

# OUR CONNECTED WORLD

RESEARCH REPORT 2023/24

UNIVERSITY OF  
WATERLOO



# A MESSAGE FROM DR. CHARMAINE B. DEAN, VICE-PRESIDENT, RESEARCH AND INTERNATIONAL

The theme of the 2023/24 Research Report is Our Connected World. Under the Global Futures framework, Waterloo researchers are looking to tackle complex global and local challenges that cut across research areas like society, health, technology, economics, and the environment. This new interdisciplinary approach ensures that multiple perspectives and faculties can be harnessed for the benefit of all.

In this report, you will find remarkable stories that demonstrate what's possible when the full potential of research is realized. Research is at the heart of everything we do at Waterloo, and we were proud to be named Canada's #1 research university in the comprehensive category by Research Infosource Inc. for the 16th consecutive year.

From contributing to the construction of a 3D map of the universe, to helping newcomers navigate a doctor's appointment, Waterloo's researchers dream big but also look to impact people's everyday lives. I invite you to dive into this report and learn more about the vast and varied landscape of research at Waterloo.

CHARMAINE B. DEAN, VICE-PRESIDENT,  
RESEARCH AND INTERNATIONAL



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# ADVANCING HEALTH AND WELLBEING

Waterloo is exploring the interface between health, technology and society. Additionally, innovative research on the social determinants of health are giving rise to new paradigms for population health.

## Empowering newcomers to take charge of their health

The University of Waterloo, in partnership with the KW4 Ontario Health Team, is developing an application to help newcomers navigate health and social services in their language of choice with a focus on the social determinants of health. The KW4 Ontario Health Team is a collaboration of health-care partners in Kitchener, Waterloo, Wellesley, Wilmot, Woolwich, including primary care, hospital care, long-term care, community health services, and social service groups, who are working together with a goal of providing coordinated care for patients. The translation tool on the app is powered by the Meta Seamless open-source translation model.

The Newcomer App prototype was presented at the World Summit AI Americas conference in Montreal and was well received by the attendees. Many participants recounted their own newcomer experiences and were excited to see the functionality of the app and how it would be greatly beneficial in the settlement experience. The high-level functionality was the result of the developers' co-design model, which involved extensive interviews, that ensured the perspectives of newcomers were centred in the app's creation. Once fully developed, the team looks forward to the app being deployed on a large scale to support newcomers across Canada. This project was supported by KW4 OHT and The Graham Seed Fund.



To learn more, visit

[www.kw4oht.com/newcomerapp](http://www.kw4oht.com/newcomerapp)



Newcomer App team member Alex Lu demonstrates the technology's capabilities to an attendee at the World Summit AI Americas conference in Montreal.



## **Graham Seed Fund— Health transformation through technology**

The Graham Seed Fund (GSF) with its Health Transformation through Technology Initiative seeks to leverage and build health system partnerships by providing resources for collaborating directly with a full range of health providers and clinicians. This collaborative, interdisciplinary model will help to quickly advance solutions for challenging areas in health technology and responds to Waterloo’s strategic priority of being a globally recognized hub for innovative and transformative health technologies.

The first round of applications focused on engagement with health-care partners and potential collaborations across disciplines and/or faculties at Waterloo, across NSERC/CIHR/SSHRC related fields and/or on a regional, national, or global level. The second round centred on strengthening Waterloo’s position in the community by emphasizing partnerships with Grand River Hospital, St. Mary’s General Hospital, Cambridge Memorial Hospital and member organizations of the KW4 Ontario Health Team.

In early 2023, 10 research proposals were selected from the 34 that were received. The recipient researchers span across five Waterloo faculties and the partnerships range from local hospitals and provincial health-care providers to industry partners and international universities and organizations. Later in 2023, the second round of seed funding was launched. The GSF is made possible by the J.W. Graham Trust Endowment Fund.



## **Researcher spotlight: Mihaela Vlasea— Reimagining glaucoma care**

Design of novel glaucoma stent  
Partners: St. Mary’s General Hospital,  
Grand River Hospital

Dr. Vlasea was a round one recipient of the Graham Seed Fund (GSF). Dr. Vlasea’s work on the design of a novel glaucoma stent intends to combine the expertise and imagination of the Waterloo engineering team and the guidance of the clinical teams to design a new eye implant to treat glaucoma. Glaucoma is an eye disease that can result in blindness and affects many Canadians; this research intends to improve on existing implant solutions. The Waterloo team is deploying “additive manufacturing” (or 3D-printing) to design a proof-of-concept device to improve the treatment of the disease, leveraging the complex designs possible through the printing technology. This proof-of-concept device will be a crucial step toward future refined iterations that will be clinically tested. The work is an exciting collaboration among engineering, ophthalmology, and optometry researchers that can impact various universities and organizations in Ontario and beyond.



## Partnering to improve health care access in northern and remote communities

A collaboration agreement between the Northern Ontario School of Medicine University (NOSM University) and University of Waterloo was a step toward improving and expanding health care in northern Ontario communities. NOSM University's expertise in social accountability, community-engaged research and medical education complement Waterloo's emphasis on interdisciplinary approaches to health research and extensive community partnerships.

With an overarching goal of recruiting, training and retaining health-care professionals in the north, Waterloo's School of Pharmacy students are encouraged to train in northern Ontario communities and collaborate with NOSM University's faculty and students. Throughout 24 weeks of patient care rotations, pharmacy students can take part in inter-professional education initiatives with medical students.

Waterloo's world-class researchers and entrepreneurs play a role in this partnership by developing technological advances and health data applications through Health Futures, one of five interconnected areas within the University's Global Futures. Overall, the Waterloo-NOSM University partnership helps bring together a diverse and interdisciplinary team with strong ties to remote, rural, Indigenous and Francophone communities to build health technologies that create equitable access to care.



**NOSM University's innovative medical education and our new collaboration with the University of Waterloo will create opportunities to develop technologies that improve equitable access to care, addressing health-care challenges faced by northern Ontario's underserved populations."**

-DR. DAVID SAVAGE  
NOSM UNIVERSITY

To learn more, visit

[uwaterloo.ca/news/training-and-retaining-health-care-professionals-northern](https://uwaterloo.ca/news/training-and-retaining-health-care-professionals-northern)

# UNDERSTANDING AND ENHANCING HUMAN EXPERIENCE



**Waterloo researchers are creating opportunities for social, artistic and cultural innovation in a rapidly changing world. They are analyzing how technology and innovation can help knit humanity, with all its diversity, closer together.**



**Curriculum and institutional systems of accreditation are Eurocentric and exclusionary to many Indigenous peoples, so my primary goal is to create sustainable pathways that enable Indigenous knowledge and cultural practices to broadly permeate studio art learning and how they lead to professionalization.”**

- LOGAN MACDONALD  
ASSOCIATE PROFESSOR  
FINE ARTS



## **Creating opportunities for Indigenous artists**

The Longhouse Labs (LLabs) is a research-creation hub aimed at facilitating long-term engagement with Indigenous artists, curators, conservators, and researchers through the creation of yearly residencies (Fellowships) within the Department of Fine Arts at Waterloo.

Collaborative engagement opportunities between Fellows, highly qualified personnel (HQP), and other stakeholders will be nurtured by the LLabs through research-creation and outreach activities. The LLabs is designed to accommodate broad and intersecting studio practices by offering a cluster of new studios, new media supports, archival infrastructure, collaborative research spaces, and land-based research areas and materials.

This groundbreaking research by Professor Logan MacDonald addresses gaps in Fine Arts education by integrating Indigenous methodologies and practices into Fine Arts curricula and pedagogies. He has collaborated with over 50 Indigenous artists, curators, and scholars on creative projects, including a 2019 SSHRC-funded research project “Respectful Indigenous Creative Collaboration and Consultation.” This project involved 20 Indigenous creative thought leaders in Ontario and across Canada to index challenges to Indigenous creativity in relation to cultural protocols, institutional inclusion, and disparities in resource allocation, location, training and expectations when working with colonial systems.



Artists Talena Atfield, Kahionwinehshon Phillips, Jija Jacobs, and Tesha Emarthle are among the first Longhouse Fellows. Their project, *Bead the Tract*, (featured on pages 7–8) is an initiative of Protect the Tract, a Haudenosaunee-led project.



### Researcher spotlight: Talena Atfield

Dr. Talena Atfield is a Tier 2 Canada Research Chair (CRC) in Tentewatenikonhra'khánion (We Will Put Our Minds Together).

Dr. Atfield is of Kanien'kehá:ka of the Grand River and mixed settler backgrounds and is an assistant professor in the Department of History.

The goal of this CRC program is to regenerate and reintegrate information held in material and archival collections from the 19th and early 20th centuries back into daily practice at Ohswé:ken (Six Nations). This goal will be met through community-led analysis and interpretation of archival, linguistic, photographic, and material culture, beginning with the F.W. Waugh collection which dates from 1912–1924.

IMAGE CREDIT:  
PORTRAIT OF TALENA ATFIELD  
BY HAWLII PICHETTE, URBAN ISKWEW.



# ACCELERATING SUSTAINABILITY

Waterloo is accelerating development of technology and novel practices to enhance sustainability. This research is guiding the formulation of principles, policies and paradigm shifts in global environmental governance for achieving local and regional sustainability outcomes.

## Sustainable aviation takes flight

University of Waterloo is leading the charge in Canada's electric aviation evolution.

Backed by Government of Canada funding, the experts at the Waterloo Institute for Sustainable Aeronautics (WISA) and Waterloo Wellington Flight Centre (WWFC) achieved a historic milestone when their tiny, two-seater Pipistrel Velis Electro (pictured below) made its inaugural flight. The Velis Electro is certified to fly in Europe and is being evaluated with an end goal to become Canada's first type-certified electric plane.

Thanks to the WISA team's efforts, this is just the beginning of electrically propelled flight in the country. Working with WWFC staff, WISA researchers have demonstrated that the Velis Electro can pass each stage of its flight program under demanding Canadian conditions. Their tests at the Region of Waterloo International Airport are providing conclusive evidence that electric planes can make the aviation industry more environmentally sustainable.



From left, Dorothy McCabe, Mayor, City of Waterloo and Charmaine Dean, Vice-President, Research and International, University of Waterloo

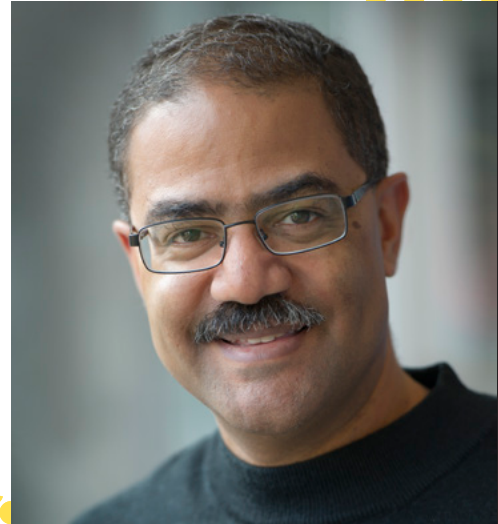


## Leveraging research strength for green communities

In October 2023, the University of Waterloo and the City of Waterloo joined forces at a connector event to promote partnerships between researchers and city staff to work together on some of the city's most pressing issues related to sustainability. The event followed many decades of collaboration and provided an opportunity to leverage the University's research strengths and the city's ability to act as a living lab to advance overarching community goals for environmental sustainability and climate change mitigation/adaptation.

City of Waterloo staff proposed three broad headings for discussion: new building construction and building retrofits, transportation, and community greening. The potential projects ranged from how to renovate or retrofit existing city facilities to reduce energy usage and greenhouse gas emissions using advanced building materials and energy-saving technology to expanding the city's tree canopy to address urban heat island effects, to sequestering carbon, and to enhancing stormwater management.

After a morning of productive discussion, Dorothy McCabe, Mayor of Waterloo, announced a handful of projects that were chosen to move forward. At the time of writing, there are five joint MITACS applications in various stages of development and other collaborations continue to flow from the event.



## Researcher Spotlight: Trevor Charles

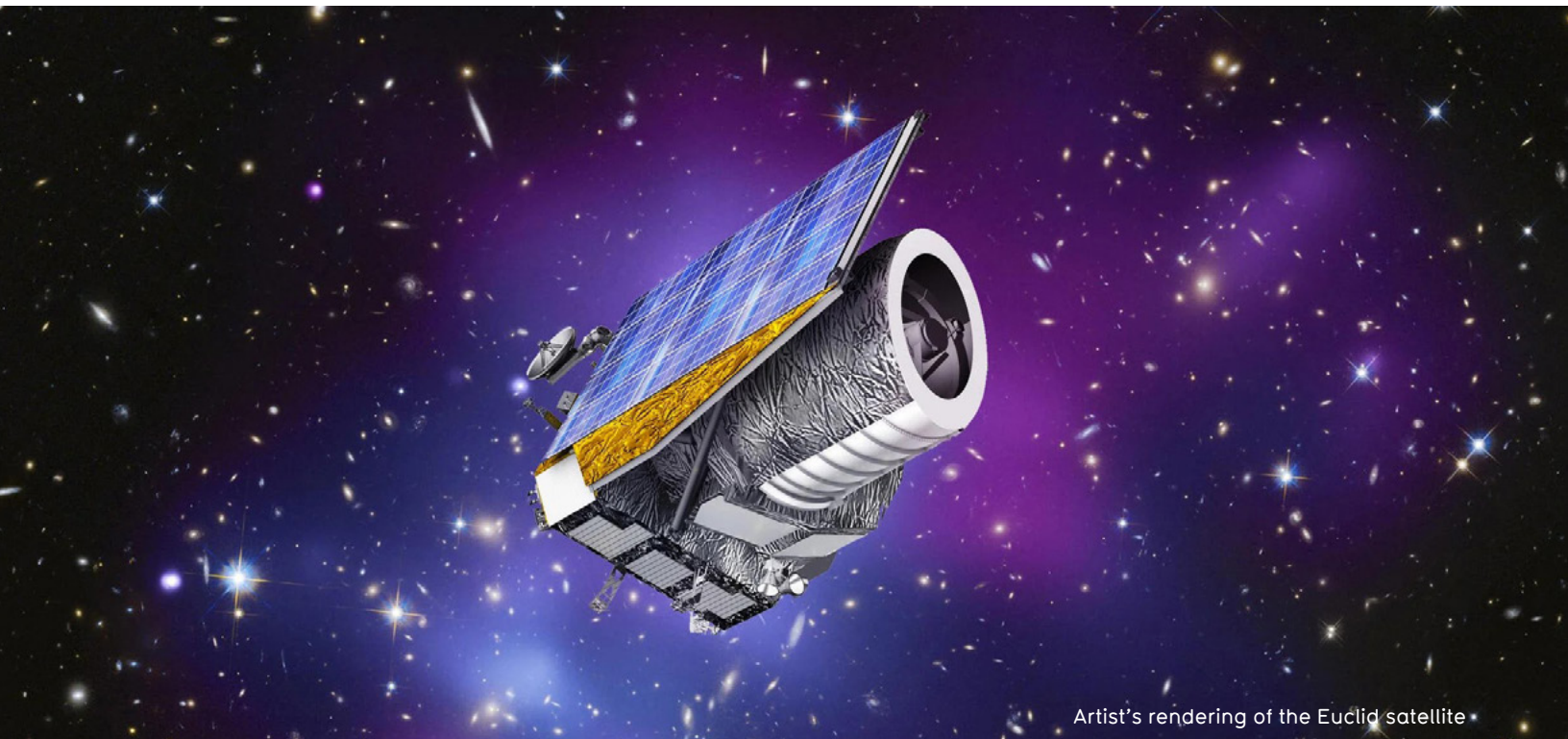
Dr. Charles is an award-winning researcher. His current areas of research address the challenges of food waste and plastics pollution by applying bacterial genome engineering and microbiome analysis within a circular bioeconomy concept to develop innovative methods for converting food waste into biodegradable plastics.

Through the startup company, MetaCycler BioInnovations, members of Dr. Charles' research group are driving commercialization by working with dairy companies to use the waste products of milk production to produce the bottles used to package milk. Opening pathways from research to commercialization is another key differentiator at the University of Waterloo. The upcycling of waste lactose from the dairy industry to biodegradable plastics suitable for food packaging materials maximizes resources and vastly reduces waste.

The Microbiome Support project, with Canada represented by the Waterloo Centre for Microbial Research, led to the international establishment of the Microbiome Support Association, of which Waterloo is a founding member.

# PUSHING THE FRONTIERS OF KNOWLEDGE

Waterloo researchers are exploring the cosmos and the limits of complexity, discovering what shapes the interactions of humans with each other and the planet. They are searching for answers, for theoretical proof, for knowledge.



Artist's rendering of the Euclid satellite

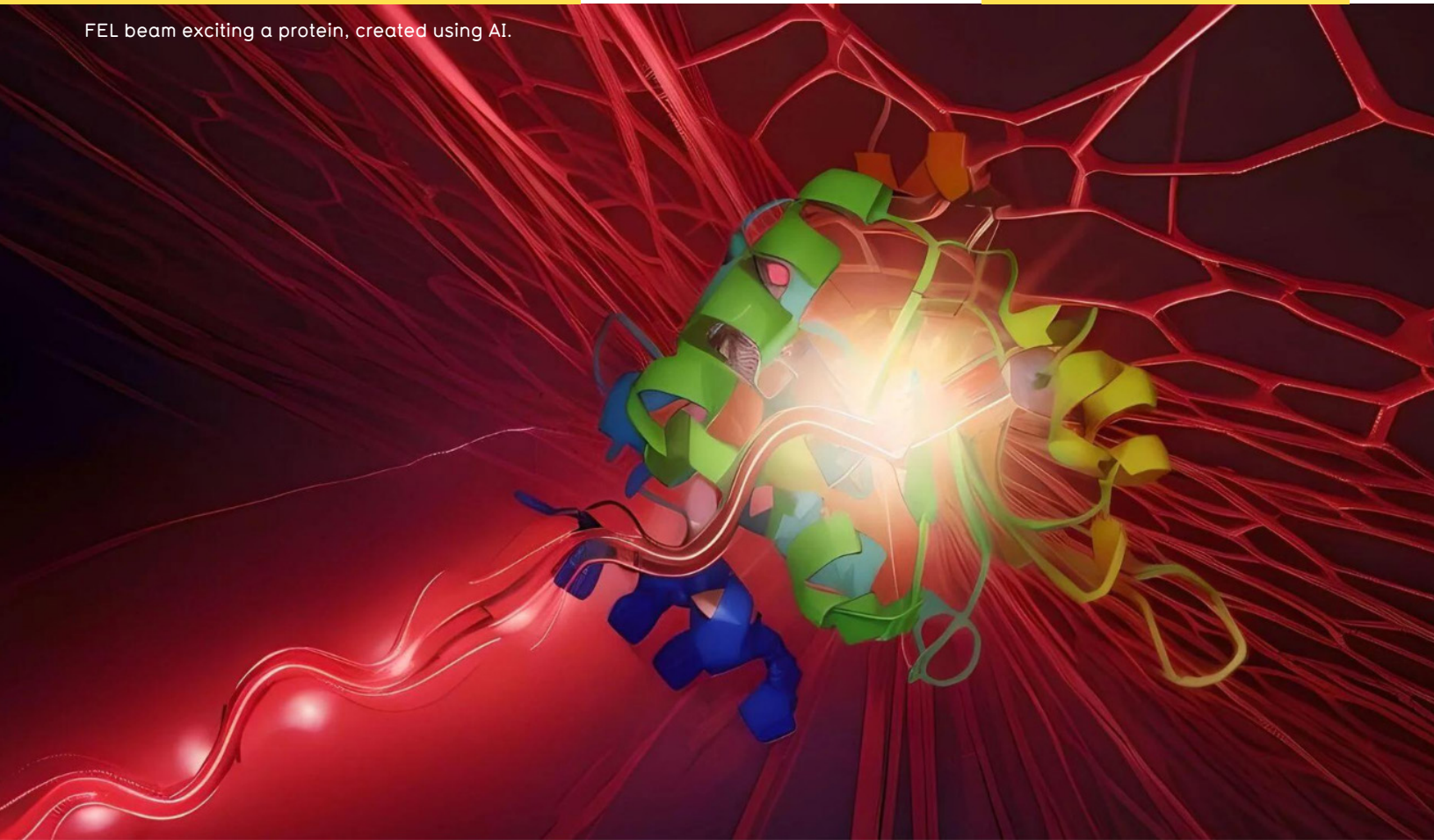
## Creating a 3-D map of the universe

Researchers at the University of Waterloo are among those from several universities across Canada and around the world contributing to the construction of a 3D map of the universe by observing billions of galaxies spanning more than a third of the sky.

With a goal of understanding the physical laws of the Universe, explaining how the Universe originated, and what it's made of, the Euclid satellite will spend more than six years in space collecting images that will provide the positions and properties of distant galaxies.

The data sent back to Earth will be analyzed by more than 2,000 scientists, with many parts of the analysis and scientific interpretation organized by researchers at Waterloo. Since the launch, the European Space Agency's (ESA) Euclid space mission has already produced extraordinary colour images of the cosmos offering a glimpse of the distant universe, and the amazing capabilities of the facility.

FEL beam exciting a protein, created using AI.



## Building a state-of-the-art Free Electron Laser

The Canadian Free Electron Laser (FEL) project received \$10 million in funding from the Canada Foundation for Innovation (CFI) to put toward the \$50+ million facility to be built on the Waterloo Campus. The facility will enable fundamental science concerned with monitoring energy flow through molecules and materials, with applications in light harvesting and photo-control of molecular properties. New research in chemical, spatial and temporal mapping of living biological materials will also become possible. The FEL will be an important tool for nanotechnology researchers who are interested in probing nanostructured materials and developing, for example, new sensors, as well as investigators who are interested in exploring the effects of radiation on molecules, materials and biological systems.



**“Having a FEL based in Waterloo will open the doors to further innovation for Canadian researchers. We’ll work with research hospitals to cure diseases and water treatment facilities to develop new technologies that eliminate contaminants. The research we conduct might even help with finding life on other planets.”**

- DR. SCOTT HOPKINS  
ASSOCIATE PROFESSOR  
CHEMISTRY

# DEVELOPING TECHNOLOGIES FOR THE FUTURE

Waterloo researchers are not only creating new technologies, but they are also probing the nature of human interaction with technology, uncovering the benefits it heralds as well as exposing and mitigating the risks it poses.



## Advancing Canada's security and defence capabilities

In January 2023, the University of Waterloo announced a 5G and beyond mobile network technology consortium to develop secure 5G mobile networks and improve Canada's security and defence. The group is funded by the Department of National Defence (DND) through its Innovation for Defence Excellence and Security (IDEaS) program. A team of computer scientists at Waterloo is leading the \$1.5 million multi-partner consortium.

The three-year project brings together top academic and industry partners from École de technologie supérieure in Montréal, University of Regina, BlackBerry, NoviFlow, and Rockport Networks, with support from Rogers Communications Canada to create new solutions to secure 5G mobile networks. This latest global wireless standard delivers reliable, high-speed data transfers with very little delay — advanced communications technology that is transforming businesses, industries, and nations.

Among the technologies the consortium will develop are artificial intelligence systems to detect a range of cyberattacks on 5G network slices as they happen, then respond quickly and automatically with countermeasures to keep the network secure.



To learn more, visit

[uwaterloo.ca/news/media/waterloo-leads-university-and-industry-consortium-advance](https://uwaterloo.ca/news/media/waterloo-leads-university-and-industry-consortium-advance)



## Leading the Canadian quantum revolution

On January 13, 2023, in support of the new National Quantum Strategy (NQS), Canada's federal government announced a new Quantum Advisory Council and appointed two co-chairs: Dr. Raymond Laflamme, founding director of Waterloo's Institute for Quantum Computing (IQC) and professor in the Department of Physics and Astronomy, and Dr. Stephanie Simmons (BMath, '08), a Waterloo alum. With the aim to advance Canada's quantum potential, the NQS focuses on three core pillars, all of which are aligned with the strategic priorities for quantum research at Waterloo and IQC. As part of the NQS, the NSERC Alliance Quantum Grant was established to advance research opportunities and in 2023, five IQC researchers were cumulatively awarded over \$10 million from this grant. The NQS' mission to develop, attract and retain talent in Canada is reflected well at Waterloo; IQC recruited Dr. Graeme Smith as an associate professor in the Department of Applied Mathematics and celebrated 42 new alumni who graduated with advanced degrees in quantum research at the doctoral and master's levels in engineering, math and science. The final NQS pillar, translating research into commercial products that benefit Canadians, is also highly reflected in the startup ecosystem of Waterloo; 40 per cent of researchers at IQC are actively involved with commercialization. In 2023, four new ventures were launched, and one quantum-focused patent was granted to our quantum researchers.



**Path-breaking work in quantum has been underway at Waterloo for many years now and we look forward to helping to grow and solidify a national network of quantum scientists, and industry partners who will come together to tackle some of the greatest challenges we face as a society.”**

- DR. CHARMAINE B. DEAN,  
VICE-PRESIDENT,  
RESEARCH AND INTERNATIONAL

# INNOVATION AND ENTREPRENEURSHIP

**Velocity, Canada’s flagship entrepreneurship centre at the University of Waterloo, stands as one of the world’s most impactful startup incubators. Renowned for fostering a vibrant entrepreneurial ecosystem, Velocity has played a critical role in translating innovative ideas and research into successful, scalable businesses. Its influence spans the globe, shaping the landscape of innovation and startup creation.**

## Breaking ground on startup commercialization

In 2023, the University of Waterloo and Velocity broke ground at the Innovation Arena, the new home of Velocity on Waterloo’s Health Sciences campus in downtown Kitchener.

The site is part of Waterloo’s expanding pipeline for health innovation in Southwestern Ontario. It features collaborative spaces to forge partnerships and facilitate exchanges between businesses, founders, researchers and community partners. This purpose-built space will allow Velocity to streamline commercialization, fast-track entrepreneurs, and support the global economy. Velocity’s expansion will deepen its ability to support health-tech, deep-tech and software companies and double the number of companies it can assist annually.

At the Innovation Arena, Waterloo, Velocity and its partners expect to create 730 skilled jobs, support the development and growth of 135 businesses and commercialize 150 new health-related products, services or processes. It will also help anchor a growing number of health-tech firms in Southwestern Ontario, contributing to regional growth while attracting international startups to Waterloo.

The Innovation Arena, located in downtown Kitchener, will house unique capabilities to accelerate health innovation.



**“The Innovation Arena is driven by a community that has a common vision, a bold strategy and the talent, research and ideas to deliver on possibilities. Momentum in the Waterloo Region and the city of Kitchener is building to support technology-inspired innovations in health care and delivery. The Innovation Arena will also play a crucial role in expanding the impact and scope of Waterloo’s flagship incubator, Velocity.”**

- VIVEK GOEL, PRESIDENT AND VICE-CHANCELLOR OF THE UNIVERSITY OF WATERLOO



From left, Velocity Fund General Partners Ross Robinson and Akash Vaswani

## Growing resilience in the food supply chain

When it comes to buying fresh produce, Canadians are largely vulnerable to global food supply chains, which can fall in a matter of weeks. Ceragen, a company at Velocity, University of Waterloo’s startup incubator, develops novel probiotics for the hydroponic greenhouse industry to increase its crop yields.

Chief technology officer Matthew Rose said Velocity has been key to advancing the company’s business operations, including the development of its initial products. “From world-class mentorship, to access to financing, to some of the best lab resources available for startups in North America— Velocity has been instrumental in Ceragen’s success to date,” Rose said.

In 2023, Ceragen’s project group accepted \$1 million to optimize several aspects of domestic indoor strawberry production, including preserving the summer-quality strawberry taste. “Canada imports 80 per cent of our produce, so we are susceptible to supply chain interruptions, and improving Canadian production and supporting local production can ensure that the customer gets better quality produce in a safe manner,” said Danielle Rose, Ceragen’s co-founder and CEO.

## Waterloo’s solution for Canada’s innovation funding gap

Building on University of Waterloo’s history of game-changing innovation, in 2023 the University became the first post-secondary institution in Canada to invest from its endowment into a venture capital (VC) fund spun out of Velocity. Waterloo’s Board of Governors approved an investment of up to \$5 million into the Velocity Fund II (VFII), a new, for-profit VC fund operated independently by general partners Ross Robinson and Akash Vaswani.

Canada has a well-documented funding gap— ranking sixth among G7 nations and 15th overall in the World Intellectual Property Organization’s 2022 global innovation index. The VFII aims to fill this innovation gap by providing early support for early-stage software, health tech and deep tech startups, coming out of Waterloo, Velocity and the broader startup ecosystem in Waterloo Region.



# AWARDS, FUNDING AND IMPACT

## Royal Society of Canada at Waterloo

The University of Waterloo was proud to host the Royal Society of Canada (RSC) for the 2023 *Celebration of Excellence & Engagement (COEE)* conference and present the symposium, *Health and Wellbeing for All by 2030: Application of technology to global health problems*.

Founded in 1882, the Royal Society of Canada (RSC) comprises the Academies of Arts, Humanities and Sciences, and The College of New Scholars, Artists and Scientists. The RSC recognizes excellence, advises the government and the larger society, and promotes a culture of knowledge and innovation in Canada and with other national academies around the world.

Each year, the RSC and its members elect their new cohorts — fellows of the RSC and members of the RSC College of New Scholars, Artists and Scientists.

Five new RSC fellows and four College members from the University of Waterloo were among the researchers inducted in 2023.

From left: Frank Deer, President, RSC College, Charmaine Dean, Vice-President, Research and International at Waterloo, Darren Gilmour, RSC Executive Director, Jean Becker, Associate Vice-President, Indigenous Relations at Waterloo and Alain-G. Gagnon, RSC Board Director and President



## Royal Society of Canada Fellows



**N. Asokan**  
Professor  
David R. Cheriton  
School of Computer Science



**Kerstin Dautenhahn**  
Professor  
Department of  
Electrical and Computer  
Engineering



**John Hirdes**  
Professor  
School of  
Public Health  
Sciences



**Jonathan Jun Li**  
Professor  
Department of Geography  
and Environment  
Management



**Daniel Scott**  
Professor  
Department of Geography  
and Environmental  
Management

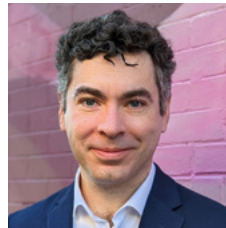
## Members of the Royal Society of Canada College of New Scholars, Artists and Scientists



**Nicole Nolette**  
Associate Professor  
Department of  
French Studies



**Naila Keleta-Mae**  
Associate Professor  
Department of  
Communication Arts



**Igor Grossmann**  
Professor  
Department of Psychology



**Aiping Yu**  
Professor  
Department of  
Chemical Engineering

## Rankings

**#1**

Comprehensive Research  
University for 16 years in a row  
(Research Infosource Inc., 2023)

**#2**

Most Innovative  
University in Canada  
(Maclean's, 2024)

**#3**

Best Overall University  
in Canada  
(Maclean's, 2024)

# ENHANCING RESEARCH EXCELLENCE

## Canada Excellence Research Chairs announced 2023/24

### **Sara Hart**

Canada Excellence Research Chair in Developmental Science

Professor of Psychology, Faculty of Arts

### **Renée J. Miller**

Canada Excellence Research Chair in Data Intelligence

Professor, Cheriton School of Computer Science, Faculty of Mathematics

## Canada Research Chairs announced 2023/24

### **Talena Atfield**

New Canada Research Chair in Tentewatenikonhra'khánion (We Will Put Our Minds Together) (Tier 2)

Assistant Professor, History

### **Andrew Bauer**

Renewed Canada Research Chair in Taxation, Governance and Risk (Tier 2)

Associate Professor, School of Accounting and Finance

### **Zahid Butt**

New Canada Research Chair in Interdisciplinary Research for Pandemic Preparedness (Tier 2)

Assistant Professor, School of Public Health Sciences

### **Travis Craddock**

New Canada Research Chair in Quantum Neurobiology (Tier 1)

Associate Professor, Biology

### **Kaylena Ehgoetz Martens**

New Canada Research Chair in Research Chair in Gait and Neurodegeneration (Tier 2)

Associate Professor, Kinesiology and Health Sciences

### **Chris Eliasmith**

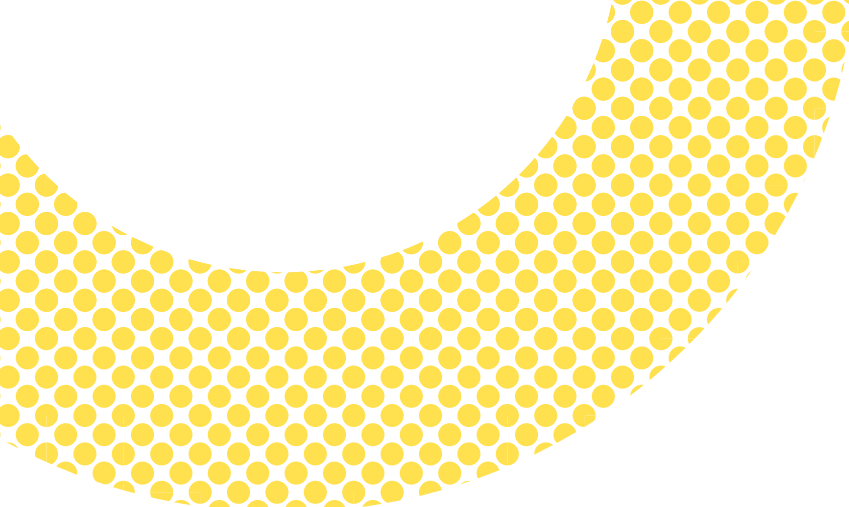
Renewed Canada Research Chair in Theoretical Neuroscience (Tier 1)

Professor, Philosophy and Systems Design Engineering

### **Lai-Tze Fan**

New Canada Research Chair in Technology and Social Change (Tier 2)

Associate Professor of Technology & Social Change, Department of Sociology & Legal Studies, cross-appointed in the Department of English Language and Literature



**Mark Ferro**

Renewed Canada Research  
Chair in Youth Mental Health  
(Tier 2)

Associate Professor, School of  
Public Health Sciences

**Laura Hug**

Renewed Canada Research  
Chair in Environmental  
Microbiology (Tier 2)

Associate Professor, Biology

**Aukosh Jagannath**

New Canada Research Chair in  
Mathematical Foundations of  
Data Science (Tier 2)

Associate Professor, Statistics  
and Actuarial Science

**Chantel Markle**

New Canada Research Chair  
in Wildlife Ecohydrology and  
Global Change (Tier 2)

Assistant Professor,  
Geography and Environmental  
Management

**Tizazu Mekonnen**

New Canada Research Chair  
in Sustainable Multiphase  
Polymers (Tier 2)

Associate Professor, Chemical  
Engineering

**Valerie Ward**

New Canada Research Chair in  
Microalgae Biomanufacturing  
(Tier 2)

Associate Professor, Chemical  
Engineering

**Luis Ricardez-Sandoval**

Renewed Canada Research  
Chair in Multiscale Modelling  
and Process Systems (Tier 2)

Associate Professor, Chemical  
Engineering

**Roudu Wang**

New Canada Research Chair in  
Quantitative Risk Management  
(Tier 1)

Professor, Statistics and  
Actuarial Science

# CANADA RESEARCH EQUITY TARGETS AND DATA

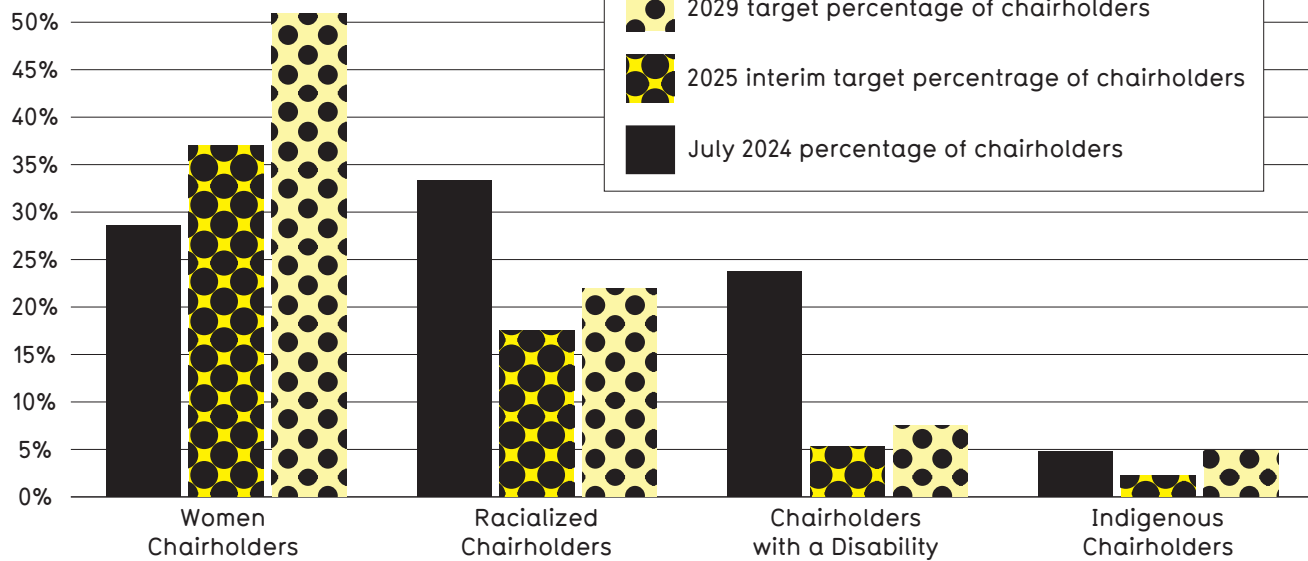
The Canada Research Chair (CRC) program has set equity targets that all institutions must reach. The chart below (data from July 2024) demonstrates how Waterloo is working

toward meeting the equity targets across the four federally designated groups (Indigenous peoples, persons with disabilities, racialized individuals and women and gender minorities).

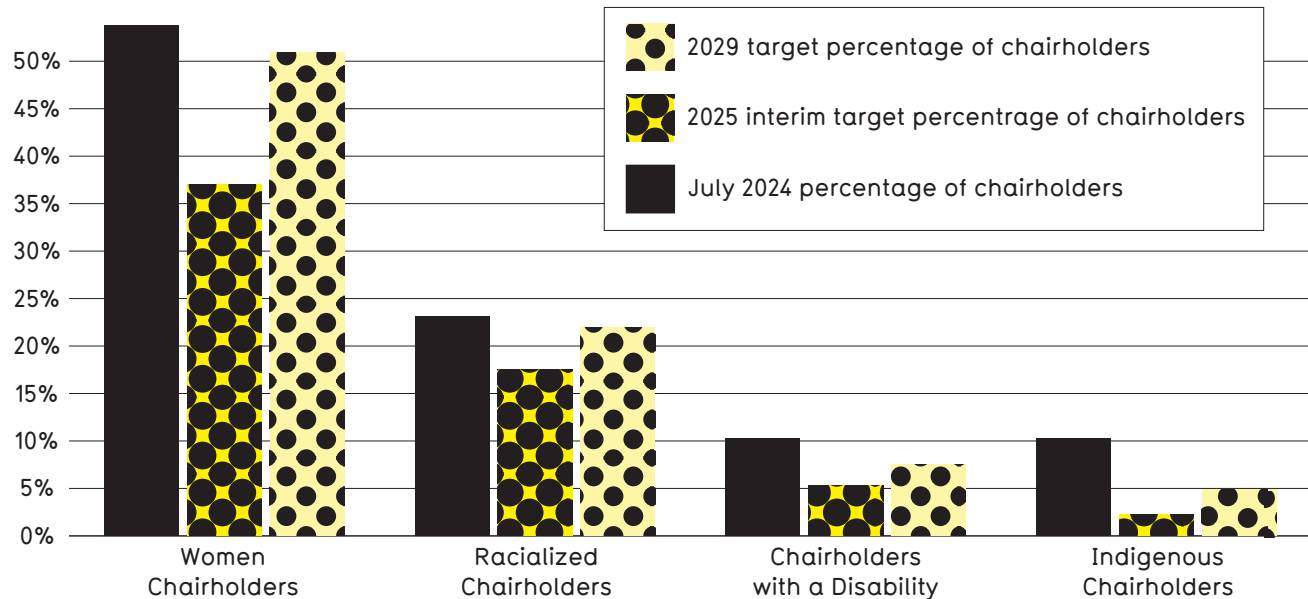
## Canada Research Equity Targets and Data

Source: Internal database

### Tier 1 Chairholders



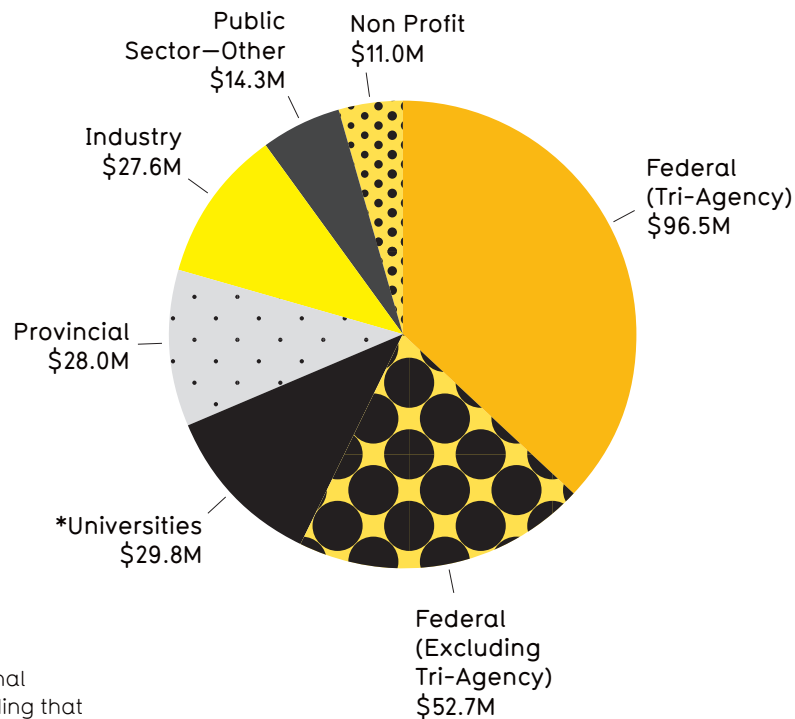
### Tier 2 Chairholders



# MAJOR FUNDING

Thank you to our funders including NSERC, SSHRC, CIHR and CFI, along with our provincial and federal government partners, and corporate and non-profit sponsors.

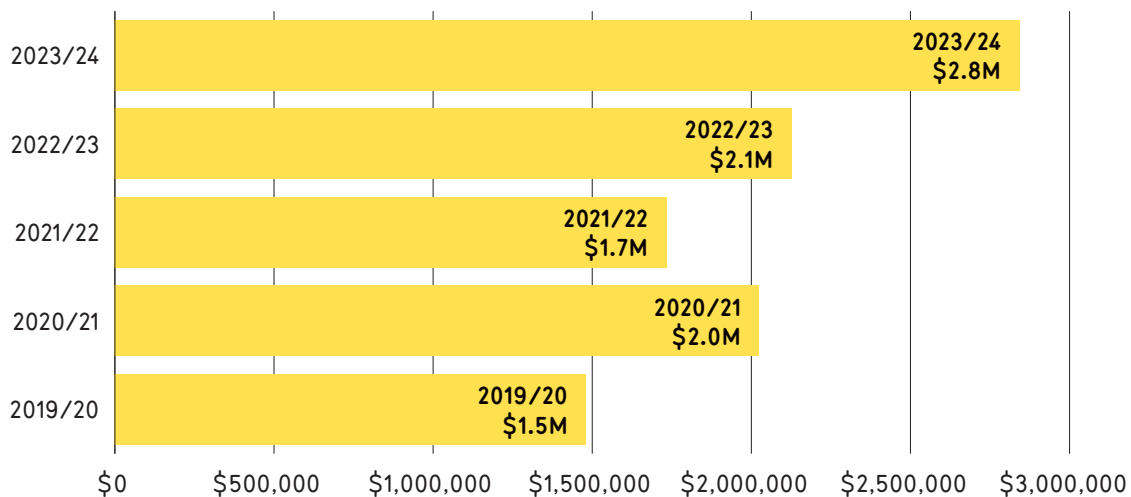
## Total Research Funding for 2023/24



\* Universities includes internal funding and external funding that flows through universities

Source: Internal pre-award database and InfoEd

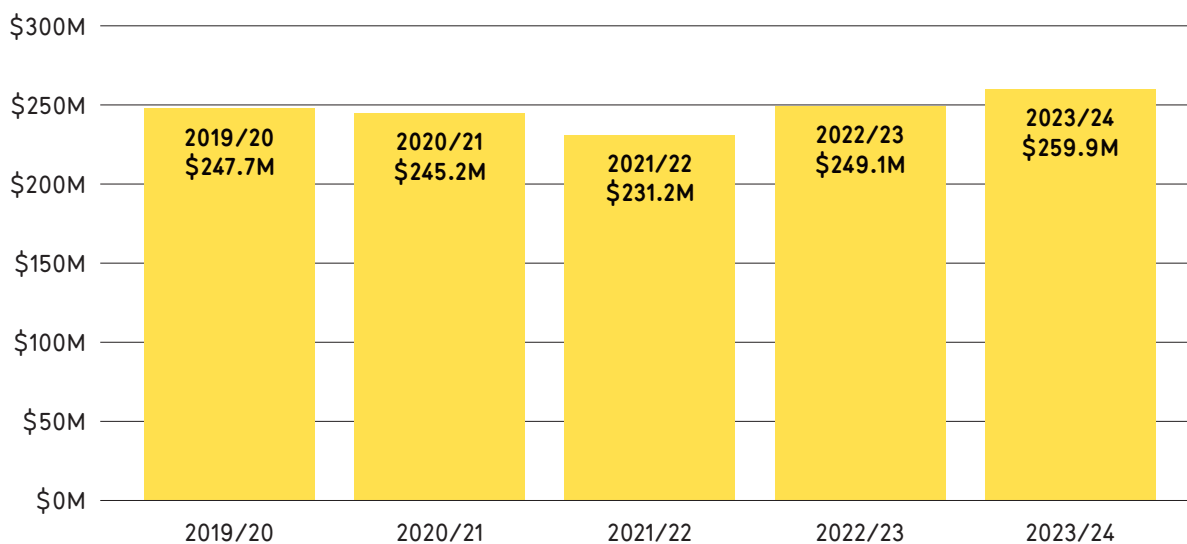
## New Frontiers in Research Funding (NFRF) from 2019/20 – 2023/24



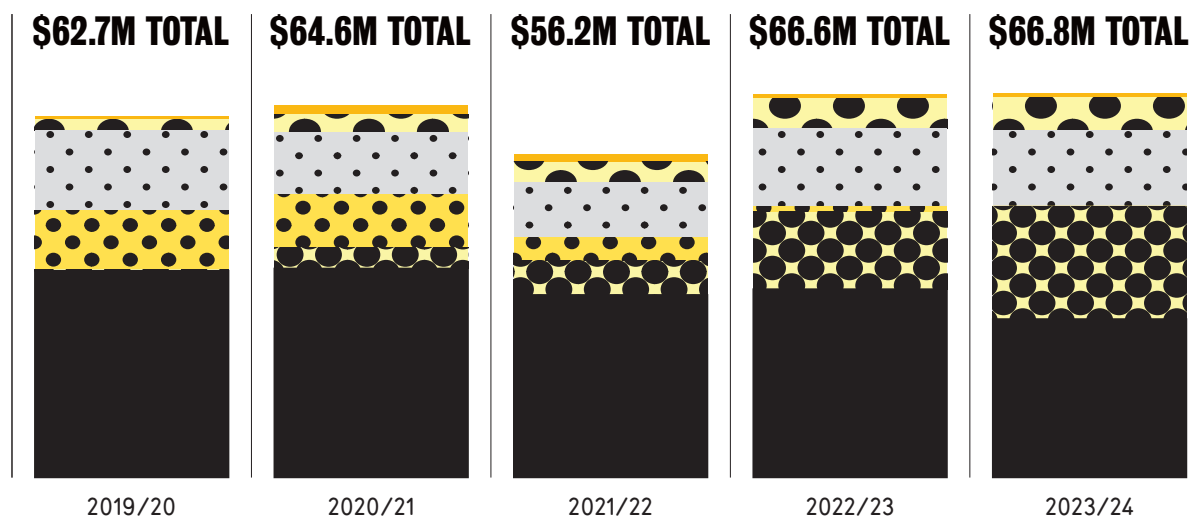
Source: Internal pre-award database and InfoEd

## Total sponsored research funding trend 2019/20 – 2023/24

Source: InfoEd

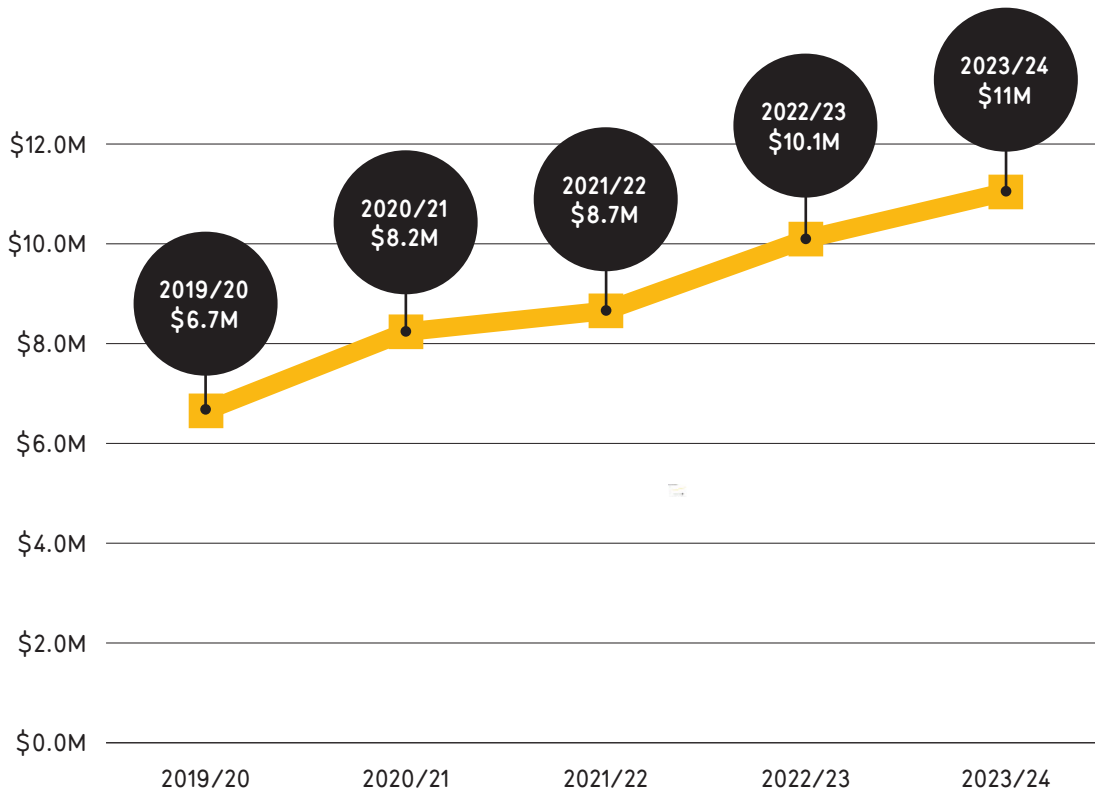


## University of Waterloo Industry and Government Matching Partnership Funding



	2019/20	2020/21	2021/22	2022/23	2023/24
Industry	\$36.0M	\$36.4M	\$31.8M	\$32.8M	\$27.6M
NSERC Alliance	\$0.2M	\$3.7M	\$5.9M	\$13.4M	\$19.6M
Other (Fed Dev, APC, Engage as examples)	\$14.1M	\$10.9M	\$9.5M	\$13.6M	\$13.3M
Mitacs Inc	\$1.7M	\$3.1M	\$3.6M	\$5.1M	\$5.6M
OCI	\$0.5M	\$1.5M	\$1.3M	\$0.7M	\$0.7M
NSERC - CRD	\$10.3M	\$9.1M	\$4.1M	\$1.0M	\$0.0M
<b>Total</b>	<b>\$62.7M</b>	<b>\$64.6M</b>	<b>\$56.2M</b>	<b>\$66.6M</b>	<b>\$66.8M</b>

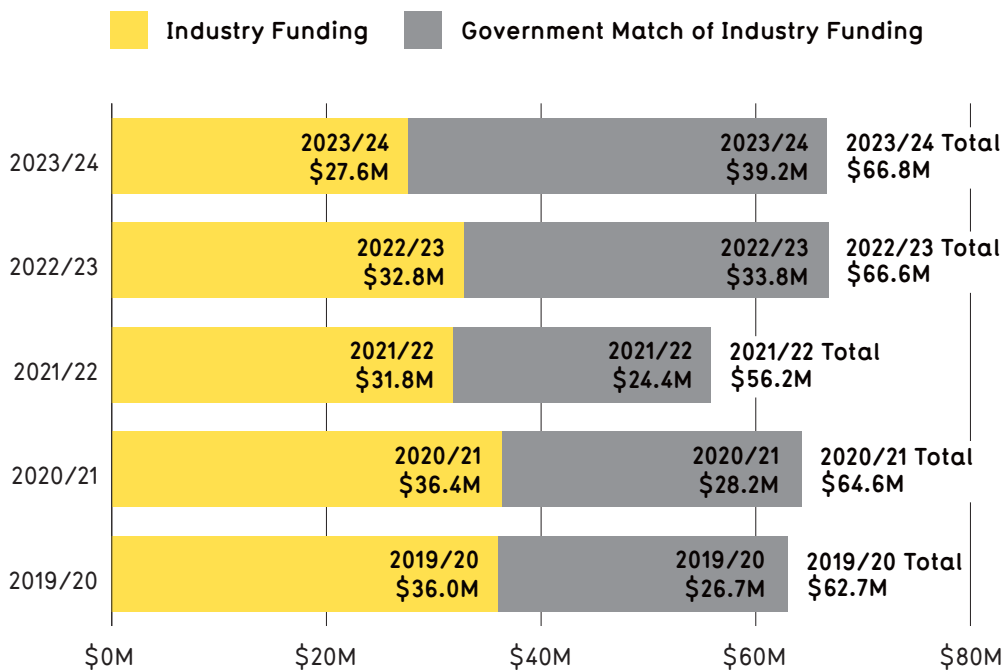
## Total non-profit funding trend 2019/20 – 2023/24



Mitacs is included in Non-profit funding

Source: InfoEd

## Total industry funding (with government match) trend 2019/20 – 2023/24



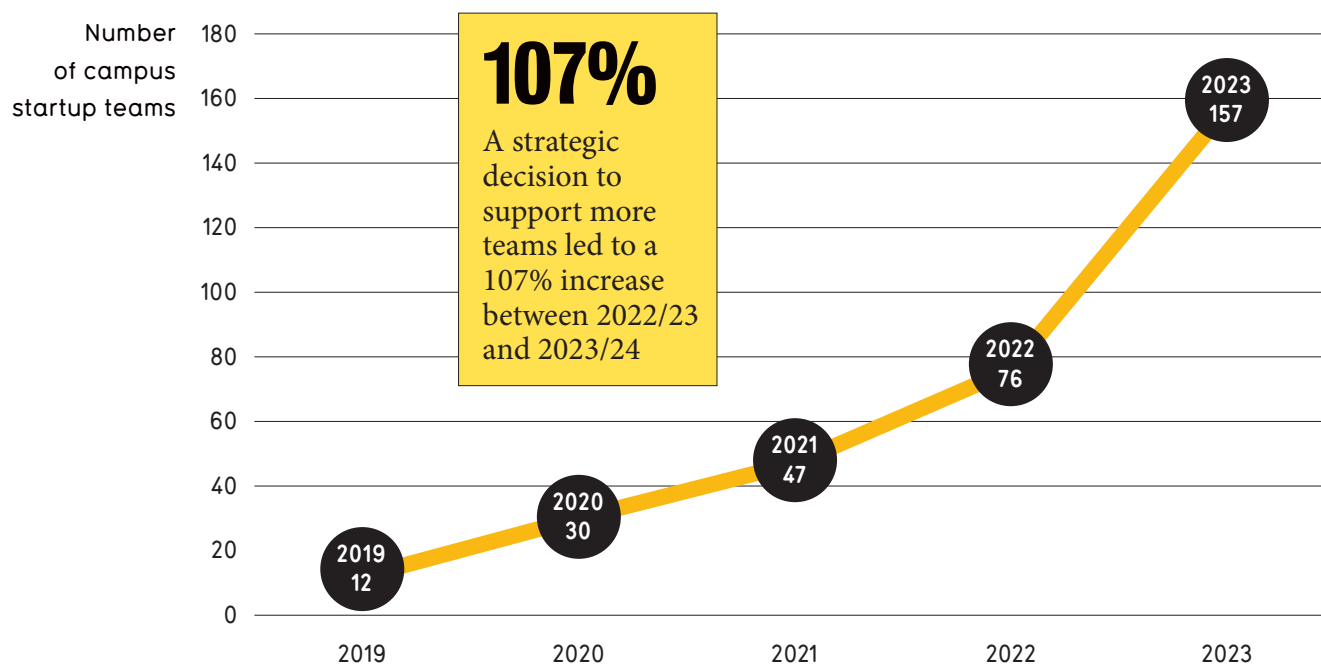
Source: InfoEd



# ENTREPRENEURSHIP

## Growth of University of Waterloo Campus Startup Teams

Source: Velocity internal tracking



## U15 Universities globally producing investment-backed undergraduate entrepreneurs (Total Jan 2013 – Sept 2023)

Rank	University	Founders	Companies	Capital Raised
1	University of Waterloo	562	478	\$20B
2	McGill University	558	511	\$20B
3	University of Toronto	531	488	\$26B
4	University of British Columbia	367	323	\$6B
5	Queen's University	272	243	\$8B
6	University of Western Ontario	194	184	\$2B

Source: Pitchbook annual ranking of universities:  
Top 100 colleges ranked by startup founders

UNIVERSITY OF  
**WATERLOO**



UNIVERSITY OF WATERLOO  
200 UNIVERSITY AVE. W., WATERLOO, ON, CANADA N2L 3G1

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