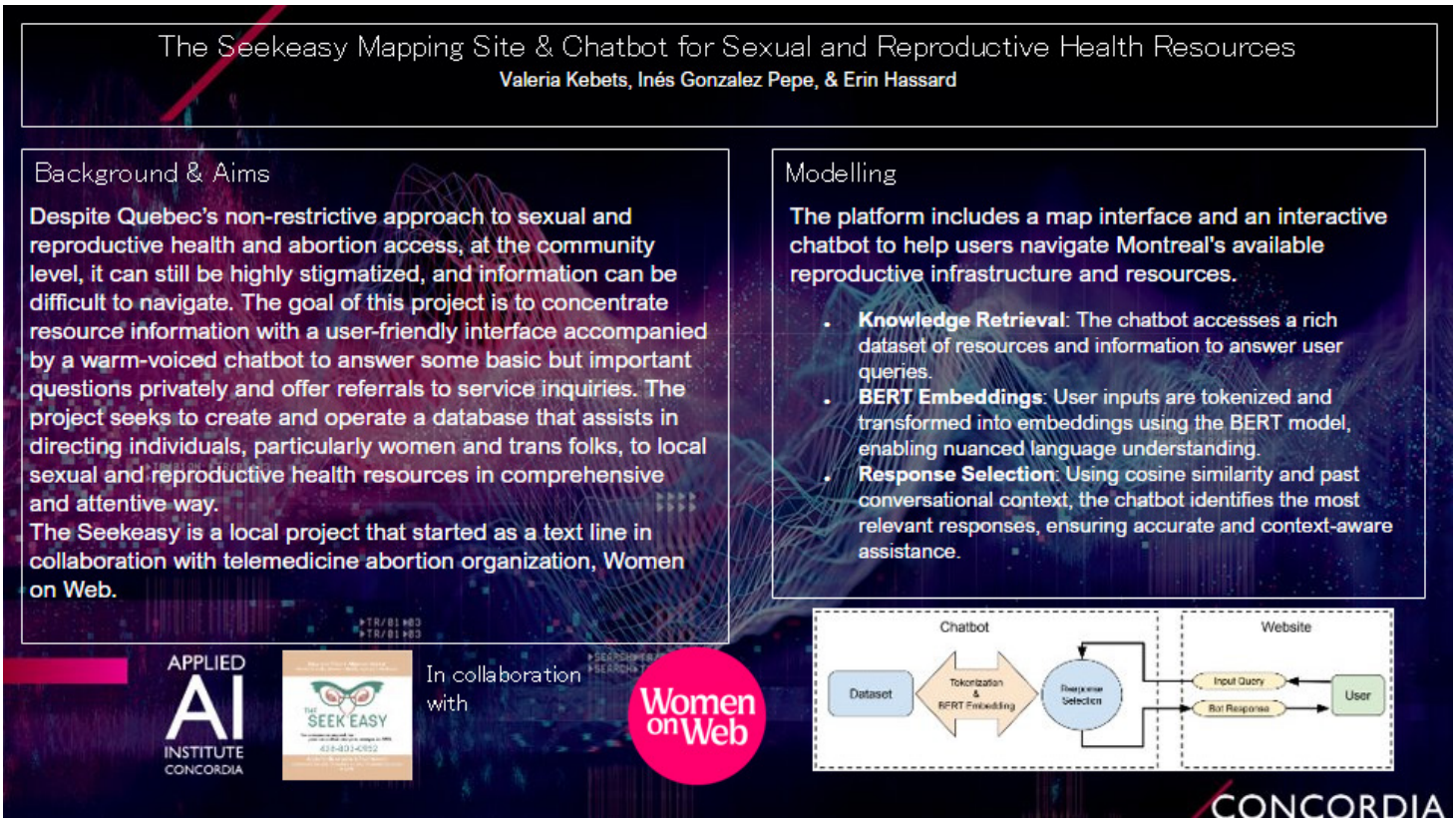
Proof-of-concept platform showcasing document intelligence applications, including an automated request classification tool, a database-specific chatbot, and a text summarization system. These use cases illustrate how AI can streamline repetitive, resource-intensive government processes while maintaining transparency and accountability.

KEY PROJECTS

In partnership with Women on Web, building a chatbot to enhance access to reproductive health.

In collaboration with Women on Web, an international non-profit dedicated to ensuring access to reproductive health, we are designing a chatbot that provides accessible, trustworthy information online.

The “Seek Easy” highlights our commitment to using AI in ways that expand equitable access to essential resources.



What does Responsible AI Adoption mean?

At the Applied AI Institute, Responsible AI isn't a set of guidelines. It's the foundation of how we work. We embed ethical and human-centered principles into every project, from the first idea to final implementation. Our goal is to develop AI systems and research that are not only technically sound, but also socially responsible and in the public interest.

To do this, we take a hands-on, integrated approach.

We design with intent: Every tool we build reflects principles of fairness, accountability, transparency, and explainability.

We identify risks early: Ethics reviews are built into the start of each project to surface and address issues before they scale.

We prioritize public-good solutions: Open-source, auditable tools are our default, not the exception.

We build with perspective: Our teams include ethics and equity experts from day one to ground our work in lived realities.

This approach runs through all our projects, from public sector collaborations to research on digital rights and public interest technologies. In every case, ethics and impact are treated as core deliverables, not extras.

What sets us apart is that we don't treat Responsible AI as a standalone concern or a box to check. Many organizations publish principles, but we focus on putting them into practice. As expectations around AI ethics continue to grow from funders, regulators, and the public, this model gives our partners a clear advantage. It helps them stay ahead of compliance requirements, reduce risk, and build systems that people can trust. We are continuing to strengthen and share this model so that Responsible AI becomes not just something we believe in, but something we are known for.

Deborah Ahenkorah

Responsible AI Specialist

TRAINING PARTNERSHIPS

We promote AI and Machine Learning upskilling through partnerships with Concordia Conti academic nuing Education (CCE) and Ericsson. In 2024, our collaboration positioned Concordia as a Tier 1 partner for Ericsson Canada and delivered two tailored training programs.

ML-AI Upskilling Program (Feb–June 2024) - 133 graduates

Through a blend of lectures and project clinics, the program was crafted to support a wide spectrum of AI topics—from data preparation and visualization to supervised and unsupervised learning, classical machine learning, deep learning, time series analysis, and generative models. It was structured to reflect the varied data and challenges professionals encounter in the workplace, emphasizing experiential learning as a core approach to tackling these complexities.

End-to-End Design of Software Systems (Sept–Nov 2024) - 58 participants

The program offered both theoretical foundations and practical experience in the comprehensive design of AI-based software systems, enabling participants to apply concepts directly in a real-world context. Key topics spanned core principles, requirements gathering, system architecture, deployment strategies, testing methodologies, and continuous delivery practices.

We also offer targeted training program to help businesses unlock the potential of AI. The **AI for Decision-Makers in Advanced Manufacturing**— developed in 2024-25 and launching in the Fall 2025 — is a key initiative supported by Digital, in partnership with CCE and Bold New Edge.

This eight-week hybrid program equips manufacturing leaders with the strategic insight and practical tools to implement AI solutions through a blend of foundational theory and expert mentorship for the development of customized AI roadmaps.

ADVANCING AI IN THE PUBLIC SECTOR

Applied AI Institute at Concordia University, together with the Québec Ministry of Cybersecurity and Information Technology (Ministère de la Cybersécurité et du Numérique) and their Québec Digital Centre of Excellence (Centre québécois d'excellence numérique) co-hosted a symposium addressing the opportunities and challenges surrounding the implementation of artificial intelligence in the public sector.

This full day conference united thought leaders from academia, industry and government to discuss and debate the latest academic research and technologies in AI deployment, safety, ethics, governance, and the opportunities and risks of AI adoption.

SESSIONS

Language Models

- Keynote: Dr. Joëlle Pineau, McGill
- Chair: Dr. Leila Kosseim, Concordia
- Student: Jasmine Latendresse

Democratizing AI

- Keynote: Cristiano Therrien, Open North
- Chair: Meaghan Wester, AI2
- Student: Adele Aubin

AI Deployment

- Keynote: Dr. Bram Adams
- Chair: Dr. Darine Ameyed, MCN

Panel Discussion - AI adoption: Challenges and Opportunities

- Moderator: Ann-Louise Davidson
- Panelists:
  Alexandre Poulin DGCQEN-MCN
  Maria Parysz, CEO ElephantAI
  Lilia Jemay, MITACS
  Rajiv Gupta, Associate Head of the Canadian Centre for Cyber Security

STUDENT ENGAGEMENT

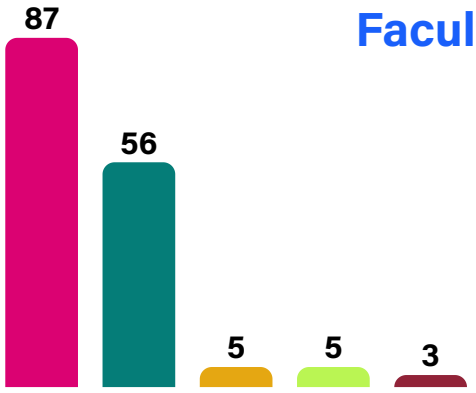
Engaging students in our activities is essential for cultivating the next generation of responsible, interdisciplinary AI professionals.

Students bring fresh perspectives, diverse experiences, curiosity, and critical thinking that strengthens our impact.

By involving students in research, development, policy, and community initiatives, we contribute to their learning and professional development while creating a culture of collaboration, inclusion, and social responsibility.

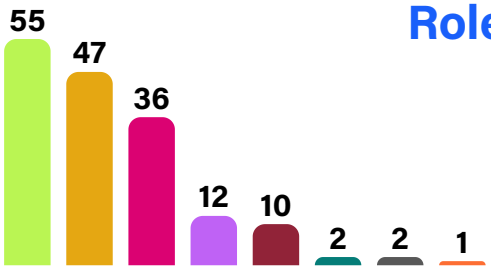
STUDENT ENGAGEMENT

Faculty



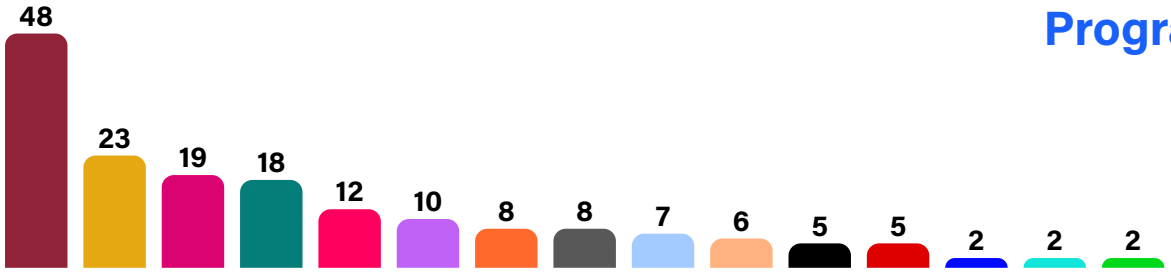
- Gina Cody School of Engineering and Computer Science
- Faculty of Arts and Science
- Independent Studies
- Faculty of Fine Arts
- John Molson School of Business

Roles



- Poster Presentation
- Mentee
- Research Assistant
- FAI Reading Group
- Summer School Attendee
- Fellow
- Event Speaker
- Consultant

Programs



- GEMinAI
- Interdisciplinary AI Forum
- Applied AI Showcase: Digital Poster Session
- MCN
- GenAI Studio
- Speaker
- NFRF
- WoW Chatbot
- Affecting Machines
- AI + Sustainability Poster Session
- Social Life of AI Summer School
- MTRAV
- Advancing AI in the Public Sector
- Red Team
- AI2 Student Fellowship

GEMinAI

The Gender Equity Mentoring in Artificial Intelligence (GEMinAI) Program was borne out of a collaboration between Lori Akiyama, Program Coordinator at CREATE SE4AI, and Dr. Lindsay Rodgers, Knowledge Mobilization Advisor at Concordia Applied AI Institute.

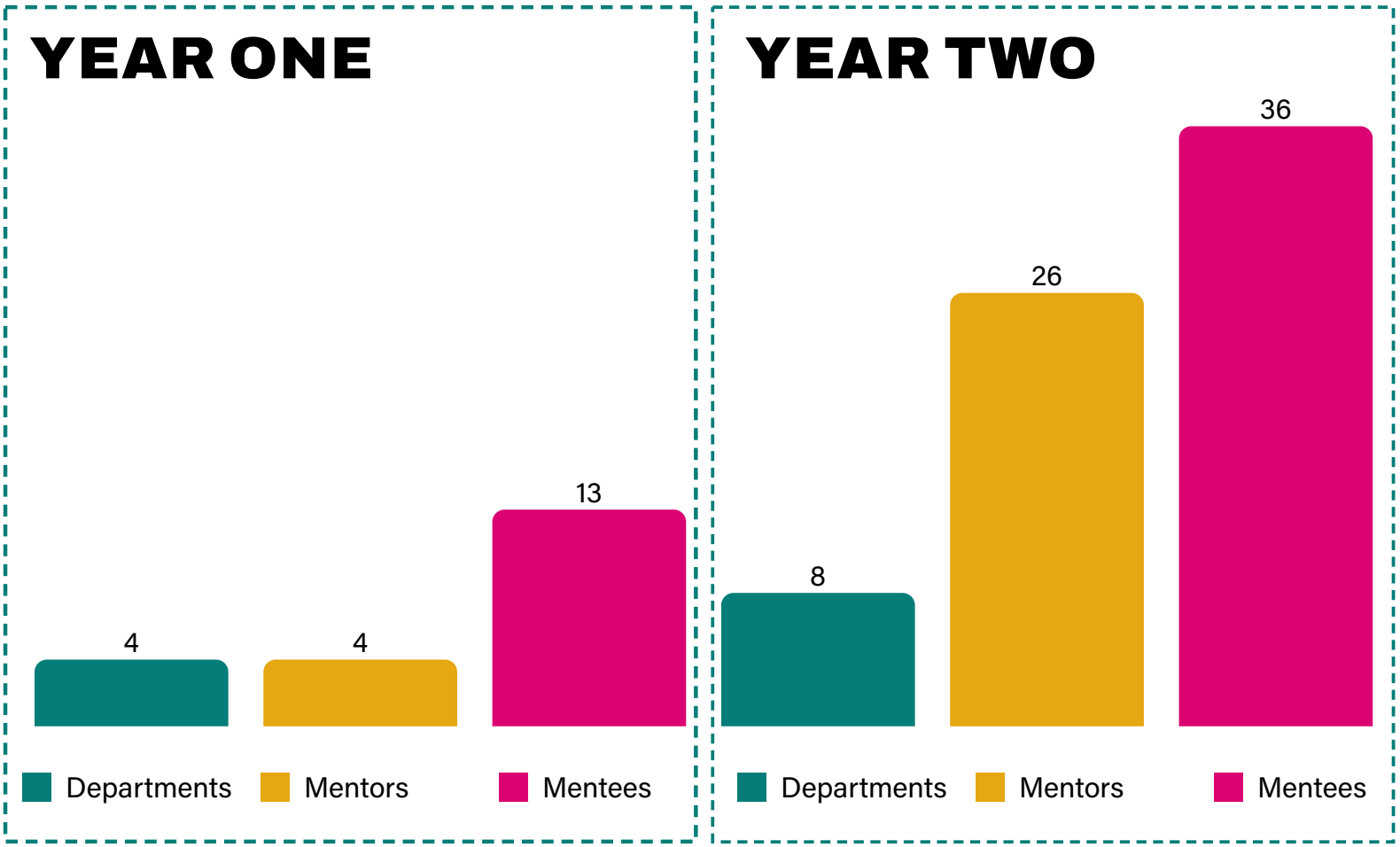
Through ongoing efforts to collaborate and a shared commitment to AI for social good, Lori and Lindsay became increasingly aware of the gender disparity within AI fields.

Lori's experience with mentoring programs combined with Lindsay's background in feminist research and organizing inspired the design of GEMinAI.

The first cohort of thirteen mentor-mentee matches was launched in October 2023.

Through this program, we aim to create an environment where aspiring AI professionals can thrive, ultimately contributing to a more diverse and inclusive AI landscape.

PARTICIPATION GROWTH



GEMinAI
Gender Equity Mentoring in AI

STUDENT FELLOWSHIP AWARDS

In our first year, we supported the projects of three student fellows.

JIHANE MOSSALIM

PhD Candidate, Art Education

Jihane's research delves into the relationship between traditional art practices and artificial intelligence. By integrating AI tools with classic mediums like painting and drawing, she aims to create a bridge between tradition and innovation. One of the key motivations behind her work is accessibility.

Jihane envisions AI as a conduit, helping students and teachers ease into artistic expression or find comfort in tried-and-true methods. As she continues her journey at the crossroads of art and technology, Jihane aims to explore new dimensions of creativity and share her findings with the world.

STUDENT FELLOWSHIP AWARDS

VRINDA NAIR

PhD Candidate, Physics

Vrinda is a doctoral student in physics who currently researches drug design of small molecules by implementing machine and deep learning models. Her project focuses on antibiotic resistance and aims to find new antibiotics.

Her doctoral research is funded by the Natural Sciences and Engineering Research Council of Canada, Canada Research Chairs and Concordia.

She also received Mitacs Accelerate Fellowship and is doing her internship at Molecular Forecaster Inc (a RaaS biotech company).

STUDENT FELLOWSHIP AWARDS

ANDRÉS SALAS

PhD Candidate, Humanities

Andres' work lies at the intersection of studies of extraction, critical design, and alternative epistemologies. By exploring the modes in which emerging technologies influence and are influenced by cultural networks and vital ecosystems, his research-creation practice aims to make visible the ways wherein extraction modulates existence. He follows the case for niobium (Nb), a strategic mineral unique for its place in developing new technologies for particle accelerators.

By situating particle physics experiments within the material practices that allow them, Andrés questions the representations of the future that legitimate the development of new scientific inventions, and the processes through which scientific knowledge is created.

A Pipeline to AI Adoption: AI Experiential Learning at the College and University Levels

In partnership with Dawson College, AI2 organized internships for 30 CEGEP students. Through this program, students were assigned to an AI Lab at Concordia and spent six weeks collaborating with Concordia student researchers on the following projects.

Artificial Intelligence and Machine Learning Models for Omni-Channel Retail Supply Chain Planning
- Claudio Contardio + Navneet Vidyarthi

AI-powered penetration testing on cyber-physical smart grids based on reinforcement learning
- Jun Yan

Estimating relevance of occupant activities with advanced energy management systems (EMMS)
- Manar Amayri

Smart management of water systems: Machine learning models to predict future water main failure, detect leaks, and optimize operations
- Rebecca Dziedzic

Reimagining climate governance in the digital age
- Sustainability in the Digital Age

Numerical stability of DeepGoPlus with regard to perturbations in protein sequence data
- Tristan Glatard + Ines Gonzalez Pepe

THE SOCIAL LIFE OF AI SUMMER SCHOOL

Artificial intelligence has gone public. Once a matter of scientific research, AI has become a household name. ChatGPT introduced the public to the experimental large language models while Stable Diffusion and other text-to-image models helped millions imagine how AI could be applied to a range of contexts.

This Summer Institute, lead by Fenwick McKelvey, reflected on the rapidly evolving social life of artificial intelligence, looking to understand the social impacts of many new applications of artificial intelligence.

- Introduction
- Fundamentals of AI
- Auditing AI Methods, Part 1
- Auditing AI Methods, Part 2
- AI Ethics
- AI Futures

DISTRIBUTED RESEARCH THAT CONSIDERS COLLABORATION, MUTUAL AID, AND ACADEMIC FREEDOM AS KEY DRIVERS OF SUCCESS

We recognize that innovation and impact emerge from diverse disciplinary perspectives and collaborative environments. This means we work to support distributed rather than centralized research.

Each year, we provide funding to researchers across Concordia's four faculty. These exceptional projects exemplify interdisciplinary research, drawing on a diverse array of expertise across multiple fields.

funds awarded

13
sponsorships

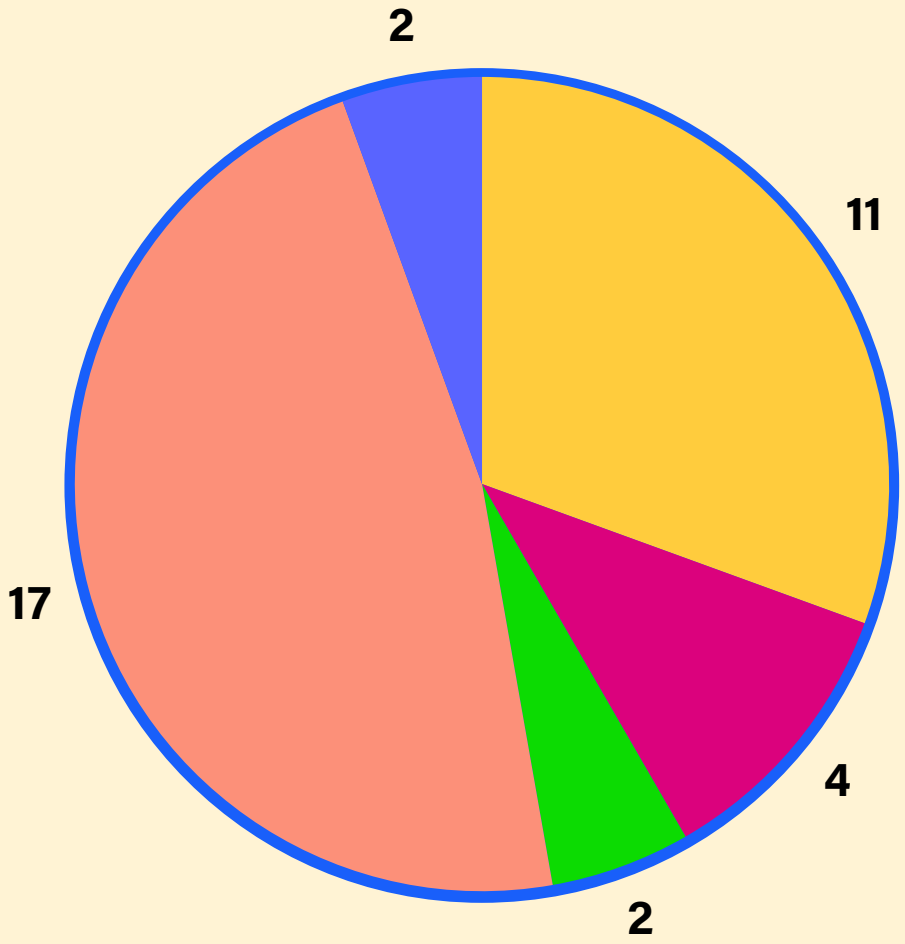
4
PROMPT awards

11
working groups

5
seed + matching funds

3
student fellowships

faculty breakdown

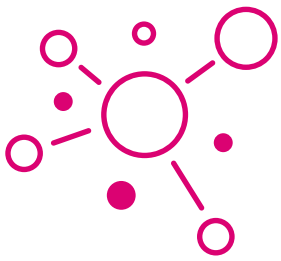


- Arts and Sciences
- John Molson School of Business
- Fine Arts
- Gina Cody School of Engineering and Computer Science
- Cross-Faculty

SEED AND MATCHING FUNDING

(2023 - 2024)

In 2022, we launched a funding call inviting applications to two strategic funding streams to accelerate interdisciplinary research on AI: Matching funding for AI-related grant applications, and Seed projects related to the assessment, development, and auditing of AI systems. This brought forth exciting projects that we are proud to have supported.



EXPLAINABLE AI FOR DESIGN OF ANTIMICROBIAL PEPTIDES

Ré Mansbach, PI; Yiming Xiao, Co-PI; Valerie Booth, Collaborator

This project explored ways to make deep learning (DL) algorithms more reliable, interpretable, and effective in designing new antimicrobial peptides (AMPs)—short proteins that can kill bacteria and to which bacteria develop resistance slowly, making them promising candidates for next-generation antibiotics.

Building on prior work in the Mansbach Lab, the team investigated different DL architectures, including models that use “latent spaces” to capture underlying patterns in data. They examined methods for representing the geometric and biochemical properties of AMPs, tested generative models, and applied regularization techniques to improve accuracy and transparency.

By the end of the project, the researchers had analyzed an AMP database, evaluated multiple DL approaches, and developed new strategies for encoding molecular characteristics to guide the design of innovative antibiotics.

EXPLAINABLE INTERACTIVE UNSUPERVISED LEARNING FOR SMART BUILDINGS

Manar Amayri, PI; Nizar Bouguila, Co-PI

This project developed explainable machine learning (ML) approaches for smart building applications, focusing on two main directions.

First, the team extended earlier work that added explainability to basic unsupervised learning algorithms, such as K-Means, applying these techniques to more advanced models.

Second, they explored how interactive ML—where users can guide a model's development—can be combined with explainable ML to better align system behavior with human goals, improve trust, and enhance understanding. This novel integration supported stronger security, privacy, ethical, and accountability measures, while incorporating beyond-accuracy metrics and equity, diversity, and inclusion (EDI) considerations.

The results advanced research in unsupervised and interactive learning, and demonstrated how combining technical innovation with human expertise can build more transparent and trustworthy AI systems for smart buildings.

BOTTOM-UP PROPTECH AUDITING IN MONTREAL

Alessandra Renzi, PI; Tamara Vukov's, Co-PI; Simone Brugiapaglia, Co-PI

This project examined the intersection of Montreal's tech boom and the city's housing affordability crisis, focusing on PropTech—technology tools used by real estate sellers, marketers, developers, and managers—and how these systems can embed histories of discrimination into their datasets and algorithms.

Using an interdisciplinary approach that combined platform studies, data science, computational mathematics, and critical social theory, the team explored the social impacts of PropTech on housing access. In summer 2023, undergraduate student Rocco Trinci (Mathematics & Statistics) completed an Honour's project under the supervision of Dr. Simone Brugiapaglia and Dr. Aaron Berk (McGill), producing a literature review on black-box auditing, reproducing published auditing algorithms, and developing a GitHub repository with Python code to replicate results and test algorithmic fairness techniques.

AI AND ML MODELS FOR OMNI-CHANNEL RETAIL SUPPLY CHAIN PLANNING

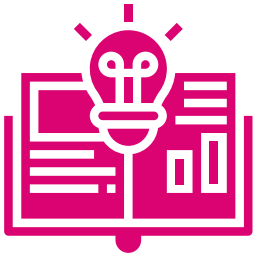
Claudio Contardo, PI; Navneet Vidyarthi, Co-PI

This project developed models and algorithms to address supply chain planning challenges while incorporating consumer purchasing behavior.

Recognizing that sales are influenced by supply chain decisions at multiple levels, the team examined strategic planning (such as network design and facility planning) and its effects on shipping costs, delays, and demand; tactical planning (including distribution, replenishment, and inventory strategies) and its impact on costs and revenues; and operational planning (such as last-mile delivery and order picking) in relation to product assortment.

The researchers created integrated models to capture the interconnections across these layers and conducted sensitivity analyses to understand how changes in one area affect others, offering new insights into the complex relationship between supply chain management and consumer behavior.

DIGITIZINGWASTE (AKA OPENWASTE): A LIVING LAB STUDY ON CIRCULAR ECONOMY, IOT, OPEN DATA, AND AI



Ursula Eicker, Ketra Schmitt, Caroline Roux, Faisal Shennib

Concordia University led Open Waste.ai, an innovative multi-year research project that used Internet of Things (IoT) sensors and AI-driven technologies in community waste management systems to advance zero-waste targets and generate new insights into waste behaviors.

The project brought together Concordia engineering and business faculty with industry and non-profit partners to address a pressing environmental challenge with far-reaching societal and economic implications.

WORKING GROUPS

(2023 - 2024)

AI + Health

As health sensors proliferate in daily life, from smartwatches to ingestible devices, the **AI and Health working group** addresses critical challenges in data diversity, device heterogeneity, and analysis complexity.

They develop AI and machine learning techniques that create novel data representations to reduce heterogeneity effects and identify meaningful associations between behaviors, physiological markers, and health conditions for early disease detection and monitoring.

Unlike current methods that fail to generalize across devices or populations, this approach produces interpretable, trustworthy algorithms that can update medical practices and improve patient care through robust sensor data analysis and advanced statistical techniques for longitudinal health data.

Research Team:

- Paula Lago, Assistant Professor, Electrical and Computer Engineering
- Jennifer McGrath, Professor, Psychology
- Sayeda Shamma Alia, PhD Candidate, Electrical and Computer Engineering

WORKING GROUPS

(2023 - 2024)

The I-R3 DNA Enzyme: An Automated Design Program and Empirical Results

The AI + Synthetic Biology working group develops ML-empowered software to identify potential IR-3 cut-sites within single-stranded DNA sequences and predict cleavage efficiency for therapeutic applications.

The interdisciplinary collaboration between computer engineering and molecular biology expertise produces a practical software tool for identifying optimal cut-sites in target DNA sequences, wet-lab validation data demonstrating prediction quality, and an adapted machine learning method applicable to similar synthetic biology challenges.

This approach addresses the critical need for computational prediction of DNAzyme efficiency, potentially accelerating the development of targeted DNA-cleaving therapeutics while bridging computational modeling with experimental validation in molecular biology applications.

The software is available for download at https://github.com/XinxinTree/IR3

Research Team:

- Nawwaf Kharma, Professor, Electrical and Computer Engineering
- Gabriel Aguiar-Tawil, PhD Candidate, Biology
- Xinxin Yu, MASc Candidate, Electrical and Computer Engineering
- Jonathan Ouellet, Associate Professor, Chemistry and Physics

WORKING GROUPS

(2023 - 2024)

The Sensorium Colaboratory: research-creation spaces for transdisciplinary 'common sense' [VIDEO]

The Sensorium combines sensory ethnography, computational neuroscience, and contemplative practices through an innovative workshop-residency program. Through collaborative multisensory experimentation, the working group explores human consciousness, creativity, and Neuro-AI ethics by gathering perceptions from both human collaborators and AI systems.

The approach integrates verbal reports, bodily movements, and electrophysiological signals from humans and plants to generate personalized, real-time multisensory artifacts centered around autopoiesis—the neuroscience concept of sense-making activities.

This co-sensing methodology celebrates human embodiment and creativity while addressing cultural and sensory diversity in evolving human-machine interactions, developing hybrid qualitative and quantitative approaches to understanding social Neuro-AI through public engagement and collaborative design.

Research Team:

- David Howes, Professor, Sociology and Anthropology
- François Lespinasse, PhD Candidate, Individualized Program
- Antoine Bellemare. PhD Candidate, Individualized Program
- Philipp Thölke, Artist

WORKING GROUPS

(2023 - 2024)

Machine Agencies GenAI Studio

The GenAI Studio supports Milieux and AI2 students, staff and faculty develop collaborative and personal research projects using generative AI. The studio's technical and social governance is part of the ongoing research-creation of the studio itself and is subject to change. As a research-creation project, the studio privileges free software approaches to AI first, open models second, commercial models last in its adoption and design.

Research Team:

- Bart Simon, Assistant Professor, Sociology and Anthropology
- Fenwick Mckelvey, Assistant Professor, Communication Studies
- Rowena Chodkowski, PhD Candidate, Computation Arts
- Maurice Jones, PhD Candidate, Communication Studies
- Kamyar Karimi, BA, Computation Arts
- Aurelie Petit, PhD Candidate, Film and Moving Image Studies
- François Lespinasse, PhD Candidate, Individualized Program
- Luciano Frizzera, PhD Candidate, Communication Studies

WORKING GROUPS

(2025 - 2026)

How can AI help the real-time recognition and prediction of emotional markers in persons living with dementia?

This project addresses the urgent challenges posed by dementia, which currently affects more than 733,000 Canadians and is projected to impact nearly 1 million by 2030. In advanced stages, the loss of verbal communication is often accompanied by distress and behavioural changes, reducing quality of life for people living with dementia and placing heavy burdens on caregivers.

To respond to this need, the team is developing an experimental proof-of-concept AI system that can recognize and predict emotional markers in real time within a smart building environment equipped with nonintrusive sensors. Unlike most existing approaches, the system combines multimodal learning with domain expertise from dementia specialists to ensure both explainability and clinical relevance.

The long-term aim is to enhance emotional well-being and quality of life, while easing caregiver strain—for example, through rapid, customized, screen-based interventions that can prevent or calm distress.

Research Team:

- Manar Amayri Professor, Concordia Institute for Information Systems Engineering
- Zishuao Zhao, MSc Candidate, Concordia Institute for Information Systems Engineering
- Sami Ben Brahim, PhD Candidate, Concordia Institute for Information Systems Engineering
- Ali Algumaie, PhD Candidate, Concordia Institute for Information Systems Engineering
- Nizar Bouguila, Professor, Concordia Institute for Information Systems Engineering
- Ana Ines Ansaldo, Faculté de médecine, l'Université de Montréal

WORKING GROUPS

(2025 - 2026)

How can we adopt and manage AI technologies responsibly, implementing RAI principles in different sectors?

This working group will review existing standards and guidelines for RAI, identify challenges and limitations, and establish benchmarks for developing actionable measurements to evaluate AI technologies. This project examines how artificial intelligence (AI) technologies can be adopted and managed responsibly across sectors such as healthcare, education, and research. Grounded in ethical principles of fairness, accountability, transparency, and privacy, the team reviews existing standards and guidelines for responsible AI, with attention to regulatory compliance, stakeholder engagement, and social impact.

The research identifies challenges and limitations in current approaches to measuring responsible AI and works toward establishing benchmarks and actionable tools to evaluate AI technologies and policies. By doing so, the project seeks to translate high-level ethical principles into practical governance strategies that safeguard human rights and serve the public interest.

Research Team:

- K. Khorasani, Professor, Electrical and Computer Engineering
- Mandana Omidbakhsh, PhD Candidate, Computer Science

WORKING GROUPS

(2025 - 2026)

How can we use aging as a lens to critically examine the role and place of technology in society?

This working group brought together researchers from health sciences, engineering, design, the arts, and the critical humanities and social sciences to explore the intersections of aging and artificial intelligence. In collaboration with older adults from engAGE's network of community organizations, the group held a series of meetings and webinars—beginning with in-person sessions on the fundamentals of AI, ageism, and participatory design, followed by online webinars where researchers presented their work for public discussion, and concluding with a "World Café"-style summit co-hosted with the Atwater Library and Computer Centre.

Recordings and transcripts from these events will inform a final report to support future grant applications, research collaborations, curriculum development, and methodological innovation. Grounded in the recognition that age is too often misrepresented in "age-tech" discourse—as decline, dependency, or a problem to be solved—the group created space for meaningful dialogue on how ageism becomes embedded in AI-driven products and services, ensuring that the perspectives of older adults are included in shaping more inclusive technologies.

Research Team:

- Kim Sawchuk, Professor, Communication Studies
- Lynn Verge, Director, Atwater Library
- Simon Bacon, Professor, Departments of Kinesiology and Applied Physiology

WORKING GROUPS

(2025 - 2026)

How are AI advances in humour affecting and affected by human relationships to humour and the human rights and freedoms associated with it?

The AI, Humour, and Human Rights working group explores the intersection of artificial intelligence and humour from a human rights perspective, building on Critical Humour Studies seminars and ongoing SSHRC-funded research on humour and law. The interdisciplinary group examines how AI generates and interprets humour, focusing on implications for human dignity, freedom of expression, academic freedom, and freedom of thought—particularly regarding hate speech and the normative bias of AI systems.

Through collective recruitment of participants across disciplines, the working group curates reading lists and conducts bimonthly discussions on recent AI, humour, and human rights research, addressing questions ranging from AI guardrails and intellectual property in jokes to the fundamental nature of humour itself. The year-long research process, supported by recorded discussions and research assistance, culminates in a publicly available pamphlet documenting key insights about whether and how improving AI's sense of humour serves human interests while safeguarding fundamental rights and freedoms.

Research Team:

- Danielle Bobker, Associate Professor, English Department
- Maia Harris, MA Candidate, English Department
- Nelson Filipe Costa, PhD Candidate, Computer Science and Software Engineering

WORKING GROUPS

(2025 - 2026)

How can we co-design and deploy responsible and sustainable AI-augmented decision-support systems that meaningfully engage local communities, researchers, and other right-holders?

This working group brings together researchers, community partners, and professionals from engineering, social sciences, data ethics, and environmental studies to explore how artificial intelligence (AI) can support environmentally sustainable and socially just transitions. While AI is often praised for improving efficiency and reducing emissions, it rarely addresses equity concerns or community priorities. To bridge this gap, the group will organize reading groups, co-design workshops, and collaborative brainstorming sessions to examine interdisciplinary methodologies, identify design principles for community-engaged AI, and highlight success stories of socially accountable applications.

The discussions will inform a collaboratively authored white paper outlining case studies, best practices, and open questions for developing the next generation of AI-driven decision support tools. Within the first year, the group will host a public event with local stakeholders and Concordia's Applied AI Institute to share findings, solicit feedback, and foster broader engagement.

Research Team:

- Yassine Yaakoubi, Mechanical, Industrial, and Aerospace Engineering

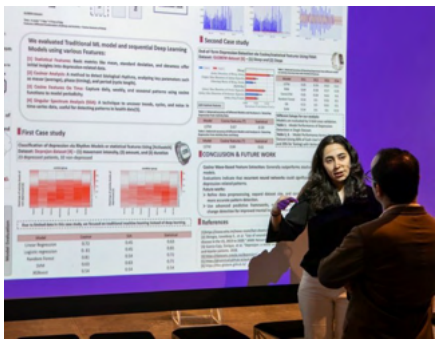
RESEARCH EXCHANGES

In collaboration with 4th SPACE

Our interdisciplinary research exchanges create dynamic forums where affiliated members and their research teams showcase their applied AI research through an innovative, sustainable approach that transforms traditional academic presentations.

These exchanges begin with focused, short presentations where researchers address two fundamental questions: **What is your research question? Why is this research important now?**

These regular exchanges serve multiple functions: they provide researchers with presentation practice in low-stakes environments, expose participants to cutting-edge work across AI applications, and foster active dialogue and meaningful connections. The emphasis on current relevance ensures discussions remain grounded in real-world impact and societal needs.



prompt

University Propulsion Partnership

AI2 provides matching funding for innovative research that advances AI adoption in Quebec industries through our collaboration with PROMPT.

This allows us to create meaningful and effective connections between academia and industry, furthering our commitment to applied research with real-world implications.

Claudio Contardo, Professor, Mechanical, Industrial, and Aerospace Engineering

Navneet Vidyarthi, Professor, Supply Chain and Business Technology Management

UKG

Integrating ML and optimization to address large scale scheduling problems

This project leverages historical data to accelerate large-scale retail workforce scheduline optimization, moving beyond traditional pure optimization approaches. The research explores three main avenues for using past data to improve future scheduling decisions that balance service quality and cost.

Yan Liu, Professor, Electrical and Computer Engineering

maket

Hybrid Graph-based Generative Architecture of Schematic Floor Plans

This research develops an RLHF pipeline to generate industry-compliant building floor plans by integrating human expert feedback with geometry learning to satisfy design constraints using fewer data samples. The goal is creating a reproducible AI framework for cost-efficient, high quality design architecture design services.

Damon Matthews, Professor, Geography, Planning, and Environment

Camilo Alejo Monroy, Postdoctoral Fellow

Achieving global biodiversity and climate targets through human-centered AI

This project uses reinforcement learning to identify optimal global conservation and restoration areas that simultaneously maximize biodiversity, carbon storage, and ecosystem benefits while achieving 30% land protection targets.

The framework assesses environmental trade-offs and synergies to guide nature-based investment decisions under future climate and socio-economic scenarios.

Paula Lago Assistant Professor, Electrical and Computer Engineering

Human Digital Twin for Space Exploration: A Model for the cardiovascular system

This project develops a human digital twin for space exploration, starting with a circulatory system model that uses wearable sensors to monitor astronaut health and predict cardiovascular risks in real-time.

The system employs self-supervised learning and knowledge graphs to analyze physiological data while accounting for space environment constraints like limited computational resources.

Olivier Charbonneau, Senior Librarian, Concordia

Yara Stouhi, BSc, Computer Engineering

Megan Fitzgibbons, Instructional Services Coordinator and Librarian

APPLIED AI INSTITUTE CONCORDIA

Gaby Says™ | Gaby Dit™

This research strives to craft an inclusive, ethical and community driven chatbot to guide members within universities through the vast services, documentation and collections provided by libraries.

Tristan Glatard, Professor, Computer Science and Software Engineering

Intelligent platform for public sector use

Develop a platform to implement document intelligence use cases including automated request classification, database chatbots, and text summarization as a proof of concept for automating tedious government processes using AI models.

RESEARCH PROFILES

ALI AYOUB

What interdisciplinary collaborations, if any, have been most influential in advancing your research?

Interdisciplinary collaborations with healthcare researchers and neuroscientists have helped develop smart AI systems for assistive applications. Further collaborations with researchers in education have helped develop ethical robotic systems interacting with students in classrooms.

What's the most striking impact AI is having in your field?

AI, particularly LLMs, has transformed the fields of commonsense reasoning, personalized assistance, and adapting to dynamic user preferences in smart healthcare, autonomous vehicles, and robotics.

Describe your research in simple terms

My research is aimed at developing personalized smart autonomous systems through a unique bi-directional relationship between systems and their users. In this relationship, smart systems can continually learn about users' evolving individual preferences and unique environments and provide long-term personalized assistance to the users by reasoning on the continually acquired knowledge. I develop machine learning and human-computer interaction methods that are backed by rigorous testing in simulation and physical testing on robotic platforms with human users.

What does responsible AI mean to you?

In my field, explainable, interpretable, and unbiased AI are key to developing AI models that can interact and provide assistance to all users in a safe and ethical manner. Deploying large-scale and pre-trained models, such as LLMs, with human users, particularly children and older adults, can be quite dangerous. My research focuses on adapting these models to the unique and dynamic preferences of each user to ensure safety and comfort for the users.

APPLIED AI INSTITUTE CONCORDIA

SIMONE BRUGIAPAGLIA

What does responsible AI mean to you?

Responsible AI means developing algorithms that are not only validated by empirical success but also accompanied by rigorous theoretical guarantees of performance. Deploying powerful AI algorithms at large scale without properly understanding them (e.g., treating them as "black boxes" or ignoring the issue of AI "hallucinations"), although very common these days, is a potentially dangerous and--I believe--irresponsible practice.

What's the most striking impact AI is having in your field?

AI, and in particular deep learning, is transforming the field of scientific computing for problems like approximating high-dimensional functions or solving partial differential equations, leading to the emergence of a new field called "Scientific machine learning". Deep learning is also having a profound impact on inverse problems and signal processing through the development of efficient data-driven reconstruction techniques.

Describe your research in simple terms

My research is aimed at developing and analyzing algorithms employed in machine learning, scientific computing and signal processing through a mathematical approach.

Being a numerical analyst by training, I strive to design computational methods that are accompanied by rigorous guarantees of performance, such as convergence, robustness and stability.

What interdisciplinary collaborations, if any, have been most influential in advancing your research?

I had several projects in collaboration with computer scientists and engineers that were instrumental to deepening my understating of applicative and practical aspects of my research. I am also currently involved in a highly interdisciplinary research project with A2I members from communication studies on auditing AI algorithms in proptech and seeing their different approach to research is enriching and mind-opening.

APPLIED AI INSTITUTE CONCORDIA

CLAUDIO CONTARDO

What does responsible AI mean to you?

Transparency. In our field in decision optimization, it becomes of most importance to be able to interpret a model's results. A black-box model has lower chances to be deployed my managers, and are often deemed as unreliable.

What's the most striking impact AI is having in your field?

AI and information technologies have enabled the possibility to design data-driven pipelines that react to fluctuations in a system's behavior in real-time

Describe your research in simple terms

I am interested in the design and analysis of models and algorithms for decision-support systems

What interdisciplinary collaborations, if any, have been most influential in advancing your research?

With colleagues from business administration schools, we have developed novel modeling techniques that are at par with recent technological advances.

REBECCA DZIEDZIC

What does responsible AI mean to you?

To me, responsible AI is two-fold: accountability and a clear understanding of its limitations. At least for now, AI is as smart and unbiased as the data and people behind it. Thus, adopting responsible AI means recognizing that AI is not always the best solution.

What's the most striking impact AI is having in your field?

AI is enabling researchers develop more accurate predictions of infrastructure deterioration. Predictive AI models can factor in multiple contributors to infrastructure aging, such as weather, usage patterns, and soil conditions.

Describe your research in simple terms

Municipal infrastructure, such as water, wastewater and stormwater systems, and local road networks are essential for urban life.

My research group develops smart and sustainable solutions to ensure this infrastructure is operated and maintained efficiently and reliably.

What interdisciplinary collaborations, if any, have been most influential in advancing your research?

Since our research focuses on municipal infrastructure, collaborations with municipalities and companies in the municipal sector have been highly influential.

Learning from a variety of domain experts, such as mechanical engineers, data scientists, utility managers, and operators has shaped our research approaches.

GABRIEL VIGLIENSONI

What interdisciplinary collaborations, if any, have been most influential in advancing your research?

As a sound and music artist, I've collaborated with professionals from various fields to push research and creative work forward. These include computer scientists and HCI researchers to conceptualize and develop creative AI systems with bespoke interactions, as well as UX and UI experts and visual artists to craft interfaces that are both meaningful and look good. Additionally, I maintain ongoing collaborations with researchers in communication and design.

What's the most striking impact AI is having in your field?

AI is significantly reshaping the music and creative industries on multiple levels. It's now incredibly easy to generate audio signals that resemble (generic) music with a simple prompt, flooding streaming services with such content. Audiences face an overwhelming volume of music and media and increasingly depend on AI-driven recommendations to navigate it. I believe this ease of creation and consumption is diminishing the perceived value of individual works. However, instead of being discouraged, I believe artists should focus and work even harder on producing truly distinctive and unique work.

Describe your research in simple terms

In my research, I explore the creative affordances of machine learning and artificial intelligence in sound and music making. I'm particularly interested in how we can maintain and enhance our creative agency when designing and using AI systems. To do this, I adopt a small-data mindset, treating data as a vehicle to communicate intention rather than as an objective 'ground truth'. This involves crafting smaller AI models with fewer, carefully curated data points. The resulting models are not designed for broad, general use but can excel at specific creative tasks.

What does responsible AI mean to you?

Beyond the usual emphasis on using ethical training data and considering environmental impacts, I believe responsible AI also involves accountability to ourselves. It's about devising strategies to ensure our voices and ideas are heard amidst the dominant mainstream narratives embedded into large generative models. How can we make our unique contributions stand out in models where generic content prevails? How can we cut through the noise?

APPLIED AI INSTITUTE CONCORDIA

MARTA KERSTEN-OERTEL

What does responsible AI mean to you?

Responsible AI in the context of the research we do in the domains of health and medicine refers to the need of ethical and cautious use of AI technologies that ensure patient safety, privacy and fairness. It involves transparent and accountable AI development processes, as well as thorough validation and testing of AI algorithms to minimize the risk of errors or biases that could adversely affect patient outcomes. Additionally, responsible AI entails adhering to strict data protection regulations and guidelines to safeguard sensitive medical information from unauthorized access or misuse. Only by prioritizing responsible AI practices, will we be able to foster trust among patients and healthcare professionals so that we can maximize the benefits of AI in improving healthcare delivery.

What's the most striking impact AI is having in your field?

AI is having a huge impact on surgery and diagnosis by enhancing medical imaging analysis, assisting surgeons during procedures, and predicting patient outcomes. Additionally, AI can enable such things as drug discovery, remote monitoring of patients and telemedicine. One of the really interesting research areas right now is looking at how LLMs can be used to augment clinical decision-making by extracting insights from vast amounts of unstructured medical data to improve patient care and clinical decision-making by providing insights and recommendations to healthcare professionals.

Describe your research in simple terms

In the Applied Perception Lab (AP Lab), we're developing building novel technologies to help clinicians and improve patient care. For example, we're looking at how we can improve surgical workflows, diagnosis of different diseases, and general health and wellbeing. Projects in the AP Lab include using AI for deciding on the best treatment options for patients presenting with stroke, developing new AI algorithms to ensure that patient data remains secure and private, developing games with AI feedback for training surgical residents, using augmented and virtual reality for both patients and clinicians to improve decision making, and developing low cost clinical systems (e.g. for emergent neurosurgical care) for remote regions and low and middle income countries.

What interdisciplinary collaborations, if any, have been most influential in advancing your research?

One of the things that I strongly believe in is working closely with end users to that the technologies that we are developing are actually solving a real need or problem. A prerequisite for bringing any new technology from laboratory to clinic is the development of a close relationship and excellent communication between the clinical team, radiologists, engineers and surgeons. I've had the privilege to work with clinicians and surgeons from various backgrounds (neurosurgery, endocrine and acute care, cardiothoracic etc.) to better understand their needs and the shortcomings of current technologies.

APPLIED AI INSTITUTE CONCORDIA

LEILA KOSSEIM

What does responsible AI mean to you?

AI aims at building systems capable of making decisions that typically require human intelligence. For me, Responsible AI is about building systems capable of making decisions with the same values as a responsible human. This entails going beyond the data, and, among other things, be able to explain its reasoning, be fair and unbiased, be able to preserve individual's privacy, be able to refuse doing harm, and be accountable for its decisions.

What's the most striking impact AI is having in your field?

In recent years, the introduction and availability of Large Language Models (LLMs) has disrupted and reshaped the field of NLP. These models have demonstrated unprecedented performance across many NLP tasks and have now become the de facto approach in many NLP tasks.

Describe your research in simple terms

My research interest is Natural Language Processing (NLP), i.e. the development of algorithms capable of communicating in written human language (such as English or French). NLP is used in a wide range of applications, such as email filtering, text summarization and machine translation. Of particular interest to me is Computational Discourse Analysis which studies how machines can detect or generate linguistic strategies to convey specific communicative goals.

What interdisciplinary collaborations, if any, have been most influential in advancing your research?

Given the inherent interdisciplinary nature of NLP, collaborations with linguists have had the most profound influence in my research.

As opposed to treating language as just data, working with linguists has taught me to look, analyse and appreciate languages as an important part of culture that we should cherish and preserve its diversity.

APPLIED AI INSTITUTE CONCORDIA

RACHEL MANSBACH

What does responsible AI mean to you?

To me, one of the most important principles of responsible AI is the same as the main principle of responsible computer science: GIGO, or Garbage In Garbage Out. You must understand your data, not just your algorithms, to use AI responsibly.

What's the most striking impact AI is having in your field?

AI is improving the efficiency of high-throughput drug discovery when integrated thoughtfully with drug discovery pipelines. In addition, there are indications it will also become useful as part of accelerating modeling of proteins and peptides.

Describe your research in simple terms

Peptides are short proteins, larger than many traditional drugs, that can be used as therapeutic candidates.

We construct search spaces for of different types of peptides by using deep learning approaches and try to use them for design and understanding of peptides for applications such as antibiotics.

What interdisciplinary collaborations, if any, have been most influential in advancing your research?

One of our most interesting interdisciplinary collaborations has been with medical physicists, where we apply network theory and data augmentation techniques to brain images, which is a little out of our usual scope.

We also routinely collaborate with experimental chemists and biochemists, which allow us to test our theoretical understanding in vitro.

APPLIED AI INSTITUTE CONCORDIA

MIRCO RAVANELLI

What does responsible AI mean to you?

Responsible AI means developing models that are fair, transparent, reproducible and interpretable while ensuring they do not pose security risks.

What's the most striking impact AI is having in your field?

Speech processing was one of the first fields revolutionized by deep learning. Thanks to this technology, we now have real-time, highly accurate speech recognition and synthesis, making voice assistants, automated transcription, and multilingual communication more accessible than ever.

Describe your research in simple terms

My research focuses on building AI systems that understand and generate human speech, enabling more natural and effective interactions between humans and machines. This involves deep learning techniques for speech recognition, speech synthesis, and multimodal conversational AI. ⊠⊠

I am leading SpeechBrain (https://speechbrain.github.io/), which is currently one of the most used open-source toolkits in the world for speech processing.

What interdisciplinary collaborations, if any, have been most influential in advancing your research?

My work has largely benefited from collaborations with neuroscientists, clinicians, and biomedical engineers. For instance, interdisciplinary research focusing on processing EEG brain signals has helped me develop novel methods for EEG inspired by the way we process speech. A collaboration with clinicians and neuroscientists is ongoing to better detect early signs of Parkinson's disease from short speech recordings with AI.

APPLIED AI INSTITUTE CONCORDIA

YIMING XIAO

What does responsible AI mean to you?

Responsible AI to me means that the end products should equally benefit and be accessible to all members of the society.

What's the most striking impact AI is having in your field?

With a range of medical AI products receiving FDA approvals, AI has made significant impact in healthcare, including reducing radiation exposure in radiotherapy, streamlining clinical paperwork, improving cancer diagnosis, and facilitating surgical interventions.

Describe your research in simple terms

My research explores the incorporation of human-centered designs in the development of medical AI and VR to improve the efficiency and accuracy of image-based diagnosis and image-guided surgery.

What interdisciplinary collaborations, if any, have been most influential in advancing your research?

I work at the intersection of computer science and medicine. Collaborating with clinicians is a crucial part of my research to ensure that my works are rooted in the needs of patients and physicians.

APPLIED AI INSTITUTE CONCORDIA

What interdisciplinary collaborations, if any, have been most influential in advancing your research?

In the latest episode of our research, insights from behavioral science have been pivotal. By integrating insights from human cognition and decision-making, we move beyond simply improving machine intelligence as algorithms to formulating research questions and innovations that better complement and enhance human capabilities.

What's the most striking impact AI is having in your field?

AI's ability to self-adapt through predefined learning strategies while integrating human expertise is transforming real-time operations. The latest AI advancements are evolving into autonomous, self-learning agents that go beyond automating complex manual processes—they provide enhanced decision support, enabling more informed and intelligent decision-making.

Describe your research in simple terms

My research group explores the cutting edge where intelligence meets criticality. I am working with a great team of graduate students, postdoctoral fellows, and global collaborators to investigate computational intelligence techniques that enhance the autonomy, security, and resilience of operational technologies in next-generation energy, mobility, and other mission-critical systems.

What does responsible AI mean to you?

For our research, responsible AI means pioneering new research paradigms, fostering public literacy, and demonstrating proper use cases that will help us better utilize, secure, and trust machine intelligence. We will proactively identify the algorithmic blind spots, pitfalls, and biases of AI methods, explore human-machine interactions within an ecosystem with large-scale AI adoption across various use cases and industries, and pinpoint pivotal areas where AI can be reliably integrated into the cyber-physically interwoven world.

APPLIED AI INSTITUTE CONCORDIA

EQUITY AND JUSTICE ACKNOWLEDGING THAT BIAS IS STRUCTURAL AS WELL AS STATISTICAL

We recognize that bias in AI systems cannot be addressed solely through technical approaches or improved datasets. Statistical biases must be mitigated alongside an analysis of the structural dimensions that shape how AI is developed, deployed, used, and governed, including the historical, institutional, and sociopolitical contexts.

Upholding this guiding principle requires us to embed equity and justice into every stage of our work. In this section, we present the ongoing work and commitment to responsible, inclusive artificial intelligence.

key projects

TRANSATLANTIC RESEARCH

MONTREAL RAI HUB

GLOBAL INDEX ON RESPONSIBLE AI

FEMINIST + GENDER RESPONSIVE AI

RESPONSIBLE AI

Below are some key projects reflecting our commitment to RAI and community engagement.

Visiting Scholar

Applied AI Institute welcomed artificial intelligence media scholar Katalin Fehér as a visiting scholar through the European Union's inaugural Next Generation Internet (NGI) Transatlantic Fellowship Program.

Concordia was the only Canadian university among more than 30 North American universities and colleges to receive scholars through this inaugural call.

MONTREAL RAI HUB

Led by Fenwick Mckelvey, Katalin Katalin Fehér, Lindsay Rodgers, and Robert Marinov, this workshop convened policy experts from across sectors to explore and co-create a shared vision for the future of Responsible AI.

Using Horizon Scanning—a strategic foresight method—participants identified emerging signals, key trends, drivers of change, and potential disruptions likely to shape the next decade.

Their collective insights culminated in a consensus map highlighting priority areas and guiding principles for advancing RAI across disciplines.

WORKSHOPS

AIDA or beta? Discussing Canada's New Artificial Intelligence + Data Act and Beyond

This panel brought together experts for a timely discussion on the Government of Canada's proposed Artificial Intelligence and Data Act (AIDA)—the country's first attempt at legislating AI.

Panelists shared insights on the Act's implications, limitations, and future possibilities, offering critical perspectives on how Canada can foster responsible and inclusive AI governance.

Panelists included **Maroussia Lévesque**, **Christelle Tessono**, **Bianca Wylie**, and **Florian Martin-Bariteau**.

WORKSHOPS

Responsible AI Curve: AI2's Interdisciplinary Playbook for Development and Deployment

This event brought together researchers, developers, and practitioners interested in the responsible use of artificial intelligence.

Participants mapped their roles across the AI system lifecycle and gained practical tools for engaging with AI technologies in ethical, accountable, and socially responsive ways.

Speakers: Fenwick McKelvey + Meaghan Wester

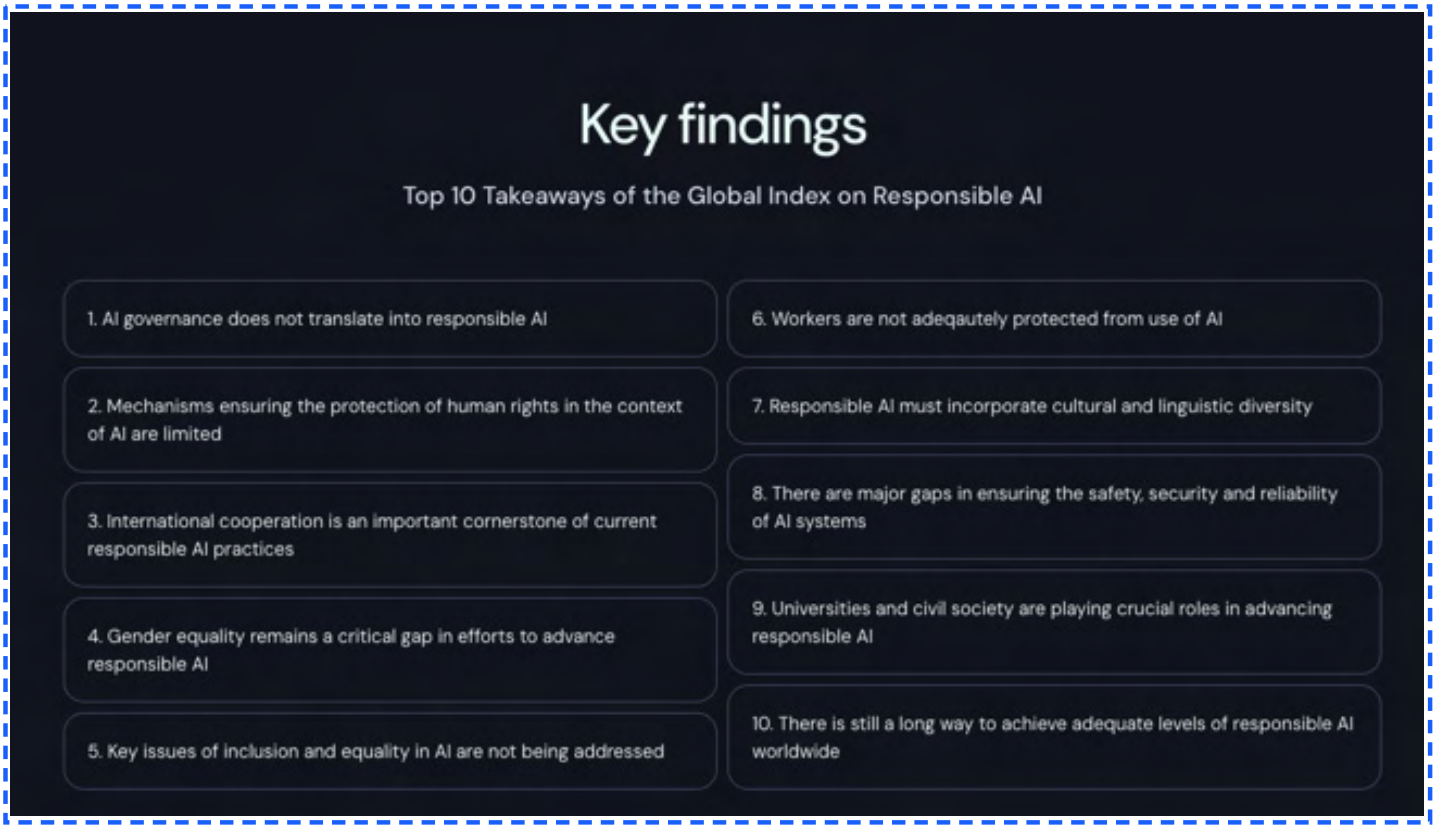
VIDEO

GLOBAL INDEX ON RESPONSIBLE AI

The Applied AI Institute served as the only Canadian partner on this crucial project. We worked to collect and analyze data on commitments and progress towards responsible AI in 138 countries.

The Global Index on Responsible AI is a multidimensional tool measuring progress towards responsible AI in 138 countries and jurisdictions.

With a comprehensive and comparative set of human rights-based benchmarks, the Global Index on Responsible AI measures government commitments and country capacities, through a social, technical and political lens.



FEMINIST AND GENDER RESPONSIVE AI

Our commitment to advancing gender diversity has yielded exceptional outcomes with respect to staffing, programming, and partner engagement. Through the Affecting Machines Working Group, an umbrella initiative for feminist AI, we have:

- Designed a research-informed recruitment strategy that successfully increased the number of women and LGBTQ+ candidates applying for technical roles within our AI Adoption team
- Exceeded the national average of 25% of women in AI. In the AI Adoption Team and overall within the institute, we have achieved gender parity
- Mentored 30+ women and non-binary students interested in AI-careers
- Partnered with 15+ organizations and 20+ professional women and non-binary AI mentors to support gender diversity in AI
- Led a Feminist Approaches to AI Reading Group and Directed Study for graduate students and community members
- Received 320k in funding for gender-responsive research projects
- Hosted, designed, and facilitated workshops to advance gender-responsive approaches to AI research, development, deployment, and professional development
- Published resources designed to intervene into different stages of the AI pipeline, related to AI literacy, hiring and onboarding, research guidelines, and more

When building our AI adoption team, we initially received predominantly male applications. Drawing on feminist approaches to gender diversity in STEM fields, we revised our recruitment strategies by updating the framing and description of our projects and pointing toward the range of potentially valuable experiences (outside of academic qualifications) that we welcome.

We actively connect with gender diverse people in our networks and encourage them to apply to open positions. Since implementing these changes, the number of women and LGBTQ+ individuals applying to our positions has increased significantly. While these initial results are promising, we continue our efforts in making our technical team as diverse as possible.

– Dr. Valeria Kebets, Manager, Machine Learning Projects

Affecting Machines – Feminist Lab Ethnographies

Building on the Affecting Machines research project, Drs. Golnoosh Farnadi, Fenwick Mckelvey, Tanja Tajmel, and Lindsay Rodgers received funding to conduct research whose objective is to surface and analyze the persistent yet overlooked gendering of labs, lab cultures, and AI technologies and ultimately, to change lab cultures so that gender minorities not only enter the field, but they also want to stay there.

AFFECTING MACHINES

We promote gender diversity and inclusivity in AI in collaboration with a range of stakeholders, objects and methods of study, outputs, and disciplinary frameworks. In Spring 2023, we were awarded a $250 000 research grant through the Commission des partenaires du marché du travail to improve gender equity within AI/STEM sectors.

The proposed research, designed and led by Dr. Lindsay Rodgers, enacted a community-based action methodology to collaboratively establish meaningful trajectories for the project. Thus, an interdisciplinary working group, Affecting Machines, was launched.

Research Assistants: Juliette De Lamberterie, Mohsen Monji, Sabrina Ward-Kimola, Saskia Kowalchuk, Rachel Kirstein, Aviva Majerczyk, Ozgem Acar, Mieko Tarrius, Leonardo Morales Vega, and Dimana Radoeva

Industry Partners: Seynabou Ndiaye (Women in AI), Andy Saldana (Queer Tech), Valentine Goddard (Alliance Impact), Erin Hassard (Women on Web), Bettina Forget, Gitta Ghiasi, Riya Dutta (Concordia University), Ross Hodess, Mike Deutsch (Digital Moment), Thomas Linder (Open North), Lori Akiyama (CREATE SE4AI)

This initial iteration of Affecting Machines was made up of researchers, community representatives, and AI professionals who work to create practical tools for those interested in improving gender equity.

Here are some of the tools we developed:

NORMATIVE PRINCIPLES

Normative Principles that serve as tools to address gender inequity in AI in two key ways: by promoting inclusive, respectful, and accountable work environments, and by encouraging critical reflection on ML/AI research practices and their social impacts.

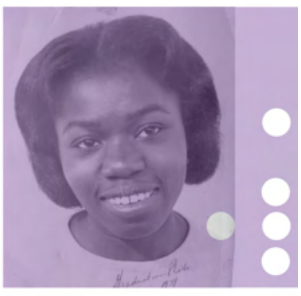
TIMELINE

Today's North American STEM fields privilege stereotypically 'masculine' skills and perspectives, but the lack of gender diversity isn't about talent. Gender biases in AI create real barriers for women and gender-diverse people—barriers shaped by beliefs that aren't fixed or inevitable. It hasn't always, and doesn't have to, be this way.

TRADING CARDS

What comes to mind when you imagine an expert coder, a data scientist, or a historical figure who helped shape computing?

The role model trading cards include a range of perspectives, identities, skills, and career paths. Available in English and French.



Arlene Gwendolyn Lee
(b. circa 1940)

Anita Borg
(1949-2003)

Timnit Gebru
(b. 1983)

The ENIAC Six
Kathleen Antonelli (1921-2006)
Betty Jean Bartik (1924-2011)
Betty Holberton (1917-2001)
Marlyn Wescoff Meltzer (1922-2008)
Frances Spence (1922-2012)
Ruth Teitelbaum (1924-1986)

WORKSHOPS

AFFECTING MACHINES

Affecting Machines: Normative Principles for Gender Diversity in AI

A participatory workshop to introduce participants to feminist design principles in AI research and development.

VIDEO

WORKSHOPS

AFFECTING MACHINES

Affecting Machines: Mapping Women's Contributions to AI

A participatory workshop where participants collaboratively played with and gamified this deck of role model trading cards through a series of hands-on activities.

VIDEO

PUBLIC INTEREST SCHOLARSHIP TO ENSURE THAT AI IMPROVES, NOT ENTRENCHES, THE STATUS QUO

At the heart of our work is a dedication to public interest scholarship: research that is rigorous, socially engaged, and designed to advance justice, equity, and the public good. Our approach prioritizes questions that matter to (and emerge from) communities, policymakers, researchers, and the public, ensuring that the benefits of AI innovation are widely shared and the harms mitigated.

In this section, we highlight our efforts to embed equity and justice into re search design, create resources that bridge disciplinary divides, and engage diverse publics in shaping the futures of AI.

key issues

RESPONSIBLE AI ADOPTION

COMMUNITY-BASED ACTION RESEARCH

ELECTION INTERFERENCE

HEALTHCARE ACCESS

Knowledge Mobilization: Circulating Research Across Boundaries

Knowledge mobilization is how we ensure that research doesn't remain confined to academic journals or internal reports, accessible only to the already initiated. It is the deliberate process of making research visible, accessible, and actionable for the people and sectors who can use it: academics, industry, community organizations, policymakers, and the public.

Technical work on AI often assumes neutrality: that better models and data will naturally produce better outcomes. But without attention to the structures in which AI is built and deployed, "better" systems can deepen inequalities. Critical frameworks are particularly vital in AI research because they reveal how technical choices about datasets, algorithms, and evaluation metrics embed assumptions about whose knowledge counts, whose labour is valued, and whose experiences matter.

The role of a knowledge mobilization advisor is to design and sustain these exchanges, to build the conditions for research to travel, connect, and transform. This means creating infrastructure for meaningful exchange between technical expertise and lived experience, applied research and public good. It means ensuring the institute's work is not just technically sound, but socially responsive. **It means asking: Who gets to define the problem? Who benefits from the solution? Who is missing entirely?**

Through this work, we are building not just better AI systems, but more just and inclusive processes for creating them — ensuring that knowledge mobilization serves not only the advancement of research, but the advancement of equity and social good.

PUBLIC SCHOLARSHIP

Election Interference Research

Working with the Canadian Digital Media Research Network on its recent Incident reporting, Elizabeth Dubois, Scott DeJong, Robert Marinov, Colleen McCool, Hélène Huang, Jeremy Clark, Jun Yan and Fenwick Mckelvey prepared a rapid report on how major LLMS could produce automated, fake tweets.

This simple study shows major holes in commercial AI firms' governance and readiness for election interference.

Read the full report here: https://lnkd.in/ee7aSXhv

Key takeaways:

- Commercial AI tools can be used to generate similar attacks
- There is a major accountability gap in Canada's approach to AI regulation
- AI detection is largely ineffective in detecting whether the AI generated messages in this incident

AI CBAR

The Applied AI Institute is invested in supporting the continued work of the Montreal AI community-based action research network. The Network is committed to bringing the tangible effects of AI into focus to better understand the underlying implications and possibilities for resistance and change.

The Montreal AI CBAR network invites perspectives beyond the technical and entrepreneurial to emphasize the differential impacts AI has on lived experiences. Ultimately, our goal is to create a more equitable and just society that leverages AI for the betterment of all. **You can find more information on the Montreal AI CBAR Network at: https://aicbar.ca/**

PUBLIC SCHOLARSHIP

Pills, Clicks, and Bans: Auditing Digital Censorship of Access to Abortion and Reproductive Rights

We are proud to collaborate with nonprofit organizations like Women on Web to work against forms of digital censorship that prevent access to safe abortions and reproductive health information.

Through the project, Pills, Clicks, and Bans: Auditing Digital Censorship of Access to Abortion and Reproductive Rights, lead by Dr. Stefanie Duguay and the Digital Intimacy, Gender, and Sexuality (DIGS) Lab, the Applied AI Institute will not only assist Women on Web in understanding the scope of its digital censorship challenges but will also develop tools and training materials for other advocacy organizations facing similar issues.

INTERDISCIPLINARY IN THEORY AND PRACTISE, KNOWING THAT DATA IS SOCIAL AND TECHNICAL

Reflecting our commitment to interdisciplinary research and public engagement, our interactive programming draws participants from all four faculties, highlights emerging research, and fosters dialogue on some of AI's most pressing issues.

Below are a few highlights from the year. Missed an event? Recordings are available here.

events 2022 - 2025

35

events

13 in person
20 hybrid
1 fully virtual

10

formats

panel discussions
lectures
research exchanges (poster sessions)
networking
presentations (information sharing)
symposiums + conferences
installations
exhibitions

15

workshops

arts-based
community building
skill development

INTERACTIVE WORKSHOPS

Careers in AI for all Disciplines

Artificial Intelligence (AI) is rapidly reshaping the world of work, impacting nearly every sector. With its expansive reach, careers in AI are not limited to technical fields. Students from all disciplinary backgrounds have valuable roles to play.

Building responsible, inclusive, and effective AI systems requires interdisciplinary collaboration that includes voices from the social sciences, humanities, law, philosophy, and the arts.

This event invited students from across disciplines to explore their potential place in AI-related fields. Industry professionals shared insights on how diverse forms of expertise can contribute to ethical and impactful AI development, followed by a lively Q&A with participants.

VIDEO

Tina Yang
Development Architect and AI/ML Engineer
Jennifer Addison
Project Manager, AI4Good Lab / Mila
Madhavi Mantha
Executive Advisor, AI Innovation & Value Creation, Mantha Advisory
Indra Kubicek
CEO, Digital Moment
Moderator: Lori Akiyama
Project Coordinator, CREATE SE4AI, Concordia University

Collaboration between AI2 + CAPS + SE4AI

INTERACTIVE WORKSHOPS

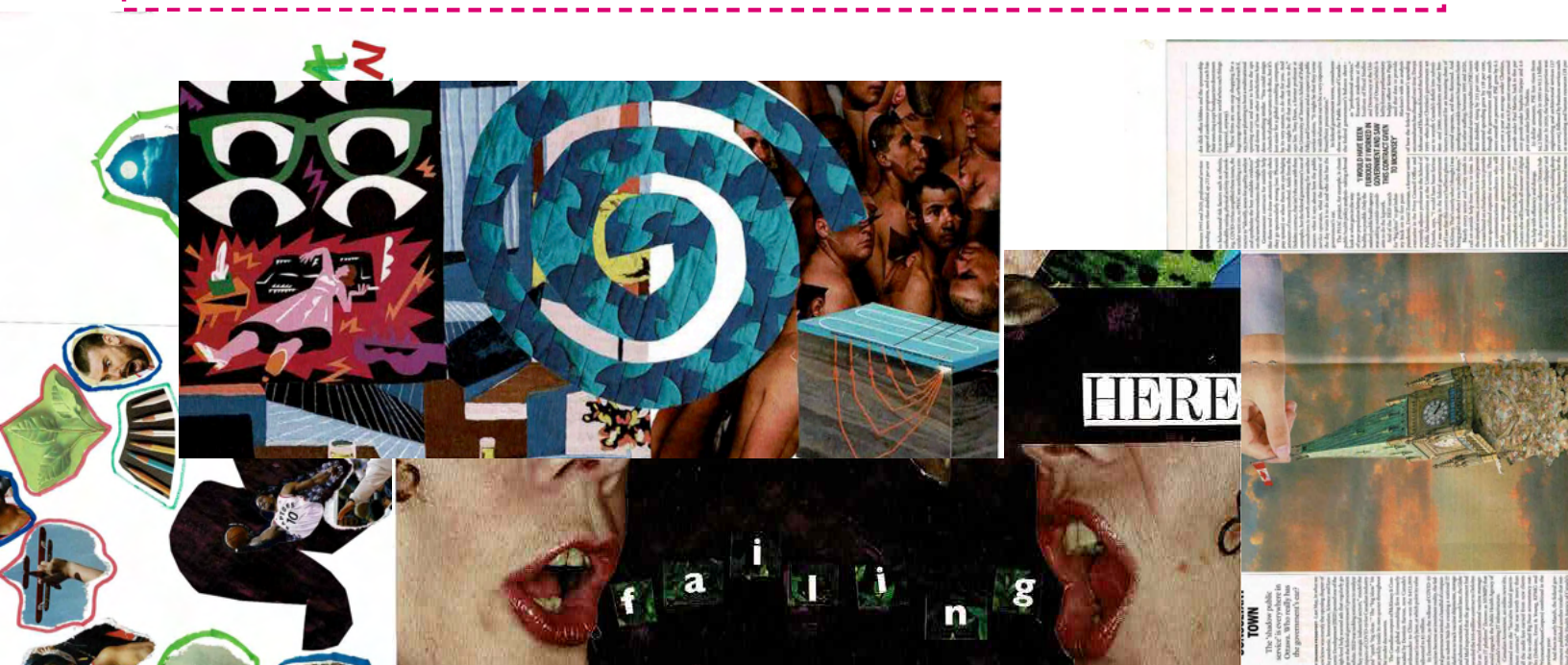
Crafting AI Imaginaries: A Digital and Material Collaging Workshop

Inspired by the Better Images of AI initiative, this workshop invited participants to critically reflect on how dominant visual tropes—such as humanoid robots and glowing brains—shape public understanding of AI. Tania Duartem, from Better Images of AI, introduced attendees to projects that challenge these stereotypical images by highlighting often-overlooked aspects of AI, including labour, human impact, climate, and infrastructure.

Participants then created their own representations of AI through material or digital collage. On-site attendees, guided by Aurélie Petit, crafted paper-based collages using provided materials. At the same time, Rowena Chodkowski led virtual participants in a collaborative session using Stable Diffusion's img-to-img tool to generate digital artworks. No prior experience was necessary, and all tools and materials were made accessible to ensure inclusive participation.

Tania Duarte, Aurélie Petit, Rowena Chodkowski, and Lindsay Rodgers

VIDEO



INTERACTIVE WORKSHOPS

Creative Possibilities and Generative Potentials

Renowned media artist **David Rokeby** joined us to present Voice Scroll, a real-time voice-to-image generator that transforms live speech into an unfolding panoramic visual.

Designed for both interactive installations and live performance, Voice Scroll showcased the BMO Lab's innovative use of machine learning in performance environments—creating spaces where audiences can intuitively engage with AI systems.

Following the talk, Rokeby led an interactive demonstration and discussion on the creative potential of generative AI in the arts.

VIDEO

PANEL DISCUSSIONS

Inappropriate AI: Encounters with Unruly Algorithms

Researchers showcased a series of generative AI agents that subvert expectations, challenge conventional roles of AI assistants, and—often unexpectedly—make us laugh. The exhibition featured five unique AI agents designed to prompt reflection on how we interact with intelligent machines:

- City Player: How pushy should AI persuasion be if we are logically committed to saving the world?
- Date Planner: What if we were to outsource the planning of our love lives to AI? Chabot: If a therapist's goal is to make us feel better, are there limits to what an AI therapist should do?
- Jay Mort: Can we develop relationships of care towards AI?
- SAM: In an age of online certification, do you have what it takes to smash all your relationship goals? Can you please link to SAM on your LinkedIn?

These agents—and how we respond to them—are unexpectedly funny. Why? What makes an interaction with an AI assistant amusing, and what does this reveal about human-AI relations? These questions and more were explored during the round table discussion on the intersection of humour and AI.

Moderator **Lindsay Rodgers** lead a conversation with panelists **Danielle Bobker**, **Rilla Khaled**, **Christopher Gibbs**, **Femke Kocken**, **Shayne La Rocque** and **Jay Mort** as they explore the role of humour in shaping our interactions and the limits we impose on AI. We give special credit to **Onee Yekeh** and **Shahrom Ali** for the realization of these projects.

VIDEO

PANEL DISCUSSIONS

In love with AI: A Valentine's Day Special

This event explored the recurring theme of artificial intelligences as personal and intimate figures in popular culture—drawing on examples like Her and Ex Machina to examine how AI is imagined in romantic contexts.

Through a series of talks, speakers unpacked how these portrayals shape public perceptions of relationships, highlighting the gendered stereotypes and narrative tropes embedded within them. The discussion was followed by a participatory workshop where attendees re-imagined and rewrote AI relationship narratives.

To mark the occasion, everyone received a custom Valentine's Day card— and many arrived dressed in festive, Valentine's themed outfits, adding a playful and reflective atmosphere to the conversation.

Panelists included **Maxine Iannuccilli**, **Dimana Radoeva**, **Alisha Piercy**, moderated by **Lindsay Rodgers**. **Kay Pettigrew** lead the workshop.

VIDEO

PANEL DISCUSSIONS

The Future of Communication with ChatGPT: Promises and Perils

Large language models like ChatGPT are transforming the ways we communicate, learn, and interact with one another. In this event, experts discussed the pedagogical, ethical, social, and political implications of this technology.

Panelists included **Gita Ghiasi**, **Ann-Louise Davidson**, **Mike Barcome**, **Nelson Filipe Costa**, and **Riya Dutta**, moderated by **Stefanie Duguay**.

VIDEO

/imagine: Deconstructing AI Art

This interactive event invited participants to explore the creative possibilities and critical questions surrounding AI-generated art. Leading up to the panel, attendees learned to use Midjourney—a text-to-image generation tool—by experimenting with prompts to produce their own visual works.

The session was open to all, from seasoned creators to first-time users of the technology. Facilitated by Bettina Forget, whose research explores the recontextualization of art and science, the workshop encouraged hands-on engagement with AI image-making tools. The event concluded with a dynamic panel discussion that examined the broader implications of AI-generated art.

Panelists **Bettina Forget**, **Lynn Hughes**, **Michael Malenfant**, **Harley Smart**, **Zeph Thibodeau**, and **Cynthia Girard-Renard** explored themes such as representations of gender and diversity, evolving visual cultures, the ethics of using artists' work in training data, and how generative technologies are reshaping creative practices, teaching, and learning.

VIDEO

MUTEK Forum (August 2024, August 2025) - Wilding AI Lab: a ground-breaking showcase that provided GenAI Studio members with an opportunity to present their research or research-creation project, exploring the latest advancements in generative, creative AI.

The 11th TC3 Workshop on Artificial Neural Networks in Pattern Recognition (October 2024) - This international platform for neural network and machine learning-based pattern recognition brings researchers and practitioners together to share the latest findings and ideas.

EVENTS SPONSORED BY THE APPLIED AI INSTITUTE

Situated Emergences Academic Conference (September 2024) - Situated Emergences aims to strengthen flourishing networks of knowledge production from current MA and PhD students across media-related disciplines.

International Conference on Pattern Recognition and Artificial Intelligence (June 2026) - ICPRAI is an international conference attracting researchers from the fields of Artificial Intelligence, machine learning, neural networks, deep learning, classification techniques, computer vision, and image processing.

Confabulation: Digital Divides Stories of virtual assistance, artificial intelligence, putting our devices down (May 2025) - Confabulation presents true stories, shared by the people that lived them, exploring the machines that made us. Digital Divides will be an evening of stories that take a closer look at how tech has transformed us, for better or worse.

The AI Revolution: Transforming Business Functions for a Sustainable Future (March 2025) - Exploring AI's role in streamlining logistics, making smarter financial decisions, personalizing marketing, and strengthening cybersecurity, all while tackling one of the biggest concerns—workforce displacement.

42nd International Symposium on Automation and Robotics in Construction (ISARC 2024) - ISARC-2024 is the leading international conference related to Automation and Robotics in Construction and explores AI applications in engineering (robotics, machine learning, computer vision, point cloud analysis, data science in general, etc.).

UKAI Shipwreck - UKAI Projects presents their thought-provoking "Shipwreck" project, an immersive and interactive experience exploring how we navigate ecological, cultural and technological devastation.

EVENTS SPONSORED BY THE APPLIED AI INSTITUTE

ConUHacks IX - ConUHacks is the biggest 24-hour hackathon in Québec, with over 800 talented CEGEP/University students from diverse disciplines across North America (e.g., computer science, business, biomedical science) to compete for the best innovative solution to real-world challenges.

Generative AI in Finance Conference - This conference invited scholarts to discuss current research on Generative AI in Finance and was associated with a Special Issue in the Journal of Banking and Finance on Generative AI in Finance and provided authors with valuable insights from the editorial team prior to submission.

AI Ecologies Lab - The MUTEK AI Ecologies Lab includes a cohort of artists, researchers, and technologists gathered for a unique interdisciplinary residency. The six selected projects: Chat-BRB / Lichen as Biosensor / LoRes Moss Sky, Nightly Build / The Garden VR Case Study / Visualizing Entropy Regularized Decision Algorithms / Wattsup address topics such as AI transparency, the decentralization of technologies, and the integration of ecological principles in artistic practice.

Abolhassani, S. S., Zandifar, A., Ghourchian, N., Amayri, M., Bouguila, N., & Eicker, U. (2024). Occupant counting model development for urban building energy modeling using commercial off-the-shelf Wi-Fi sensing technology. Building and Environment, 258, Article 111548.

Ahmed, R., Amayri, M., & Bouguila, N. (2024). FSNet: A hybrid model for seasonal forecasting. IEEE Transactions on Emerging Topics in Computational Intelligence, 8(2), 1167- 1180.

KEY PUBLICATIONS

Concordia's Applied AI Institute hosts AI media scholar Katalin Fehér. (2024, April 12). Concordia University News. https://www.concordia.ca/cunews/main/stories/2024/04/12/concordia-s-applied-aiinstitute-hosts-ai-media-scholar-katalin-feher.html

Concordia joins two-year collaborative research project, Making AI Generative for Higher Education. (2023, November 16). Concordia University News. https://www.concordia.ca/cunews/stories/2023/11/16/concordia-joins-two-yearcollaborative-research-project-making-ai-generative-for-higher-education.html

Concordia launches the Applied AI Institute. (2022, March 18). Concordia University News. https://www.concordia.ca/cunews/stories/2022/03/18/concordia-launches-the-applied-aiinstitute.html

Dissem, M., Amayri, M., & Bouguila, N. (2024). Neural architecture search for anomaly detection in time series data of smart building: A reinforcement learning approach for optimal autoencoder design. IEEE Internet of Things Journal, 11(10), 18059-18073.

Feher, Katalin and McKelvey, Fenwick and Rodgers, Lindsay and Marinov, Robert Nicholas, Strategic Foresight in Ai Governance: The Archer Model for Responsible Ai Futures. Available at SSRN: https://ssrn.com/abstract=5316818 or http://dx.doi.org/10.2139/ssrn.5316818

Incident Update 3 | Exploring incident replicability using commercial AI tools. Canadian Digital Media Research Network. https://www.cdmrn.ca/publications/bot-campaign/iu3

KEY PUBLICATIONS

Jones, M., & McKelvey, F. (2024). Deconstructing public participation in the governance of facial recognition technologies in Canada. AI & Society. https://doi.org/10.1007/s00146-024- 01952-w

McKelvey, F. (2023, August 28). Wait—Is ChatGPT even legal? The Walrus. https://thewalrus.ca/wait-is-chatgpt-even-legal/

McKelvey, F., Dubois, E., DeJong, S., Marinov, R., McCool, C., Huang, H., Clark, J., & Yan, J. (2024). Exploring incident replicability using commercial AI tools (Incident Update No. 3). Canadian Digital Network. https://www.cdmrn.ca/publications/bot-campaign/iu3

McKelvey, F., Redden, J., Roberge, J., & Stark, L. (2024). (Un)stable diffusions: The publics, publicities, and publicizations of generative AI. Journal of Digital Social Research, 6(4), Article 4. https://doi.org/10.33621/jdsr.v6i440453

New Concordia mentoring project GemInAI addresses gender inequity in artificial intelligence. (2023, November 28). Concordia University News. https://www.concordia.ca/news/stories/2023/11/28/new-concordia-mentoring-projectgeminai-addresses-gender-inequity-in-artificial-intelligence.html

Rodgers, L. (2024). Advancing gender equality through interdisciplinarity. IEEE Technology and Society Magazine, 43(2), 42-47. https://doi.org/10.1109/MTS.2024.3396819

KEY PUBLICATIONS

"Data-driven technologies and artificial intelligence for sustainable waste management," published in IEEE ISTAS 2021.

“OpenWaste – a proposal for an open data, IoT and AI-driven framework to drive community-level circular economy and reach zero waste targets”, conference paper, International Conference for Sustainable Development.

WORKING GROUP PUBLICATIONS

H. Al-Bazzaz, M. Azam, M. Amayri, and N. Bouguila. (2023). Refining Nonparametric Mixture Models with Explainability for Smart Building Applications. IEEE International Conference on Systems, Man, and Cybernetics (SMC 2023).

Islam, S., Aguiar-Tawil, G., Yu, X., Ouellet, J., & Kharma, N. (2025). A base pair outside the catalytic core of the I-R3 DNA enzyme has a significant effect on its cleavage activity: An improved catalytic core model and an automated design program. Journal of Nucleic Acids, 2025, 5518018. https://doi.org/10.1055/jna/5518018

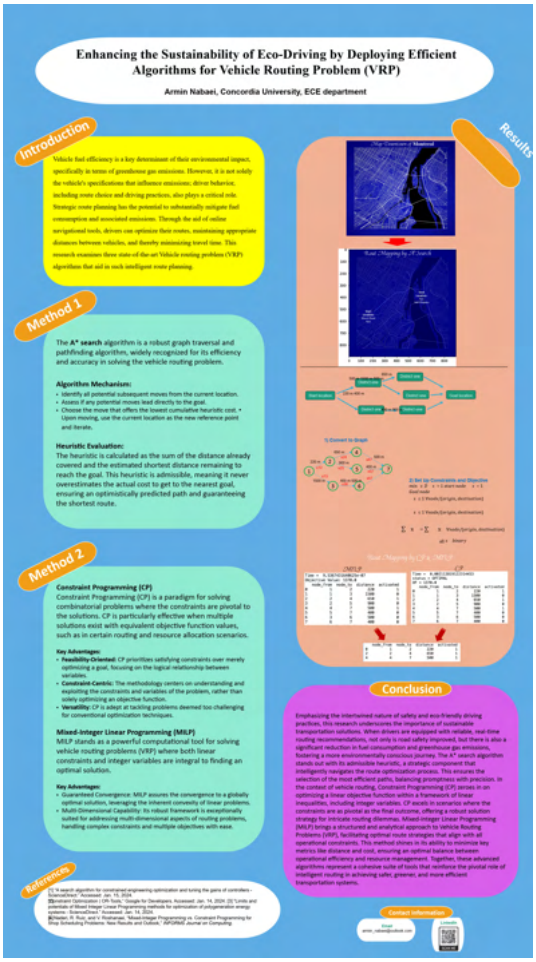
J. Dridi, M. Amayri, N. Bouguila. (2023). Unsupervised domain adaptation with and without access to source data for estimating occupancy and recognizing activities in smart buildings. Building and Environment. 246 (110651)

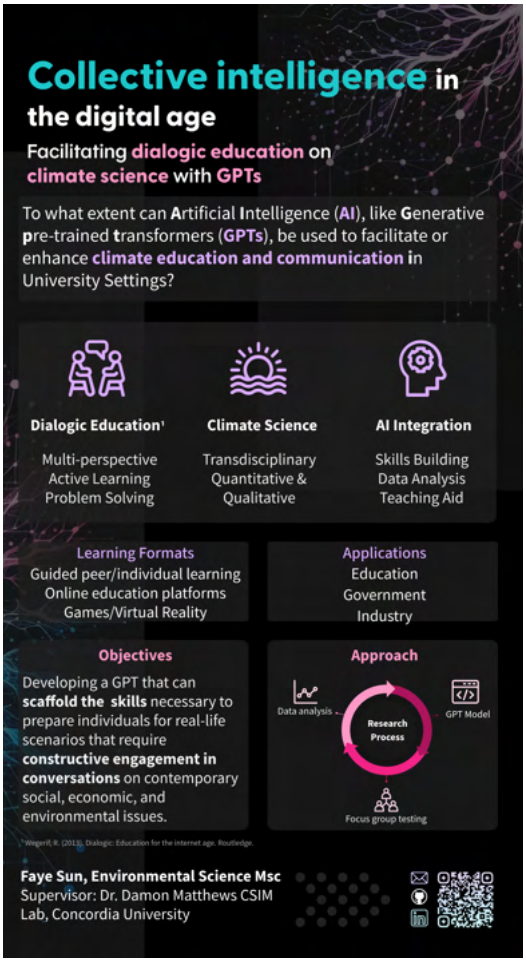
Khaked, A. A., Oishi, N., Roggen, D., & Lago, P. (2025). In shift and in variance: Assessing the robustness of HAR deep learning models against variability. Sensors, 25(2), 430. https://doi.org/10.3390/s25020430

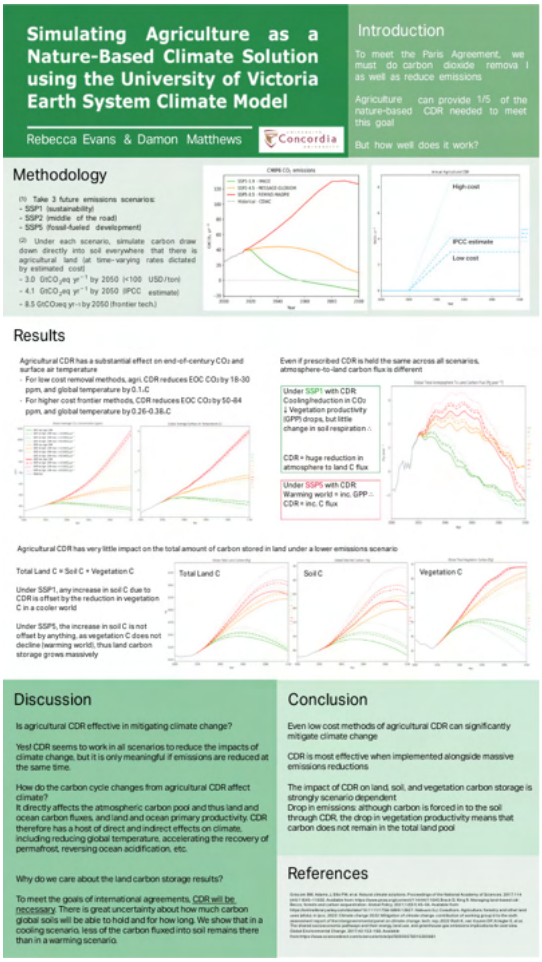
McGrath, J. J., & Lago, P. (2024). Psychophysiological principles for effective physiological signal integration in HCI. PhysioCHI Workshop at CHI 2024.

McGrath, J. J., Jarczok, M. N., & Lago, P. A. (2025). Let's get psychophysiological! A hands-on wearables laboratory experience with recording, processing, & interpreting electrophysiology signals. Course at CHI 2025.

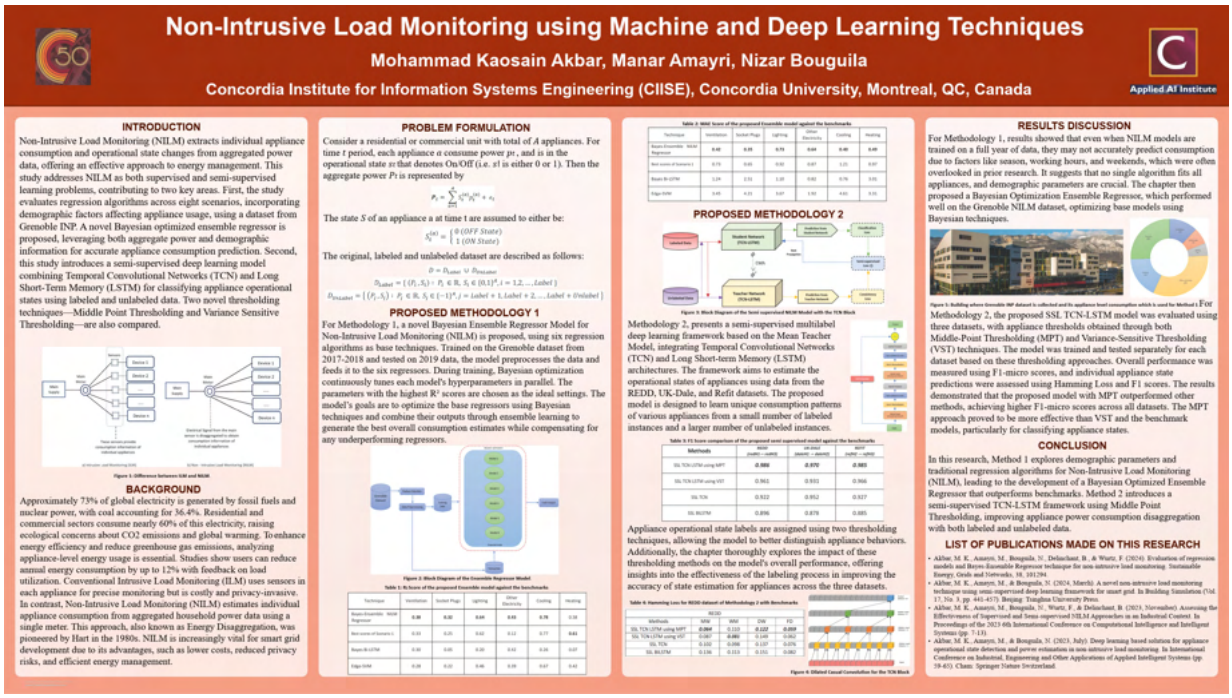
WORKING GROUP PUBLICATIONS







POSTER PRESENTATIONS



Distribution network design for an omnichannel retailer

1. Abstract

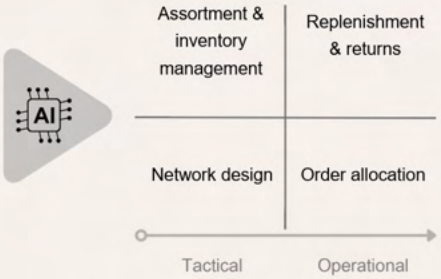
- Since COVID-19, online sales have experienced exponential growth. By the first quarter of 2021, Amazon reported a 44% rise in total sales and a 220% surge in profits.
- New technologies have created new expectations for customers, who want to purchase at any time, from any place, using their preferred device, with quick delivery, and the option to return their purchases hassle-free.
- In such a dynamic environment, how can an omnichannel retailer define a production, replenishment, distribution, and fulfillment plan?

2. Problem

- Customer expectations require offering multiple options.

- Customers can be categorized into three groups according to their channel preferences: pure online, pure physical, and those who can switch between channels.

3. Research question

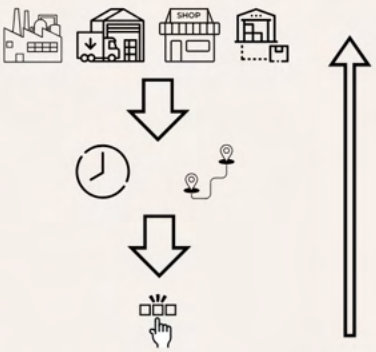


How to determine which orders a retailer should fulfill from what facilities, while minimizing costs and maximizing covered demand?

4. Methodology

Bilevel modeling with elastic demand

- Upper level: The retailer selects a fulfillment strategy.
- Lower level: The customer chooses whether to buy, and if so, the channel to do so.



Miguel Hoyos (1), Claudio Contardo (1), Navneet Vidyarthi (2)
Concordia University: (1) Gina Cody School of Engineering and Computer Science; (2): John Molson School of Business

Responsible AI Futures: from Media to Generative Insights KATALIN FEHER

OBJECTIVE

To investigate responsible AI practices and future outlooks, emphasizing media and generative technologies.

MOTIVATION

Exploring responsible AI in widely used media and communication tech, addressing an explainable technology for societal trust.

APPLIED METHODS

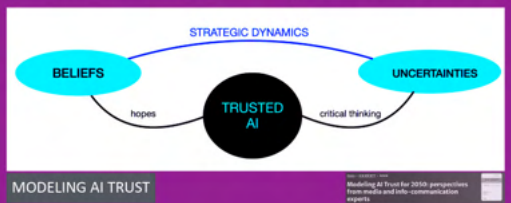
Quantitative trend research: PRISMA, topic modeling with community detection and association networks

Qualitative expert research: interviews/ qualitative survey, horizon scanning, backcasting

KEY RESULTS


TRENDING RESEARCH TOPICS IN SOCIAL SCIENCES AND HUMANITIES

TRUST PYRAMID OF FUTURE AI



MODELING AI TRUST

ONGOING FLAGSHIP

EU HORIZON NGI at AI2:
Responsible AI futures applying horizon scanning

CONCURRENT WORK

Defining AI Media: conceptualization

Generative AI's impacts: content analysis

Entangled AI: sustainable AI futures

REFERENCES

Feher, K., Vicsek, L., Deuze, M. (2024) Modeling AI Trust for 2050: perspectives from media and info-communication experts, AI & Society, Springer Nature Feher, K., & Veres, Z. (2023). Trends, risks and potential cooperations in the AI development market. International Journal of Sociology and Social Policy, Emerald Feher, K., & Katona, A. I. (2021). Fifteen shadows of socio-cultural AI: A systematic review and future perspectives. Futures, Elsevier

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