Ontario Genomics

Made in Ontario: **Unlocked for the World**

2022-2023 Annual Report

LAND **ACKNOWLEDGEMENT**

Ontario Genomics acknowledges that our office is situated in Tkaronto, or Toronto, on the traditional territory of the Anishinaabe, including the Mississaugas of the Credit, Haudenosaunee, and Huron-Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples. This land is covered under several treaties, including the Toronto Purchase (Treaty 13) and the Dish with One Spoon Agreement. The closest community is the Mississaugas of the Credit First Nation. To acknowledge the historical and present-day injustices and support our team's reconciliation work, we strive for continuous learning about the history of and present-day injustices impacting Indigenous peoples across Ontario, Canada and the world.

Ontario Genomics

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GOVERNMENT **MESSAGE**

The Honourable Jill Dunlop

MINISTER OF COLLEGES AND UNIVERSITIES

"I would like to commend Ontario Genomics for its strong leadership, strategic vision and commitment to public-private partnerships, which is helping us drive the commercialization of "made-in-Ontario" genomics technologies and products. The province is proud to support leading genomics research projects. From helping to identify disease-causing viruses, to increasing crop yields and protecting our water supply, the potential of genomics to address some of our biggest challenges is truly limitless."

INTRODUCTION

Discover the key to Ontario's innovation economy in our 2022-2023 Annual Report, where we explore our theme "Made in Ontario: Unlocked for the World." This year, we showcase the transformative power of Ontario's ingenuity, unveiling breakthroughs that resonate worldwide. Our commitment to excellence continues to unlock new avenues of growth, fostering a thriving and sustainable economy that transcends borders.

A Message from our Board Chair, Dr. Deborah Stark and President & CEO, Dr. Bettina Hamelin

As humanity continues to struggle with pressing global challenges – from climate change to food insecurity to acute and chronic diseases - more and more hope is put on the promise of science to deliver sustainable and game-changing solutions. Fortunately, the rapid pace of innovation enables the commercialization of vital technologies from the lab benches to the hands of consumers at unprecedented speeds. Today, Ontario is perfectly positioned to be a leader in what is now called the global bio-revolution.

We invite you to discover the key to Ontario's innovation economy in our 2022-2023 Annual Report, where we explore our theme ***"Made in Ontario: Unlocked for the World."*** This year, we showcase the transformative power of Ontario's breakthroughs that echo worldwide. Our commitment to excellence continues to unlock new avenues of growth, fostering a thriving and sustainable economy that transcends borders.

Over the last year, Ontario Genomics has worked hard to maintain Ontario's competitive edge by investing in and nurturing critical projects and initiatives across sectors. In addition to maintaining an over $391M active projects portfolio, Ontario Genomics raised over $27.8M in new funding and secured over $26.1M in follow-on funding. The economic impact of this work includes hundreds of new or retained jobs in the many corners of the province. But our commitment to growing Ontario's economy goes beyond statistics.

Economic growth and sustainability are a generational endeavour that require strategic foresight to meet the growing workforce demands of an innovation-driven economy.

That's why Ontario Genomics is driven to develop and retain Ontario's brightest talent – our province's greatest asset. Our strategic approach to talent development is harnessed at various career and company growth stages. Over the last year, we committed to making the study of genomics and its applicable career paths accessible in high schools, colleges, and universities while nurturing entrepreneurial and start-up development through our BioCreate Program. We upped our game with transformative collaborations in cellular agriculture and waste upcycling to foster a future where innovation thrives, challenges are met, and sustainable solutions flourish. Together, we are penning a remarkable narrative of positive change, ushering in a new era of prosperity, sustainability, and human ingenuity.

We know the real "key" to our shared success are the people who dedicate themselves to impacting scientific advancements and critical technology development for a better world. With this key, we can collectively unlock unprecedented insights, propel advances across industries and forge a path to a limitless future.

Join us as we reflect on a year of ground-breaking achievements and look ahead to the boundless doors our innovative aspirations can unlock.

Dr. Deborah Stark
Ontario Genomics
Board Chair

Dr. Bettina Hamelin
Ontario Genomics
President & CEO

MADE IN ONTARIO:
UNLOCKED FOR THE WORLD

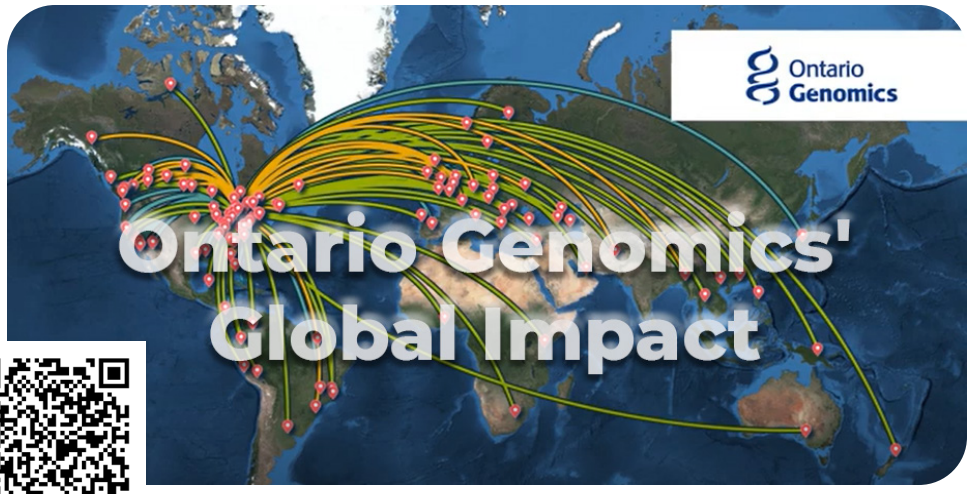
A Year in Review 2022–2023

Leading the application of genomics-based solutions across key sectors to drive economic growth, improve quality of life and foster global leadership in Ontario.

Connecting scientists, ideas and partner organizations for collaborative investment opportunities in genomics technologies. Learn more about how we bring the right researchers together with the right partners at the right time to achieve our goals.

Ontario Genomics' Global Impact

The verdict is in - we're spilling genes all over the world! This video focuses on our provincial, national, and global reach, encapsulating the far-reaching impacts of the science and innovation unlocked by Ontario Genomics. (Watch Video)



Impact During this Year (2022-2023)

$27.8M+
Funds Raised

$26.1M+
Follow-On Funding

574
Jobs Created or Maintained

$391M+
Active Portfolio (Including Co-Funding)

Impact Since 2000

310+
Patents Awarded

$1.8B+
GDP Growth Supported (2013-2018)

$1.9B+
Follow-On Investments (Companies & Research)

330+
Projects

600+
Partners

Impact Across Digital Platforms (2022-2023)

FOLLOWERS	PROFILE VISITS	ENGAGEMENTS	IMPRESSIONS	POSTS
12,755 (56%↑)	174,430 (53%↑)	31,707 (25%↑)	1.37M+ (29%↑)	1,592 (8.4%↓)

** Baselines readjusted to account for digital media policy changes*

THE KEY TO **GENOMICS TALENT**

Unlocking the full potential of genomics in our rapidly evolving world requires a unique blend of scientific prowess and business acumen. At Ontario Genomics, we're not just shaping the future; we're shaping the future's leaders.

Our programs foster trans-disciplinary talent, bridging diverse expertise and market-focused vision, driving our strategic mission to elevate Ontario's research and innovation landscape. Join us in the pursuit of genomics excellence, where the key to success lies in nurturing the genomics talent of tomorrow.

START-UP FOCUS

Unlocking Innovation: Fueling Home-Grown Talent and Start-up Creation

In advancing our vision to cultivate engineering biology across Ontario and Canada, Ontario Genomics is at the forefront of enabling small and medium-sized enterprises. By providing financial investment and in-kind support, we are igniting innovation and unlocking opportunities for growth.

Empowering Talent Growth: A Catalyst for Innovation

Our initiatives facilitate access to investments, forging connections between businesses, investors, funders, and stakeholders, while advocating for policies that pave the way for commercialization of genomics-based technology. This key endeavour promises to yield higher returns on investments in genomics technology research, development, and commercialization, effectively bridging a crucial gap in Ontario's life sciences ecosystem.

BioCreate: Supporting Entrepreneurial Ingenuity

Ontario Genomics launches BioCreate, a flagship program supporting eight promising start-ups in health, food, agriculture and clean-tech sectors. With a Government of Canada investment of more than $5.6 million through the Federal Economic Development Agency for Southern Ontario (FedDev Ontario), we have established this first-of-its-kind initiative.

This overall $11.6-million investment in BioCreate is a testament to our commitment to unlock the potential of the province's biotechnology ecosystem.

BioCreate nurtures carefully selected enterprises with funding of $150,000 per company, coupled with 18 months of invaluable mentorship and access to vital infrastructure. This holistic approach propels innovation and fosters sustainable growth, enabling these start-ups to access further investment opportunities.

The Cultivated B: Shaping the Future of Food

Since 2019, Ontario Genomics has embarked on a journey to advance cellular agriculture, a transformative field which uses cell cultures from different organisms (such as bacteria, fungi, plants and mammals) instead of animals for food production. A crucial partnership with The Cultivated B (TCB), a European biotechnology company, adds an exciting chapter to this endeavour.

Together, we are unlocking a revolutionary potential, exemplified by TCB's impressive 130,000-square-foot production facility and Canadian headquarters in Burlington, Ontario, which will be home to an OG-partnered Innovation Hub. This partnership aligns with our ethos of innovation and opens doors to groundbreaking advancements and scale-up of sustainable, alternative protein production. Cellular agriculture can unlock the full potential of biotechnology by taking it from the laboratory environment to industrial commodities which ultimately revolutionizes our meals and our approach to resource utilization and environmental conservation. This collaboration extends beyond food production, to cosmetics, fabrics, personal care and healthcare.

WasteCanCreate: Transforming the Paradigm

Facing the consequences of a linear consumption pattern of make, use, and discard, a powerful concept emerges: the circular economy. Ontario Genomics is championing a paradigm shift by leveraging biology and engineering to transform waste into valuable resources.

Imagine a world where waste is a catalyst for innovation. This isn't science fiction; it's an achievable reality. Our wasteCANcreate upcycling consortium exemplifies this transformation, blending waste, specialized organisms, and innovative solutions to create products with tangible benefits for the environment and the economy.

Shaping Tomorrow Together

Ontario Genomics envisions an exciting future fueled by innovation and collaboration. With BioCreate and efforts in areas like cellular agriculture, we're scripting a tale of positive change, igniting prosperity and sustainability for Canada and beyond. Together, we're weaving a captivating story of positive transformation and human brilliance, ushering in an era of prosperity, and sustainability.

HIGH-SCHOOL AND COLLEGE FOCUS

Unleashing the Genomics Revolution: Education for Future Innovators

In the realm of groundbreaking discoveries and technologies, genomics is a key to unlocking the potential of our future. As the genomics field excels, Ontario Genomics recognizes the urgent need to nurture a workforce with the right skills to understand, develop and put innovative technologies to use over the next decade and beyond. Bridging the gap between current education offerings and the demand of the burgeoning bioeconomy is a key pillar of our Strategic Vision.

Fueling College Innovation

Ontario's colleges have a rich history of cultivating practical skills for the workplace. Recognizing their pivotal role, Ontario Genomics has partnered with several Ontario Colleges and is investing in novel college-based training programs in fermentation & biomanufacturing and applied research. Work on these online micro-credential programs began in 2022 and will equip current and future employees with indispensable skills for sectors spanning biopharmaceutical manufacturing, gene therapy production, clean technologies, and more. We aim not just to meet the demands of the industry, but to exceed them, bolstering Ontario's workforce capacity and driving productivity to new heights.

Empowering Young Visionaries

High school is a pivotal phase where career paths take shape. With genomics at the forefront of revolutionary change, Ontario Genomics is dedicated to teaching students about the transformative power of genomics and its broad-ranging applications. When we started out on this journey, we realized that the existing curriculum was not comprehensive. To bridge this gap, we've embarked on virtual and in-person events across the province, reaching over 850 students. By showcasing the everyday relevance of genomics and the array of potential careers it offers, we're inspiring the next generation to envision their career paths in this cutting-edge field.

Check out our exciting field trip: Canadian Agriculture Literacy Month Virtual Event – Genomics in Agriculture & Food.

A Personal Touch

In 2022, we took our passion to the Western University Women in STEM career fair, engaging with aspiring young minds. The event showcased Ontario Genomics, its industry partners, and the remarkable career pathways for women in STEM. We are committed to nurturing talent that bridges scientific expertise with business acumen and steadfast inclusion as we continue to fuel interest in genomics, engineering biology, and STEM overall.

Innovating for Tomorrow

Our journey continues through strategic sponsorships, speaking engagements, and participation in conferences and forums. The vision of a sustainable future guided by SynBio, biotech, and start-ups propels us forward. Through impactful initiatives, we ensure that coming generations are prepared to face the world's challenges and can lead the charge to solve them.

In the innovative realm of genomics, Ontario Genomics is more than an organization—it's a beacon guiding us toward a future rich with possibilities.

POST-DOC FOCUS

Bridging the Gap: Nurturing Bioeconomy Leaders for a Sustainable Tomorrow

When the pace of global change is hard to keep up with, how do we effectively merge the knowledge from labs with the pressing needs of our rapidly evolving environment? Can we harness the power of genome data science to combat infectious diseases, ensure sustainability, and tackle the looming threat of food insecurity amidst the unfolding climate crisis? These questions serve as the driving force behind a unique fellowship program that seeks answers and nurtures the potential of burgeoning talents.

The heart of our Ontario Genomics-CANSSI Ontario Postdoctoral Fellowship lies in its unwavering support for early-career investigators. Equipped with expertise in genome data science, these visionary minds are evolving the studies of statistical genetics, infectious diseases, and biodiversity. By doing so, they are not only confronting challenges head-on but also paving the way for Ontario and Canada to emerge as global leaders in the expanding bioeconomy.

A Strategic Partnership

The foundation of this endeavour is a strategic partnership between Ontario Genomics and CANSSI Ontario. United by a common purpose, we have established a postdoctoral fellowship in genome data science. Its goal? To attract, retain, and nurture Highly Qualified Personnel (HQP) within Ontario. These HQPs possess a diverse skill set spanning statistics, computational biology, bioinformatics, computer science, epidemiology, engineering, genetics, or mathematics – all indispensable in tackling the complex challenges of our times.

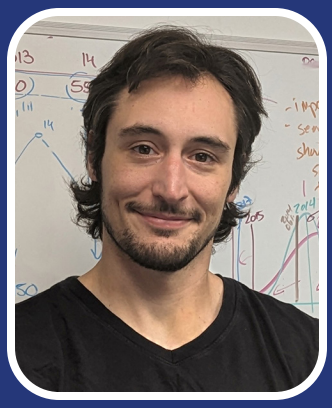
Beyond its scientific objectives, this fellowship program boasts a profound human-interest angle. In addition to research, it's about fostering a new generation of trans-disciplinary leaders capable of seamlessly integrating scientific acumen with an impact-oriented mindset. This vision aligns with our strategic goals, aiming to prepare these individuals for a world where genomics and engineering biology interconnect with data sciences to drive innovation.

Now in its third year, this fellowship continues to make a resounding impact. With two-year salary support of up to $50,000 annually, it empowers postdoctoral fellows to dedicate themselves fully to groundbreaking research. Past cohorts have already made remarkable strides, addressing infectious diseases and diving into environmental genetics and the socioeconomic implications of genomic technologies.

As the program matures, its influence will empower the next wave of groundbreaking researchers to illuminate the path forward in genomic medicine.

"Ontario Genomics and CANSSI Ontario have transformed my scientific journey and propelled my career forward. Despite arriving in March, the transition from Spain was made welcoming by the friendly warmth of the University of Toronto and my colleagues at the Ontario Institute for Cancer Research. This postdoctoral fellowship has broadened my horizons. I am excited about the variety of high-level events, talks, and collaborations that this opportunity offers for my future."

Dr. Ander Diaz-Navarro, Postdoctoral Fellow



"As an Ontario Genomics-CANSSI Ontario Postdoctoral Fellow, I've received the necessary support to explore new perspectives in my research program. With the increasing availability of genomic data, I can thoroughly explore and test complex ecological and evolutionary questions. Through intricate simulations, I unlock insights into genetic diversity shifts over time, fuelling conservation and enriching our grasp of genomics' role in shaping populations and landscapes."

Dr. João Pedro Fontenelle, Postdoctoral Fellow

"With support from the Ontario Genomics-CANSSI Postdoctoral Fellowship, I have leveraged my statistical prowess to forge a groundbreaking model delving into the enigmatic HIV latent reservoir. This reservoir is a key challenge to curing HIV-1. Our first findings from this research are now poised for publication, marking a remarkable stride forward."

Dr. Roux-Cil Ferreira, Postdoctoral Fellow

Investing in Tomorrow

This initiative goes beyond research funding; it invests in a brighter, sustainable future. It's about recognizing and nurturing talent that holds the promise of solving some of humanity's most pressing challenges. By supporting these early-career investigators, we are advancing scientific knowledge and ensuring that our collective journey toward a better world remains guided by innovation, compassion, and collaboration.

PUBLIC-FOCUSED – GENOMICS ENGAGEMENT

Bridging Knowledge and Needs: Genomics for All

Understanding genomics and its impact isn't just for scientists anymore. Public engagement in genomics is key to unlocking the potential of this innovative field and bridging the gap between science and society. By translating cutting-edge research into real-world impacts, we can drive positive changes in policy, ethics, privacy, and access to genetic information and technologies.

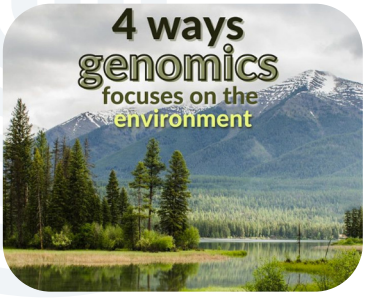
Innovative Content Creation for Genomic Awareness

Samantha Yammine, @Science.Sam

Ontario Genomics is on a mission to spread the word about genomics in Ontario. With the help of a genomics advocate and science communicator, Samantha Yammine, better known as "Science Sam", we're bringing genomics to your screen. Our shared passion for making science accessible has led to an exciting collaboration.

Our goal is ambitious yet simple – to educate and engage by making genomics accessible. By demystifying genomics through captivating Reels and Posts, we reach students, researchers, and the public beyond our typical social media echo chamber. Our campaign covered diverse genomics topics like Food Systems, Environment, Healthcare, and Big Global Challenges. Through 50,703 impressions, 45,241 accounts reached, and 3,362 interactions, we're sparking conversations that matter.

INSTAGRAM POST



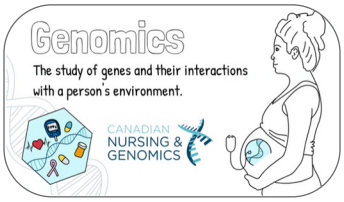
INSTAGRAM POST

INSTAGRAM POST

INSTAGRAM POST

Nursing Genomics Initiative: Empowering Frontline Workers

Genomics goes beyond lab coats; it is critical for frontline healthcare workers. The Canadian Nursing and Genomics (CNG) steering group, alongside Ontario Genomics and additional partners, empowers nurses in the age of precision health. Through educational videos, we're breaking down the importance of genomics for patients and nurses. We're also laying out an engagement framework and priorities for action. Collaboration among nurses across different practice areas is a strategy to bring genomics into everyday care. And let's remember the crucial role of nurses in addressing the ethical and equity issues tied to genomics.



WATCH THE VIDEO

WATCH THE VIDEO

WATCH THE VIDEO

WATCH THE VIDEO

Continuing the Journey Towards a Better Future

Our commitment to public engagement and knowledge translation doesn't stop here. Ontario Genomics is always in action, striving to keep you informed. From campaigns during Ontario Agriculture Week to Science Literacy Week, we're here to share stories, initiatives, funding opportunities, and real-world impacts of genomics. It's not just about abstract concepts; it's about how genomics is changing lives.

Unlocking Potential, Bridging Policy

Genomics isn't just for scientists—it's for you, me, and everyone. Through collaboration, education, and engagement, we're paving the way to a future where genomics benefits us all. Together, we're bridging gaps, translating knowledge, and unlocking the potential of innovation.

THE KEY TO **GENOMICS BREAKTHROUGHS**

At Ontario Genomics, we embark on a relentless pursuit of answers to humanity's most pressing dilemmas: combating climate change, eradicating food shortages, and conquering acute and chronic diseases. Our unwavering dedication stems from our distinctive position, empowering Ontario to harness the boundless potential of genomics and synthetic biology.

We firmly believe that nurturing genomics talent is the key to unlocking a future brimming with health, prosperity, and environmental harmony. Join us as we propel Ontario into a future filled with health, economic success, and environmental sustainability.

HUMAN HEALTH

Unlocking the Mysteries of Rare Genetic Diseases: A Journey Towards Equitable Healthcare

In Canada, an unseen battle unfolds every day. More than 7,000 rare genetic diseases silently affect up to 3% of Canadians. Imagine facing a seemingly endless journey for answers, which is lengthy, costly, and often leaves symptomatic patients uncertain – there are always more questions than answers. This journey, aptly named the 'diagnostic odyssey,' has cast a shadow over patient care for far too long. But now, a beacon of hope shines through cutting-edge innovation and collaboration in the scientific community.

Meet the heroes behind the scenes: the scientists, the doctors, and the innovators. They have joined forces to turn the tide against rare genetic diseases. Their tool of choice? Genome-wide sequencing, or GWS, is a technology that can unveil secrets hidden within our DNA, providing answers like never before. However, this lifeline has been elusive for many Canadians, as access to GWS testing was limited, and the process involved sending samples abroad, a costly and time-consuming affair.

Scientific breakthroughs propose to flip the script. Imagine a Canada where access to life-changing genetic testing is no longer a distant dream. Enter the All for One Precision Health Initiative – investing in six unique projects across Canada, each striving to bring equitable regional access to genomic

testing for all those dealing with rare genetic diseases.

In Ontario, a dedicated team of experts leads the way. Dr. Kym Boycott at the Children's Hospital of Eastern Ontario (CHEO) and Dr. Martin Somerville at the Hospital for Sick Children (SickKids), alongside Ontario's Ministry of Health, are the driving forces behind the optimization and implementation of a clinical genome-wide sequencing (GWS) service for rare disease diagnosis. Together, their vision gave birth to Genome-wide Sequencing Ontario (GSO), a partnership bringing the most common form of GWS, exome sequencing, home to Ontario. Patients can now experience a quicker journey to diagnosis, with results from genetic testing delivered within an average of seven weeks. This remarkable feat brings a glimmer of certainty into the lives of these families.

But the journey doesn't stop there. Ontario is also the guiding star in developing a Health Data Ecosystem – also part of the All for One Precision Health Initiative - a digital platform where clinical GWS data can be shared seamlessly, opening new avenues for research and diagnosis. This collaborative undertaking is a testament to the collective spirit that defines Canada's healthcare landscape.

The All for One Clinical Genomics Network data-sharing agreement, initially signed by CHEO and SickKids, is set to be the foundation upon which an interconnected network of minds and data can thrive, making the promise of better care for those in need a reality.

Imagine a Canada where genetic diseases are met with cutting-edge solutions, where the 'diagnostic odyssey' is transformed into a path of hope for a better life. The All for One Precision Health Initiative and its champions across the nation are turning this dream into reality, one step, one genetic sequence at a time.

AGRICULTURE AND FOOD

First-of-its-Kind Partnership Unlocking Sustainable Food Innovation in Canada

Since 2019, Ontario Genomics has been working to advance an emerging field – cellular agriculture – in Ontario and across Canada. In October 2023, we teamed up with The Cultivated B (TCB), a European biotechnology company, to bring cellular agriculture infrastructure, jobs, talent, and innovation development opportunities to Ontario. This partnership announcement aligned with TCB's exciting news about opening a massive 130,000-square-foot production facility and Canadian headquarters in Burlington, Ontario. It's like we're setting up a groundbreaking hub for the future of scalable and sustainable protein production.

What's all this buzz about cellular agriculture? Well, imagine a world where we don't rely solely on traditional agriculture as a source for our nutrition; instead, we use cutting-edge

biotechnology to grow delicious and sustainable products. This could mean getting our favourite proteins, flavours, and even fats from alternative sources that do not require the slaughtering of animals! But wait, there's more – think about foods like dairy, eggs, meat, chocolate, foie gras, and seafood being created without putting a strain on our planet. That's what cellular agriculture is all about.

In November 2021, Ontario Genomics and our partners released a report titled "Cellular Agriculture – Canada's $12.5 Billion Opportunity in Food Innovation." This report highlights the incredible potential for this new way of producing food and alternative proteins and beyond. The report didn't just talk numbers; it showed the opportunity to make up to $12.5 billion yearly and create about 142,000 new jobs across Canada. That's like turbocharging our economy while caring for our environment – a win-win situation!

For all this to become a viable reality, we need a special place where magic can happen. That's where Ontario Genomics and TCB's partnership comes in. The Burlington manufacturing facility will be home to a transformative innovation hub. This hub will be a playground for scientists, researchers, and companies to come together and bring their impactful ideas to life. They'll have access to top-notch labs, fancy bioreactors (fancy science machines!), and expert guidance to make their ideas go from small tests to big, real-world products.

And you know the exciting part? This isn't just about food. The science behind cellular agriculture can be used for all sorts of things – from more sustainable components for cosmetics to creating high-tech, vegan fabrics and even helping with critical medicines like vaccines. So, it's not just about a delicious meal; it's about cutting-edge biotechnology for scalable and sustainable alternatives for the industry.

To provide equitable technological access, there are exciting opportunities for everyone to join in. Training programs, where people can learn about this cutting-edge field and land excellent jobs, are an essential piece of this puzzle. It's like being a part of something huge and groundbreaking from the start.

So, there you have it – the story of Ontario Genomics, TCB, and the incredible journey of changing how we eat, live, and create. We are writing a whole new chapter in the book of innovation, and everyone is invited to take a bite. With interdisciplinary teams of scientists, a dash of innovation, and a whole lot of passion, we're on track to create not just a better food system but a better future for all of us. Who knows, maybe the next burger you munch on will be a product of science and a sprinkle of Canadian magic!

INDUSTRIAL BIOTECH & ENVIRONMENT

Unlocking the Power of Nature: How Science is Transforming Waste into Wealth

In our everyday lives, we often see a linear pattern: make, use, and then toss away. Our world faces challenges like climate change, disappearing animal habitats, and shortages of essential resources like clean water, all due to this wasteful cycle. Yet, a better solution is emerging that taps into biology and engineering to change the game – a circular bioeconomy.

Picture this: instead of throwing things away, what if we could transform garbage into something valuable? This idea might sound like science fiction, but it's becoming a reality thanks to incredible scientific breakthroughs. Envision microbes that eat waste and turn it into useful stuff that we can use in our daily lives. This shift from a straight-line unsustainable process to a circle where waste becomes a resource is game-changing. It can help us reduce the need for landfills, keep our environment clean, and even replace products that harm the planet with more eco-friendly alternatives.

Guess what? More than 65% of the things we make could be created using these biological processes combined with recycling waste. This isn't just good for the environment; it's also a fantastic opportunity to create new jobs and help care for our planet simultaneously.

Recognizing the importance of this revolutionary approach, Ontario Genomics has developed **WasteCANcreate Upcycling Consortium**. This is like a team of superheroes, but instead of capes, they're armed with brilliant ideas and innovative solutions. The consortium has three main parts: first, they use food waste like leftovers or byproducts; second, they use specially engineered tiny organisms and powerful enzymes; third, they work with companies that can test these new materials to make real products.

Thanks to support from Agriculture and Agri-Food Canada, Ontario Genomics and industry partners, the consortium has made incredible strides. We're working on how to take food waste and leftovers from ethanol (a fuel from corn) production and turn them into things like biodegradable plastics. Imagine your food scraps turning into something good for the earth! And that's not all – we're also creating alternatives to materials like nylon, which is traditionally harmful to the environment.

What's next for this exciting journey? The team aims to take these lab-tested ideas and turn them into full-scale processes that can be used in large scale manufacturing facilities. We aim to achieve this milestone over the next year, all while sharing our knowledge with others and building the tools we need to make these changes stick. It's a giant leap forward in using biology and science to make the world cleaner, greener, and more sustainable for all of us.

The next time you're about to throw something away, think – what if this waste could be transformed into something amazing? Thanks to these ingenious minds and their dedication, our trash might just become the treasure that saves the planet.

All Funded Projects 2022-2023

SECTOR	PROJECT TITLE	ORGANIZATION(S)	LEADER(S)	FUNDING
BioCreate: Cohort 1				**$2,819,140**
Bioproducts & Environment	Biodegradable Plastic Production from Fermented Food Waste in Engineered *Escherichia coli*	Genecis Bioindustries Inc.	Adam Westbrook, Andrew Chiappetta	$394,187
Human Health	Taking EndomiR to a New Market	AIMA Laboratories	Lauren Foster, Jocelyn Wessels	$384,900
Agriculture & Food	Pilot-scale production and customer validation of animal-free collagen for functional beverages	Liven Proteins	Fei Luo	$332,500
Agriculture & Food	Development and Regulatory approval of high yielding soybean with enhanced water use efficiency by gene editing	Performance Plants Inc	Yafan Huang, Jiangxin Wan	$467,000
Human Health	Development of a cost-effective and automated genome sequencing biosensor	Ecoli Sense operating as Kraken Sense	Sarah Mishriki, Nisha Sarveswaran, Julia Wakulewicz	$251,419
Agriculture & Food	Quantitative Detection of BioTag Sets Using a Hybrid Amplification and Sequencing Approach	Index Biosystems	Mike Borg	$360,794
Agriculture & Food	The Development of Plant Growth Promoting Bacterial Inoculants for Hydroponically Grown Basil, Cucumber, Lettuce, and Kale	Ceragen	Danielle Rose	$308,340
Bioproducts & Environment	Development of a Novel Fermentation-Derived Protein Sweetener for the Food and Beverage Industry	Biofect Innovations	Ralph Christian Delos Santos, Louis Lo	$320,000
Canadian Bioinformatics Workshops				**$539,011**
Human Health	Expanding the Bioinformatics.ca Brand	Ontario Institute for Cancer Research (OICR), McGill University, Simon Fraser University	Michelle Brazas, Guillaume Bourque, Lincoln Stein, William Hsiao	$539,011
Challenge 2022 - Interdisciplinary Challenge Teams [ICT]				**$30,968,173**
Agriculture & Food	The Social Implications of Agri-Genomics: Ensuring a Just Transition to Climate-Resilient Agricultural and Food Systems in Canada	University of the Fraser Valley and Trent University	Evan Bowness, Lenore Newman, Stefania Pizzirani	$ 1,051,627
Agriculture & Food	Bio-inoculants for the promotion of nutrient use efficiency and crop resiliency in Canadian agriculture	University of Manitoba, Queen's University	Ivan Oresnik, George diCenzo	$ 3,614,565
Agriculture & Food	Omics guided technologies for scalable production of cell-cultivated meat	McMaster University, University of Toronto, University of Guelph, College La Cite	Ravi Selvaganapathy, Julie Audet, Michael von Massow, Michelle Bamji-Mirza	$ 10,105,201
Agriculture & Food	Leveraging Genomics to Achieve Dairy Net Zero	University of Guelph, Lactanet and University of Guelph, Universite Laval, University of Alberta	Christine Baes, Filippo Miglior, Rachel Gervais, Paul Stothard	$ 16,196,780

All Funded Projects 2022-2023

SECTOR	PROJECT TITLE	ORGANIZATION(S)	LEADER(S)	FUNDING
Global Alliance for Genomics and Health (GA4GH)				**$3,631,000**
Human Health	Supporting Canadian Leadership in International Genomic Data Sharing Through the Global Alliance for Genomics and Health (GA4GH)	Ontario Institute for Cancer Research (OICR), McGill University	Peter Goodhand, Yann Joly	$3,631,000
Genomics Applications Partnership Program (GAPP)				**$ 17,902,639**
Agriculture & Food	Biopesticide with New Modes of Action for Control of Highly Polyphagous Mite Agricultural Pests	Western University, Greenlight Biosciences, Ontario Greenhouse Vegetable Growers	Vojislava Grbic, Ken Narva, Niki Bennett	$4,109,815
Human Health	Enabling personalized genomics in health with the CanPath Data Safe Haven	Ontario Institute of Cancer Research, Canadian Partnership for Tomorrow's Health (CanPath), Adela	Philip Awadalla, Trevor Dummer, John McLaughlin, Anne-Renee Hartman	$6,000,000
Bioproducts & Environment	Developing Novel Bioleaching Process for Ni Recovery from Pyrrhotite Streams	University of Toronto, Metso Outotec	Krishnan Mahadevan, Waldemar Olivier	$5,992,824
Human Health	Improving Patient Matching to Therapy (PMATCH): streamlining clinical trial criteria to guide precision oncology	University Health Network, Princess Margaret Cancer Centre, Canadian Clinical Trials Coordinating Centre	Benjamin Haibe-Kains, Trevor Pugh, Janet Dancey	$1,800,000
SSHRC - Knowledge Synthesis Grants				**$29,857**
	Addressing Racisms and Anti-Racism in Science and Teacher Education Research	University of Ottawa	Nicholas Ng-A-Fook	$29,857
SSHRC - Societal Implications of Genomics				**$369,840**
Human Health	Personalized Genetic Drug Technologies and Medical Economies in Canada: Moral Experiment or Curative Renaissance?	University Health Network	Jennifer Bell	$199,462
Human Health	In Crypts and Cabinets: uniting ancient DNA and the history of medicine to re-examine the emergence of smallpox and the advent of vaccination	McMaster University	Ana Duggan	$170,378
Technology Development 2022				**$4,000,000**
Bioproducts & Environment	Centre for Biodiversity Genomics (CBG)	University of Guelph	Paul Hebert	$1,000,000
Bioproducts & Environment	CGEn	The Hospital for Sick Children, BC Cancer Research Centre, McGill University	Stephen Scherer, Lisa Strug, Steven Jones, Ioannis Ragoussis	$3,000,000
			Total Funding for 2022-2023	**$60,259,660**

THE KEY TO **COMMUNITY ENGAGEMENT**

Canada SynBio 2022: Creating Pathways in Genomics and Bioinnovation

Discover the dynamic world of synthetic biology at the 2022 Canada SynBio conference. Join entrepreneurs, academics, and experts exploring bioengineering solutions to global challenges. With vibrant discussions, this event embodied Canada's bioeconomy leadership. Brought to you by Ontario Genomics and supported by esteemed partners.

272K+
Digital Media Reach

650+
Social Media Mentions

360+
Attendees

270+
Slido Questions Asked

490+
Slido Poll Votes

Dive into the thrilling world of biotechnology at the Canada SynBio 2022 conference, where groundbreaking ideas and innovative minds collide! This electrifying three-day event brought together an eclectic mix of entrepreneurs, academics, policymakers, and biology enthusiasts. With its pulse on the forefront of genomics, the conference revealed the key to unlocking the potential of engineering biology to tackle the world's most pressing challenges.

Imagine rubbing shoulders with global biomanufacturing titans like Dr. Paul Freemont, the visionary co-founder of the Imperial College Centre for Synthetic Biology; Douglas Friedman, the visionary CEO of BioMADE; and Dr. Bettina

Hamelin, the passionate CEO of Ontario Genomics. In a fireside chat, this dynamic trio shared insights into Canada's journey towards a thriving biomanufacturing hub, revealing exciting opportunities on the horizon.

The audience was inspired by remarkable journeys, like that of Dr. Pieter Cullis, who played a most pivotal role in crafting COVID mRNA vaccines. His tales of passion, risk-taking, and impactful discoveries demonstrate the immense potential of following one's passion.

Anna Marie Wagner, VP of Corporate Development at Ginkgo Bioworks, brought a touch of magic to the stage, recounting how a humble iGEM project transformed into a SynBio unicorn, becoming a publicly traded NYSE company. Her stories of resilience and the sheer beauty of biology will leave you awestruck.

Dr. Andrew Pelling added a dash of quirkiness with his unconventional approach to science. His team's cutting-edge research, using cellulose scaffolds from apple slices and asparagus stems to repair spinal cord injuries, promises to revolutionize regenerative medicine.

But that's not all! Panels exploring cell agriculture, net-zero solutions, investments, ecosystem support, advanced biologics, and accessibility showcased the power of synthetic biology to reshape industries and lives. The intersection of AI and SynBio opened doors to unforeseen possibilities.

The Pitch Competition was the heart of the event, where ingenious startups vied for the spotlight. Dispersa, a cleantech marvel striving to clean up oil spills, took home the $10k grand prize, demonstrating Canada's opportunity in the SynBio realm.

As the conference curtain closed, attendees were treated to a vibrant poster reception, celebrating the brilliance of Canada's up-and-coming minds.

Clean DNA: How Genomics Can Reduce Emissions and Drive Economic Growth for Canada

Amid the pressing climate crisis, innovative strategies emerge from an unexpected source: biology. Natural microorganisms like bacteria, yeast, and microalgae are harnessed to create materials with enhanced efficiency and fewer emissions. The potential spans from protein-producing bacteria to lab-cultivated meat cells, offering promising solutions to many challenges. Recent findings indicate that a biological approach could replace petroleum-based processes, paving the way for a prosperous and sustainable future, leveraging Canada's prowess in genomics and biotechnology.

LEARN MORE

Eating for a Sustainable Future

Explore the fascinating world of cellular agriculture, a cutting-edge field revolutionizing food production. With population growth, climate change, and shifting preferences, traditional methods are strained. Enter cellular agriculture: using advanced cell cultures and precision fermentation to craft sustainable alternatives. Learn how Canada's poised to seize a $12.5B opportunity as experts advocate for strategy, regulations, and support. Witness startups like Ardra, redefining meat flavours, and CELL AG TECH's sustainable seafood quest. Join the movement that's reshaping the culinary landscape.

LEARN MORE

Turning Crisis into Opportunity: A Canadian-Made Bio-Revolution

Discover how, two decades after the Human Genome Project, genomics is reshaping healthcare and expanding to agriculture, biomanufacturing, and climate solutions. Explore Canada's response to COVID-19, challenges in biotech growth, and the path to a flourishing industry that addresses health, climate, and prosperity. Join the journey towards innovation-driven transformation.

LEARN MORE

Genomics Can Both Grow and Green Canada's Economy

Unveiling a new perspective, this Op-ed highlights the power of genomics and engineering biology in reshaping industries like agriculture, resource extraction, and manufacturing. Embracing genomics could revolutionize economic sectors, spurring a shift towards sustainable practices. By leveraging Canada's potential in cellular agriculture, fostering innovation, and strategic investment, we can thrive economically while addressing climate change and global challenges. The era of genomics promises a brighter, more harmonious future.

LEARN MORE

THE KEY TO **SUCCESS**

OUR PROJECTS IN THE HEADLINES

Known for our leadership in groundbreaking 'omics innovations, Ontario Genomics has its finger on the pulse of what is making headlines. Learn about projects, organizations, and researchers that Ontario Genomics has worked with and/or funded that are making headlines locally and around the world.

HUMAN HEALTH

Opening Doors to Discovery: Ontario Genomics and SGC's Two-Decade Journey

LEARN MORE

For the past two decades, Ontario Genomics has supported SGC's relentless pursuit to unravel the mysteries of the human genome. This Toronto-headquartered, global collaboration, blending public and private efforts, is dedicated to deciphering the intricacies of structural and chemical biology, all while expediting the revelation of novel medicinal breakthroughs. SGC's growth has transcended borders, embracing research partners from London and Germany to Sweden and North Carolina, uniting 250 brilliant minds. Their open-science approach has been instrumental in helping thousands of other scientists around the world advance their own discoveries while accelerating global drug discovery programs.

HUMAN HEALTH

Unlocking Excellence: Quality Antibodies for Scientific Progress

LEARN MORE

In the realm of bioresearch, antibodies stand as crucial tools. But how do you know when they're top quality and the right one for a particular experiment? Open-science company YCharOS, which spun out of the Montreal Neurological Institute - a Structural Genomics Consortium site, has characterized more than 760 antibodies and remains committed to keeping their results transparent and patent-free, so their groundbreaking research can be used to move science and healthcare forward. Industry partners warmly embrace YCharOS' innovative, cooperative strategy, recognizing its key role in fostering progress.

AGRICULTURE & FOOD

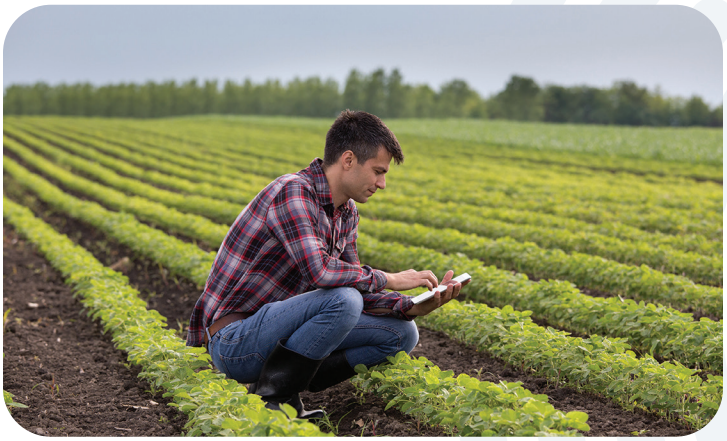
Unveiling the Hidden World of Trees: Using Drones to Unlock Nature's Secrets

LEARN MORE

Drones, often associated with capturing stunning landscapes, have taken on a new role through the FastPheno initiative. At the University of Toronto Mississauga's Ensminger lab, a remarkable blend of hyperspectral (HSL) and LiDAR data collected by drones. This high-throughput drone-based phenotyping technology captures information of thousands of trees andunlocks the well-being of each individual trees Combined with the genetic information of each tree, this endeavour aims to create the first genotype-phenotype spruce database, empowering scientists to unravel ways to bolster Canada's forest industry against challenges posed by pests and the changing climate. These innovative methods unveil a previously hidden world of tree vitality for a greener future.

AGRICULTURE & FOOD

Unlocking Nature's Key: The Eco-Friendly Biofertilizer Revolution



LEARN MORE

In a groundbreaking collaboration, NutriAg Ltd. and Professor Neil Emery from Trent University have unveiled a novel biofertilizer concoction that's both efficient and eco-friendly. By harnessing the power of beneficial bacteria, this ingenious formula is key to unlocking plants' true potential. Through the nurturing touch of the specialized *Methylobacterium organophilum*, not only do crops thrive and flourish, but they also gain resilience against nature's trials, such as drought. Initially tailored for soybeans, this botanical elixir boasts universal growth-enhancing attributes, a boon for a myriad of plants.

INDUSTRIAL BIOTECH & ENVIRONMENT

Investigating Nature's Secrets: Opening Biodiversity's Door at the Centre for Biodiversity Genomics

LEARN MORE

Spanning from Guelph, Canada, to the vibrant landscapes of Australia, the Centre for Biodiversity Genomics embarks on a captivating journey. A shining illustration is the Insect Investigators program, which beckons school children from various corners of Australia to actively partake in bug sample collection. Through this engaging experience, young minds unravel the genetic enigma of these creatures, unveiling Australia's exceptional biodiversity. In the process, students relish adventure and foster a profound appreciation for science and the environment. Closer to home, each year, the Bees@Schools project collaborates with 200 Canadian classrooms to unveil the dynamic shifts in plant-pollinator interactions across Canada through innovative DNA barcoding and climate data analysis, providing hands-on experience to students while gathering data valuable to research.

INDUSTRIAL BIOTECH & ENVIRONMENT

Unlatching Ontario's Hidden Potential: Microbes Transform Oil Sites for a Greener Future

LEARN MORE

When pondering oil production, most Canadians turn to Alberta. However, Ontario boasts more than 2,300 active oil and gas wells. Meet the University of Toronto's Professor Elizabeth Edwards, whose research seeks out and utilizes microorganisms to unlock nature's solution for cleansing oil sites. The infamous BTEX compounds (benzene, toluene, ethylbenzene, xylenes), integral to petroleum production but hazardous to both the environment and humans, find their key to elimination through this novel anaerobic microbe-driven technology. Successfully reaching commercial scales, it opens a pathway to purify soil and water at oil sites, nurturing a healthier planet. This research was enabled through a long-standing partnership with SiREM and open science.

GOVERNANCE

Board of Directors (2022-2023)

Deborah Stark
Vice Chair, University of Guelph and Former Deputy Minister of the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)

Nancy Carter
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Colleen Hogan, Division Director, Data, Research & Innovation at Government of Ontario

Tanzeel Merchant, Regional Director General (Ontario), Innovation, Science, and Economic Development Canada

Dalia Morcos Fraser, Vice-President, Corporate Services and Chief Financial Officer, Genome Canada

Jehoshua Sharma, Co-founder and Director of Operations, cGEM

FINANCIALS

Ontario Genomics makes public its annual financial statements, which are prepared in accordance with Canadian accounting standards for not-for-profit organizations. The consolidated financial statements present the consolidated financial position of Ontario Genomics as of March 31, 2023, its consolidated results of operations and its consolidated cash flows for the year then ended.

DOWNLOAD THE FINANCIAL REPORT PDF

In this report

- Independent Auditors' Report
- Consolidated Statement of Financial Position
- Consolidated Statement of Operations
- Consolidated Statement of Changes in Net Assets
- Consolidated Statement of Cash Flows
- Notes to the Consolidated Financial Statements

THANK YOU TO **OUR FUNDERS**

GenomeCanada

Ontario

Ontario Genomics

Made in Ontario: **Unlocked for the World**

2022-2023 Annual Report