### VECTOR INSTITUTE

# HELPING CANADA WIN AT AI: Building a remarkable

future with Vector

Annual Report 2023-2024



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# Canada

The Vector Institute is funded by the Government of Canada, the Government of Ontario, and leading industry sponsors from across the Canadian economy.



# **CIFAR**

Generative AI supported some of the writing of this year's annual report.

### Message from the Board Chair

The world of AI has not stood still, and its rapid development continues. AI touches everyone and everything. In a few short years, it will be fully integrated into our lives in ways that we cannot imagine. Countries around the world are now rapidly adopting this technology, and failure to do so will leave those countries that don't behind.

Equally, companies will also find themselves at a competitive disadvantage, and Vector wants to make sure that doesn't happen. What makes Vector unique is combining great research and helping companies apply that into solutions and products.

Vector's researchers were focused from the start on solving tough issues like bias and transparency and are now eager to deal with the emerging problems raised by gen AI and developing best-in-class ways to do so. They are applying their leading expertise both here and internationally, helping hundreds of organizations safely use AI.

This desire to help others safely use AI is why Vector introduced our AI Trust & Safety Principles which give organizations a roadmap for using AI responsibly. The principles help Vector's AI practitioners create open-source tools for companies to use when deploying AI thereby making AI safer. Now is the time for Canada to dig deep if we want to be the best in the world at creating and using AI.

Vector, together with its AI ecosystem partners, has pushed to ensure that Canada remains a leader in the AI and innovation economy. Falling behind in AI means falling behind in every measure of prosperity that a country can aspire to.

This is why Vector and its partners were laserfocused on advocating for much needed funding to support AI compute infrastructure to stay in the game, to continue to attract talent, and to fuel progress in the new economy and avoid depending on other countries.

Vector's role over the next few years will remain focused on ensuring that both private sector and public institutions continue to develop the people, skills, and resources to be best in class at the use of AI.

Vector's senior leadership team has always recognized the positive role that AI will play in Canadian society. And after reading about the people and projects in this year's report, I have no doubt you will too.

### ED CLARK

Chair, Board of Directors, Vector Institute





### Message from the President & CEO

Reflecting on the past 12 months, I am excited by the numerous accomplishments that Vector has achieved.

We collaborated with partners across industry, government, and academia to advance AI trust and safety—an area that Vector has established a leadership position in—within Canada and around the world, ensuring that whatever AI enables can be trusted and does no harm.

We are also enabling hundreds of industry and health partners to develop cutting-edge AI solutions, making an impact in the real world as we develop practical AI tools and frameworks that enable products that solve complex challenges and benefit Canadians. Our community of hundreds of world-renowned researchers continues to lead global AI research breakthroughs with their work.

We're particularly proud of our banking partners, who are among the most active in AI adoption. We were pleased to see two of them ranked amongst the top AI adopters within their industry globally. And just this month alone, CIBC expanded its relationship with Vector, moving from a Founding Gold Sponsor to a Platinum Sponsor, underpinning their commitment to innovation and upskilling their workforce. Engagement in our industry programs continues to increase by more than 100%—demonstrating the growing impact and relevance of our work.

All of this set the stage for a refresh of Vector's multi-year strategy that will be focused on being the best at AI research, cultivating and retaining the best talent, and accelerating applied AI adoption across sectors, set to be completed later this year. But what gives me pause—and fills me with pride—is how these achievements were made.

We always talk about the community that's been at Vector's heart since its inception. This year, we saw that community blossom across multiple new partnerships. Whether it was the co-development of Radical Ventures' Responsible AI for Startups (RAIS) framework, welcoming Merck Canada as Vector's newest Gold sponsor, Cohere becoming a unicorn, Vector's move to the new Schwartz Reisman Innovation Campus, or the coming together of the entire AI ecosystem at Remarkable 2024, none of these accomplishments could have occurred in a vacuum.

These milestones were achieved because of the community that Vector helped build. And we're already seeing the effects of these achievements this year.

This year's annual report shows many of the remarkable ways in which the Vector community of more than 10,000 individuals, partners, AI researchers, and students are playing a leadership role in Canadian AI.

Of course, with every opportunity comes some risk. Gen Al's power in particular, in the hands of the wrong people, increases the chance of its misuse.

Decisions shaping how AI is developed and used are being made now, and getting AI right for Canada is paramount to reap its immense societal benefits something Vector cares greatly about.

Thank you to the entire Vector team and community for your work over the past year. We look forward to continued success as we work to ensure Canada wins at AI.

TONY GAFFNEY

President & CEO, Vector Institute





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### Ontario's Al ecosystem by the numbers

Since 2020 the Vector Institute, with support from Deloitte Canada, has produced snapshots of the Ontario AI ecosystem based on survey data.

This year's data (April 1, 2023 – March 31, 2024) shows that last year's job creation numbers slowed significantly—a shift from company creation and an AI boom to job numbers that are more in line with historical patterns. This suggests that companies have made great strides in building up a solid AI talent base following significant job creation numbers in 2021 and 2022. The dip in job creation also aligns with the slowing demand for AI talent seen in 2023 across the globe following growth over a five year period\*.

While there has been a reduction in the number of jobs in AI created in Ontario, there has also been an uptick in job vacancies in AI roles that have yet to be filled suggesting that the current labour market cannot meet the demand for AI talent.

\*Source: <u>Stanford Artificial Intelligence Index Report 2024</u>

36

%

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### Highlights of Ontario's Al ecosystem:

AI jobs created in Ontario<sup>1</sup>

AI jobs retained in Ontario<sup>2</sup>

new AI master's and study path enrollments<sup>3</sup>

new AI master's graduates from Vector-recognized programs<sup>3</sup>

new AI-related patents filed across Canada<sup>₄</sup>

billion in AI-related Ontario VC investments<sup>5</sup>

companies invested in the Ontario Al ecosystem<sup>6</sup>

million in AI R&D spending or budgets<sup>7</sup>

new AI companies established in Ontario<sup>8</sup>

of CEOs surveyed report their companies have commercialized AI products/services or use AI to sell core products/services<sup>9</sup>

For detailed footnotes, please see the Appendix



### **Innovation:** Al research excellence and growth

Vector's renowned research community is making significant advancements in the science and application of AI. From accelerating insect identification to improving cancer care, Vector researchers are discovering new methods for AI to drive innovation and enhance economic, health, and societal outcomes.

### Daniel Roy

Vector Research Director and Canada CIFAR AI Chair; Associate Professor in the Department of Statistical Sciences, Faculty of Arts and Science, University of Toronto: and Associate Professor in the Department of Computer and Mathematical Sciences, University of Toronto Scarborough



### **VECTOR WELCOMED NEW RESEARCH DIRECTOR**

Daniel Roy was appointed Vector's Research Director, succeeding Graham Taylor. Vector is deeply grateful for Dr. Taylor's leadership over the past two years during which he significantly grew Vector's community and research program.

Dr. Roy, a founding Vector Faculty Member, brings a wealth of experience and expertise to the team. His groundbreaking contributions span deep learning theory and practice from pioneering work on empirically grounded statistical theory to state-of-the-art algorithms for neural network compression. Dr. Roy's research has shed light on various deep learning phenomena and advanced the mathematical underpinnings of AI.

### **TRAILBLAZING RESEARCH**

Vector researchers showcased Canada's expertise at prestigious global AI conferences, including the Conference on Neural Information Processing Systems (NeurIPS), the Conference on Computer Vision and Pattern Recognition (CVPR), the International Conference on Learning Representations (ICLR), and the International Conference on Machine Learning (ICML):

+366 research papers presented at high-impact global conferences and in top-ranked journals

- +63 patents +315 research talks

Vector's AI Engineering team produced over 20 research papers, more than half of which were published or accepted at AI-related conferences. Highlights of their work include:

- Learn more

### +58 Vector-hosted research events

• To establish AI benchmarking and evaluation capabilities, Vector evaluated xAI's Grok-1 shortly after its public release and was the first Al institution to do so. Learn more

• The team behind the FL4Health project, a federated learning library, was invited to deliver a talk at the Flower AI Summit, the world's largest federated learning conference.

• The team's FlexModel framework was spotlighted at NeurIPS 2023, the world's largest machine learning conference. The interpretability framework for generative AI models gives researchers tools to improve the safety of these models.



# **Parvin Mousavi:** Improving breast cancer removal with AI research

During breast cancer surgery, the smoke plume from cauterized incisions is suctioned into a mass spectrometer, which profiles burnt tissue samples. Vector Faculty Member and Canada CIFAR AI Chair Parvin Mousavi's deep learning models interpret this complex data, accurately categorizing tissue types to help surgeons conserve healthy tissue while removing cancerous cells.

By providing real-time guidance, Dr. Mousavi's technology aims to completely remove all cancerous cells with minimal healthy tissue loss and reduce unnecessary surgeries to improve patient outcomes.

Last year, Dr. Mousavi's team received a \$700,000 grant from the Canadian Institutes of Health Research to continue building on this innovation. The project will help surgeons identify and trace tumour boundaries during surgery.



### VECTOR RESEARCHERS LAUDED FOR AI ADVANCEMENTS

Last year, Vector researchers received numerous awards and appointments for their innovative advancements. This recognition affirms Vector's commitment to research excellence and discoveries that benefit the economic, health, and societal outcomes for Canadians:

Nicolas Papernot named an <u>AI2050 Early Career</u> <u>Fellow by Schmidt Futures</u> Shai Ben-David and Geoffrey Hinton named Association for Computing Machinery Fellows for their transformative contributions to computing science and technology

**Bo Wang** appointed as <u>Chief AI Scientist at the</u> <u>University Health Network</u>

Gillian Hadfield named one of seven <u>AI2050</u> senior fellows by Schmidt Futures

**Raquel Urtasun** awarded the <u>Order of Ontario</u>, the province's highest civilian honour

#### Parvin Mousavi

Vector Institute Faculty Member and Canada CIFAR AI Chair; Professor in the School of Computing, Faculty of Arts and Science, Queen's University





### AWARDS AND RECOGNITIONS EARNED BY **VECTOR INSTITUTE FACULTY MEMBERS:**

#### Shai Ben-David

2023 Association for Computing Machinery (ACM) Fellow

### Wenhu Chen

Area Chair Award in Question Answering Track 2023, International Joint Conference on Natural Language Processing (IJCNLP)

### Jeff Clune

"One of the people to watch in Canadian AI" by The Logic

Publication of the Decade from the Norwegian Artificial Intelligence Research Consortium

Significant Impact Award from SIGEVO

### Sanja Fidler

Honourable Mention 2023, Special Interest Group on Computer Graphics and Interactive Techniques (SIGGRAPH)

"The top people in artificial intelligence" by Insider's AI 100 2023

**David Fleet** CS-CAN Lifetime Achievement Award

**Roger Grosse** CS-CAN Early Career Researcher Award

### Alán Aspuru-Guzik

Outstanding Research Award 2023, Intel

Fellow of Industry Academy, International Artificial Intelligence Industry Alliance

Chemical Engineering Medal, Eidgenössische Technische Hochschule, Zürich

Fellow of Asia-Pacific Artificial Intelligence Association (AIIA)

### **Gillian Hadfield**

AI2050 Senior Fellow from Schmidt Sciences

#### **Geoffrey Hinton**

Association for Computing Machinery (ACM) Fellow 2023

AI leader in the 2023 TIME100 AI

"The top people in artificial intelligence" by Insider's AI 100 2023

Rahul G. Krishnan Amazon Research Award 2023

#### Sheila McIlraith

Best Paper Prize 2023, International Joint Conferences on Artificial Intelligence Organization (IJCAI) and Journal of Artificial Intelligence Research (JAIR) Northrop Frye Award (Team) 2024

#### Parvin Mousavi

Best Presentation Award from Information Processing for Computer Assisted Interventions, All Conference, with PhD candidate Paul Wilson

Best Presentation Award from Imaging Network Ontario with PhD candidate Laura Connolly

Best Demonstration Award from MICCAI ASMUS with PhD candidate Laura Connolly

#### **Nicolas Papernot**

Elected to the 2023 cohort of the Royal Society of Canada's College of New Scholars, Artists and Scientists

AI2050 Early Career Fellows from Schmidt Sciences

#### Gennady Pekhimenko

Early Research Award Ontario

Distinguished Artifact Award 2023, The Association for Computing Machinery International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)

### **Toniann Pitassi**

Test of Time Award, International Conference on Machine Learning (ICML) 2023

### Graham Taylor

Arthur C. Stern Distinguished Paper Award 2024

### **Raquel Urtasun**

Emerging Technology CEO of the Year as awarded by Business Development at the Ontario Chamber of Commerce

AI leader in the 2023 TIME100 AI

"The top people in artificial intelligence" by Insider's AI 100 2023

Order of Ontario 2023

#### **Richard Zemel**

Test of Time Award, International Conference on Machine Learning (ICML) 2023

### AWARDS AND RECOGNITIONS EARNED BY **VECTOR INSTITUTE FACULTY AFFILIATES:**

### **Benjamin Alarie**

Publishers Award for Professional and Scholarly Excellence (PROSE), Legal Studies and Criminology Category 2024

### Vaughn Betz

Association for Computing Machinery (ACM) Fellow 2023

**Timothy Chan** 

Pierskalla Best Paper Award 2023

#### Fanny Chevalier

Knight in the Order of Academic Palms by the Government of France

Igor Gilitschenski Sony Focused Research Award

### Nachiket Kapre

Best Paper Award 2023, Association for Computing Machinery, Transactions on Reconfigurable Technology and Systems (ACM, TRETS)

#### Amir-Hossein Karimi

ETH Zürich Medal for outstanding dissertations

### **Kyros Kultulakos**

Best Paper Award 2023, International Conference on Computer Vision (ICCV)

### David Lindell

Connaught New Researcher Award

Best Paper Award 2023, International Conference on Computer Vision (ICCV)

### Laura Rosella

Public Health Sciences Award for Excellence

### Nisarg Shah

Computer and Thoughts Award 2023, Kalai Prize in Game Theory and Computer Science, IJCAI

### **Bhavin Shastri** Ontario Early Researcher Award

### **Florian Shkurti**

Best Paper Award 2023, Safe Autonomy Workshop, Robotics: Science and Systems (RSS)

### Nandita Vijaykumar

Sony Focused Research Award





# **Bo Wang:** Transforming the future of lung transplants

A new innovative AI-powered tool can predict which donor lungs are most likely to be successful transplants, dramatically improving patient outcomes.

Vector Faculty Member and Canada CIFAR AI Chair Bo Wang and his team developed the tool in response to a critical shortage of transplants in Canada. Called InsighTx, the tool analyzes vast amounts of data to make its predictions.

In addition to his continued groundbreaking work in AI and health, Dr. Wang was appointed to the inaugural role of Chief AI Scientist at UHN in September 2023 and is now working at the forefront of applying AI to health care.

#### Bo Wang

Vector Institute Faculty Member and Canada CIFAR AI Chair; Assistant Professor in the Department of Laboratory Medicine and Pathobiology, University of Toronto; and Chief AI Scientist at University Health Network



#### April Khademi

Vector Institute Faculty Affiliate; Assistant Professor in the Department of Electrical, Computer and Biomedical Engineering, Faculty of Engineering and Architectural Science, Toronto Metropolitan University; and Canada Research Chair in AI for Medical Imaging

# **April Khademi:** Decoding cancer biomarkers, one cell at a time

Vector Faculty Affiliate April Khademi and her team are working on an AI tool to help pathologists more accurately examine breast cancer tissue.

A biomedical engineer and Canada Research Chair at Toronto Metropolitan University, Khademi's tool can identify the Ki-67 biomarker, which helps pathologists decide on the best treatment options for patients. Testing the tool in a study with 90 international pathologists, they found that it performed better than other available solutions.

Their tool makes breast cancer treatment plans more reliable and tailored to each patient with the potential for improved patient outcomes and a faster, more efficient diagnostic process, reducing health care costs.

Khademi's work underscores the importance of collaboration between Vector's AI experts and clinicians in developing AI tools for health care.



# Growing Vector's research community

Since 2017, Vector has grown from a handful of researchers into a vibrant community of over 860 researchers, committed to responsibly advancing AI in order to improve Canadians' lives.

The 860 members of the Vector research community comprise of:

- 46 Faculty Members, including 42 Canada CIFAR AI Chairs
- 133 Faculty Affiliates
- 58 Postdoctoral Fellows
- 560 Graduate researchers
- 63 Undergraduate students

Through the Postdoctoral Fellow program, Vector supported 20 early-career researchers last year in driving academic AI research, innovation, and collaboration. <u>Explore Vector's Postdoctoral Fellows</u>.

Beyond programs like this, the Vector community collaborates with a wide range of institutions across Canada and abroad, further expanding its research network. <u>Discover Vector's affiliated institutions</u>.

According to <u>CBRE's Scoring</u> <u>Tech Talent 2023 report</u>, Toronto ranked fifth as the largest tech talent market while Startup Genome's Global Startup Ecosystem Report 2023 ranked the Toronto-Waterloo corridor as one of the top 20 global tech ecosystems.





### Meet Vector's newest Faculty Members



Xiaoxiao Li Vector Faculty Member and Canada CIFAR AI Chair; Assistant Professor in the Department of Electrical and Computer Engineering, University of British Columbia; and Assistant Professor Adjunct at Yale University School of Medicine

My goal is to develop AI technologies that significantly improve healthcare, with a focus on precision, safety, and real-world deployment challenges, delivering tangible benefits for patient care and medical research.



**Geoff Pleiss** Vector Faculty Member and Canada CIFAR AI Chair: Assistant Professor in the Department of Statistics, University of British Columbia

My research aims to improve the capabilities of machine learning methods for scientific applications. In the next few years, I aim to develop methods for understanding and quantifying the uncertainty of large foundation models, while also demonstrating how this uncertainty can be used to power scientific discovery.



**Renjie Liao** Vector Faculty Member and Canada CIFAR AI Chair; Assistant Professor in the Department of Electrical and Computer Engineering, University of British Columbia

During the next two to three years, my research will revolve around developing efficient, controllable, and theorygrounded generative AI models that effectively model multi-modal structured data. This work aims to drive significant advancements in industries like computer vision, robotics, and health by enabling superior data generation and more accurate predictions.



Sivan Sabato Vector Faculty Member and Canada CIFAR AI Chair; Associate Professor in the Department of Computing and Software, McMaster University

I strive to provide a deeper understanding of ways that we can use high-level interactions to improve machine learning models, as well as approaches for auditing models for equity and fairness.



### **Colin Raffel**

Vector Faculty Member and Associate Research Director of AI Engineering and Infrastructure at Vector Institute; Associate Professor in the Department of Computer Science, University of Toronto; and researcher with Hugging Face



My lab aims to make it possible for everyone to participate in the development of large-scale machine learning models. In the next few years, we aim to build systems to support distributed training on volunteer compute, rapid fine-tuning on small task-specific datasets, and efficient recycling of fine-tuned models to improve a shared base model.



### Vector offers the best of all worlds to AI researchers and engineers

In the global competition for research talent, Vector is winning because it offers a broad spectrum of opportunities for university-appointed researchers such as access to data and computing power, and the freedom to launch startups and collaborate with industry, government, and health organizations. Vector gives researchers unmatched flexibility to advance cutting-edge research and develop transformative and valuable AI tools and systems.

This is why for the first time, former Vector students returned as Vector Faculty Affiliates last year. Each was drawn to Ontario's dynamic AI ecosystem to further their AI research.

Explore all of Vector's Faculty Affiliates



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From a research perspective, Ontario is a great place to be a Stats/ML/AI researcher. Between the world-class universities and the Vector Institute, there is so much opportunity to collaborate, learn from each other, and exchange ideas.

### JEFFREY NEGREA

Vector Faculty Affiliate; Assistant Professor in the Department of Statistics and Actuarial Sciences, Faculty of Mathematics, University of Waterloo



Being a Vector Faculty Affiliate paved my path to move my research outcome from paper to practice and ensure my research benefits the real world.

### LALEH SEYYED-KALANTARI

Vector Faculty Affiliate; Assistant Professor in the Department of Electrical Engineering and Computer Science, Lassonde School of Engineering, York University



#### **Graham Taylor**

Vector Faculty Member and Canada CIFAR AI Chair; Academic Director of NextAl



Faced with a biodiversity crisis brought on by climate change, the task of studying the world's many insects seems impossible—this is where Vector Faculty Member and Canada CIFAR AI Chair Graham Taylor and his team hope that AI can help.

Enter BugShot, which uses AI to help identify and understand insects. Led by Dr. Taylor, Professor of Engineering at the University of Guelph, and Academic Director of NextAI, BugShot uses deep learning, high-definition imaging, and computer vision to classify bugs with unprecedented speed and accuracy.

Identifying bug species is crucial to assess an ecosystem's health, monitor biodiversity, and understand environmental changes. By pairing Vector's AI expertise with the University of Guelph's extensive biodiversity databases, Dr. Taylor and his team's BugShot project can identify over 1,000 bug species from a single photo—a task that would take human experts months.

As the world races to preserve biodiversity, BugShot is a made-in-Canada solution that offers a hopeful glimpse of how AI can help illuminate the intricacies of the natural world.

> Image from "Bulk arthropod abundance, biomass and diversity estimation using deep learning for computer vision" published in British Ecological Society journal





# **Implementation:** Delivering value for our partners

Vector translates advanced AI research into practical tools, frameworks, and products for Canadians, collaborating with partners across various sectors. For over seven years, Vector has consistently enabled Canadian enterprises to excel in AI. For example, according to the <u>Evident AI Index</u>, five Vector banking partners are now globally ranked, with four ranked in the top 20 and one ranked third in the world for AI adoption and research. Vector's work with Canadian banks also continues to scale with other industry, government, and health partners.

### VECTOR PARTNERSHIPS DRIVE AI ADVANCEMENTS

Last year, Vector supported industry partners through:

### 19 collaborative projects

**18** new collaborations covering topics that cut across multiple domains in an organization like causal inference, generative AI, recommender systems, robot process automation, and synthetic data

### +47,000 hours of knowledge transferred to industry sponsors

Creation of a Vector sponsors' portal that has **+125** hours of on-demand upskilling content and **+500** registered users from industry sponsors and FastLane companies



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Canadian Tire Corporation's (CTC) partnership with the Vector Institute has been instrumental in bringing AI to life across the company. In addition to informing our enterprise AI strategy, Vector has provided training and insights that have helped to facilitate the integration of Generative AI into CTC with a focus on safety, scale, and quantifiable outcomes. Our partnership has further enabled connections with other large organizations in Canada to inform and be informed on essential topics including public policy, AI regulation, and managing macro impacts such as compute power, data, and electricity supply necessary to power AI. Finally, Vector has been a great partner in helping us to raise awareness of the impacts, risks, and opportunities of AI within our employee base at our annual AI conference, and as valuable contributors to educating our Board of Directors on AI.

### **CARI COVENT**

Head of AI and Emerging Technology, Canadian Tire Corporation

### Meet Vector's sponsor community

Vector's partnerships with our sponsors help organizations acquire the experience, skills, and talent that their businesses need to innovate and compete using AI. Vector brings together diverse expertise, working collaboratively with firms across the economy to shape the future of AI.

In February 2024, Vector was thrilled to welcome Merck Canada to our industry community.

Merck Canada joins a dynamic group of industry leaders, including:

9 Platinum sponsors
20 Gold sponsors
2 Silver sponsors
31 total industry-leading enterprises

Vector is grateful to our industry sponsors for their support, recognizing that their collaboration is key to driving innovation and enhancing Canada's standing in the global AI community.

Meet our sponsors



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We are excited about the opportunities that our collaboration with the Vector Institute brings to Merck Canada. Together, we will explore the potential of AI to transform the way we address healthcare challenges and deliver impactful solutions that benefit patients in Canada and beyond.

MARWAN AKAR Managing Director at Merck Canada

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# Connecting industry with the world's best AI talent

Vector's <u>Digital Talent Hub</u> is an online platform that connects leading Canadian organizations with the best and brightest AI talent.

Just last year, the Digital Talent Hub hosted:

### **1,446** jobs

4,183 AI talent profiles58 top employers\* who used the Digital TalentHub to find top AI-skilled talent

Vector's annual AI Summit & Career Fair gives AI graduate students and alumni a chance to hear from leading AI practitioners. Last year, Vector connected 520 graduate students and alumni with nearly 30 employers.







Vector's FastLane program helps Canadian small- and medium-sized enterprises (SMEs) compete using AI. The FastLane program offers targeted solutions to implement AI including tailored workshops and events that help businesses transform with AI.

Over 250 active SMEs are part of FastLane, with over 140 SMEs joining in the past year. Vector hosted more than 30 events and workshops for FastLane members and industry sponsors over the past year, addressing topics such as professional development, talent advisory, IP education, and AI commercialization.

REMARKABLE AI ENTREPRENEURS: ALEX CUI, ALEX ADAM, AND JACOB JUNQI TIAN

**GPTZero**, a Vector FastLane company, leads the field of AI interpretability, serving

customers across many industries with advanced and accessible tools that foster responsible AI adoption.

Alex Cui, a former Vector researcher and Vector Scholarship in AI recipient, co-founded GPTZero. Cui was joined by Alex Adam, another Vector alum, and Jacob Junqi Tian, a Vector Associate Applied ML Specialist. Together, they aim to engineer a vehicle for responsible AI.

Their experiences at Vector drove Cui and Adam to launch the first commercially viable AI detection solution in January 2023.

GPTZero is now growing as a Vector FastLane company, implementing safe AI solutions thanks in part to Vector fostering entrepreneurship between researchers and industry.



# Vector's SegMate: Impacting climate change monitoring

A groundbreaking open-source AI toolkit can aid climate change monitoring with precise rapid satellite imagery analysis.

Developed by Vector's AI Engineering team with Vector Platinum sponsor BMO and Vector Gold sponsor TELUS, as well as other partners, SegMate uses Meta's Segment Anything Model (SAM) for advanced computer vision to precisely isolate and analyze objects in satellite images.

SegMate automates analysis of deforestation, agricultural land use, water bodies, and natural disaster impacts, which provides more accurate and detailed information and extends SAM's abilities.

By open-sourcing SegMate, Vector aims to accelerate global efforts in climate change mitigation.

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Through this collaboration between TELUS' AI Accelerator team, TELUS Environmental Solutions, and the Vector Institute, we are leveraging the power of AI to better understand how climate change impacts vegetation so that we can make smarter decisions and develop effective strategies to improve our planet's health.

### IVEY CHIU

Senior Strategy Manager of Special Projects and Innovation; AI Accelerator, TELUS





### Advancing health with AI

Excelling in health AI, machine learning, and multi-sector collaborations, Vector tackles specific health system and health care challenges.

Last year, Vector collaborated on health advancements with partners in our AI ecosystem through:

**25** academic partnerships, including the Canadian Hub for Health Intelligence and Innovation in Infectious Diseases, and Diabetes Action Canada

**7** new data-sharing agreements with Ontario hospitals and research collaborators





#### **Elham Dolatabadi** Vector Faculty Affiliate;

Assistant Professor in the School of Health Policy and Management, York University

# **Elham Dolatabadi:** Empowering youth mental health service frontline staff with AI

Kids Help Phone (KHP) is Canada's only 24/7, free, multilingual e-mental health service for young people from all backgrounds and lived experiences, from coast to coast to coast. To address the needs of youth today and in the future, KHP is transforming the youth mental health landscape by leveraging leading-edge technologies and working with key partners like the Vector Institute.

Vector and KHP have partnered to continue to expand KHP's insights and AI-enabled service delivery. Vector Faculty Affiliate Elham Dolatabadi is part of the team working closely with KHP to look at how AI can be a part of a human-centred solution that complements the existing in-depth skills and expertise of KHP's dedicated frontline staff.

Dr. Dolatabadi is exploring how conversational AI could complement KHP's clinicians and frontline staff in day-to-day service delivery. The goal of this work is to create an AI agent that acts like a secondary pair of eyes, working with and offering frontline staff and volunteers recommendations to offer personalized insights, information, and additional recommendations to clinicians in real-time.

For example, if a young person uses words associated with depression in their service interaction, the AI agent could capture this language and prompt staff with relevant resources for the service user, further empowering KHP staff and volunteers while ensuring that young people who access KHP services continue to receive up-to-date, relevant, holistic, and clinically-sound recommendations, and human-to-human connection.

Currently, Vector and KHP are testing the AI agent to ensure the agent is bias-aware, context-relevant, fair, and responsive, and that KHP's clinically-sound recommendations to young people are maintained.

Dr. Dolatabadi's work with KHP serves as a prime example of how AI can be deployed to complement mental health services, making them even more accessible and effective for those in need.

### Depar

**Timothy Chan** 

Vector Faculty Affiliate; Professor in the Department of Mechanical and Industrial Engineering, Faculty of Applied Science and Engineering, University of Toronto

Close up of bottled donor milk at Mount Sinai Hospital's Rogers Hixon Ontario Human Milk Bank

# **Timothy Chan:** Using AI to ensure optimal nutrition for vulnerable babies

Vector Faculty Affiliate Timothy Chan, a professor at the University of Toronto, and his team are leveraging machine learning to predict the nutrient levels in different combinations of donated breast milk and ensure balanced nutrition for vulnerable babies.

In a one-year implementation trial with Mount Sinai Hospital's Rogers Hixon Ontario Human Milk Bank, Dr. Chan and his team showed that AI-informed models can help milk banks create consistently nutrient-balanced milk blends without costly analyzers.

Looking ahead, Dr. Chan is exploring how to use AI to help with other donor milk processes like predicting bacteria in milk.

**IMPLEMENTATIO** 

### Driving AI application

**IMPLEMENTATION** 

CyclOps is a set of evaluation and monitoring tools developed by Vector's AI engineering team that health organizations can use to safely develop and evaluate sophisticated machine learning models in clinical settings.

Here's how Vector health partners are using CyclOps:

- Trillium Health Partners is evaluating an AI tool called RapidAI against their in-house developed model to improve stroke diagnosis and treatment selection. The hospital is using CyclOps to monitor RapidAI's performance and data drift, enhancing ongoing evaluation.
- GEMINI is expanding a delirium risk prediction model. The hospital is using CyclOps to support the model's expansion from Sunnybrook Health Sciences Centre to St. Michael's Hospital, and St. Joseph's Health Centre, supporting implementation across multiple sites.
- UHN's Data Aggregation, Translation and Architecture (DATA) team is using and evaluating an AI algorithm to quickly detect pneumothorax on chest X-rays and improve care for high-risk patients. The DATA team identified and corrected bias found in the algorithm using CyclOps, enhancing its accuracy.

### Open-sourcing safe Al solutions

Vector's open-source solutions drive innovation by streamlining AI model training and enabling researchers to focus on core research questions instead of technical challenges.

Open source is crucial at Vector, driving collaboration, accelerating innovation, and ensuring research transparency and reproducibility. By sharing our datasets, models, and tools under open-source licenses, Vector fosters global cooperation to advance safe AI.

Select open-source solutions released by Vector last year include:

### VectorLM

A large language model (LLM) training tool that is designed to give Vector researchers a highly performant but simple entry point to large-scale model training on Vector compute.

### VectorInference

An LLM inference tool that reduces the engineering burden of working with large-models.

### **FlexModel**

A software library designed to make LLM interpretability and safety research more accessible to researchers without deep knowledge of distributed computing. Vector's team developed the Health AI Implementation Toolkit, a step-by-step guide that helps researchers, clinicians, and health professionals implement AI.

VECTOR INSTITUTE ANNUAL REPORT 2023-2024

Explore Vector's Health AI Implementation Toolkit







### Building workforce-ready AI talent through internships

### Vector applied interns

Vector onboarded 57 applied internships to collaborate on Vector projects with our teams and partners.

An impressive 92% of our applied interns from last year are now employed, with all of them working in Canada. Of these, 89% have chosen to continue their careers in Ontario.

### Vector research interns

Vector welcomed 59 research interns to work with high-profile researchers and gain hands-on experience before entering the workforce.

### Vector-supported summer research program

Eleven Ukrainian interns joined Vector through a Vector-supported summer research program at the University of Toronto for students whose studies were disrupted by the war in Ukraine.

### Black and Indigenous research interns

Vector welcomed four interns through its Black and Indigenous Research Intern program to enhance AI research and career paths for underrepresented groups.

By creating career pathways for underrepresented student groups, Vector helps support their goals and provides valuable experience in the field of AI.

The Indigenous and Black Engineering and Technology PhD Project (IBET) is an organization which helps to alleviate barriers for Indigenous and Black students pursuing PhDs. Vector has partnered with IBET, giving IBET fellows access to Vector programming, including research talks and courses, and the Vector Digital Talent Hub, where they can connect with leading industry sponsors on AI-related internships and work opportunities.

"

During my internship at Vector, I had the privilege of collaborating with an exceptional group of AI enthusiasts and experts on diverse projects.

DAMI AREMU

Al Project Management Intern, Winter/Summer 2023



### Nurturing top Al talent in Ontario

Programs like the Vector Institute Scholarship in Artificial Intelligence (VSAI) ensure that Ontario continues to attract top talent to fuel the province's economy. The merit-based scholarship awards \$17,500 each to exceptional graduate researchers pursuing Vector-recognized or AI-focused master's programs in the province.

Last year, Vector awarded 106 scholarships to students across 26 Vector-recognized programs from 14 Ontario universities.

Vector has awarded 567 scholarships since the program launched in 2018.

### Developing Ontario's Al workforce

Vector collaborates with Ontario universities to shape AI education. Twenty-six Vector-recognized master's programs now equip graduate researchers with in-demand AI skills.

Explore all Vector-recognized master's programs now

## 66

I was ecstatic when I received the email notifying me that I had been selected as a Vector Scholarship in Artificial Intelligence recipient. This scholarship is a once-in-a-lifetime opportunity that is going to open new doors for me and many other recipients.

### POOJA SHARMA

Master of Health Informatics (MHI) at the University of Toronto

### 66

Vector's Scholarship in AI is a key part of our commitment to nurture the next generation of AI experts. We seek to equip them with the most sought-after AI skills and cultivate an ecosystem that encourages them to build their future here in Ontario. Vector is ensuring that such top-AI talent strengthens Canada's economy as we drive AI adoption here in Canada and reinforce our position as a global AI leader.

### MELISSA JUDD

Vice President, Research Operations & Academic Partnerships, Vector Institute



## **Impact:** Al trust and safety advancements

Vector is committed to developing safe and trustworthy AI, leading the charge in responsible AI adoption, and democratizing AI for the benefit of society through AI safety research and tools that enable organizations to deploy AI ethically.

Vector worked with partners from different sectors to distill six AI Trust & Safety Principles for Canadian and international organizations that reflect the ongoing dialogue, shared values, and best practices of the businesses, governments, and globally-renowned research communities that we work with. Shortly thereafter, Vector was one of the first organizations to support Canada's federal government in signing the <u>Voluntary Code of Conduct on the Responsible Develop-</u> <u>ment and Management of Advanced Generative AI Systems</u>.





### AI TRUST & SAFETY PRINCIPLES

- AI should benefit humans and the planet
- AI systems should reflect democratic values
- Al must respect privacy and security
- AI should be robust, secure, and safe
- Al oversight requires responsible disclosure
- Organizations developing AI must be accountable

Learn more about Vector's AI Trust & Safety Principles

Vector's global expertise in AI safety was on full display last year when Vector Faculty Members Sheila McIlraith, Gillian Hadfield, and Jeff Clune; Faculty Affiliate Tegan Maharaj; and Chief Scientific Advisor Geoffrey Hinton co-authored, along with others, the groundbreaking paper <u>Managing extreme AI risks</u> amid rapid progress.

Released before the first Global AI Summit last November 2023, their insights described in the paper helped inform the Summit's policy discussions and recommendations on safe AI.





### AI is software. Its reach is global and its governance needs to be as well.

### SHEILA MCILRAITH

Vector Faculty Member and Canada CIFAR AI Chair; Professor in the Department of Computer Science at the University of Toronto; and Associate Director and Research Lead at the Schwartz Reisman Institute for Technology and Society



### Advancing AI thought leadership

This past year, Vector played an important advocacy role in ensuring the vitality of the Canadian AI ecosystem and keeping Canada's long-standing leadership position in AI. Together with the efforts of other AI ecosystem partners, Vector helped make the case for substantial investment in AI compute infrastructure with policymakers, <u>media</u>, and the general public, noting that without this urgent investment, Canada would fall further behind in the global AI race, eroding the nation's ability to flourish in an innovation economy.

These concerted advocacy efforts contributed to a landmark announcement in the Federal Budget 2024: a \$2.4 billion package aimed at securing Canada's AI advantage and ensuring its continued prominence on the global AI stage.

Vector will continue to be a strong voice for the AI ecosystem on issues impacting the economic well-being and prosperity of Canada.

Vector's senior leadership, faculty, and researchers regularly share their Al expertise with national and international media. They offer insights on AI-related policy, health, safe AI, and scientific compute infrastructure. Vector experts were mentioned more than 4,790 times in media articles last year.

With our partners, Vector's community, including key members of our Faculty and staff, have shared their expertise to bolster Canada's global position. Examples of such initiatives include:

• Collaborating on the G7 Hiroshima AI Process Guiding Principles Document, led by Vector's senior leadership team

- Supporting the Organisation for Economic Co-operation and Development (OECD) Expert Group of AI Futures working group, represented by Graham Taylor, Vector Faculty Member and Canada CIFAR AI Chair
- Representing Canada in the OECD.AI community with Ben Davies, Vector's CIO; Tony Gaffney, Vector's President & CEO; and Vector Faculty Members and Canada CIFAR AI Chairs Graham Taylor and Nicolas Papernot
- Collaborating with the World Economic Forum, Vector Institute is involved in AI governance and safety through Tony Gaffney in the AI Governance Alliance, and Vector Faculty Member and Canada CIFAR AI Chair Jeff Clune in the AI Safety and Technology Technical working group, with contributions from Vector Faculty Member and Canada CIFAR AI Chair Gillian Hadfield to the AI Governance Alliance, and distributing our community's research regularly to the Forum's subscribers
- Supporting the European Union's Consultation on the G7 AI Principles, with feedback from Vector's senior leadership team helping contribute to the development of a voluntary international code of conduct for AI developers

By engaging in these critical conversations and providing insights on AI ethics, regulation, and implementation, Vector and our community of AI practitioners continues to advocate for the interests of Ontarians and Canadians more broadly while strengthening Canada's voice on the global stage.

IMPAC.

Government of Canada's new Voluntary Code of Conduct



Federal government visits Vector Institute for compute announcement



### Exterior view of the Schwartz **Reisman Innovation** Campus

INSTITUT VECTEUR

### Leading remarkable change

The Vector Institute is strategically positioned at the forefront of AI advancement, moving into our new home this year at the University of Toronto's new Schwartz Reisman Innovation Campus, surrounded by leading scholars, entrepreneurs, and industry partners. This relocation marked a major milestone for the Vector community, symbolizing our growth and strong commitment to AI research and development.

The move was celebrated with Vector's inaugural Remarkable conference in February 2024, an event that brought many in Ontario's Al ecosystem into one location and positioned Ontario as one of the globe's most vital AI ecosystems.

Keynote speakers included Cody Coleman, Co-founder and CEO of Coactive AI; Keith Strier, Vice President of Worldwide AI Initiatives at NVIDIA; Brian Keng, Research Director of RBC Borealis AI; Geoffrey Hinton, Chief Scientific Advisor of Vector Institute; and Beena Amannanath, Executive Director of the Global Deloitte AI Institute, Deloitte.

- +1,700 attendees in-person and online
- +25 countries
- +20 thought leaders featured
- +45 cutting-edge AI research posters presented
- +70 companies
- +30 Vector industry sponsors
- +15 media outlets
- +180 academic institutions around the globe had students join





# Driving safe AI for the venture capital industry

Vector supported the Toronto-based venture capital firm Radical Ventures with technical advice to create the <u>Responsible AI for Startups</u> (<u>RAIS</u>) framework. This open-source resource gives venture capital investors the essential tools they need to evaluate early-stage AI companies and technologies.

By leveraging Vector's technical expertise and AI Trust & Safety Principles, the RAIS framework offers a comprehensive approach for responsible AI investment.

### ONTARIO INVESTS \$27 MILLION IN VECTOR AS PART OF A RENEWED MANDATE

In June 2023, the Ontario government announced the Vector Institute will receive up to \$27 million for driving innovation, fostering AI talent, and propelling economic growth. This investment marked a major milestone for Vector as a recipient of Ontario's Critical Technology Initiatives fund.

# **Shaina Raza:** Detecting and correcting bias, one text at a time

Shaina Raza, an Applied ML Scientist in Responsible AI at Vector created UnBIAS, a tool that detects and corrects text bias to help the issue of biased algorithms that perpetuate stereotypes, prejudices, and misinformation.

UnBIAS uses advanced AI models to analyze text in three steps. First, it identifies whether bias exists, then pinpoints specific biased words or phrases. The UnBIAS tool then offers to replace biased language with a neutral alternative without necessarily losing the original meaning of the text.

With the potential to promote fairer AI and combat biases related to race, gender, age, and more, UnBIAS could help curb the spread of misinformation.



Shaina Raza Applied Machine Learning Scientist - Responsible AI



### Highlights of Ontario's Al ecosystem: footnotes

1. The # of jobs created was estimated by multiplying the average number of jobs created within an AI-related company in Ontario (based on survey results) and the total number of AI companies in Ontario (collected from pitchbook data).

2. The # of jobs retained was estimated by multiplying the average number of jobs retained within an AI-related company in Ontario (based on survey results) and the total number of AI companies in Ontario (collected from pitchbook data); findings are comparable to Linkedin Insights, methodology used in last year's national survey, that indicated 53,455 professionals actively engaged in Ontario's AI industry, as of July 5, 2024. Important to note: the number of engaged professionals will be an overestimate of the number of jobs retained, as it will also contain newly created roles and recently terminated roles.

3. Metric was collected from Vector's Academic Partnership Team for the 2023-2024 academic year.

4. Metric was sourced from the world intellectual property organization website, that had the publication dates: April 1, 2023 – March 31, 2024.

5. Data collected from Pitchbook. The following search criteria and terms were applied: Deal Date:

April 1, 2023 – March 31, 2024; Deal type: All VC Stages; Location: Ontario, search HQ only; Industries, Verticals & Keywords: "Artificial Intelligence & Machine Learning (Vertical)" OR "Robotics & Drones (Vertical)" OR "Advanced Manufacturing (Vertical)" OR "Autonomous Cars (Vertical)".

6. Data collected from Pitchbook. The following search criteria and terms were applied to identify the investors: Industries, Verticals & Keywords: "Information Technology"; Deal Date: From "April 1, 2023" To "March 31, 2024"; Deal Type: All VC Stages; Target HQ Location: Ontario, Canada.

7. The total R&D expenditure and external research funding for AI in Ontario was estimated to be \$869M, based on the summation of private investments toward AI R&D (\$518M estimated from survey results and PitchBook data), enterprise AI R&D budget for companies in Ontario (\$10M, estimated from survey results), and government grants for AI R&D in Ontario (\$341M, Government of Canada's open data portal).

8. Data collected from PitchBook. The following search criteria and terms were applied: Search terms: "Artificial Intelligence & Machine Learning (Vertical)" OR "Robotics & Drones (Vertical)" OR Advanced Manufacturing (Vertical)" OR "Autonomous Cars (Vertical)"; Country: Canada; Target HQ Location: Ontario; Year Founded: From "April 1, 2023" To "March 31, 2024".

9. Metric estimated from survey data.

### Vector Institute **Faculty Members**

Many Faculty Members are also Canada CIFAR AI Chairs, with the exception of those marked with an asterisk\*.

Alán Aspuru-Guzik Jimmy Ba Shai Ben-David Michael Brudno Juan Felipe Carrasquilla Álvarez Wenhu Chen Jeff Clune David Duvenaud Murat Erdoqdu Amir-massoud Farahmand Sanja Fidler David Fleet Brendan Frey\* Marzyeh Ghassemi Anna Goldenberg Roger Grosse Gillian Hadfield Xi He Gautam Kamath Rahul G. Krishnan Xiaoxiao Li Renjie Liao Chris Maddison Alireza Makhzani Sheila McIlraith Yalda Mohsenzadeh\*

Parvin Mousavi Sageev Oore Nicolas Papernot Gennady Pekhimenko Toniann Pitassi Geoff Pleiss Pascal Poupart Colin Raffel\* Daniel Roy Frank Rudzicz Sivan Sabato Angela Schoellig Vered Shwartz Leonid Sigal Graham Taylor Raquel Urtasun\* Anatole von Lilienfeld Bo Wang Yaoliang Yu **Richard Zemel** 

### Vector Institute Postdoctoral Fellows

Elham Bagheri Franziska Boenisch Rob Brekelmans Leonardo Cotta Felix Dangel Adam Dziedzic Pascale Gourdeau Stefan Heinen Agustinus Kristiadi Wu Lin Scott Lowe Kirill Neklyudov David Pellow James Requeima Masoumeh Shafieinejad

Changjian Shui Matthew Spellings Sriram Ganapathi Subramanian Sana Tonekaboni

### Vector Institute affiliated institutions

**Carleton University** Communitech Dalhousie University The Hospital for Sick Children Kids Help Phone Lakehead University Lunenfeld-Tanenbaum Research Institute, Sinai Health System McMaster University Ottawa Hospital Research Institute Ontario Institute for Cancer Research Ontario Tech University Queen's University Sunnybrook Research Institute Toronto Metropolitan University Trillium Health Partners University Health Network University of British Columbia University of Guelph University of Ottawa University of Toronto University of Waterloo University of Windsor Western University York University

### Vector Institute recognized master's programs

Lakehead University MSc in Computer Science (Specialization in AI)

Ontario Tech University Master of Business Analytics and Artificial Intelligence (MBAI)

Ontario Tech University Master of Information Technology Security (Artificial Intelligence in Security Field) (MITS-AIS)

Queen's University MASc in Electrical and Computer Engineering (Field of Study in AI)

Queen's University MSc in Computer Science (Field of Study in AI)

Queen's University (Smith School of Business) Master of Financial Innovation and Technology (MFIT)

Queen's University (Smith School of Business) Master of Management Analytics

Queen's University (Smith School of Business) Master of Management in Artificial Intelligence

Toronto Metropolitan University MEng (AI Concentration)

Toronto Metropolitan University MSc in Data Science and Analytics

University of Guelph Master of Data Science

University of Guelph Collaborative Specialization in AI

University of Ottawa MEng/MASc in ECE (Applied AI Concentration)



University of Ottawa Master of Computer Science (Applied AI Concentration)

University of Toronto Master of Health Informatics (MHI)

University of Toronto Master of Management Analytics

University of Toronto Master of Science in Health Policy, Management and Evaluation, Emphasis in Health Systems AI

University of Waterloo Master of Data Science and Artificial Intelligence (MDSAI)

University of Waterloo MMath in Data Science

University of Windsor MSc in Computer Science (Concentration in AI)

Western University Master of Data Analytics (Specialization in Artificial Intelligence)

Western University MSc in Computer Science, MEng/MESc in Electrical and Computer Engineering (Collaborative Specialization in AI)

Western University Collaborative Specialization in Machine Learning in Health and Biomedical Sciences

York University MSc in Computer Science (Specialization in AI)

York University (Schulich School of Business) Master of Business Analytics

York University (Schulich School of Business) Master of Management in Artificial Intelligence

### Vector Institute industry sponsors

### Platinum Founding

**BMO Financial Group** Google Loblaw Companies Ltd. NVIDIA RBC Scotiabank Shopify Inc. TD Bank Group Thomson Reuters

### Gold

Founding

Accenture Air Canada CIBC CN Deloitte Canada EY Canada Georgian KPMG Canada Magna International PwC Canada Sun Life Financial TELUS Thales Canada

2020 Roche Canada

2021 OMERS Bell Canada

### 2022

Boehringer Ingelheim (Canada) Ltd. Canadian Tire Corporation, Ltd.

### 2023

**KT** Corporation

2024 Merck Canada

### Silver

Founding EllisDon Corporation Linamar Corporation

### Bronze

Founding **Deep Genomics** FreshBooks Integrate.ai Layer 6

### 2018

MindBridge Analytics Inc. TealBook

### 2019

Ada BenchSci Canvass Analytics Inc. ALS GoldSpot Discoveries Ltd. League

### 2022

AltaML Avidbots Blue J Cohere Private Al Riskfuel Shakudo Signal 1 Troj.Al

### 2023

CentML Ubenwa

### Team and leadership

The Vector Institute is governed by a distinguished Board of Directors, comprising accomplished professionals from various sectors, including academia, research, public sector, and private industry.

Vector's Members of the corporation and Board of Directors as of March 31, 2024 are: Ed Clark, Chair Melissa M. Chee

Charmaine Dean Janet L. Ecker Chaviva Hosek Nadir Mohamed Michael Serbinis Melanie Woodin

### Leadership as of March 31, 2024

Gary Burlakoff, Director, Finance Kari Clarke-Zemnickis, Vice President, Marketing & Communications

Ben Davies. Chief Information Officer

Tony Gaffney, President & CEO

Melissa Judd. & Academic Partnerships

Deval Pandya, Vice President, AI Engineering

Dan Roy, **Research Director** 

Cameron Schuler, Chief Commercialization Officer & Vice President, Industry Innovation

Roxana Sultan, Chief Data Officer & Vice President, Health

Alan Veerman, Chief Operations & Finance Officer

### **FINANCIALS**

Vector is funded through multi-year commitments from different funding sources, including:

- Colleges and Universities.
- Federal funding from the the Pan-Canadian AI Strategy

(PCAIS) – Talent and Research, administered by CIFAR and from the Government of Canada through the PCAIS – Commercialization, administered by Innovation, Science and Economic Development Canada (ISED). • Private sector industry sponsorships at various levels and Vice President, Research Operations commitments to support Alenabled programs and related initiatives. The Vector Institute's audited financial statements for the 2023–24 fiscal year are available on

our website. Read more now

• Funding through the Government of Ontario's Ministry of Economic Development, Job Creation and Trade (MEDJCT) and Ministry of

Government of Canada through

# FINANCIALS

### Vector Institute Statement of Financial Position

March 31	2024
Assets	
Current	
Cash	\$ 20,969,584
Short-term investments (Note 1)	30,706,438
Accounts receivable	2,119,560
Current portion of employee loans (Note 2)	184,308
HST receivable	70,780
Prepaid expenses	714,566
	54,765,236
Employee loans (Note 2)	690,213
Capital assets (Note 3)	9, 424,144
	\$ 64,879,593
Liabilities and Net Assets	
Current	
Accounts payable and accrued liabilities	\$ 4,112,013
Deferred rent	135,665
Deferred contributions (Note 4)	3,256,722
Deferred capital contributions (Note 5)	3,070,526
	10,574,926
Net Assets	
Unrestricted net assets	54,304,667
	\$ 64,879,593

**Commitments** (Note 6) On behalf of the Board:

MWoon . Director Jel 1 AL \_\_\_\_ Director

### 2023

\$	7.508.656
·	40,756,296
	4,553,106
	275,778
	64,244
	2,552,640
	55,710,720
	834,217
	3,502,395
\$	60,047,332

\$	4,267,524
	1,602,409
	1,239,416
	7,109,349
	52,937,983
\$	60,047,332

# FINANCIALS

### Vector Institute Statement of Operations

2024	For the year ended March 31
	Revenue
	Government grants
\$ 6,546,912	Province of Ontario
	Government of Canada
9,365,823	PCAIS - Talent and Research (Note 7)
5,000,000	PCAIS - Commerccialization (Note 7)
9,916,667	Industry partners
1,121,978	Amortization of deferred capital contributions
2,554,580	Investment income
825,764	Other revenue
35,331,724	

Expenses	
Research and education (Note 7)	\$ 9,976,340
Industry skills training	451,958
Technology adoption (Note 7)	6,549,717
Business acceleration (Note 7)	7,004,143
General and adminstration (Note 7)	5,713,509
R <sup>A1</sup> SE AI	2,233,630
Employee loans accretion expense (Note 2)	20,474
Amortization	2,015,269
	33,965,040
Excess of revenue over expenses for the year	\$ 1,366,684





### 2023

\$ 4,624,256

ł	8,393,843
	3,829,412
	9,533,333
	1,452,605
	1,735,750
	286,572

29,855,771

\$	9,287,515
	183,758
	6,136,011
	3,468,126
	4,886,527
	2,493,273
	130,355
	1,962,694
	28,548,259
\$	1,307,512



### Vector Institute Statement of Changes in Net Assets

For the year ended March 31	2024
Net assets, beginning of year	\$ 52,937,983
Excess of revenue over expenses	
for the year	1,366,684
Net assets, end of year	\$ 54,304,667



2023	)
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\$ 51,630,471

1,307,512

\$ 52,937,983





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#### About Vector Institute

Launched in 2017, the Vector Institute works with industry, institutions, startups, and governments to build AI talent and drive research excellence in AI to develop and sustain AI-based innovation to foster economic growth and improve the lives of Canadians. Vector aims to advance AI research, increase adoption in industry and health through programs for talent, commercialization, and application, and applications, and research excellence in AI to develop and sustain AI-based innovation to foster economic growth and improve the lives of Canadians. Vector aims to advance AI research, increase adoption in industry, and health through programs for talent, commercialization, and application, and applications in products and processes, company-specific guidance, training for professionals, and connections to workforce-ready talent. Vector is funded by the Province of Ontario, the Government of Canada through the Pan-Canadian AI Strategy, and leading industry sponsors from across multiple sectors of Canadian Industry. For further information or media enquiries, please contact: media@vectorinstitute.ai

### vectorinstitute.ai