Killam Conversation

Building Canada's AI future: A Call to Action

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Killam Trusts

"The best way to predict the future is to create it." – Peter Drucker

Since AI is fundamentally changing how all research is performed, Canada's research community has a vital role to play not only in embracing AI to help Canada thrive and flourish, but also in defining the boundaries of use. The path to success involves collaborating with like-minded government, academic and industry powerhouses.

"I don't think we can hit a pause button on AI because there's so many enormous benefits from it. But we really need to worry about how to keep it under control." – British-Canadian computer scientist Geoffrey Hinton, Nobel and Killam laureate (and "Godfather of AI")

Change of such magnitude poses questions around how to keep up so that we seize the good and mitigate the bad. In late 2024, the National Killam Program convened 20 of Canada's top thought leaders, AI experts and researchers to discuss how Canadian scholars and scientists can work with stakeholders to adopt and manage artificial intelligence in crafting Canada's desired future.

Participants in this first AI conversation at Toronto's Massey College are leaders in their respective disciplines who are known for generating impact and driving results. From academia, government, and the private and non-profit sectors, they represent thinkers from all 5 of Killam's funded domains: engineering, social sciences, humanities, health sciences, and natural sciences.

AI is as transformative as the internet and smartphones that put immense power into the hands of ordinary users. Microsoft founder Bill Gates predicts that AI is going to be bigger than the internet.

With unprecedented speed, Artificial Intelligence (AI) is becoming ubiquitous. For the moment, for many jobs, people can still do better. But with the speed with which AI is evolving, it raises dystopian fears that one day, AI could surpass human capabilities and allow computers to take over. The research community is seized with understanding all dimensions of AI – social, political, psychological, legal, scientific, technological and more, to guide the evolution of AI to harness the power for good, counter malicious actors, mitigate societal risks, and seek benefits and enrichments.

A critical component of capturing the advantages of AI and of mitigating the risks is changing the conversation from mistrust and fear to understanding and confidence. It is only by boldly pursuing AI that Canada will keep up with and stay ahead of bad actors, and compete for Canada's share of the economic potential of the AI market.

To those ends, the Conversation focused on three key themes:

1) Research and innovation potential of AI
2) Ethical, equitable and safe AI
3) Socioeconomic impacts

1. Research and innovation potential of AI

AI is already transforming research in ways we could never have imagined – and has presented opportunities for researchers to help design our desired future. It identifies meaningful trends in large datasets, predicts outcomes based on data and simulates complex scenarios. As the technology develops, it may give birth to "AI scientists" with the ability to carry out independent investigations in partnership with human scientists. And the research teams of the future will be a blend of AI and humans.

Today, increasing numbers of AI researchers are collaborating with researchers in other groups, faculties and fields. They are identifying and solving problems of economic and social value that make studies more relevant and complete. At the University of Alberta, for example, professors in drama, education, physics, chemistry and design work with AI researchers to incorporate AI solutions into their fields.

The technology has proven its value in countless areas. In education, AI researchers are helping teachers revolutionize drama, education, physics, chemistry, design and more. Personal instruction has proven to be a far better mechanism than classroom-style instruction, but the required volumes and configurations of the information needed are prohibitive. Yet with the emergence of large language models (LLMs), we can scale it to students specifically. AI-powered personalized research assistants like Notebook GoogleLM allow you to upload 50 documents, ask questions and generate a short podcast – all with realistic-sounding hosts.

AI is also dramatically accelerating research into new products, from drugs and medical devices to construction materials and self-driving cars. Experimental work has historically been constrained by the pace at which limited numbers of research staff and students could work. However, AI-enabled robotics is allowing exponentially more

testing and experimentation, and is used to analyze the results in a fraction of the time. This is expected to accelerate the pace of discovery in materials science, medicine and more.

The technology has begun revolutionizing research methods for biochemistry, microbiology and other medical fields. In the past, for example, it took years to solve the 3D structure of a protein. AI powers this forward in a stunning way. One AI system, AlphaFold, predicts the 3D structure of proteins in saliva from their amino acid sequences. This can help fast-track research in fields like treating diseases, breaking down single-use plastics and finding new malaria vaccines.

Canada is vast, and not all regions have the capacity and connectivity to access this type of technology. And on a corporate level, not all businesses can afford it. Help is at hand from a number of Canadian organizations and initiatives aim to advance individual and regional access to capacity and connectivity. Some of these include AI Assist, Amii, Mila, Vector, CIFAR, regional development agencies, and the NRC, amongst others.

More specifically, in Budget 2024, the federal government announced a $2.4 billion package of measures to secure Canada's AI advantage. These investments will accelerate job growth in Canada's AI sector and beyond, boost productivity by helping researchers and businesses develop and adopt AI, and ensure this is done responsibly.

2. Ethical, equitable and safe AI

Despite the promise of the technology's benefits, it comes with risks and dangers that can spread biases and discrimination, fuel divisions and threaten fundamental human rights and freedoms. With some of these dangers already a reality, building ethical guardrails is an urgent requirement.

Developing expertise in safe AI and training will mitigate the risks. Over the last 24 months, the emphasis on reducing the dangers associated with a burgeoning AI field has intensified. Thinking has shifted to responsibilities for how it's used, where it's used and whether it can be trusted. It has also led to discussions about and actions for building ethical guardrails.

Conversation participants noted that, with intimate knowledge of AI, the research community can help integrate guardrails into all aspects of its development. But they cautioned that, while guidelines and regulations are important, they could hinder innovation or drive AI underground if they are too stringent.

We can also learn from history: When engines and motors were initially discovered and developed, they weren't regulated. But once they were used in trains, cars, planes and ships, governments established guardrails in every sector for safety. On the military front, humans have done a good job of controlling powerful weapons through legal and diplomatic measures.

Today, the negatives of AI naturally make headlines in the media because fear sells news. Many detractors feed on our mistrust. A recent example is "deepfakes," which use AI technology to create false content with realistic-looking images, videos and audio recordings, are showing how AI can pose a threat to privacy and security, create confusion and skepticism, and spread misinformation. Mitigating these risks means retaining and developing the best talent here in Canada and amongst allies. The way to achieve this is to build a world-class AI ecosystem for AI across industry, academia and government that will attract and develop talent for cyber defence and for socioeconomic gain.

Among the ethical concerns raised in the discussion were exploiting workers from the Global South. There, risks to human lives surround the development and deployment of AI systems as there are typically fewer protections for workers.

AI guidelines

Some progress has been made toward putting guidelines and regulations into place. In 2019, for example, the European Commission developed ethics guidelines around trustworthy AI.

In 2023, U.K. heads of state met at Bletchley Park and developed the Bletchley Declaration: joint agreement to work towards safe development of frontier AI. This generated agreements from signatory countries to create AI Safety Institutes (now about 10 institutes). Canada established its AI Safety Institute in November 2024. And organizations like IEEE have been devising standards and regulations over the past few years.

And at the 2025 AI Action Summit in France, Canada signed a joint Leaders' Declaration on inclusive and sustainable AI, which reinforces Canada's approach to AI development and ensures it aligns with human rights, public interest, and environmental protection. Strengthening transatlantic partnerships and securing Canada's AI advantage | Prime Minister of Canada

3. Socioeconomic impacts

AI is changing the ways in which we think, share and exchange information. We need to look at the effects of that and increase AI literacy on what the technology is, what it does, and what the risks are. Lack of understanding engenders more fear. To build trust, we need to decide how we choose literacy, how we codesign, and how we deliver the technology and the messages.

Global collaboration is key to managing AI's effects and making it safe. This will help create realistic guardrails and maintain human control over the technology. In a global world, working across borders for more consistent regulation and AI safety is essential.

AI can also have a major impact on the agriculture and food sectors. While the potential is huge for predicting climate risks to help farmers plan production and increase food safety and traceability, ethical control of food safety and pricing is a challenge.

The process of building guardrails is underway. In the food processing industry, for example, the European Commission, through the AI Pact, has developed new regulations around matters such as data protection and regulation, data governance, AI regulation, and market and consumer regulation. Member countries created pilot projects to evaluate the impact of the regulations on the agriculture and food sectors.

Development concerns also raised red flags, since AI is transforming how people make and produce media. One major worry is seeing AI as a form of media rather than a solution – a medium that accelerates innovation because you can create new AI with existing AI.

Crafting Canada's utopia

There is potential for Canada, and its scholars to take a leadership role in this space. In the Centre for AI and Digital Policy's global report on Artificial Intelligence and Democratic Values, Canada, Japan, and South Korea rank first among 80 countries as leading responsible AI adoption.

With AI pervading all parts of our lives, we are already starting to take it for granted. Let's not get lulled into complacency and forget the important steps in development and deployment that keep us on a path toward improving the world with AI. And let's engage

AI as a partner for keeping Canada at the forefront of defining advancements with all appropriate risk mitigations in place.

Everyone agrees that there's no way to predict the next 50 years of AI – even the next 24 months. Fifty years ago, no one could begin to imagine some of the revolutionary technology that today is taken for granted. This includes smartphones and CRISPR (Clustered Regularly Interspaced Short Palindomic Repeats), a system that lets scientists edit DNA in almost any kind of cell or organism.

While this first Killam Conversation on AI touched only the tip of the iceberg, it did yield a number of thoughts for addressing the immense challenges facing the world. Leaders in countries – not big technology companies chasing profits – should drive the discussions about transformation. The challenge remains to pursue the benefits of AI aggressively while establishing standards and regulations that everyone applies consistently toward a future of unbiased, democratic and safe AI.

Key ideas for the Canadian research community to contemplate:

1. As researchers, how do we take control of AI and its potential?

2. What is our role in directing society's resources to build AI tools that help us?

3. How do we implement guardrails without stifling creativity?

4. How will we use our platforms as researchers to disseminate knowledge and understanding beyond the academic community?

The Killam Conversation can play a role in shedding light on current issues facing Canada, and convening thought leaders across a variety of disciplines to discuss them. But it takes many voices and many efforts to move pressing issues forward. Others around the world are engaging in similar conversations about AI technology, ethics and creativity. At the 2024 World Economic Forum (WEF), for example, global leaders, policymakers, CEOs and academics focused on AI in The Davos Discourse. In 2025, the theme was "The Intelligent Age."

But there is room for many more minds and voices. We encourage Canadian researchers to examine the issues most relevant to them and carve out opportunities to help shape the future. A future in which Canada is at the forefront of defining advancements with all appropriate risk mitigations in place.
Leaders across industry and academia should continue to call out the risks associated with AI, define what to do about them – and find answers. Because the biggest danger could be missing the opportunity to get AI right.

ABOUT KILLAM

Killam Conversations are funded by the Killam Trusts, which since 1965 have provided more than $1 billion in scholarships, fellowships and prizes to graduate and postgraduate scholars at five Canadian universities. The current market value of the Killam Trusts is some $600 million – about the size of England's Rhodes Trust and close to Sweden's Nobel Foundation. The National Killam Program is administered by the National Research Council of Canada.

"My purpose in establishing the Killam Trusts is to help in the building of Canada's future by encouraging advanced study." – *from the Last Will and Testament of Dorothy Johnston Killam*