CIFAR

THE NEXT LEAP STARTS HERE

IMPACT REPORT
2024-25

LAND ACKNOWLEDGEMENT

The land on which CIFAR operates has been the traditional territory of the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples for thousands of years and it is still home to many diverse First Nations, Inuit and Métis peoples. We wish to pay respect to Turtle Island, and to the Indigenous history of this land. We acknowledge that the area is covered by Treaty 13, signed with the Mississaugas of the Credit. As an organization, we are committed to respectful and collaborative relationships with Indigenous communities. We will continue to find ways to ensure that we are engaging in meaningful action to move reconciliation forward.

CIFAR

From Nobel Prize wins to groundbreaking science, CIFAR's global community drove extraordinary impact and progress in 2024-2025.

This report covers the period between April 1, 2024 and March 31, 2025.

CONTENTS

JOINT MESSAGE FROM OUR PRESIDENT & CHAIR

At CIFAR, our work begins where traditional systems hesitate: at the edge of the unknown. For over 40 years, we have been committed to asking the boldest questions and creating a research ecosystem for transformational ideas to take root.

This past year, we took a decisive step forward with a renewed Strategy and a reaffirmed pinnacle aspiration: to convene and mobilize the world's most brilliant minds across disciplines and at all career stages in order to advance transformative knowledge and solve humanity's biggest problems, together.

That aspiration is already making an impact. Our researchers are exploring the nature of consciousness, developing antifungal vaccines to protect biodiversity and health, and charting pathways for a sustainable, decarbonized future — among many other important efforts. These are more than discoveries: they're paradigm shifts with the power to reshape how we understand the world and respond to challenges and opportunities on the horizon.

CIFAR's leadership in AI has also never been more visible, or more vital. We've helped shape the field, from catalyzing early AI breakthroughs through our *Artificial Intelligence, Robotics & Society* program more than four decades ago to building the foundations of Canada's AI ecosystem through the Pan-Canadian AI Strategy and, most recently, launching the Canadian AI Safety Institute Research Program at CIFAR.

This year alone, our global research community has been recognized with an extraordinary array of honours, including three Nobel Prizes, a Kyoto Prize in Basic Science and the A.M. Turing Award, often called the Nobel Prize of Computing — a powerful reminder of the global impact of CIFAR.

This work is only possible through strong partnerships. We thank the Government of

Canada for renewing its support through the Strategic Science Fund and are deeply grateful to our provincial partners, international collaborators and generous donors around the globe. Together, we are nurturing the next generation of leaders and cultivating the ecosystems that produce new knowledge to improve our world.

CIFAR's story has always been one of boldness and possibility — of seeing what's next and building the conditions to get there. In a moment when trust in science is being tested, we believe that boundless ideas, deep collaboration and long-term investment are more essential than ever. We are proud to champion that vision, in pursuit of knowledge that serves humanity.

We hope you enjoy our latest Impact Report and sincerely thank you for being part of our global community.

The next leap starts here.

Stephen J. Toope
OC, FRSC, LLD
President & CEO

Irfhan Rawji
Chair
CIFAR Board of Directors

2024-2025

HIGHLIGHTS AT A GLANCE

GLOBAL RESEARCH COMMUNITY

502

researchers across 23 countries and 167 institutions, spanning 6 continents

(266 Fellows, 66 Advisors, 26 CIFAR Azrieli Global Scholars, 126 Canada CIFAR AI Chairs, 18 Solution Network members)

SCIENTIFIC EXCELLENCE

117

major awards and honours received by CIFAR researchers this year

(78 from our researchers in our programs and 39 from Canada CIFAR AI Chairs)

HIGH-IMPACT RESEARCH

2,211

publications from 355 researchers

TOP-TIER SCHOLARSHIP

219

researchers (62%) contributed to the top 1% of most-cited papers globally

RESEARCH THAT SHAPES THE WORLD

95%

of CIFAR researchers say CIFAR shaped their ideas and research directions

TRUSTED PARTNERS

82

formal partnerships with governments, foundations, industry and research organizations

CATALYZING BOLD IDEAS

73

Catalyst Funds awarded to research where high potential meets high uncertainty

$3.8M

in Catalyst Funds committed to projects that will accelerate discovery

EXTERNAL MOMENTUM

$229M

in additional funding secured for research shaped by CIFAR

SELECT HIGHLIGHTS FROM OUR 40-YEAR HISTORY

GLOBAL RECOGNITION

23 Nobel Prizes and 4 ACM A.M. Turing Awards received by CIFAR-affiliated researchers to-date

CITATION IMPACT

CIFAR researchers' work was cited 3.6 times more than the global average in their fields (1996-2023)

MENTORSHIP MULTIPLIER

CIFAR Fellows and Advisors mentored nearly 3 times more trainees than comparable peers (1996-2023)

CIFAR'S AI LEADERSHIP: A NATIONAL LEGACY WITH GLOBAL REACH

For over 40 years, CIFAR has cultivated a world-leading AI research ecosystem, attracting top global talent and driving breakthroughs in science and technology.

Group photo at the annual AICan meeting.

***Geoffrey Hinton** received the 2024 Nobel Prize in Physics for his foundational work on neural networks.*

Now in its ninth year, CIFAR's leadership through the Pan-Canadian AI Strategy continues this legacy by advancing cutting-edge research and talent in collaboration with our three national AI Institutes: Amii in Alberta, Mila in Québec and the Vector Institute in Ontario.

With continued support from the Government of Canada, the Pan-Canadian AI Strategy has firmly positioned Canada as a global leader in responsible AI. It is catalyzing real-world impact through the pursuit of transformative research ideas, the creation of innovative startups and high-quality jobs, talent attraction from all over the world, and increased investment in Canada.

A Globally Renowned Research and Talent Hub

CIFAR's longstanding scientific excellence was recognized this year with major honours, including two of the world's most prestigious awards.

Geoffrey Hinton (University of Toronto, Canada) received the 2024 Nobel Prize in Physics for his foundational work on neural networks. Hinton was a member of CIFAR's first AI program in 1987, *Artificial Intelligence, Robotics & Society*, and created and led our *Neural Computation and Adaptive Perception* program during the formative years of deep learning from 2004 to 2014. He is now a Distinguished Fellow in the successor program, *Learning in Machines & Brains*.

Richard S. Sutton (University of Alberta, Canada), a Canada CIFAR AI Chair, first joined CIFAR in 2015 as a Fellow in the *Learning in Machines & Brains* program. He was awarded the 2025 ACM A.M. Turing Award for his pioneering work in reinforcement learning — a key method enabling AI systems to learn through interaction.

Attracting Talent, Accelerating Discovery: Canada's AI Momentum

The Pan-Canadian AI Strategy attracts top global talent to Canada to pursue cutting-edge research, train the next generation of AI leaders and drive innovation that strengthens and reshapes the Canadian economy.

2024-2025

AI BY THE NUMBERS

126 active Canada CIFAR AI Chairs

CANADA IS 5TH among the top 100 most-cited AI publications in the world[1]

CANADA RANKS 5TH in the world for the creation of high-potential AI startups, with 481 new startups created. Canada ranks behind only the U.S., China, the U.K. and Israel[2]

CANADA IS 6TH worldwide for AI R&D according to Stanford's Global AI Vibrancy Index[3]

$2.89B in private investment in Canadian AI companies[4]; AI investments constitute a full 30% of all venture capital funding in Canada[5]

418 TRAINEES participated in CIFAR's NextGen AI training programs

1 https://hai.stanford.edu/ai-index/2025-ai-index-report *(Fig. 1.11)*
2 https://hai.stanford.edu/research/ai-index-report *(Fig. 4.3.13)*
3 https://hai.stanford.edu/ai-index/global-vibrancy-tool
4 https://hai.stanford.edu/research/ai-index-report *(Fig. 4.3.8)*
5 https://www.bdc.ca/en/about/analysis-research/canada-venture-capital-landscape

***Parvin Mousavi** advances AI-driven healthcare by applying machine learning to analyze ultrasound signals and metabolic and robotic data, for early detection of cancer and stroke.*

AI For Health Innovators

REINVENTING PROSTHETICS WITH AI

Patrick M. Pilarski (University of Alberta, Canada), Canada CIFAR AI Chair at Amii, is transforming prosthetic technology through machine learning to restore and enhance mobility for people with amputations. He co-leads the first lab in Canada to introduce both lower and upper limb bone anchoring, connecting advanced prosthetics directly to bone. By applying intelligent control systems, his team enables more natural movement, greater comfort and improved quality of life for users.

MACHINE LEARNING TO TRANSFORM DISEASE DIAGNOSIS

Parvin Mousavi (Queen's University, Canada) advances AI-driven healthcare by applying machine learning to analyze ultrasound signals and metabolic and robotic data, for early detection of cancer and stroke. As a Canada CIFAR AI Chair at the Vector Institute, she develops AI tools that support real-time surgical decisions, helping surgeons navigate complex procedures with greater precision, reduce risks and improve patient health outcomes.

Bridging Research and Real-World Impact

CIFAR Solution Networks are forging strong connections between cutting-edge AI research and frontline healthcare challenges. These initiatives go beyond academic insight, deploying tools in real communities to improve health outcomes, demonstrating how AI can make a profound difference in people's lives.

AI FOR DIABETES PREDICTION AND PREVENTION

In Ontario's Peel region, which has one of the highest rates of Type 2 diabetes in Canada, researchers Laura Rosella and James Shaw (both at University of Toronto, Canada) are collaborating closely with community healthcare providers. Their AI-driven risk

prediction system helps detect diabetes earlier by addressing barriers to care, such as limited access to healthcare and the high cost of medications, and enables scalable solutions at the population health level.

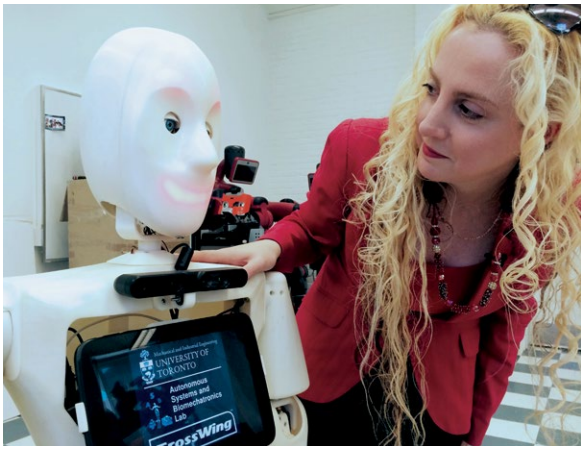
INTEGRATED AI FOR HEALTH IMAGING

Led by researchers Robert Avram (Université de Montréal, Canada) and Samuel Kadoury (Polytechnique Montréal, Canada), this project integrates AI into existing medical imaging infrastructure to enhance clinical decision-making and improve diagnostic accuracy. Using data from medical images, such as X-rays and ultrasounds, the team has developed a custom AI software called PACS-AI, which is already showing promise. This includes successfully integrating a medical AI algorithm (CathEF) to rapidly and reliably identify underlying heart damage in patients treated for heart attacks.

Canada Leads on AI Safety

This year, CIFAR launched the Canadian AI Safety Institute Research Program at CIFAR — a bold national initiative supported by the Government of Canada, and powered by the Canada CIFAR AI Chairs and other leading researchers from Amii, Mila and the Vector Institute. The initiative puts Canada at the forefront of research tackling the risks posed by advanced AI systems, and is already making a difference: through initiatives like AI Safety Catalyst Grants and Solution Networks, CIFAR is driving research and innovation that is shaping safe AI and promoting an AI future that is trustworthy and aligned with human values.


LEADING IN AN
IEFA
FEIA


UNIVERSITY OF TORONTO
Autonomous Systems and Biomechatronics Lab

DRIVING FUNDAMENTAL RESEARCH & IMPACT

CIFAR was built on the conviction that bold ideas, interdisciplinary collaboration and long-term commitment are essential to understanding and improving our world.

Alán Aspuru-Guzik, Co-Director of Accelerated Decarbonization program and Canada CIFAR AI Chair, in his lab.

*"CIFAR is a **dynamic, influential, nimble, and exciting team** at the forefront of discovery." – MICHAEL KOERNER, DONOR AND FORMER MEMBER, CIFAR COUNCIL OF ADVISORS*

Across disciplines, CIFAR-supported researchers are making paradigm-shifting discoveries that redefine what's possible in science, health, technology and society.

This year, we saw fundamental breakthroughs that show how long-view research can drive seismic impact: from redefining consciousness, to safeguarding biodiversity, to creating new tools for sustainable energy and climate resilience.

In 2024-2025 alone, research inspired by CIFAR's programs helped secure more than $229 million in additional funding for projects seeded by CIFAR. Our Catalyst Fund — which supported 73 bold, early-stage projects this fiscal year — continues to be a launchpad for ideas that others scale.

Consciousness, Reimagined

As we continue to understand human consciousness, and as AI systems and synthetic life forms — such as programmable organisms — grow more complex, knowing who or what is conscious has never been more important. That's why researchers in CIFAR's *Brain, Mind & Consciousness* program launched a global study to redefine how we detect consciousness across humans, animals, machines and organoids. Their work identifies key failures in current tests and proposes a new multidimensional framework to guide science, ethics and policy. By advancing tools to recognize consciousness in overlooked or emerging systems, this research has the potential to transform medical care, reshape AI oversight and challenge how we understand awareness itself.

The study included Co-Directors Tim Bayne (Monash University, Australia), Liad Mudrik (Tel Aviv University, Israel) and Anil Seth (University of Sussex, United Kingdom), among other program members.

Adrian M. Owen's *leading-edge work is transforming diagnosis and care for individuals with severe brain injuries and neurodegenerative conditions.*

SPOTLIGHT

Adrian M. Owen (Western University, Canada), Koerner Fellow in the *Brain, Mind & Consciousness* program, uses MRI and EEG — medical imaging and electrical activity of the brain — to detect hidden signs of consciousness in unresponsive patients. His leading-edge work is transforming diagnosis and care for individuals with severe brain injuries and neurodegenerative conditions, changing how we understand awareness when it appears to be lost.

SPOTLIGHT

For 35 years, the Koerner family has been engaged with CIFAR, starting with Michael Koerner's philanthropy in the early years of CIFAR under the leadership of Founding President, Fraser Mustard. Today, Michael's daughter, Jacqueline Koerner, is Co-Vice-Chair of the CIFAR Board and, as well, a donor. Next generation family member, Robin Yeo, recently participated in the direction and structure of a new grant — a matching opportunity, called the "Futures Challenge", encouraging our CIFAR community to join them in supporting team-based, interdisciplinary research that can solve some of the world's greatest challenges.

"We have watched CIFAR grow from a wonderful idea into a global research leader. CIFAR is a dynamic, influential, nimble, and exciting team at the forefront of discovery, consistently exceeding expectations. I particularly appreciate the powerful curiosity, camaraderie and mentorship that drives extraordinary outcomes from the community," said Michael Koerner, donor and former member, CIFAR Council of Advisors.

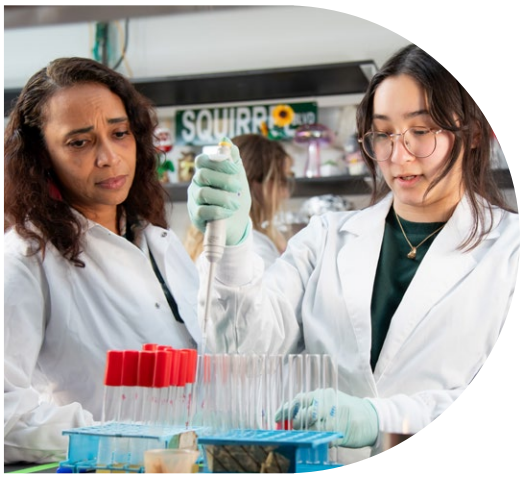
*CIFAR researchers in the **Fungal Kingdom: Threats & Opportunities** program have played a critical role in developing a vaccine for white-nose syndrome, a fungal disease devastating North American bat populations.*

How Does Wildfire Smoke Impact Early Child Development?

Women across the province of British Columbia who were pregnant from 2016 onward — and exposed to wildfires — are being recruited into a groundbreaking study. CIFAR researchers in the *Child & Brain Development* program are leading a first-of-its-kind study on how wildfire smoke affects babies exposed in utero. Led by Fellow Michael S. Kobor (University of British Columbia, Canada) and in collaboration with Program Co-Director Thomas McDade (Northwestern University, United States), the team is analyzing neonatal blood spots to detect inflammation and epigenetic changes tied to smoke exposure, integrating this data with geocoded air quality and household environments. As climate change fuels more severe wildfires, this research offers urgent insights into the lasting health impacts on children. It will help shape future policies to better protect pregnant women and newborns during wildfire seasons.

Vaccinating Bats to Protect Human Babies

CIFAR researchers in the *Fungal Kingdom: Threats & Opportunities* program have played a critical role in developing a vaccine for white-nose syndrome, a fungal disease devastating North American bat populations. Bats are vital for natural pest control, and their decline leads to more insecticide use, which research now links to increased infant mortality in humans. This breakthrough — led by Associate Fellow David S. Blehert (National Wildlife Health Center, United States), Bruce Klein (University of Wisconsin-Madison, United States) and Fellow Don Sheppard (McGill University, Canada) — doesn't just protect biodiversity: it supports healthier crops, safer human pregnancies and reduced chemical exposure. It's a striking example of how investing in ecosystems directly improves human health.



Driving Antifungal Innovation

Through three global summits, CIFAR's *Fungal Kingdom: Threats & Opportunities* program has mobilized science, industry and government to break long-standing bottlenecks in antifungal drug development. These efforts by program members have helped revive a shelved Pfizer drug and led to a USD$268M investment from the U.S. Biomedical Advanced Research and Development Authority (BARDA) — its first ever investment in antifungals. CIFAR's convening power is now drawing new partners, including the Global Antibiotic Research and Development Partnership (GARDP), catalyzing progress in this underserved field.

SPOTLIGHT

Anuradha Chowdhary (University of Delhi, India), a Fellow in the *Fungal Kingdom* program, specializes in emerging drug-resistant fungal infections. She leads India's National Reference Laboratory for Antimicrobial Resistance in Fungal Pathogens. Chowdhary investigates Candida auris, a difficult-to-treat yeast spreading through direct and indirect contact with infected individuals and surfaces in hospitals around the world. Her research combines molecular ecology, genomics and epidemiology to confront this escalating global health threat.

The Future of Energy

The world's growing demand for energy must be met while preserving our precious natural environment. CIFAR is helping reshape global energy systems by advancing breakthrough research in clean fuels, energy efficiency and decarbonization. From extracting natural hydrogen deep underground to supercharging mineralization and rethinking the carbon cost of computing, CIFAR researchers are creating pathways toward a net-zero future.

DEEP UNDERGROUND LIES A NATURAL HYDROGEN SOLUTION

Today's hydrogen often comes from fossil fuels, but CIFAR's *Earth 4D: Subsurface Science & Exploration* researchers are exploring a cleaner source — natural hydrogen that forms underground through geological processes. At a 2024 expert panel hosted by CIFAR, participants from six countries collaborated to accelerate this

emerging field. The group is now informing Canada's Hydrogen Strategy and working with government and industry to identify sustainable opportunities. This work may lead to a new frontier in clean energy.

SPOTLIGHT

Mang Lin (Chinese Academy of Sciences, China), a CIFAR Azrieli Global Scholar in the *Earth 4D: Subsurface Science & Exploration* program, was awarded a prestigious $10 million research grant from the Chinese Academy of Sciences, serving as sole Principal Investigator and leading a team of approximately 30 researchers. The project explores how gases and other volatile substances move deep within the Earth and its surface, and how these movements may help explain the formation of natural resources like underground hydrogen. Building on this success, Lin was appointed this year as Director of China's newly established State Key Laboratory of Deep Earth Processes and Resources.

FROM MINING WASTE TO CARBON SINKS

Steel, cement and mining are among the world's most carbon-intensive sectors. Matthew Kanan (Stanford University, United States) and Yogesh Surendranath (Massachusetts Institute of Technology, United States), CIFAR Fellows in the *Accelerated Decarbonization* program, are changing that by developing low-energy processes that turn rock and mining waste into stable carbonates. These materials safely store CO_2 and can even be used in concrete. The result: scalable decarbonization with practical industrial applications. This work is supported by many CIFAR donors including Canada Life, the Chisholm Thomson Family Foundation and the Trottier Family Foundation.

SPOTLIGHT

Program Co-Directors Alán Aspuru-Guzik (University of Toronto, Canada), who is also a Canada CIFAR AI Chair at the Vector Institute, and Curtis P. Berlinguette (University of British Columbia, Canada) lead CIFAR's *Accelerated Decarbonization* program to advance clean technologies that convert carbon and environmental waste into valuable fuels, chemicals and materials. Their leadership is helping chart a path toward scalable, low-carbon innovation across sectors, by developing real-world solutions through interdisciplinary science.

Harnessing AI to Make Energy Cleaner

Energy use by data centres and AI systems is growing fast. CIFAR researchers are making computing more energy-efficient by designing machine learning systems that use less power without compromising performance. Gennady Pekhimenko (University of Toronto, Canada) is a Canada CIFAR AI Chair at the Vector Institute. His company, CentML — which was acquired by Nvidia in 2025 — provides tools that reduce the carbon footprint of AI workloads. The company also connects developers with underused compute resources, creating a new micro-economy of clean AI innovation.

SPOTLIGHT

Martha White (University of Alberta, Canada), a Canada CIFAR AI Chair at Amii, is advancing the next generation of adaptive autonomous agents — AI systems that learn continuously from streaming data. Her research focuses on developing intelligent control algorithms that optimize the operation of large-scale infrastructure, such as water treatment plants and biorefineries. By moving beyond simple rule-based logic, these adaptive agents can learn directly from the vast data streams they encounter. White's work has the potential to impact energy efficiency across diverse industries.

Breakthroughs with Global Impact

CIFAR's decades-long investment in pressing research areas, such as equitable prosperity or planetary systems, to name a few, is gaining global recognition. Our researchers are being honoured with the world's most prestigious awards for work that continues to transform how we understand both society and the planet. From redefining the roots of economic development to uncovering Earth's ancient climate history, these accolades reflect the profound impact of CIFAR researchers in shaping a more inclusive and sustainable future.

DARON ACEMOGLU & JAMES ROBINSON

(The Sveriges Riksbank Prize in Economic Sciences)

Daron Acemoglu (Massachusetts Institute of Technology, United States) and James Robinson (University of Chicago, United States), former Fellows in CIFAR's *Institutions, Organizations & Growth* program, which concluded its work in 2019, were awarded the 2024 (Nobel) Sveriges Riksbank Prize in Economic Sciences for their transformative research on inclusive institutions and national prosperity. In their groundbreaking book, *Why Nations Fail: The Origins of Power, Prosperity and Poverty*, they showed how concentrated power and wealth drive inequality and stagnation. Their work has reshaped global thinking on development economics and influenced policy worldwide. CIFAR continues the tradition of supporting work that examines how institutional systems and structures support or exacerbate inequities through the *Innovation, Equity & the Future of Prosperity* program.

PAUL HOFFMAN

(Kyoto Prize in Basic Sciences)

Paul Hoffman (University of Victoria, Canada), a world-renowned geologist and member of CIFAR's now-completed *Earth System Evolution* program, was awarded the 2024 Kyoto Prize in Basic Sciences for his groundbreaking "Snowball Earth" hypothesis. With CIFAR's support, Hoffman challenged conventional thinking and helped transform our understanding of Earth's ancient climate and its influence on life. His bold ideas are now foundational in Earth sciences. Today, these research avenues remain ongoing at CIFAR through the *Earth 4D: Subsurface Science & Exploration* program.

To learn more about CIFAR's fundamental research programs, see pages 32-33.

EXPLORING CHALLENGES ON THE HORIZON

CIFAR's renewed Strategy recognizes that the most serious threats and opportunities for human health and prosperity will unfold over the coming decades.

CIFAR's Future of Food panel visits a rooftop farm in Toronto.

*CIFAR's partnership with the **Geneva Science and Diplomacy Anticipator** (GESDA) seeks to create synergies between existing initiatives while forging new pathways.*

Over the last fiscal year, CIFAR has deepened its partnerships and launched initiatives to anticipate and explore the ideas and challenges that will shape our world over the next 10, 20 or more years.

The Future of Food

Food is responsible for the greatest environmental impact humans have on this planet. This includes food production, transportation and processing. In fact, food accounts for 50% of habitable land and 70% of freshwater use. The global food system is also under mounting pressure: food insecurity is rising, biodiversity is declining and climate-driven shocks have intensified. In 2024, with the generous support of the Arrell Family Foundation, CIFAR launched a Discovery Panel on the Future of Food to explore this growing complexity. Their conclusion: incremental change isn't enough. We need a fundamental rethinking of how food is produced, consumed and governed — grounded in long-term, interdisciplinary research that connects local practices to global systems and drives sustainable transformation.

Since understanding key complexities in the food system cannot wait, we launched the CIFAR Arrell Future of Food Initiative in September 2025 with a call for new Discovery Workshops to deeply explore key issues and develop a roadmap for advancing progress.

Learn more by reading the Future of Food Report on our website at cifar.ca.

Collaboration on Science Anticipation and Research Foresight

Last year, CIFAR strengthened its collaboration with the Geneva Science and Diplomacy Anticipator (GESDA). This partnership seeks to create synergies between existing initiatives while forging new pathways, and capitalizing on our respective networks of experts to drive progress towards shared goals in the fields of scientific anticipation and research foresight.

SPOTLIGHT

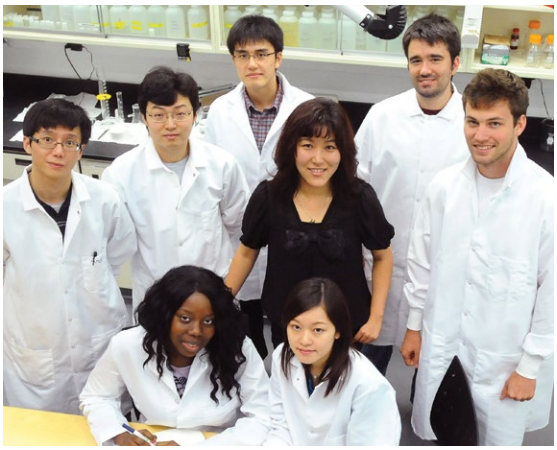
The Ralph M. Barford Foundation made the inaugural donation in support of CIFAR's commitment to Challenges on the Horizon. Honouring Ralph M. Barford, a former Board Director, the gift honours both his legacy and CIFAR's future — a meaningful gesture made all the more poignant by the timing of the initial discussion, on the day Geoffrey Hinton received the Nobel Prize in Physics. This marked a full-circle moment in CIFAR's history, as Ralph Barford was a CIFAR Board member during the early days of Geoffrey Hinton's groundbreaking work.

SPOTLIGHT

Like many frontiers of sustainable development, climate change is a problem that cannot be solved by a single decision-maker. With this in mind, CIFAR researchers are developing an AI framework to understand and incentivize collaborative climate action.

Their pilot project uses AI inspired by social neuroscience — such as Multi-Agent Reinforcement Learning (MARL) — to model human decision-making around climate solutions, incorporating cognitive biases and social behaviours. The system then explores realistic strategies for cooperation and coordination. The first application of this AI framework will be in sustainable water management, with potential to expand to other sustainability challenges. This work is supported by our partnership with the Swiss National Science Foundation (SNSF).

The research team includes: Guillaume Dumas (Université de Montréal, Canada), a CIFAR Azrieli Global Scholar (2023-2025) in the *Brain, Mind & Consciousness* program, Christof Brandtner (emlyon business school, France), Fellow in the *Innovation, Equity & the Future of Prosperity* program, Élise Devoie (Queen's University, Canada), a CIFAR Azrieli Global Scholar (2023-2025) in the *Earth 4D* program, Benjamin Rosman (University of the Witwatersrand, South Africa), a Fellow in the *Learning in Machines & Brains* program and researcher Patrick Haack (University of Lausanne, Switzerland).

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Paul F. Hoffman

ENGAGING DIVERSE NETWORKS

CIFAR is a global platform and convener for diverse networks, uniting researchers, institutions and sectors across borders and disciplines. In 2024-2025, we had 82 active partnerships with governments, research organizations, industries and foundations, in more than 10 countries around the world.

Attendee at the CIFAR Forum on Radical Interdisciplinarity viewing artifacts at the Musée d'histoire des sciences.

By creating space for deep, sustained collaboration, CIFAR continues to foster breakthrough ideas that no one research area or country could achieve alone.

Catalyzing Leadership for Women Researchers in Africa

In January 2025, CIFAR hosted the Women in Research Leadership Development Symposium, in partnership with the Mastercard Foundation. The event brought together 55 exceptional researchers from across sub-Saharan Africa for three days of skills training, mentorship and interdisciplinary networking. Designed to empower early-career female researchers, the symposium provided opportunities to strengthen leadership capacity, foster collaboration and build lasting professional networks.

SPOTLIGHT

Sahba Nomvula Besharati (University of the Witwatersrand (Wits) in South Africa), a CIFAR Azrieli Global Scholar (2021-2023) in the *Brain, Mind & Consciousness* program, was among the attendees of the Women in Research Leadership Development Symposium. Besharati, a neuropsychologist and senior lecturer in cognitive neuroscience, understands the value of a strong support system for early-career researchers. She recalls how transformative it was to be part of the CIFAR Azrieli Global Scholars program early in her academic journey. Now further along in her career, attending this new symposium held special weight — she was no longer an early-career researcher; she had become a mentor.

Bold, Cross-border Collaboration

CIFAR's partnership with the Swiss National Science Foundation (SNSF) is fostering bold, cross-border collaboration and diversifying our global research community. At the 2025 CIFAR Forum on Radical Interdisciplinarity, 37 early-career researchers from 33 disciplines explored frontier topics, from climate change and AI to extraterrestrial life.

SPOTLIGHT

CIFAR *Quantum Materials* Co-Director, Alannah Hallas (University of British Columbia, Canada) participated in a panel discussion at the Swiss-Canada Quantum Symposium held in Calgary in October 2024, where she spoke to the importance of CIFAR's research partnership with the SNSF. Hosted by the Swiss Embassy, the event brought together top Swiss and Canadian quantum researchers, with His Excellency Olaf Kjelsen, Swiss Ambassador to Canada, also in attendance.

EXPANDING THE NEXT GENERATION OF RESEARCH LEADERS

CIFAR continues to shape the future of research and innovation by supporting early-career researchers.

Jacqueline Goordial measuring a thaw slump in the Northwest Territories.

*Since 2016, the **CIFAR Azrieli Global Scholars** program has supported the next generation of research leaders, fostering interdisciplinary collaboration and bold thinking.*

The CIFAR Azrieli Global Scholars program exemplifies our commitment to next-generation researchers, enabling them to produce leading-edge work across disciplines. Having delivered 10 years of meaningful outcomes, the program underscores the long-term strength of CIFAR's model.

Since 2016, CIFAR Azrieli Global Scholars, who make up less than 10% of CIFAR's community, have contributed to nearly 125 Catalyst Fund projects, representing one-third of all CIFAR collaborations. They've also taken part in 56 cross-program projects — showing a strong drive for interdisciplinary collaboration, a cornerstone of CIFAR's model.

In addition, for more than 20 years, CIFAR's Winter and Summer Schools have provided immersive and interdisciplinary training through mentorship, global networking and exposure to cutting-edge research.

Permafrost and Pathogens: CIFAR Azrieli Global Scholars Forge Bold Collaboration

Since 2016, the CIFAR Azrieli Global Scholars program has supported the next generation of research leaders, fostering interdisciplinary collaboration and bold thinking. This is exemplified by the work of Jacqueline Goordial (University of Guelph, Canada), Fellow in *Earth 4D: Subsurface Science & Exploration* and Rebecca Shapiro (University of Guelph, Canada) in *Fungal Kingdom: Threats & Opportunities*, who were both CIFAR Azrieli Global Scholars in the 2021-2023 cohort.

Their ongoing project — bridging permafrost microbiology and fungal biology — investigates ancient microbes that are released by thawing permafrost and their potential threat to health today.

SPOTLIGHT

CIFAR Azrieli Global Scholars (2017-2019) Alexander Kwarteng (Kwame Nkrumah University of Science and Technology, Ghana) in the *Humans & the Microbiome* program and Kristi Kenyon (University of Winnipeg, Canada) of the now-completed *Successful Societies* program, are investigating the molecular and immunological roots of neglected tropical diseases, including filarial infections. Born out of a 2018 Global Scholars meeting, this interdisciplinary project explores how communities in Ghana perceive Lymphatic Filariasis — a disease caused by parasitic worms transmitted to humans through mosquito bites — and how stigma around the disease hinders access to health care and community support.

Fostering the Next Generation of Thinkers Through CIFAR's Summer and Winter Schools

CIFAR's Winter and Summer Schools have a rich history of offering immersive, interdisciplinary training for thousands of senior PhD students and postdoctoral fellows, connecting them with mentors and peers from across the world. For 20 years, The CIFAR Deep Learning + Reinforcement Learning Summer School, in partnership with Amii, Mila and the Vector Institute, has positioned Canada as a global hub for AI talent. Meanwhile, the CIFAR Neuroscience of Consciousness Winter School brings together emerging neuroscience leaders with leading researchers in the *Brain, Mind & Consciousness* program for three days of intensive learning, where experts unravel the mysteries of consciousness.

2024-2025

NEXT GENERATION IMPACT AT A GLANCE

8 COUNTRIES

were represented among our Global Scholars, enriching the program and expanding our global network

18 NEXT GENERATION INITIATIVES

(**8** in our Research Programs and **10** under the Pan-Canadian AI Strategy) at CIFAR provided early-career researchers with mentorship, training and a supportive community to fuel interdisciplinary innovation

26 CIFAR AZRIELI GLOBAL SCHOLARS

were supported by CIFAR, each driving bold research across diverse fields

278 PARTICIPANTS

engaged in CIFAR's Summer and Winter Schools, deepening their knowledge and building interdisciplinary networks

14 PRESTIGIOUS RECOGNITIONS

were awarded to CIFAR Azrieli Global Scholars, including an Alfred P. Sloan Research Fellowship, a Presidential Early Career Award for Scientists and Engineers, and the Krill Prize for Excellence in Scientific Research

CIFAR PROGRAMS AT A GLANCE

Through our portfolio of 15 fundamental research programs, CIFAR convenes and mobilizes the world's most brilliant people across disciplines and at all career stages to advance transformative knowledge and solve humanity's biggest problems, together.

Operating over five-year terms, each program fosters deep collaboration among leading researchers and CIFAR Azrieli Global Scholars. Impact is shaped through ongoing dialogue between academic and non-academic stakeholders to address humanity's most pressing challenges and to seize great opportunities.

CIFAR isn't focused on incremental change — it is committed to paradigm-shifting leaps.

To learn more about CIFAR's Research Programs, visit cifar.ca/research-programs/.

ACCELERATED DECARBONIZATION

Innovative ways to capture and store carbon are a key focus of CIFAR's *Accelerated Decarbonization* program. Researchers are exploring how common minerals, even waste like mine tailings, can help lock carbon away. Program researchers are also turning captured carbon into useful products like low-emission cement and crop-boosting fertilizers.

BOUNDARIES, MEMBERSHIP & BELONGING

This year, the *Boundaries, Membership & Belonging* program focused on how global crises, such as climate change, inequality, rising authoritarianism and mass migration, reshape our sense of belonging in societies. From "polycrisis" to "permacrisis," these overlapping global challenges are putting pressure on the ways communities draw boundaries and define membership.

BRAIN, MIND & CONSCIOUSNESS

The *Brain, Mind & Consciousness* program brings together neuroscientists, philosophers and psychologists to explore one of life's biggest questions: what is consciousness, and how does it work? This year, the team focused on three key areas: tests for consciousness, development of consciousness and functions of consciousness.

CHILD & BRAIN DEVELOPMENT

This year, researchers in the *Child & Brain Development* program explored how early life experiences shape long-term health and development. One of the highlights included breakthroughs in tracking biological aging in children using simple, non-invasive tools. Fellows also reframed "forgetting" as a form of brain flexibility, while cross-species studies revealed how early social conditions can leave lasting marks on our biology.

CIFAR MACMILLAN MULTISCALE HUMAN

The *CIFAR MacMillan Multiscale Human* program is building a revolutionary model of the human body across scales, linking genes to organs with tools like AI, genomics and advanced imaging. This "Google Maps" of the human body will help researchers understand health and disease across biological scales, paving the way for faster discoveries and personalized medicine.

EARTH 4D: SUBSURFACE SCIENCE & EXPLORATION

The *Earth 4D: Subsurface Science & Exploration* program explores big, interconnected questions about life, energy, water and time, both on Earth and beyond. This year, a powerful new theme emerged: habitability and energy. Researchers are studying how life survives in extreme environments deep underground, as well as novel energy sources that could address the current and future challenges of energy consumption and climate change.

FUNGAL KINGDOM: THREATS & OPPORTUNITIES

The *Fungal Kingdom: Threats & Opportunities* program continues to bring together experts across disciplines to understand fungi, both as threats to human, animal and plant health, and as powerful tools for innovation. This year, the team explored fungal adaptation, drug resistance and strategies to combat disease.

FUTURE FLOURISHING

The *Future Flourishing* program brings together scholars, artists and cultural leaders, and asks: *What does it mean to live well?* This year, the team explored how ideas of human exceptionalism have shaped science, art and culture, and how challenging those ideas could lead to more just and sustainable futures.

GRAVITY & THE EXTREME UNIVERSE

The *Gravity & the Extreme Universe* program explores some of the most profound mysteries in astrophysics — from black holes and neutron stars to the accelerating expansion of the Universe. This year, program researchers played leading roles in detecting and analyzing gravitational waves, unlocking new ways to study cosmic collisions and testing Einstein's theory of gravity.

HUMANITY'S URBAN FUTURE

CIFAR's *Humanity's Urban Future* program is rethinking how we understand and shape cities. Now in its second full year, the program has coalesced around three core themes: Making and Unmaking, Knowing and Unknowing, and Imag(in)ing the City. Early research explores topics like climate "boom towns," and urban imaginaries in the Global South.

HUMANS & THE MICROBIOME

This past year, the *Humans & the Microbiome* program explored how the microbes in and on our bodies are deeply connected to those in our social circles, homes, food systems and environments. This broader perspective challenges conventional medicine's focus on individuals, emphasizing instead the collective nature of microbial health.

INNOVATION, EQUITY & THE FUTURE OF PROSPERITY

The *Innovation, Equity & the Future of Prosperity* program explores how technological change can either widen or reduce social inequality. Over the past year, researchers examined how innovation— across industries like mining, caregiving and advanced manufacturing — affects access to opportunity, labour conditions and local economies.

LEARNING IN MACHINES & BRAINS

The *Learning in Machines & Brains* program continues to bridge insights between brain science and machine learning. This past year, researchers tackled urgent challenges in building more responsible AI, such as teaching models to reason more reliably, forget sensitive data when needed and generate better scientific knowledge. Researchers also used AI to better understand how the brain works, developing models that mimic attention, memory and neural rhythms.

QUANTUM INFORMATION SCIENCE

The *Quantum Information Science* program explores how quantum systems can revolutionize computing and deepen our understanding of physics. This year researchers investigated quantum machine learning, advanced quantum chemistry applications and novel approaches to computing beyond traditional qubits.

QUANTUM MATERIALS

The *Quantum Materials* program is entering an exciting new chapter, focused on designing and exploring "new quantum worlds." Researchers are advancing next-generation materials while expanding efforts in custom material design. These discoveries aim to unlock new possibilities in quantum technologies and fundamental physics.

CIFAR Supporters

We extend a heartfelt thank you to our supporters for their generosity and inspiring commitment to our mission. You empower CIFAR to address the most pressing questions facing science and humanity.

DONORS

Lifetime Giving

We proudly celebrate the exceptional generosity of donors whose lifetime giving has helped shape CIFAR's story. Discover the supporters whose cumulative giving of $1 million+ reflects a profound commitment to CIFAR's mission at: cifar.ca/supporters.

Every gift fuels CIFAR's groundbreaking discoveries. Thank you to all who supported our mission this year including these champions who made multi-year commitments (in ***italics***) and gifts of $100,000 or greater between January 1, 2024 and March 31, 2025.

CIFAR is also proud to share that 100% of our Board of Directors and Executive Team support CIFAR philanthropically, demonstrating their strong commitment to our mission.

Anonymous

Alfred P. Sloan Foundation

The Azrieli Foundation

Canada Life

Chisholm Thomson Family Foundation

The George Cedric Metcalf Charitable Foundation

The Henry White Kinnear Foundation

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Richard Rooney

Templeton World Charity Foundation, Inc.

Trottier Family Foundation

The Fraser Mustard Legacy Society

We are profoundly grateful to the generous individuals who have made CIFAR part of their legacy through a meaningful bequest.

Lesley Evans

Elizabeth Gerrits

Richard Ivey

Lawrence Tanenbaum

*To explore how you can further your impact or for any questions, please reach out to **jennifer.marczak@cifar.ca**, Manager, Donor Relations.*

Government Support

With deep gratitude, we acknowledge the essential support of our government partners in advancing CIFAR's mission:

Innovation, Science and Economic Development Canada (ISED)

The International Development Research Centre (IDRC)

The Ministry of Technology and Innovation of Alberta

Le Fonds de recherche du Québec (FRQ)

Research Partners

Thank you to our research funding partners for advancing CIFAR's bold ideas and catalyzing our global impact through collaboration, insight and shared commitment.

The British Academy

European Laboratory for Learning and Intelligent Systems (ELLIS)

Geneva Science and Diplomacy Anticipator (GESDA)

Genome British Columbia

Helmholtz Association (Germany)

Inria (France)

IVADO (Canada)

International Research Center for Neurointelligence (IRCN) (Japan)

Jacobs Foundation (Switzerland)

National Science and Technology Council (NSTC - Taiwan)

Swiss National Science Foundation (SNSF)

CIFAR FINANCIAL OVERVIEW | (In thousands of dollars)
March 31, 2025, with comparative information for 2024

SUMMARIZED STATEMENT OF FINANCIAL POSITION	2025	2024
ASSETS		
Current assets (cash, accounts receivable and prepaid expenses)	13,163	12,700
Investments	31,654	28,581
Other assets	486	635
	$45,303	**$41,916**
LIABILITIES AND NET ASSETS		
Current liabilities	16,745	14,632
Deferred contributions	534	1,726
Net assets	28,024	25,558
	$45,303	**$41,916**

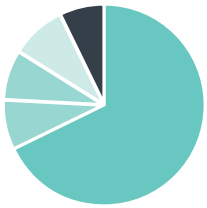
SUMMARIZED STATEMENT OF OPERATIONS	2025	2024
REVENUE		
Government		
Federal: Pan-Canadian AI Strategy	29,668	26,614
Federal: Canadian AI Safety Institute Program at CIFAR	1,645	-
Federal: Research Programs	11,200	11,000
Provincial	1,031	1,293
Philanthropy	10,213	9,455
Partnerships	3,748	2,167
Investment income	1,876	1,960
	$59,381	**$52,489**
RESEARCH PROGRAM EXPENSES		
Program expenses		
Fundamental Research	18,577	15,505
Communications & Knowledge Mobilization	2,127	1,934
Next Generation	2,222	2,831
Non-program expenses		
Advancement	2,489	2,332
Governance & Administration	1,952	2,207
	$27,367	**$24,809**
PAN-CANADIAN AI STRATEGY EXPENSES		
Talent funding to AI Institutes (Amii, Mila, Vector)	20,687	17,508
Operational Funding to AI Institutes (Amii, Mila, Vector)	6,006	6,000
Research & ecosystem funding to CIFAR	3,605	4,181
	$30,298	**$27,689**
CANADIAN AI SAFETY INSTITUTE PROGRAM AT CIFAR		
Talent funding to AI Institutes (Amii, Mila, Vector)	355	-
Operational Funding to AI Institutes (Amii, Mila, Vector)	1,111	-
Research & ecosystem funding to CIFAR	179	-
	$1,645	-
Deficiency of revenue over expenses	71	(9)
Unrealized gain (loss) on investments	2,395	3,838
Excess (deficiency) of revenue over expenses	**$2,466**	**$3,829**

TOTAL CIFAR REVENUE

RESEARCH PROGRAMS REVENUE

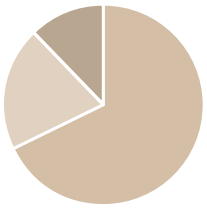
- 40% Government (Federal)
- 4% Government (Provincial)
- 36% Philanthropy
- 13% Partnerships
- 7% Investment income

TOTAL EXPENSES



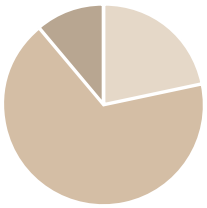
RESEARCH PROGRAM EXPENSES

- 68% Fundamental Research
- 8% Communications & Knowledge Mobilization
- 8% Next Generation
- 9% Advancement
- 7% Governance & Administration



PAN-CANADIAN AI STRATEGY EXPENSES

- 68% Talent funding to AI Institutes (Amii, Mila, Vector)
- 20% Operational funding to AI Institutes (Amii, Mila, Vector)
- 12% Research & ecosystem funding to CIFAR



CANADIAN AI SAFETY INSTITUTE PROGRAM AT CIFAR EXPENSES

- 22% Talent funding to AI Institutes (Amii, Mila, Vector)
- 68% Operational funding to AI Institutes (Amii, Mila, Vector)
- 10% Research & ecosystem funding to CIFAR

This financial information is drawn from CIFAR's full audited financial statements, available at cifar.ca/publications-reports.

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The Board of Directors is responsible for the overall governance of CIFAR and is composed of distinguished individuals from the business, research and professional communities.

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THE NEXT LEAP STARTS HERE.

CIFAR

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