Genome Canada

RISING TO THE CHALLENGE FOR CANADA

2022-23 ANNUAL REPORT

TABLE OF CONTENTS

Genome Canada's main office is located on the unceded traditional land of the Algonquin Anishnaabeg Nation. As a national organization, we support activities taking place on the traditional territories of many First Nations, Inuit and Métis peoples across the country.

We recognize past and ongoing injustices perpetrated against Indigenous peoples as part of the colonial project in Canada, including violence, oppression, land theft and harmful attempts to erase culture. Given Canada's colonial foundation and how it shapes the discourse and practice of science—especially genomics and related health and biomedical research—Genome Canada commits to fostering Indigenous truth, reconciliation and engagement in our programs to address the gaps in the participation of underrepresented, equity-deserving and Indigenous groups in Canada's genomics research agenda, data sets and governance.

Genome Canada commits to working in co-creative partnership with Indigenous researchers, leaders and communities to develop and support a stand-alone and distinctions-based strategy to bolster Indigenous genomics leadership in Canada.

JOINT MESSAGE FROM THE PRESIDENT AND THE BOARD CHAIR

Dear Friends,

After more than three years of fear, uncertainty and widespread devastation, the World Health Organization announced the end of the global COVID-19 pandemic on March 5, 2023. We are extremely proud of the tireless efforts of Canada's genomics community to support the pandemic response by enabling surveillance efforts, informing public health decision making, and delivering new vaccines and other cutting edge health solutions in record time.

The pandemic showed that our community can accomplish incredible things if we work together with a shared sense of purpose and focus. As we reflect on the historic mobilization of Canada's public health and research communities to tackle this global crisis—including through the flagship Genome Canada-led Canadian COVID-19 Genomics Network (CanCOGeN)—we also look ahead to how we can mobilize and maximize the talent and resources of a complex, world-class genomics ecosystem to solve our other big challenges.

The need to harness Canada's considerable strengths in genomics has never been more crucial as we face evolving threats posed by climate change, biodiversity loss, food insecurity, inequitable economic growth, antimicrobial resistance and other emerging pathogens—all against the backdrop of geopolitical instability, rising misinformation and eroded trust in science. That's why Genome Canada is focused on supporting healthy people, a strong economy, and a sustainable planet through genomics research and innovation.

In 2022-23, we advanced this vision with new challenge-driven investments. In spring, 2022, we kicked off our **Climate-Smart Agriculture and Food Systems initiative**. This initiative will translate genomics research and innovation into sustainable solutions supporting Canadian producers and a resilient national food system and supply chains. Later in the year, we built on the foundation of our COVID response by launching a $10 million **strategic initiative** on genomic monitoring of antimicrobial resistance and emerging pathogens in water. We continued to support work on rare diseases with our pan-Canadian **All for One** precision health partnership to bring genomics into the clinic across nine provinces, and we continued to make significant investments in industrial partnerships, training and technology development across Canada.

We are lucky and proud that we are able to work with an outstanding community of researchers, innovators and commercial partners across Canada. Our impact-focused initiatives are a gateway to the solutions needed to shape a healthier and more sustainable future for us all. We are excited to continue working with you all as we rise to this challenge.

Elizabeth Douville, PhD, ICD.D
Board chair

Rob Annan, PhD
President and CEO

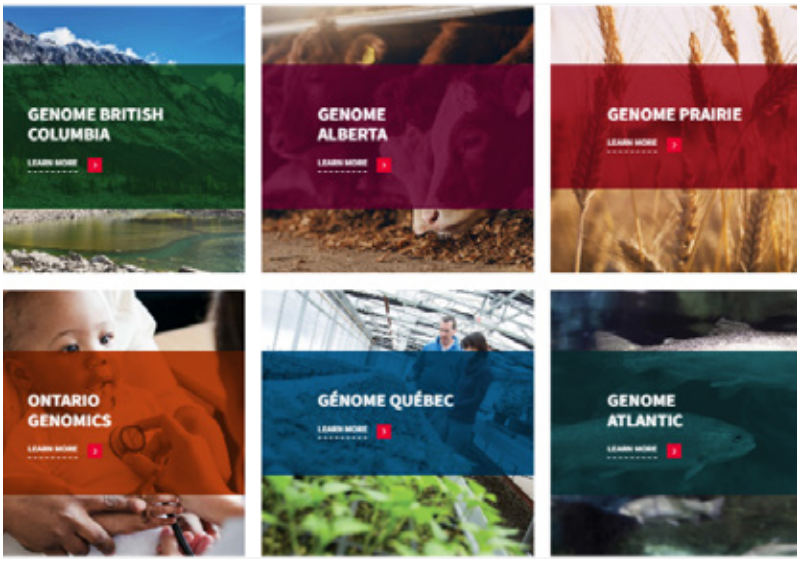
DRIVING IMPACT THROUGH GENOMICS

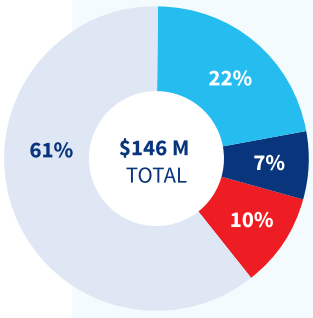
The year in review 2022-23

Canada is among the world's leaders in genomics, with significant areas of global strength. But we need to collaborate and coordinate better—and solve persistent challenges around data sharing and equity and inclusion—to maximize the opportunity to build a productive, knowledge-based economy and healthy communities.

This report shows that Genome Canada's investments are building on our strengths to drive long-term economic growth, low-carbon productivity and a healthier future for Canadians. We are supporting multi-partner teams who are using genomics to revolutionize healthcare, develop climate-resistant crops, protect endangered wildlife, detect new COVID-19 variants, harness microbes to reduce the environmental impact of critical mineral mining and so much more.

We are excited that the federal government is poised to issue a Pan-Canadian Genomics Strategy that will strengthen Canadian genomics leadership in an increasingly competitive international landscape. Following extensive **consultations in summer 2022**—including with Genome Canada and the six regional Genome Centres—the government released a ***What We Heard* report in March 2023**. The report underlines the commitment and ambition of scientists, students, industry, research organizations and funders, including 20+ years of leadership by Genome Canada and the Centres. Canada's genomics community is ready to seize this moment and deliver results.





2022-23 RESEARCH FUNDING SUPPORTED BY THE CANADIAN GENOMICS ENTERPRISE

- Federal *(including Genome Canada)*
- Provincial
- Industry
- Universities, Canadian not-for-profit organizations, foundations, and foreign governments and not-for-profit organizations

A MODEL TO MEET THE CHALLENGE

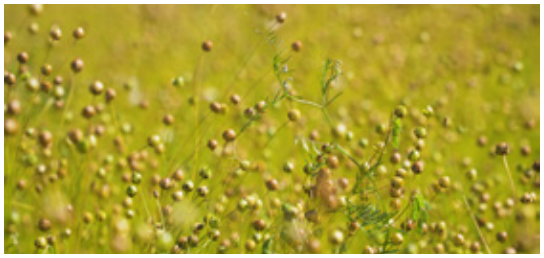
We are leading Canada's genomics ecosystem towards greater impact, leveraging a pan-Canadian network of six independent Genome Centres that form the **Canadian Genomics Enterprise**.

We work in partnership across sectors and borders to drive investment and coordinate, connect and diversify genomics research, innovation, data and talent initiatives to meet today's biggest challenges.

Our federated model delivers research and innovation partnerships by leveraging federal investment through Genome Canada, and regional investment from provincial governments, industry, universities and non-profits through the Genome Centres.

We work closely with the Canadian government and other federal science, technology and innovation ecosystem partners to address national priorities that align with regional needs, realities and strengths through the Genome Centres.

In 2022-23 a total of $146.0 million was provided to research projects, including $60.4 million from Genome Canada and $85.6 million from co-funders.



MOBILIZING TO MEET THE CHALLENGE

Last year we marked the **100th project funded** through our marquee **Genomic Applications Partnership Program (GAPP)**. For nearly a decade, GAPP has supported late-stage research and development projects that use genomics to address real-world opportunities and challenges in health, environment and agriculture. Deployed through research partnerships with industry, healthcare organizations and provincial and other federal partners, these projects harness cutting-edge genomics science to deliver tangible solutions for healthier, more sustainable and prosperous communities across Canada.

"Genomics is a key technology that is instrumental in responding to national and global challenges. Projects like the ones announced under the Genome Canada's Genomic Applications Partnership Program are central to make sure the Canadian research system grow and remain at the forefront globally, leading to more cutting-edge genomics science that delivers real impacts for the health and economic growth of Canadians."

The Honourable François-Philippe Champagne, Minister of Innovation, Science and Industry

In May 2022 we launched our ambitious **Climate-Smart Agriculture and Food Systems (CSAFS)** challenge that will reduce the carbon footprint of Canada's food production systems by building their resiliency, environmental sustainability and economic growth potential. CSAFS includes investment in a portfolio of interdisciplinary research projects as well as a **Data Hub** and a **Knowledge Mobilization Hub** to connect efforts across projects and maximize the portfolio's national impact.

Over the course of the last year, we prepared for the spring 2023 launch of the **Genomics Monitoring of Pathogens in Water** (GeMPaW) strategic initiative, informed by broad consultations and our fall 2021 **Future of Genomics dialogue series.** In February 2023 we held a partners' roundtable to identify gaps, map avenues for alignment and shape a coordination hub model.

GeMPaW builds on the foundations laid by our **Canadian COVID-19 Genomics Network** (CanCOGeN) and will advance pan-Canadian collaboration to prepare Canada for future pandemics and other emerging public health challenges.

We also continued to advance the pan-Canadian **All for One** precision health partnership, which will enable a new standard of care for patients with rare diseases across Canada. In spring 2022 we funded a needs assessment that will shape our approach to enabling the most high-impact use cases for health data sharing. Throughout the year, we consulted our community on the future of precision health in Canada in preparation for the launch of our next challenge-driven investment.

ENABLING CANADA'S RESPONSE TO MAJOR HEALTH CHALLENGES

CanCOGeN

"[The] Canadian COVID-19 Genomics Network, can serve as [a] model for the future by connecting public health leaders, university scientists, and governments across the country."

Chief Public Health Officer's Report on the State of Public Health in Canada 2021, p 83.

COVID-19 testing at the lab at Calgary's South Health Campus. (Alberta Precision Laboratories)

Genome Canada played a pivotal role in Canada's COVID-19 pandemic response through the development and deployment of the **Canadian COVID-19 Genomics Network** (CanCOGeN).

Launched in April 2020 through two key initiatives, **VirusSeq** and **HostSeq**, CanCOGeN coordinated a pan-Canadian, cross-agency network for large-scale SARS-CoV-2 and human host sequencing to:

- Track viral origin, spread and evolution.
- Characterize the role of human genetics in COVID-19 disease.
- Inform time-sensitive critical public health and policy decision making relevant to health authorities across Canada during the pandemic.

The genomic data generated through CanCOGeN became one of the strongest tools for pandemic surveillance and long-term healthcare response and management. CanCOGeN strengthened genomic sequencing capacity, skills, data sharing and collaboration across the country, bolstering our ability to tackle other major public health challenges and future pandemics head on.

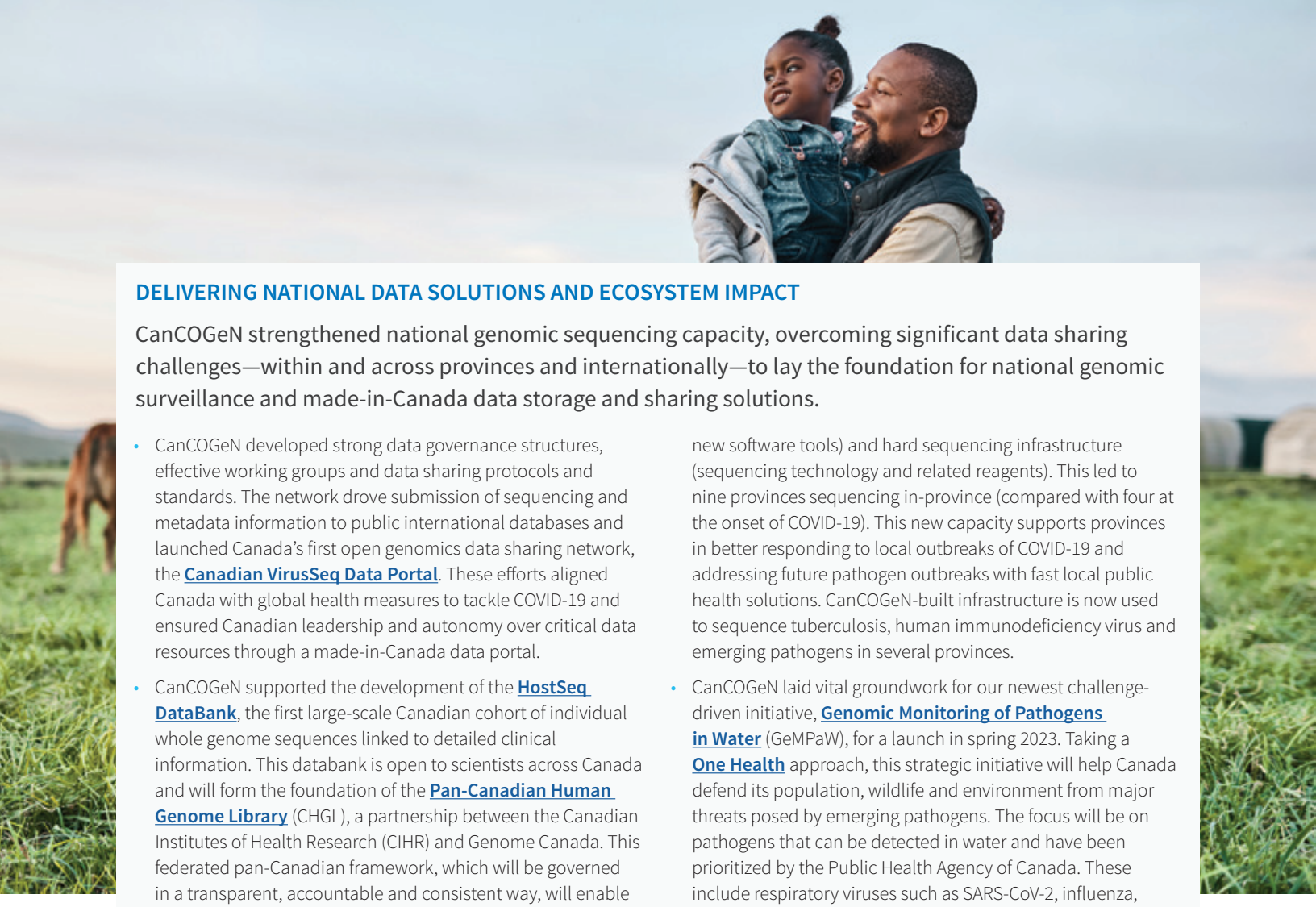
TRANSLATING $40M IN FEDERAL INVESTMENT THROUGH GENOME CANADA INTO IMPACT FOR CANADIANS

VirusSeq

Aimed to sequence up to 150,000 SARS-CoV-2 genomes and has surpassed 500,000 viral genomes (as of June 2023). It has increased capacity for sequencing nationally, allowing an increase in sequencing from 5% to ~15% of total positive cases of SARS-CoV-2 in Canada.

HostSeq

Designed to sequence genomes of up to 10,000 individuals exposed to, or affected by, the SARS-CoV-2 virus ("hosts"). It has **sequenced more than 11,300 host participants** (as of June 2023) with clinical data linked to approximately 90% of these sequences.



DELIVERING NATIONAL DATA SOLUTIONS AND ECOSYSTEM IMPACT

CanCOGeN strengthened national genomic sequencing capacity, overcoming significant data sharing challenges—within and across provinces and internationally—to lay the foundation for national genomic surveillance and made-in-Canada data storage and sharing solutions.

- CanCOGeN developed strong data governance structures, effective working groups and data sharing protocols and standards. The network drove submission of sequencing and metadata information to public international databases and launched Canada's first open genomics data sharing network, the **Canadian VirusSeq Data Portal**. These efforts aligned Canada with global health measures to tackle COVID-19 and ensured Canadian leadership and autonomy over critical data resources through a made-in-Canada data portal.
- CanCOGeN supported the development of the **HostSeq DataBank**, the first large-scale Canadian cohort of individual whole genome sequences linked to detailed clinical information. This databank is open to scientists across Canada and will form the foundation of the **Pan-Canadian Human Genome Library** (CHGL), a partnership between the Canadian Institutes of Health Research (CIHR) and Genome Canada. This federated pan-Canadian framework, which will be governed in a transparent, accountable and consistent way, will enable access to, and analysis of, human genomes and associated health and environmental information.
- CanCOGeN increased public health sequencing capacity through both soft infrastructure for genomic surveillance (people, including over 50 highly skilled full-time equivalents and 16 trainees, skills, three new protocols and eight new software tools) and hard sequencing infrastructure (sequencing technology and related reagents). This led to nine provinces sequencing in-province (compared with four at the onset of COVID-19). This new capacity supports provinces in better responding to local outbreaks of COVID-19 and addressing future pathogen outbreaks with fast local public health solutions. CanCOGeN-built infrastructure is now used to sequence tuberculosis, human immunodeficiency virus and emerging pathogens in several provinces.
- CanCOGeN laid vital groundwork for our newest challenge-driven initiative, **Genomic Monitoring of Pathogens in Water** (GeMPaW), for a launch in spring 2023. Taking a **One Health** approach, this strategic initiative will help Canada defend its population, wildlife and environment from major threats posed by emerging pathogens. The focus will be on pathogens that can be detected in water and have been prioritized by the Public Health Agency of Canada. These include respiratory viruses such as SARS-CoV-2, influenza, respiratory syncytial virus, monkeypox and polio. GeMPaW will also address the threat of antimicrobial resistance, including antibiotic-resistant bacteria and genes; and advance genomic monitoring of antibiotic-resistant genes, particularly the six "ESKAPE" pathogens that the World Health Organization has prioritized.

CanCOGeN was rapidly launched thanks to grassroots efforts and strong collaboration between genomics scientists and provincial health labs across Canada and globally. Our heartfelt thanks go out to everyone across the network for their tireless efforts, working with the shared purpose of protecting the health and safety of Canadians.

Learn more about CanCOGeN's national impact at **genomecanada.ca/cancogen** and about GeMPaW at **genomecanada.ca/gempaw**

A DECADE OF IMPACT THROUGH GAPP

The Genomics Applications Partnership Program (GAPP) strengthens Canada's bioeconomy through partnerships between academic researchers and technology receptors from the public, private and not-for-profit sectors. This program—now a decade old—has supported 114 projects with total research investment of $470 million, delivering impact through a combination of uptake in practice, policy and commercialization of genomics technologies.

These impacts are captured through several metrics that serve as proxies for technological and economic innovation—IP development, awards and publications, and training of highly qualified personnel. Encouragingly, the value of these projects is not limited to the initial investments by Genome Canada and partners: the 41 completed GAPP projects attracted an additional $124 million in other leveraged funds, representing a 289 per cent return on their original Genome Canada funding.

GAPP BY THE NUMBERS

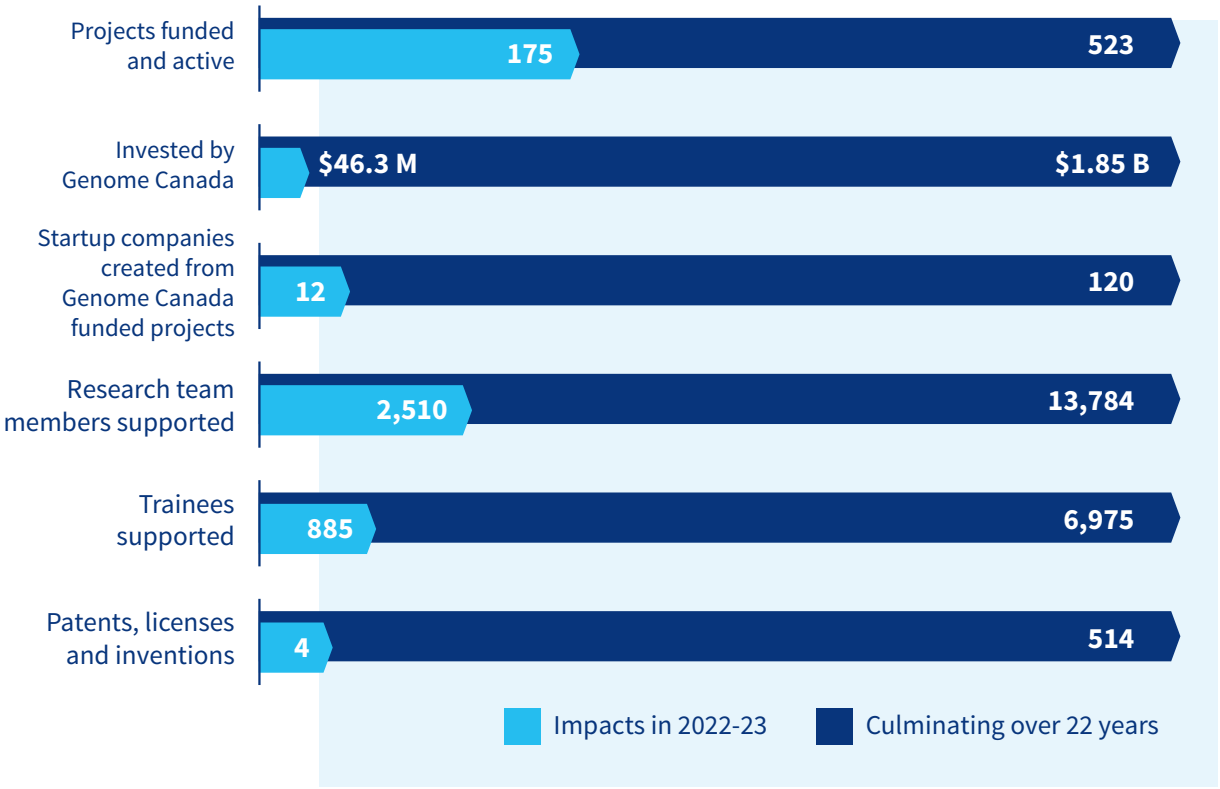
Projects funded up to March 31, 2023	**114**
Projects completed and final reports received	**41**
DATA FROM FINAL REPORTS RECEIVED	
Personnel supported	**812**
Leveraged funds	**$124M**
Media mentions	**148**
Awards	**40**
IP generated *e.g., License agreements, patents, invention disclosures*	**84**
Publications	**180**

The role of Canadian small and medium-sized enterprises (SMEs) in GAPP projects has been a particular focus. SMEs have been a driving force in moving genomics technologies from innovative promise to practical application, particularly through the development of IP. GAPP projects are also highly effective training opportunities for those employed in the projects, with industry partners or industries related to the project often hiring trainees.

The impact of GAPP projects is wide ranging, from improving the health of Canadians, to protecting Canada's environment, to addressing global food security.

- Making cancer treatment safer. A project on the use of pharmacogenomic testing to **reduce adverse drug reactions in pediatric care** has provided lessons on how and where to provide genomic testing in the provincial roll-out of new guidelines on testing for specific cancer treatment use.
- Cleaning up environmental contamination. A project has used genomically identified novel benzene-depleting microbial strains and created cocktails of them for bioremediation of contaminated sites across Canada (and beyond). It went on to develop **market-ready genomic bioremediation products** that are now on sale to those with the responsibility to clean up these sites (a market estimated at around $10 billion).
- Improving the nutritional value of turkeys. A project has applied **genomic selection in turkeys** for health, welfare, efficiency and production traits. This has seen the entire Canadian turkey production market take up the technology to support improved turkey farming, as well as 50 per cent of the global turkey production market.

GENOME CANADA BY THE NUMBERS



2022-23 FUNDING ACROSS SECTORS

Agriculture 8.1M

Environment 7.3M

Energy/mining 0.4M

Forestry 1.1M

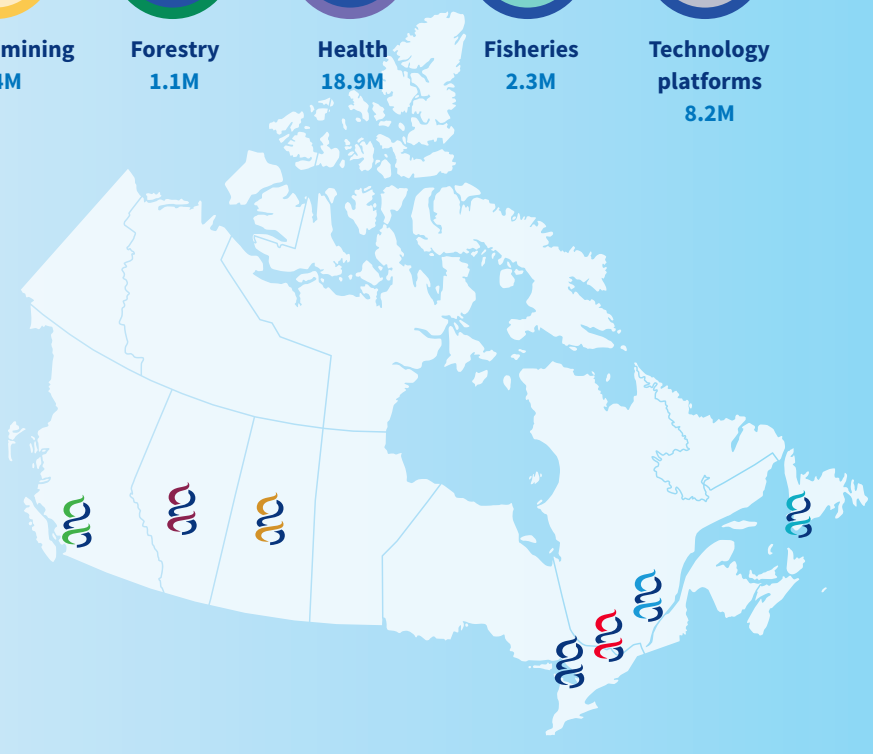
Health 18.9M

Fisheries 2.3M

Technology platforms 8.2M

NUMBER OF PROJECTS FOR 2022-23 BY REGION

- Genome Atlantic: 7
- Génome Québec: 44
- Ontario Genomics: 69
- Genome Prairie: 8
- Genome Alberta: 14
- Genome British Columbia: 33



Looking ahead to 2023-24

As Canada's national leader in genomics and a gateway to genomics around the world, we look forward in the coming year to delivering challenge-driven initiatives with impact. We welcome the opportunity to be a key partner in the upcoming Pan-Canadian Genomics Strategy and to contribute to other federal strategies where genomics can make a tangible difference. In November 2023, we will publicly launch our vision and strategic directions to mobilize genomics research and innovation for healthy people, a strong economy and a sustainable planet.

As we move into the second year of the Climate-Smart Agriculture and Food Systems (CSAFS) initiative, work will focus on implementation of the research projects in the portfolio and the connector Hubs. We will convene and host a meeting of the project and Hub teams to promote portfolio connections and coherence.

Genomic Monitoring of Pathogens in Water (GeMPaW) will be a key focus for 2023-24. We will launch the Community Coordination and Collaboration Hub (C3 Hub) stream in summer 2023 and complete the co-creative design of the regional projects and Indigenous communities' streams later in the year.

Our recent internal evaluation of GAPP showed its unique impact in the federal research and innovation ecosystem. In 2023-24 we will reflect on its results and recommendations and shape the future of GAPP to ensure it is purpose-built for the next decade. We will build on its strengths while evolving the program for even greater downstream impact, more equitable benefits to underserved communities and broader diversity of applicant teams.

We will also extend our support for public and precision health initiatives, spearheaded by **All for One**, that can be leveraged to make a major contribution to Canada's new national rare disease strategy that will roll out in the coming year.

We are working to shape a major challenge-based investment in health for launch in fall 2024. In May 2023, we convened a meeting in Montreal of our funded health researchers to mobilize lessons learned and results of existing efforts and to identify ongoing gaps and needs in diagnostics, prevention and treatment. We will continue to convene stakeholders throughout 2023-34 to explore how our precision health efforts can help meet the needs of Canada and Canadians. These important (and interesting) discussions will help bolster our leadership of the genomics ecosystem and our collective alignment with federal and provincial government health policy priorities. Across all aspects of health genomics, and as we lay the groundwork for our next health challenge, we will continue to coordinate discussions with stakeholders across the country, catalyzing and accelerating genomics research excellence, innovation, implementation and commercialization.

We will continue to demonstrate thought leadership and participate in policy dialogue around other national strategies related to science, technology and innovation, including future phases of the Biomanufacturing and Life Sciences Strategy and the Canadian Biomedical Research Hubs, the 2030 Federal Biodiversity Strategy, as well as modernization of the federal research funding ecosystem as per the recommendations of the Advisory Panel on Federal Research Funding Support. In June 2022 we welcomed former Deputy Minister of Finance Michael Sabia to our Board meeting to discuss members' views on federal innovation policy and the new Canada Innovation Corporation.

Dr. Rob Annan and Pari Johnston at the U.S. State Department in Washington, D.C., March 2023.

Genomics is a global enterprise. We will continue to represent Canada in global genomics initiatives and promote its leadership. Building on recent missions to the United States and Europe to assess the genomics landscape, as well as opportunities and challenges in rapidly evolving scientific and geopolitical contexts, we will double down on strategic partnerships with key organizations abroad who are also working to bring genomics to bear on the world's biggest challenges.

IDEA (inclusion, diversity, equity and accessibility) and Indigenous truth, reconciliation and engagement will continue to be key corporate priorities. In 2023-24 we will deliver a distinctions-based Indigenous strategy to guide our corporate strategy, governance

and programs and to elevate Indigenous genomics leadership in Canada. We will also continue our collaborations with equity-deserving groups and Indigenous communities to shape our vision, as well as investment prioritization and delivery of challenge-driven initiatives. As we prepare for future investments and new initiatives, we will actively listen, learn and engage. We will then prioritize portfolio design and investment mechanisms to address inequity in the current research and innovation system.

Committed to excellence in operations, we will continue to focus on integrated strategic planning as well as digital transformation through implementation of a corporate Customer Relationship Management (CRM) system and launch of a phased-in Program Administration and Reporting System. We are strengthening our policies and approaches with respect to national research security in compliance with evolving federal directives.

To maintain a strong corporate culture in the post-COVID hybrid work environment and to remain an employer of choice, we continue to support our high-performing team with flexible policies and benefits, group training and professional development, team building social activities and all-staff retreats. In 2023-24 we will evolve our organizational structure to ensure it is purpose-built to deliver challenges with impact.

How we achieved our objectives in 2022-23

We envision Canada as a world leader in the application of genomics-based biosciences for human health, agriculture, the environment and across the bioeconomy. To achieve this vision, we connect people and ideas across the public and private sectors through challenge-driven programming that harnesses the power of genomics research, innovation and talent for the benefit of all Canadians. This section outlines our stated objectives for the last year and how we worked to meet them.

1 Drive high-impact research to benefit Canada.

2 Deliver effective, purpose-fit programs that support our mission.

3 Promote the responsible and equitable application of genomics in Canada.

1. DRIVING HIGH-IMPACT RESEARCH TO BENEFIT CANADA

At Genome Canada, we know that the interactions of the different components of research are what drive impact. This means we support research activity (building knowledge), infrastructure (building resources) and capacity (building expertise). We continued to support large-scale, interdisciplinary research with line-of-sight to application. We invested in strategic challenge-driven research addressing social challenges, while providing access to leading-edge technologies and supporting research on genomics in society.

Genome Canada research projects are selected via world-class Canadian and international peer review. Reviewers are chosen for their recognized expertise in the science, technology and/or translation arena and in management of large-scale genomics projects. Over the past year, we recruited 149 new reviewers from 19 countries. Our portfolios undergo a two-stage scientific and portfolio review composed of Canadians and international reviewers, end users and policymakers. Our Board of Directors makes the final funding decisions on which applications to invest in, based on recommendations from management and the international panel of reviewers.

CLIMATE-SMART AGRICULTURE AND FOOD SYSTEMS CHALLENGE. An investment of nearly $70 million was made to this **initiative**, launched in May 2022, with almost $27 million from Genome Canada and an additional $42 million in co-funding. The initiative aims to build the resiliency, environmental sustainability and economic viability of Canada's food production systems.

- Interdisciplinary Challenge Teams (ICTs). Following the launch, project teams were invited to register their interest and participate in a July 2022 virtual information session about eligibility and details. A total of **38 eligible teams** submitted Letters of Intent (LOIs) via their regional Genome Centres in September 2022. In November, we notified **16 teams of successful LOIs** and invited them to submit a full application for review, first by a Genome Canada review committee and then

SUPPORTING SUSTAINABLE FOOD PRACTICES AND ECONOMIC GROWTH IN AGRICULTURE

Impacts on Canadian and world industry to improve agriculture yields

In 2019, the Government of Canada announced over $134 million in initial investments to support the first-ever **Food Policy for Canada**. The policy aims to create a healthier and more sustainable food system, building on a robust agenda to support growth for farmers, producers and food businesses. The use of genomics technologies to improve yields from a variety of crops and livestock is enhancing food security, improving sustainability in a changing climate, and driving economic growth for farmers. Examples of Genome Canada-supported projects driving impact include using genomic selection for welfare and efficiency traits in **turkeys** (now the industry standard in Canada); addressing resilience in **dairy cattle** productivity, health and fertility; improving growth and disease resistance in **Atlantic salmon**; and harnessing genetic diversity in **wheat** and **lentils** to improve yields to feed the world and support growth of Canadian agriculture. Bringing the bio-revolution to address sustainable food systems and food security can help lead the way in supporting healthier foods and diets for all Canadians.

With collaboration across the Canadian Genomics Enterprise

by a Genome Canada-assembled portfolio review committee in February 2023. In March, our Board approved nine successful ICTs and confidentially notified them of their success, with information remaining under embargo until publicly announced by ISED in fall 2023.

- Data and Knowledge Mobilization Hubs. We launched the Hub funding opportunities in August 2022, with **LOIs due from eligible teams in December 2022** and full applications due in March 2023. Three full applications were reviewed first by a Genome Canada review committee and then by a Genome Canada-assembled portfolio review committee in May 2023. We will notify the teams of our decision in summer 2023 and make a public announcement about successful teams in winter 2023.
- Assembling the CSAFS portfolio of teams. In fall/winter 2023-24, the nine ICTs and two Hub teams will organize and carry out a series of webinars to gather teams and initiate the coordination of portfolio-level activities, which will culminate in an in-person meeting to launch the portfolio-level activities ahead of the spring sowing season.

ADVANCING ALL FOR ONE, CANADA'S PRECISION HEALTH PARTNERSHIP. We continued to advance the goals of this **pan-Canadian initiative** in rare disease by supporting the six clinical implementation projects, policy toolkit and the Development Phase of the **Health Data Ecosystem** (HDE). We fostered connections between other All for One-relevant investments and partnerships in precision health (e.g., HostSeq, **Pan-Canadian Human Genome Library**) to build the foundation for a pan-Canadian precision medicine and genomics strategy. We also broadened access to genome-wide sequencing and led patient-community engagement.

- Cumulatively, we will invest approximately $13[1] million with co-funding of $26 million (for a total of approximately $39 million) in All for One projects, including the HDE.
- Each project demonstrates the clinical utility and cost-effectiveness of genome-wide sequencing as a standard of care for individuals with suspected serious genetic conditions.
- Each initiative is led by a clinical team, driven by the provincial ministry or regional health authority and carried out in partnership with clinicians and diagnostic labs.
- The HDE, a model for health data sharing in Canada, allows All for One clinical implementation sites to share data with each other for clinical and research purposes related to rare diseases. The **All for One Policy Toolkit** establishes a data governance framework for informed clinical consent and genomic data sharing across other projects within the initiative.

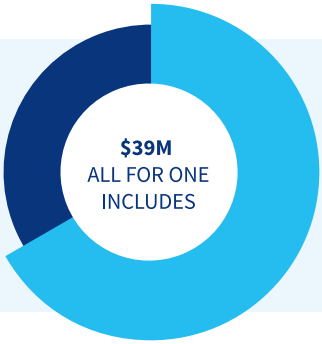
In March 2023, the Government of Canada announced a $1.5 billion ***National Strategy for Drugs for Rare Diseases***. This strategy includes significant investments in research and innovation through CIHR around rare disease, as well as supports for data sharing. All for One will be a supportive partner to the developing strategy, and we continue to advance discussions with CIHR around the connectivity of rare disease research across our respective portfolios.

[1]These figures are included in the GAPP below but are also presented here given the focus of our investments in this research area.

"Access to state-of-the-art genome-wide sequencing will be life-saving and transformative for Canadian patients, some of whom have been struggling for years to get a diagnosis. All for One opens the door for appropriate care and also opportunity for clinical trials and other interventions. Kudos to Genome Canada and all of the partners for continuing to put patients first."

Dr. Durhane Wong-Rieger, President & CEO, Canadian Organization for Rare Disorders

AllforOne Canada's Precision Health Partnership



$13M in federal investment through Genome Canada

$26M in co-funding from partners through regional Centres

GENOMIC MONITORING OF PATHOGENS IN WATER (GEMPAW) INITIATIVE. Launched in May 2023, **this initiative** is approximately $19 million, with a Genome Canada investment of $10 million plus $9 million in co-funding. This investment will deliver an integrated portfolio of projects building regional capacity and national alignment to tackle emerging pathogens/antimicrobial resistance (EPs/AMR) through:

Community coordination and collaboration (the C3 Hub) | Approx. $6M

The C3 Hub will act broadly as a connector, ensuring that water-based pathogen and AMR genomic monitoring data are used to inform public policy decisions.

Regional monitoring for EPs and AMR | Approx. $12M

Six regional teams will be funded to implement monitoring programs for EPs and AMR in water.

Indigenous-led monitoring in northern and remote communities | Approx. $1M

These genomic monitoring projects are led by community-based Indigenous researchers and/or organizations, take place on Indigenous land or incorporate Indigenous knowledge.

To ensure that the initiative can drive towards significant impacts on preparedness for future major health threats, we worked with stakeholders, rightsholders and potential partners to help frame the most effective approach, structures and strategies. A webinar for the C3 Hub in June 2023 convened over 130 interested applicants, with full applications due in fall 2023 and notification of decisions by end of the calendar year. The regional monitoring for EPs and AMR funding opportunity will be launched in winter 2024 and the Indigenous-led monitoring in northern and remote communities funding opportunity will be launched after that.

FUNDING OF DEMAND-DRIVEN GENOMICS COLLABORATIONS IN AGRI-FOOD, THE ENVIRONMENT AND HEALTH THROUGH THE GENOMICS APPLICATIONS PARTNERSHIP PROGRAM (GAPP). Cumulatively, at the end of fiscal year 2022-23, Genome Canada and our co-funding partners had funded 114 receptor-led projects. This represents an expected total investment of approximately $470 million including co-funding, in 24 rounds of investment in this rolling intake program. Examples of projects initiated last year include using genomics and proteomics to address autoimmune disease therapies and developing diagnostic and treatment tools for bacteria that can cause gastric cancer. Other projects include moving an RNA-interference-based miticide from development to commercialization to control mites in greenhouses, and developing early detection systems for harmful algal blooms that are becoming more frequent due to climate change. We invested $12.7 million in 2022-23.

FUNDING OF FOUR EXISTING LARGE-SCALE APPLIED RESEARCH PROJECT (LSARP) COMPETITIONS, EACH WITH A SPECIFIC SECTOR FOCUS:

- **2020 LSARP Competition in Genomic Solutions for Natural Resources and the Environment**. This $59.5 million competition, including co-funding, was launched in January 2020 in partnership with Natural Resources Canada (NRCan) to make Canada's natural resources and environment more resilient to climate change. It supports eight projects such as addressing the risk and resilience of Canada's extensive pine forests to mountain pine beetle devastation and the remediation of northern wetlands from ecologically harmful industrial by-products. We invested $5.1 million in 2022-23.
- **2018 LSARP Competition – Genomic Solutions for Agriculture, Agri-Food, Fisheries and Aquaculture**. This $78.4 million competition, including co-funding, was launched in January 2018 in partnership with Agriculture and Agri-Food Canada. It supports eight projects that demonstrate how genomics research can be translated into solutions advancing the sustainability, productive capacity and competitive position of the Canadian agriculture/agri-food and fisheries/aquaculture sectors. Projects include addressing challenges through a One Health approach by reducing agricultural reliance on antibiotics and building the genomic capacity of wheat breeding to address future food security issues globally. We invested $6 million in 2022-23.

- **2017 LSARP Competition – Genomics and Precision Health**. This $160.4 million competition, including co-funding, was launched in January 2017 in partnership with CIHR. It supports 15 projects that demonstrate how genomics-based research can contribute to a more evidence-based approach to health. These projects are expected to improve health outcomes and/or enhance the cost-effectiveness of the healthcare system. A broad range of projects were funded, including reducing healthcare disparities and improving diagnostic success for children with genetic diseases from Indigenous populations; addressing adverse reactions to drug therapies for children with cancer; and understanding the role of the microbiome in conditions from irritable bowel disease to asthma. We invested $5.5 million in 2022-23.
- **2015 LSARP Competition – Natural Resources and the Environment**. Genome Canada and co-funding partners are investing a total of $112.8 million in 13 projects. The scope of this competition includes genomics research in energy, mining, forestry, water stewardship, wildlife management and conservation. Projects include using microbial genomics for bioremediation of oil spills in the Arctic Ocean and creating novel biopolymers from forestry by-products. We invested $1.7 million in 2022-23.

CONTINUED INVESTMENT IN GENOMICS TECHNOLOGY PLATFORMS. We supported **10 Technology Platforms** with a total of approximately $133 million, including co-funding, over six years (2017-23) before wrapping up in March 2023. The platforms gave researchers access to the latest high throughput 'omics technologies in areas such as DNA sequencing, proteomics and metabolomics, as well as development of new methods and protocols, data analysis and bioinformatics. The program leveraged genomics infrastructure developed over the last 20 years by Genome Canada and in collaboration with the Canada Foundation for Innovation (CFI) and the Major Science Initiative (MSI). We invested $8.4 million in 2022-23.

Over the last 20 years, technology platforms have been a catalyst for Canadian research, enabling researchers to provide international leadership and achieve significant impacts. For example, during the COVID-19 pandemic, platforms demonstrated the nexus of expertise and technologies to respond rapidly, supporting time-sensitive essential research for national emergencies.

Several platforms have grown into much larger entities, requiring a blend of funding from institutional, philanthropic, provincial and federal sources, in addition to Genome Canada. We continue to work with ISED and other funders such as CFI and the Digital Research Alliance of Canada on principles for a more strategic approach to national genomic capabilities, including the development of emerging technologies necessary for our future challenges. In 2022-23 we announced an investment of $6 million from 2023-24 to 2025-26 in advanced technology development aligned with four successful CFI-MSI funded genomic facilities. This included glycomics, biodiversity, metabolomics and a new generation of DNA sequencing applications in single cell, spatial biology and long-read technology.

CONTINUED INVESTMENT IN THE 2017 BIOINFORMATICS AND COMPUTATIONAL BIOLOGY COMPETITIONS. This $23.7 million competition, launched in December 2017, supports the **development of next-generation tools and methodologies** under two streams: human health and food/agriculture and natural resources/environment. Examples of projects include using machine learning to predict drug resistance in pathogenic bacteria, developing toolkits for rapid characterization of bacterial genomes, and tackling the environmental and agri-food context of AMR. The 25 projects, which are vital for creating new and innovative ways of engaging with large-scale complex genomics data sets, received $900,000 in 2022-23.

CONTINUED INVESTMENT IN DISRUPTIVE INNOVATION IN GENOMICS. These competitions fund projects that develop leading-edge genomics technologies with the potential to displace existing technologies, disrupt an existing market or create a new market. Genome Canada and co-funding partners have invested $37.5 million in **Disruptive Innovation projects** since program inception in 2015. We invested $275,000 in 2022-23.

SUPPORT FOR NEXT-GENERATION RESEARCHERS. This partnership leverages Mitacs programs to provide placements and funding for graduate students and postdoctoral fellows to work on GAPP projects within industry partners' operations. It prepares Canada's next generation of innovators to advance the field of genomics by allowing them to apply their knowledge and skills in a real-world setting. Companies benefit from the high-quality research expertise. During 2022-23, this partnership supported 14 Mitacs Accelerate internships through GAPP projects.

UKRAINE RESEARCH TRAINEE RELIEF PROGRAM. This **program** initiates or maintains the support of graduate students and postdoctoral researchers working on Genome Canada-funded projects who are directly impacted by the crisis in Ukraine. It aligns with and complements the federal granting agencies' time-limited Special Response Fund for Trainees. Our creation of the program followed our **response** to the **2022 statement** by the Honourable François-Philippe Champagne, Minister of Innovation, Science and Industry, and the Honourable Jean-Yves Duclos, Minister of Health, on additional support for Ukrainian research trainees. This response committed us to exploring mechanisms to ease the burden of the conflict and support Ukrainian and other researchers impacted. We supported one application for $45,000 in 2022-23.

2. DELIVERING EFFECTIVE, PURPOSE-FIT PROGRAMS THAT SUPPORT OUR MISSION

We continued our support for equitable, diverse and inclusive research programs focused on excellence and impact. We further strengthened the impact of research and innovation through collaboration and coordination within academia and industry, both nationally and internationally.

STRONG COMMITMENT TO ACTION ON INCLUSION, DIVERSITY, EQUITY AND ACCESSIBILITY (IDEA). We made progress on intentionally and deliberately embedding IDEA policies and practices across our operations, workforce, programs, policies and governance structures. Over the last year, we took the following proactive measures:

- We developed an IDEA strategy and roadmap to embed equity across our operations and programs and guide our work. We built them on the 2021-22 equity and anti-racism audit of our policies, procedures and practices and on the organizational mapping we did last year to better understand our organization's IDEA-related needs and priorities.
- Our IDEA working group, with the regional Genome Centres, convened regularly under the leadership of our Director, Equity and Indigenous Engagement. The working group helped strengthen Enterprise-wide IDEA planning, priorities and collaboration, and guide the implementation of our IDEA roadmap.
- We developed and deployed two anonymous research applicant demographic questionnaires for all active Genome Canada funding opportunities: **one for project leads and receptors** and **one for reviewers**. The questionnaires are a first step in helping us address equity gaps as we develop, assess and maintain our peer-review and application processes.
- Throughout the year, we engaged diverse internal and external stakeholders, in particular individuals with first-hand experience of our funding programs and processes, to identify equity gaps and opportunities. The feedback gathered continues to inform ongoing improvement of programs and processes.
- In December 2020, in a unanimous decision, our Board of Directors signed on to the **50–30 Challenge** to accelerate organizational diversity actions to improve equity. In the last year we continued to develop and apply our new matrix for the selection of Board members. We also advanced our plans to create a more inclusive screening, selection and hiring process through targeted Indigenous and equity-seeking groups and job boards; and provided unconscious bias training for hiring committees.
- As part of our ongoing commitment to create a safe workplace environment, staff participated in a two-hour training session on trauma-informed practices and gender-based violence within the workplace. The session's in-depth overview of our anti-violence and anti-harassment policy and process aimed to ensure that staff feel safe and supported when raising a complaint.

- We continued to ensure that all documents and graphics posted to our website or included in our newsletters are certified accessible, in keeping with best practices for Web Content Accessibility Guidelines and Accessibility for Ontarians with Disabilities Act compliance.

ONGOING COMMITMENT TO INDIGENOUS TRUTH, RECONCILIATION AND ENGAGEMENT. We laid the groundwork for integrating Indigenous truth, reconciliation and engagement into all aspects of our work. Over the last year, we accomplished the following:

- Staff participated in a National Day for Truth and Reconciliation interactive dialogue, which included a screening of Courtney Montour's (2022) documentary film *Mary Two-Axe Earley: I Am Indian Again.* The documentary provided a frame through which to discuss several topics and themes, including sex discrimination against First Nations women in Canada's Indian Act, Indigeneity, patriarchy, intergenerational trauma and Indigenous resurgence.

SING summer 2022 cohort with faculty and staff, including Tracy Howlett (2nd from left), Dr. Kim TallBear (3rd from left), Dr. Warren Cardinal-McTeague (2nd from right) and Dr. Rick Smith (far right). Photo: Esta Baker.

GENOMICS AS RECONCILIATION

Addressing TRC calls to action is vital responsibility

Since the tabling of the Truth and Reconciliation Committee's 94 **Calls to Action** in 2015, there has been a mandate for all of Canada to engage in reconciliation efforts. The genomics community also needs to heed that call and work towards delivering benefits from these tools and technologies that meet Indigenous needs and priorities. Genome Canada and the Enterprise are working towards Indigenous engagement based on the recognition of rights, respect, self-determination and partnership as the foundation for transformative change. Our support for **SING Canada** has helped build Indigenous capacity and scientific literacy as well as creating postsecondary and career pathways in genomics, bioinformatics and Indigenous bioethics. Projects like **Silent Genomes** are reducing disparities and improving diagnostics success to align Canadian health systems with Indigenous healthcare needs. **BEARWATCH** and **Sustainable Fisheries in Nunavummiut** are combining traditional ecological knowledge with genomics technologies to support environmental sustainability, food security and economic opportunity. Continuing to develop our support for full and effective participation of Indigenous peoples in genomics is crucial to advance a distinctions-based, inclusive genomics agenda in Canada.

With collaboration across the Canadian Genomics Enterprise

Fall 2022 all-staff Indigenous truth and engagement learning retreat at Mādahòkì Farm in Ottawa.

- In fall 2022, staff and Board members respectively participated in a **KAIROS Blanket Exercise**, an experiential workshop that explores the nation-to-nation relationship between Indigenous and non-Indigenous peoples in Canada.
- We engaged with a wide range of Indigenous leaders across sectors and continued to support trailblazin g Indigenous-led programs. These included **Silent Genomes** (funded by Genome Canada since 2017 to reduce the healthcare disparities and improve diagnostics success for children with genetic diseases from Indigenous populations); and the Summer internship for Indigenous Peoples in Genomics (**SING Canada**), with a mandate to train Indigenous leadership in genomics and other international leaders walking the same path.
- With the advice of Indigenous partners, stakeholders and organizations, we continued to lay critical foundations for the development of a distinctions-based Indigenous truth, reconciliation and engagement strategy to elevate Indigenous genomics leadership in Canada. We are committed to co-creation and will continue to engage with Indigenous researchers and leaders to support strategy development by March 2024.

ONGOING RESPONSE TO THE COVID-19 PANDEMIC AND ITS IMPACT ON CANADA. Since the pandemic hit in early 2020, we have consistently activated our community to engage, with rapid time to impact, on a range of national and regional efforts. Over the last year, we focused on the following.

- **Oversight of the conclusion of the Canadian COVID-19 Genomics Network (CanCOGeN)**. Since the launch of CanCOGeN in April 2020, we have continued to manage this $39.4 million investment of federal money to generate accessible and usable genomics data to inform public health and policy decisions, as well as to guide treatment and vaccine development in Canada through VirusSeq and HostSeq (see page 7 for more about CanCOGeN impacts). Both initiatives wrapped up in March 2023 following three years of funding. VirusSeq governance has evolved into a monthly genomics alliance that convenes public health leaders across Canada to discuss surveillance and pandemic preparedness. This national partnership with the Public Health Agency of Canada is called the Canadian Public Health Alliance for Genomics Epidemiology and Surveillance (CHARGES). HostSeq governance is now led by the HostSeq Transition Oversight Committee, which has strong and diverse representation from international experts in genomics. We invested $4.5 million ($0.1 million in VirusSeq and $4.4 million in HostSeq) in 2022-23.
- **COVID-19 impact relief funding**. COVID-19 has had a significant impact on many projects. The relief funding we provided in 2022-23 helped ensure the delivery of project outputs and the meeting of objectives, the continuity of research teams and infrastructure, and the maintenance of positive relationships with the researcher community and partners. Based on a fair and equitable distribution across regions and projects, we invested a total of approximately $7 million through the Centres in 2022-23, and a total of approximately $10 million over 2 years.

INVESTMENT IN THE REGIONAL PRIORITIES PARTNERSHIP PROGRAM (RP3). This $21 million initiative (including co-funding) supports the Centres in developing initiatives that advance genomics research and translation capacity in areas of strategic priority for their regions. Twenty-one projects have been approved since inception across key sectors including agriculture, fisheries and aquaculture, human health and data science. In the Atlantic region, a RP3 project supports a collaboration between industry, the federal government and a genomics start-up to deliver effective environmental monitoring of the ocean. In B.C., patients, clinicians and the health system are working together to better target depression treatments. We invested $0.8 million in 2022-23.

CONTINUED PARTNERSHIP WITH THE SOCIAL SCIENCES AND HUMANITIES RESEARCH COUNCIL (SSHRC) ON SOCIETAL IMPLICATIONS OF GENOMICS. This $2 million initiative jointly supports social sciences and humanities research and related activities, including enriching the understanding of the societal implications of genomic research. SSHRC is the lead on peer review as applicants apply through its regular programs. A total of 17 projects have now been approved for funding through 2022-23 and are providing insight into topics that may inform future challenges such as consumer attitudes towards genetically modified food and enabling the growth of Indigenous-led and cross-cultural community-based wildlife monitoring programs that lead to a more resilient Arctic.

We extended and enhanced our partnership with SSHRC for two more years, with an additional investment of $500,000 focused on launching two Knowledge Synthesis Grants (KSGs) and an Imagining Canada's Future Ideas Lab. This joint work will help inform and shape our challenge-driven initiatives, move forward our IDEA strategy and engage social sciences and humanities leaders and experts in genomics. Specifically, our work together will focus on:

- Shifting Dynamics of Privilege and Marginalization (KSG awarded in April 2023)
- Global Health and Wellness in the 21st Century (Ideas Lab in 2023)
- Evolving Narratives of Histories and Cultures (KSG award in spring 2024)

CONTINUED FUNDING OF THE GENOMICS IN SOCIETY INTERDISCIPLINARY RESEARCH TEAMS PROGRAM. This $6.0 million knowledge translation program, launched in February 2019, brings researchers from different disciplines together to (i) investigate factors affecting the advancement, adoption, evaluation and governance of genomics research; and (ii) address issues at the intersection of genomics and society that will ultimately contribute to Canada's leadership and social and/or economic benefits in various sectors. It is designed to support and enhance GE3LS research and support our commitment to inclusive, diverse, equitable and accessible genomics objectives. Importantly, this work addresses overarching challenges that affect the adoption and uptake of the outcomes from genomics research and/or accelerate the synthesis and dissemination of research pertinent to users, including policymakers, within a sector. We invested $0.4 million in 2022-23.

SUPPORT FOR PAN-CANADIAN HUMAN GENOME LIBRARY WITH CIHR. Genome Canada partnered with CIHR, CGEn and the Digital Research Alliance of Canada in 2022-23 to launch a $15 million (over five years) funding opportunity to support the development of a Pan-Canadian Human Genome Library. The development of this national asset will enable the uniting of all human sequencing efforts for the benefit of Canadians while positioning Canada as a key player in international genomic research endeavours. Our investment commitment is $2 million.

INVESTMENT IN THE CANADIAN BIOINFORMATICS WORKSHOP (CBW). The CBW has been a strong Canadian program for 20 years and, until recently, was supported through Genome Canada platforms that are currently winding down. By investing in the CBW, we support training in bioinformatics and computational biology Specifically, our support has helped to restart in-person workshops after the COVID-19 pandemic. We invested $0.25 million in 2022-23.

ACHIEVING HEALTH EQUITY WITH GENOMICS TECHNOLOGIES

Addressing differential impacts on populations at risk

Accessibility is central to the **Canada Health Act**. The pandemic truly shone a light on the **differential accessibility** of Canadian health systems. It showcased the inequities that still exist in health system accessibility and usability and health outcomes. Genomics technologies are increasingly important in delivering better health. Precision health is undoubtedly the **future of healthcare**. Genome Canada and the Enterprise are supporting health equity as part of this shift to precision health. Our work includes supporting equitable access and outcomes for racialized women with breast cancer through **risk-based screening** and **epigenomics**; improving diagnosis, early detection and treatment courses for **bipolar disorder** (where racialized Canadians are more likely to be **mis- or undiagnosed**); and interrogating big data sets to understand **differential impacts of COVID-19** on Canadians. Acknowledging, analyzing and addressing health and health system inequities through genomics is leading the way on equitable precision health for the future.

With collaboration across the Canadian Genomics Enterprise

ENHANCING INTERNATIONAL LEADERSHIP. Canada's role in the international genomics landscape is essential to ensure that cooperation and collaboration drive genomics work across health, agriculture, climate and more. Genome Canada collaborates in international efforts to tackle global challenges with genomic solutions, influence the global agenda, accelerate breakthroughs in Canada and raise the profile of Canadian efforts. In 2022-23 we supported a number of international initiatives including the following:

- **The Structural Genomics Consortium** (SGC), established in 2004, is a not-for-profit public-private partnership that supports the discovery of new medicines through open access research. We reconfirmed our investment in the SGC in March 2020, approving funding for Phase V. This phase employs innovative strategies including artificial intelligence to develop tools to better understand proteins involved in many cancers and other debilitating and rare diseases. It has a total project budget of $23.5 million and a maximum of $5 million from Genome Canada over two years. We invested $0.6 million in 2022-23.
- **The Global Alliance for Genomics and Health** (GA4GH) represents 500+ member organizations from 71 countries focused on improving human health through global genomics and clinical data sharing. As a member since 2014, we have helped advance the uptake of standards for harmonized data sharing to enable responsible access to genomic and health-related data on tens of millions of individuals worldwide. Strategic collaboration with the GA4GH is projected to be critical for unlocking genomics innovation within Canada, both in the clinic and commercially. Moreover, Canada's strength in the development of genomic standards and policy through the GA4GH is considered a growth opportunity for global leadership and a powerful model for other sectors such as agriculture. In fall 2022, we approved a new funding opportunity to support GA4GH activities in areas of strategic importance to us such as convening international stakeholders around data sharing and implementing genomic medicine within Canada, informing our All for One work. This will provide an additional $0.8 million to GA4GH over two years. We provided approximately $115,000 in 2022-23 to support convening activities to advance the research efforts of the Alliance and to support the secretariat staying in Canada.
- **Genome Canada represents Canada in the Global Biodata Coalition** (GBC), a forum for research funders to better coordinate and share approaches for the efficient management and growth of biodata resources worldwide. It aims to stabilize and ensure sustainable financial support for the global biodata infrastructure and to identify, for prioritized long-term support, a set of Global Core Data Resources crucial for sustaining this infrastructure. As the Canadian member of the GBC Board of Funders, represented by our President and CEO, Dr. Rob Annan, we bring a broad Canadian perspective to discussions by consulting other Canadian parties interested in GBC work and informing them of GBC activities. We invested approximately $40,000 in 2022-23.

- **DivSeek** represents 100+ member organizations from various countries to help mobilize the genetic variation from the world's gene banks for crop breeding. This international collaboration aims to enhance the productivity, sustainability and resilience of crop varieties to challenges such as climate change. As a member of this community of practice, we participate in developing and sharing methodologies, open-source software tools, and best practices on generating, integrating and sharing information on plant genetic resources. A supporter of the DivSeek secretariat for the last two years, we fund a DivSeek Canada project that accelerates crop improvement by unlocking the potential of crop diversity. DivSeek also provides a clear link to our CSAFS challenge-driven initiative through the climate impact of sustainable crop development.
- The **International Rare Disease Research Consortium** unites national and international government, non-profit, for-profit, patient advocacy and scientific research organizations to promote international collaboration and advancement of rare diseases research. Through our continued membership we bring to the table a strong foundation of investment in rare diseases, primarily in the diagnostics space, through a genomics lens. Not only have we gained valuable access to investments and best practices underway in other countries, but we have also reviewed and advised on research projects and working group initiatives within the consortium.
- As part of our international outreach and engagement, our Chief Scientific Officer, Dr. Catalina Lopez-Correa, holds a Co-Chair position at the **Global Genomic Medicine Collaborative** (G2MC). She is also an active participant in its international conferences that target an engaged audience of leaders and stakeholders in genomicmedicine from across the world. G2MC provides us with a platform to demonstrate our global leadership in genomics. We also support and showcase the talent of young investigators through regular sponsorship of the Young Investigator Competition.
- We are an active member of the **Personalized Medicine Coalition** (PMC), an international collaboration that represents innovators, scientists, patients, providers and payers. PMC promotes the understanding and adoption of personalized medicine concepts, services and products to benefit patients and health systems. Membership enables us to help shape PMC's strategic agenda in education and advocacy work. We are also part of a new PMC Working Group on "payer engagement".
- In fall 2022, Genome Canada became the first North American member of the **International Consortium of Personalized Medicine** (ICPerMed), with our Director of Health attending the 2022 health economics meeting in Brussels, Belgium.
- We participated in the Canadian Science and Technology Delegation to the **American Association for the Advancement of Science** annual conference and side meetings in Washington, D.C. in March 2023. Our President and CEO, Dr. Rob Annan, and Pari Johnston, Vice-President Policy and Public Affairs, represented Genome Canada through the four days of meetings and formal events with scientific, policy and political leaders in U.S. science including the National Institutes of Health, the Department of Agriculture, the Department of State Office of Critical Technologies and the White House Office of Science, Technology and Policy.

COMMITMENT TO RESEARCH SECURITY AND CYBER SECURITY. National research security is receiving increasing federal policy attention in Canada given geopolitical dynamics and concerns.

- We put in place an internal senior staff committee to monitor national research security trends and to ensure that federal directives are integrated into the development, evaluation and funding of our research partnerships.
- We continued to work closely with the federal granting agencies, CFI and national third-party research organizations to align efforts and review and update security policies and procedures to better integrate national security considerations into activities. We continued to participate in the TC3+ Research Security Working Group meetings to ensure that our guidelines and processes are aligned with the TC3+.
- We developed and submitted a research security plan to ISED in October 2022, which was subsequently approved. We will continue to monitor and update this living document and related policies as required. All funded projects must adhere to our plan.
- Representatives from across the Enterprise participated in a number of briefing sessions with the Canadian Security Intelligence Service, Canadian Centre for Cyber Security and Public Safety Canada, including a briefing session that we organized.
- We undertook two independent cybersecurity exercises to identify gaps in processes, documentation, policies and defences. We enhanced Board oversight by expanding the responsibilities of its Audit and Investment Committee and introduced a cyber security due diligence quarterly report as an additional measure.
- We developed and deployed formal policies on training and awareness, incident management and password management. Our employees must complete a mandatory awareness program and yearly refreshers and are subjected to monthly, random phishing simulations. Our cybersecurity plan has been in place since July 2022 and was formally accepted as sufficient by ISED in August. In January 2023, we applied for the Cyber Secure Canada certification, which we expect to be granted by fall 2023.

3. PROMOTING THE RESPONSIBLE APPLICATION OF GENOMICS IN CANADA

We provided national leadership and mobilized the Canadian genomics ecosystem in an ongoing national dialogue on genomics and policy. We worked collaboratively with stakeholders to harness the power of genomics to responsibly and ethically deliver equitable benefits for Canadians.

PAN-CANADIAN GENOMICS STRATEGY. Building on our 2021 **Dialogue on the Future of Genomics in Canada** series, we actively supported federal consultations for the Pan-Canadian Genomics Strategy. We worked closely with ISED and the National Research Council (NRC)—the departments leading the policy and strategy development—to mobilize pan-Canadian community engagement in the May/June 2022 government consultations, resulting in over 300 online submissions. Represented at each of the six thematic round tables, we **prepared a written submission**, as did the Genome Centres. Our core message was that "mobilizing a strong genomics future for Canada requires a national strategy and action plan and funding at scale; national ecosystem leadership and coordination; a Challenge-driven research focus and innovative private-public partnerships at pace and scale; strategic national capabilities in talent, data and infrastructure; and an end-user, equity and reconciliation-based focus."

AGRICULTURE AND AGRI-FOOD CANADA (AAFC) SUSTAINABLE AGRICULTURE STRATEGY CONSULTATION. Seizing new opportunities for genomics applications to drive sustainable agriculture and Canada's climate action was a core message in the recently released Pan-Canadian Genomics Strategy ***What We Heard* report**. We led the Canadian Genomics Enterprise in submitting **key priorities and recommendations** for the Government of Canada's proposed new **Sustainable Agriculture Strategy**. We proposed that the new strategy should (i) be underpinned by AAFC's new **Strategic Plan for Science**; (ii) be flexible and reflect the strengths and diversity of Canada's federated food and research ecosystem; and (iii) prioritize both adaptation and mitigation solutions and approaches through a One Health approach. We strongly welcomed the announcement by AAFC Minister Claude Bibeau in May 2023 of updated guidelines in support of gene editing in plant breeding.

CONFERENCE OF THE PARTIES TO THE UNITED NATIONS CONVENTION ON BIOLOGICAL DIVERSITY (COP15). We joined many Canadian and **global leaders at COP15** from December 7 to 14, 2022 in Montreal to strengthen our collective approach to the global biodiversity challenge.

- We supported Génome Québec in running a family pavilion showcasing its ongoing public engagement work on genomics and biodiversity, bringing individuals of all ages together to understand the science driving environmental sustainability for generations to come.

MEETING OUR CANADIAN BIODIVERSITY CHALLENGE

The role of genomics in biodiversity solutions

Environment and Climate Change Canada is leading development of the **2030 Biodiversity Strategy**—a shared vision for halting and reversing biodiversity loss in Canada. Genomics can be an integral part of accelerating that vision. Stewardship and monitoring of our biodiversity are leading activities of Genome Canada and the Canadian Genomics Enterprise that can lead to actionable insights for biodiversity conservation. These range from using **environmental DNA** techniques to monitor **land**, **freshwater**, **marine** and **Arctic** ecosystems, to working on stewardship of at-risk species in Canada, including critical species such as **caribou**, **bison** and the **North Atlantic right whale**. Adding genomics tools and technologies to the suite of solutions for biodiversity challenges will help protect and adapt healthy ecosystems in Canada and globally in the context of climate change and natural disasters. In July 2023, the Canadian Genomics Enterprise **made a submission** in response to Environment and Climate Change Canada's 2030 Biodiversity Strategy Consultation.

With collaboration across the Canadian Genomics Enterprise

- A key **COP15 takeaway** was that Indigenous knowledge, leadership and engagement are vital to environmental sustainability. Genome Canada-funded initiatives like the **Bison integrated genomics** (BIG) project, aimed at protecting a species of significant symbolic and cultural importance for many Indigenous and First Nations communities, are working in collaboration with Indigenous communities, industry, academic and governments to harness genomics for conservation.
- Building on Canada's leadership as COP15 host, and our engagement at the event, we continued to work closely with scientists funded through the Canadian Genomics Enterprise to deepen collaborations aimed at establishing a biodiversity genomics network for Canada and to help us in preparing a response to the **2030 National Biodiversity Strategy**.

SUPPORT FOR PARLIAMENTARIANS IN ADVANCING SCIENCE, TECHNOLOGY AND INNOVATION POLICY AND LEGISLATION IN CANADA. As Canada's genomics ecosystem leader, we worked with MPs to build genomics awareness and support effective policy and legislative development and Committee studies. We were consulted as expert witnesses on numerous occasions in 2022: for example, to inform the studies of the House of Commons Standing Committee on Science and Research on the **successes, challenges and opportunities for science** in Canada (February) and on **talent, research and innovation** (May). The Committee reports picked up our recommendations. Dr. Rob Annan was also invited to meet with the Advisory Panel on Federal Research Support in October 2022 which **issued its report in March 2023**.

PUBLIC OPINION POLLING. We commissioned a national **Abacus Data survey** and related **podcast with Dr. Rob Annan** in summer 2022 to help audiences better understand misinformation and mistrust in science across Canada, and to help us drive knowledge mobilization, uptake and implementation of genomics. We held a series of briefings with government and ecosystem partners on the results. We plan to invest bi-annually in national public opinion research to benchmark and track public perceptions of genomics over time, coordinate with federal science information initiatives, and share findings at **national events** and **policy tables**, to help build a community of practice in knowledge mobilization.

Learn out more about our findings on the public perceptions of genomics *in Canada*

INCLUSIVE STORYTELLING. As part of our ongoing commitment to IDEA and Indigenous truth, reconciliation and engagement, our storytelling continued to focus on demonstrating real project impact across sectors and to the range of communities our work involves and affects.

- In partnership with The Future Economy news platform, we launched a 13-part **interview series of videos** and a **podcast** on Indigenous genomics, highlighting three researchers:
  - Dr. Nadine Caron, Co-Lead of the Silent Genomes Project, who spoke about **precision medicine and Indigenous DNA** and how access to research is a key determinant of health;
  - Dr. Tiff-Annie Kenny, Professor at Université Laval, who spoke about **genomics and Indigenous food systems** and how a portfolio approach is necessary for food system stability in the face of a changing environment; and
  - Eric Solomon, Co-Lead of Ikaarvik, who spoke about the importance of leveraging both **Indigenous knowledge and Western science** in the Arctic, where the pace and nature of change is so significant.
- In a related blog, Dr. Mae Whyte shared her story about uniting **Indigenous knowledge and genomics to advance biodiversity** in First Nations communities. She has worked on restoration of riparian habitats—such as streams, rivers and lakes—and fish habitat assessment. She also built the Blueberry River First Nations water program north of Fort St. John, British Columbia, which includes environmental (eDNA) sampling.
- Pari Johnston was a panelist in a PMC **event** in Boston in November 2022 on **diversity, equity and inclusion in personalized medicine**. The international panel examined how focusing on personalized medicine can improve care in diverse patient populations.

CONTINUED OUTREACH LEVERAGING STRATEGIC PARTNERSHIPS. We engaged in a broad range of outreach activities to promote the role of genomics in Canadian public policy through high-profile platforms with significant reach into public policy, business and researcher audiences in 2022-23. We also applied a strong IDEA and next-generation talent lens to our engagement efforts.

- Science ecosystem and science policy engagement
  - **Public Policy Forum** (PPF) Growth Summit and Awards. We were a lead sponsor of PPF's first major public and economic policy national event since the lifting of COVID-19 restrictions. Dr. Rob Annan participated in a PPF Life Sciences Panel on **Science Helped Save Us: What's Next,** alongside James Brodie of Johnson & Johnson MedTech and Ivan Semeniuk of *The Globe and Mail*. Together, Genome Canada and Ontario Genomics hosted a table of Board, Centres and partners at the Awards Night, which gathered over 1,000 people at this high-profile public policy event in April 2022 in Toronto. It was a good opportunity to meet with key stakeholders, partners and policymakers to discuss the importance of genomics to address complex challenges of today and tomorrow.
  - Agri-Food Innovation Council (AIC). In May 2022, Genome Canada sponsored AIC's annual spring engagement session, hosting a panel on genomics-enabled innovation in agriculture featuring Dr. Christine Baes, (University of Guelph), Dr. Michael Pautler, (Platform Genomics) and Dr. Susan Wood-Bohm (Wood-Bohm and Associates) and moderated by our Chief Scientific Officer, Dr. Catalina Lopez-Correa. We

BIOMANUFACTURING FOR CANADA'S FUTURE ECONOMY

Biological solutions that reduce consumption and drive growth

A future economy for Canada will rely on the biosciences to drive sustainable growth. This **bio-revolution** is worth an estimated US$4 trillion. Federal strategies and initiatives including the **Biomanufacturing and Life Sciences Strategy**, **Bioeconomy Strategy** and **circular economy initiatives** are building domestic capacity in biomanufacturing from health, to agriculture, to forestry and mining. Genome Canada is already addressing sustainable biomanufacturing across industries, showcasing the value of biological solutions to futureproofing all sectors of the economy. Examples include: supporting **infrastructure for health biomanufacturing** to prepare for future pandemics; developing **cellular agriculture** for new protein sources; translating forestry pulp fractions into **upgraded biopolymers** to valorize prior waste products; and using **bioprocessing to extract value from mining** waste. In addition to supporting biomanufacturing infrastructure and projects, we are investing in the **future bio-workforce**, and that is core to delivering broad benefits to Canadians.

With collaboration across the Canadian Genomics Enterprise

also attended a fruitful day-long session featuring meetings with senior officials from the Prime Minister's Office, ISED, and senior public servants from AAFC and Environment and Climate Change Canada on the importance of science and innovation in driving Canada's agricultural policy.

- Canada SynBio. Organized by Ontario Genomics, the May **2022 Canada SynBio conference** was an energizing gathering of entrepreneurs, academics, policymakers and engineering biology professionals. This national event built on the growing momentum in the sector, demonstrated by new ventures, foreign investment in biomanufacturing and new funding programs. During thought-provoking and engaging talks, speakers and attendees expressed momentum in engineering biology-enabled solutions to address society's greatest challenges. Dr. Ryan Phillippe, our Director of Strategic Partnerships and Innovation, was part of a panel on Circular Bioeconomy and Net Zero; and Dr. Rob Annan was part of a panel on Ecosystem Support for Canadian Engineering Biology.
- BIOTECanada. We participated in two major events led by **BIOTECanada**. In June 2022, we were part of the Team Canada pavilion on the international tradeshow floor at **BIO International 2022** in San Diego, attending sessions, networking, gathering new opportunities and key trends in the investment and technology development space in global biotechnology and biomanufacturing industries. In September 2022, at **BIONATION 2022** in Ottawa, Dr. Rob Annan introduced keynote Dr. Timothy Caulfield (University of Alberta). Dr. Bettina Hamelin, President and CEO of Ontario Genomics, served as a panelist on an industry panel examining governmental biomanufacturing initiatives. With the Honourable Jean-Yves Duclos, Minister of Health, in attendance, we also launched the **Genome Canada-adMare BioInnovations joint initiative** and partnership to drive commercialization of genomics solutions in healthcare.

Dr. Rob Annan, President and CEO, Genome Canada and Gordon McCauley, President and CEO, adMare BioInnovations, signing the Genome Canada-adMare BioInnovations joint initiative and partnership.

- Genomics Research and Development Initiative (GRDI) and the National Research Council (NRC). We collaborated broadly with major federally funded genomics initiatives, leveraging our unique national mandate and federated network, challenge-driven approach and cross-sectoral expertise to add value and address key gaps for greater impact in the seven strategic sectors of the federal government. In spring 2022, we worked with the GRDI and the NRC, including hosting a joint roundtable, to align our new **challenge programming** to support and complement GRDI's intramural genomics and agriculture climate adaptation initiatives.
- Canadian Institutes of Health Research (CIHR). We collaborated with CIHR to advance a national approach to large-scale inclusive datasets that can enable precision health to improve health outcomes and systems and drive life sciences innovation in Canada. In September 2022 we released a joint report, **Enhancing Canada's Population Cohort Environment**, with 11 recommendations to strengthen Canada's health data and research outcomes and increase benefits for Canadians. Putt ing the report's recommendations into action will take coordinated pan-Canadian effort and an ecosystem approach from Canada's genomics and health research funders and many other partners.

- **Canadian Science Policy Centre** (CSPC). This strategic partnership, which centres genomics in national science policy, science communications and next-generation science talent initiatives, generated significant impact and reach. Genome Canada and the regional Centres were partners at this annual national science policy event in November 2022. Our first of three panels was on **Trust in Science: The Science in Trust**, in collaboration with SSHRC and CFI and building on our work last year on public trust in genomics. Our two other panels supported our challenge work: one on **Climate and Innovation – the role of genomics and agri-food in addressing climate change** and the other on **Building the circular bioeconomy through innovative policy design and implementation**. We featured in an **executive interview** about our knowledge mobilization work in climate-smart genomics and supported in-person programming and networking attendance of Centre representatives from across the Enterprise.

Enterprise staff at CSPC 2022 reception. L to R: Vanessa Carias (Genome Alberta), Caroline Telekawa (Génome Québec), Sapna Mahajan, Catalina Lopez-Correa, Koko Agborsangaya (all Genome Canada), Olga Peña (Public Health Agency of Canada).

- Gairdner Science Week 2022. In October 2022 we were a silver level sponsor of the **2022 Gairdner Science Week** in partnership with Ontario Genomics. This series of events and lectures celebrated the 2022 Canada Gairdner Award laureates, fostered STEM outreach and promoted the importance of scientific research for the health and wellbeing of people around the world.
- Canadian Forum on Innovation and Societal Impact. In October 2022, we supported and participated in the **inaugural forum** hosted by McMaster University, Canadian Science Policy Centre and the Collaborative. The forum brought together all social sector stakeholders to discuss what education, policy and practice look like in the social innovation ecosystem and to develop a shared, multi-stakeholder agenda for social innovation. As roundtable speakers and workshop hosts, Pari Johnston and Sapna Mahajan, Director of Genomics in Society, led discussions on how to create better conditions for impact-driven research and practices in the social innovation ecosystem, how to bridge the academic sector and society, the sharing of best practices around stakeholder and community engagement, and the importance of skills and talent for the sector.

- **Institute for Research on Public Policy** (IRPP). In November 2022, we sponsored **IRPP's 50th anniversary celebration**, contributing to a new fellowship for early-career Black, Indigenous and racialized policy researchers. The event emphasized the importance of trusted research and constructive dialogue in an increasingly complex policy environment. Following a **keynote** talk by University of Toronto Law Professor and poet Douglas Sanderson, Nana aba Duncan (Carleton University) moderated a **panel discussion** on racial inequality and policymaking in Canada, featuring panelists Debra Thompson (McGill University), Akwasi Owusu-Bempah (University of Toronto) and Fahad Razak (St. Michael's Hospital).

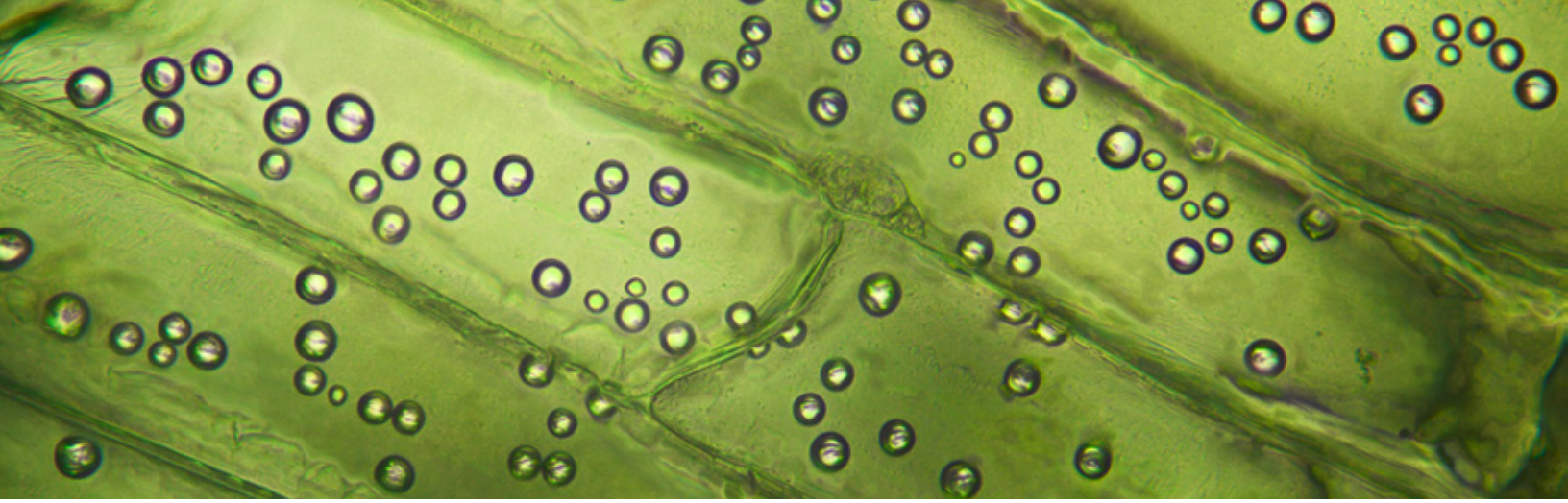
IRPP President and CEO Jennifer Ditchburn with Knowledge Mobilizer Award winners Pamela Palmater and Brittany McDonald who were honoured for their exceptional work in advancing public policy work and understanding in Canada. Photo: Justin Tang Photography.

- Canadian Chamber of Commerce (CCC). As a member of CCC, we are active in their **Food Supply Council**, a cross-sectoral coalition of Canada's leading agriculture businesses, associations and transportation companies addressing the challenges arising from an increasingly unstable, globally integrated, food supply system. We also have a seat in the **Agriculture and Agri-Food Committee** responsible for developing and advocating positions to advance the sector's interests both across the agriculture sector and along different segments of the value chain. Our membership helps us strengthen ties with key industry partners important for future applications and potential commercialization.

- Talent and next-generation skills engagement

  - **Let's Talk Science**. We partnered with Let's Talk Science and other organizations to deliver **six online symposiums** (four in English, two in French) that celebrated discovery and innovation and invited high school students (Grades 9-12) and educators across the country. Star scientists and experts were invited to share their knowledge and engage students in exploring the impact of their work and pathway to their current careers. The events, which ran from October 2022 to February 2023 and reached 5,000 youth and 220 educators, were designed to be provocative, raise awareness and inspire interest and action, while building STEM literacy and inspiring youth to consider STEM careers and education. Topics included space exploration, misinformation, future of medicine and climate-smart agriculture.

  - **Summer internship for INdigenous Peoples in Genomics Canada** (SING Canada). We further supported our longstanding partnership with SING Canada through a strategic funding agreement that invests $240,000 over three years. SING is transforming relationships between Indigenous communities and genomics researchers by building Indigenous technical capacity to do genomics, training aspiring scientists and Indigenous community members, and engaging non-Indigenous genome researchers to enhance their understanding of Indigenous knowledge, governance and worldviews. The summer 2022 cohort used the mobile genome sequencing kits from Oxford Nanopore (that we purchased in the last fiscal year) for the first time in the lab component of their #Landback initiative. Genome Canada and Genome Alberta were honoured to have the opportunity to participate in person, meeting and learning from the 2022 cohort, alumni and faculty, and to engage the group directly in our work, approach and priorities. We invested $84,500 in 2022-23.



» **Black Excellence in Science, Technology, Engineering, Mathematics and Medicine/Health** (BE-STEMM 2022-23). In February 2023 we partnered on the second-ever BE-STEMM event, which supports the research and careers of Black Canadians across a range of sectors. The Honourable Minister Champagne opened the bilingual, accessible event, which focused on removing barriers and boosting retention of these scholars. It featured both established and early-career Black keynotes and showcased the work of scientists, educators, applied professionals, undergraduates and high school students. Dr. Catalina Lopez-Correa was part of a panel on the experience of **STEMM newcomers to Canada**. We also participated in a number of virtual and on-site activities including the career fair, a leadership summit and an award program.

» Mission eDNA. We continued to partner with Génome Québec and the Fonds de recherche du Québec to support, as a pilot project rooted in the **FISHES** pan-Canadian initiative, the adaptation and the deployment of **Mission e-DNA** in Indigenous communities. Officially launched in September 2022 after months of preparation, Mission eDNA-First Nation ran in seven classes in two high schools located in the Eeyou Istchee (Cree) communities of Waskaganish and Eastmain. The pilot was made possible thanks to the support of the communities' Chiefs and Councils, as well as the Eeyou Marine Region Wildlife Board. Génome Québec worked with a local consultant and coordinator to adapt teaching materials to foster interesting and culturally relevant engagement with science. The project is now being expanded to include Innu communities in northern Québec. Well suited to Indigenous culture and connection to natural resources, this project aligns with our commitment to expand our work on Indigenous truth, reconciliation and engagement.

Strategic media relations and partnerships.

We continued to leverage media relations and partnerships to tell our impact story, support evidence-based science journalism and engage a broader audience in the conversation on Canada's genomics future.

In collaboration with **The Future Economy**, we mobilized champions with expertise related to our challenge-driven initiatives to record a panel and podcast on the power and promise of genomics to provide biological **innovation solutions to implement agriculture and food production systems that are climate resilient**, economically viable and environmentally sustainable. Moderated by Dr. Rob Annan and featuring Genome Canada-funded research, the panel ties into our CSAFS initiative, exploring how genomics can help position Canada as a world leader in agriculture sustainability and address the climate crisis.

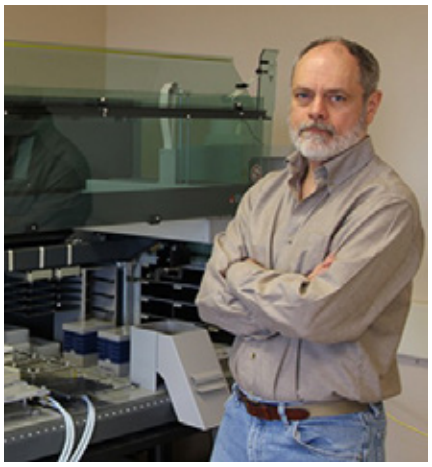
Through a partnership with **Let's Talk Science**, the Royal Society of Canada and ***The Globe and Mail***, we developed a three-part series of genomics impact stories penned by Dr. Catalina Lopez-Correa:

Lentils and smart agriculture, featuring the work of Dr. Kirstin Bett and her team at University of Saskatchewan.

[photo]Dr. Kirstin Bett, Professor, College of Agriculture and Bioresources at the University of Saskatchewan

Rare disease and precision medicine, featuring the work of molecular geneticist Dr. Daniel Sinnett (CIUSSS) and outlining the rare disease diagnosis journey of 17-year-old Laurent Tessier and his family.

[photo]Dr. Daniel Sinnett, Director of Research and Innovation, Le Centre intégré universitaire de santé et de services sociaux (CIUSSS) du Nord-de-l'Île-de-Montréal



eDNA an combining Indigenous knowledge with genomics, featuring the work of Dr. Daniel Heath, fish conservation genomics expert and professor at University of Windsor.

[photo]Dr. Daniel Heath, Professor, University of Windsor

We continued our media partnership with **The Conversation Canada** (TCC) to advance the common goal of building public awareness of genomics science, technology and its benefits across sectors as well as the societal implications of genomics. More broadly, we both focus on supporting innovative digital media and a healthy journalism landscape in Canada, mobilizing knowledge, creating opportunities for early-career and Indigenous researchers and those from equity-deserving groups to showcase their research, and enabling evidence-informed policymaking. In January 2023, we offered a TCC-led science knowledge mobilization communications training webinar on writing for mainstream media outlets for eight Genome Canada-funded early-career and established researchers and Centre communications staff.

Operating challenges in 2022-23

An ongoing operating challenge for Genome Canada has been the current model of short-term funding agreements with the Government of Canada. This presents issues with strategic investment planning and additional challenges in the ability of Genome Canada and the six Centres to secure co-funding through medium to long-term partnerships.

We welcomed the opportunity to participate in the Strategic Science Fund competition to secure longer-term federal funding that would position us as a more stable and credible partner with industry and the provinces and territories. We submitted a full proposal in September 2022 and await the results. If successful, we should have predictable, stable and long-term funding that would mitigate our past operating challenges and enable us to deliver on a national action plan and strategically harness Canada's genomics ecosystem to address the major economic, environmental, health and social challenges of our time.

Over the last year, the COVID-19 pandemic continued to present unique challenges for the research sector. Academic institutions around the country are still recovering from delays in research projects with research labs that were closed and periods of time when researchers were not able to be in close physical proximity to their teams. Economic effects heightened the risk that co-funding would be difficult to obtain, as businesses and governments adjusted their budgets to account for reduced revenues. While the situation continued to improve, we appreciated the COVID-19 relief funding allocated through Federal Budget 2021 to provide support to affected projects, allowing them to deliver on project outputs, continue research infrastructure and maintain partnerships with provinces, industry and other not-for-profit funders.

OPERATIONS

Governance

Genome Canada is governed by our Board of Directors, composed of up to 16 individuals drawn from the academic, private and public sectors. Directors bring unique skills and experiences, as well as strong interests and insights to successfully fulfil our strategic plan. A Director may hold office for a maximum of three two-year terms, apart from the Chair, who may hold office as Director for a maximum of four two-year terms. We are committed to excellence in governance and learning through Board evaluations, with a strong focus last year on better Board onboarding, renewal and retention; streamlined meetings and Committee structures; and Board retreats on strategy.

The Presidents of five federal research funding agencies—the Canada Foundation for Innovation, the Canadian Institutes of Health Research, the National Research Council, the Natural Sciences and Engineering Research Council, and the Social Sciences and Humanities Research Council—are non-voting, Ex-officio Advisors to the Board.

The Board has overall responsibility for the stewardship of our business and affairs. To help with the discharge of these duties, the Board has five standing committees:

1. Audit and Investment Committee
2. Communications and Outreach Committee
3. Executive Committee
4. Governance, Election and Compensation Committee
5. Programs Committee

Additionally, the Science and Industry Advisory Committee provides strategic advice to help us achieve our objectives.

NUMBER OF MEETINGS HELD BY THE BOARD AND ITS COMMITTEES IN 2022-23

Board of Directors	**7**
Audit and Investment Committee	**4**
Communications and Outreach Committee	**4**
Executive Committee	**0**
Governance, Election and Compensation Committee	**5**
Programs Committee	**4**
Science and Industry Advisory Committee	**4**

BOARD OF DIRECTORS, EX-OFFICIO ADVISORS AND SCIENCE AND INDUSTRY ADVISORY COMMITTEE MEMBERS IN 2022-23

BOARD OF DIRECTORS

Elizabeth Douville (Chair)
President and CEO
IRICoR
Montreal, Quebec

Jim Farrell (Vice-Chair until June 2022)
Forest Sector Consultant
Ottawa, Ontario
(until June 2022)

Bonnie Schmidt (Vice-Chair as of June 2022)
Founder and President
Let's Talk Science
London, Ontario

Rob Annan
President and CEO
Genome Canada
Ottawa, Ontario

Savage Bear
Director, McMaster Indigenous Research Institute
Assistant Professor, Faculty of Social Sciences
McMaster University
Hamilton, Ontario
(until February 2023)

Deborah Buszard
Interim President and Vice-Chancellor
The University of British Columbia
Vancouver, British Columbia
(as of June 2022)

Eric Cook
Executive Director and CEO (retired)
Research and Productivity Council
Fredericton, New Brunswick
(until June 2022)

Jennifer Gardy
Deputy Director, Surveillance, Data & Epidemiology
Bill & Melinda Gates Foundation
Chicago, Illinois, U.S.

Ivo Gut
Director
CNAG-CRG
Barcelona, Spain

Muhammad Mamdani
Vice-President, Data Science and Advanced Analytics
Unity Health Toronto
Toronto, Ontario
(as of June 2022)

Ian Rae
Founder and CEO
CloudOps
Montreal, Quebec

Eddy Rubin
Director
Science Corps
San Francisco, California, U.S.
(until June 2022)

Jacques Simoneau
Corporate Director
Montreal, Quebec
(until June 2022)

Andrew Stephens
Corporate Director and retired oil and gas executive
Canmore, Alberta

Éliane Ubalijoro
Chief Executive Officer, CIFOR-ICRAF
Director General, ICRAF
Nairobi, Kenya

Janet Wightman
Managing Partner
Kincannon & Reed
Regina, Saskatchewan
(until June 2022)

EX-OFFICIO ADVISORS

Alejandro Adem
President
Natural Sciences and Engineering Research Council of Canada
Ottawa, Ontario

Ted Hewitt
President
Social Sciences and Humanities Research Council of Canada
Ottawa, Ontario

Roseann O'Reilly Runte
President and CEO
Canada Foundation for Innovation
Ottawa, Ontario

Iain Stewart
President
National Research Council of Canada
Ottawa, Ontario

Michael J. Strong
President
Canadian Institutes of Health Research
Ottawa, Ontario

SCIENCE AND INDUSTRY ADVISORY COMMITTEE

Doane Chilcoat (Chair until June 2022)
VP, Technology and Research Operations
Design Therapeutics
Carlsbad, California, U.S.

Wyeth Wasserman (Chair as of June 2022)
Professor, Medical Genetics, University of British Columbia
Investigator, BC Children's Hospital Research Institute
Vancouver, British Columbia

Anne-Christine Bonfils
Research Program Manager, Vice-President's Office – Life Sciences
National Research Council of Canada
Ottawa, Ontario

Iain Gillespie
Principal and Vice-Chancellor
University of Dundee
Dundee, Scotland

Tina Hambuch
Medical Director, Molecular Genetics Research and Development
Quest Diagnostics Incorporated
San Diego, California, U.S.

John MacKay
Wood Professor of Forest Science, Department of Plant Sciences
University of Oxford
Oxford, England

Elaine R. Mardis
Professor of Pediatrics, Ohio State University College of Medicine
Columbus, Ohio, U.S.
(until June 2022)

Cami Ryan
Social Sciences Lead
Bayer Crop Science
St. Louis, Missouri, U.S.

Jeremy Shears
Chief Scientist - Biosciences
Shell
London, England

Susan M. Wood-Bohm
President and CEO
Wood-Bohm and Associates
Douro-Dummer, Ontario

Rae S.M. Yeung
Professor of Pediatrics, Immunology and Medical Science,
University of Toronto
Staff Rheumatologist, The Hospital for Sick Children
Toronto, Ontario

MANAGEMENT TEAM

Rob Annan
President and CEO

Catalina Lopez-Correa
Vice-President, Research and Innovation and CSO

Pari Johnston
Vice-President, Policy and Public Affairs

Dalia Morcos Fraser
Vice-President, Corporate Services and CFO
(as of May 2022)

Karl Tibelius
Vice-President, Genomics Programs
(until April 2022)

In May 2022 we welcomed our new Vice-President, Corporate Services and Chief Financial Officer Dalia Morcos Fraser.

Financial management

Genome Canada, along with co-funding partners, has invested approximately $3.9 billion in genomics research since our creation in 2000. Of this, we have provided approximately $1.6 billion including investment income from this funding. The remaining $2.3 billion has come from national and international organizations, provincial governments, universities and private- and public-sector partners. This investment supports large-scale science, access to leading-edge technology, translation and the operations of Genome Canada and the six regional Genome Centres.

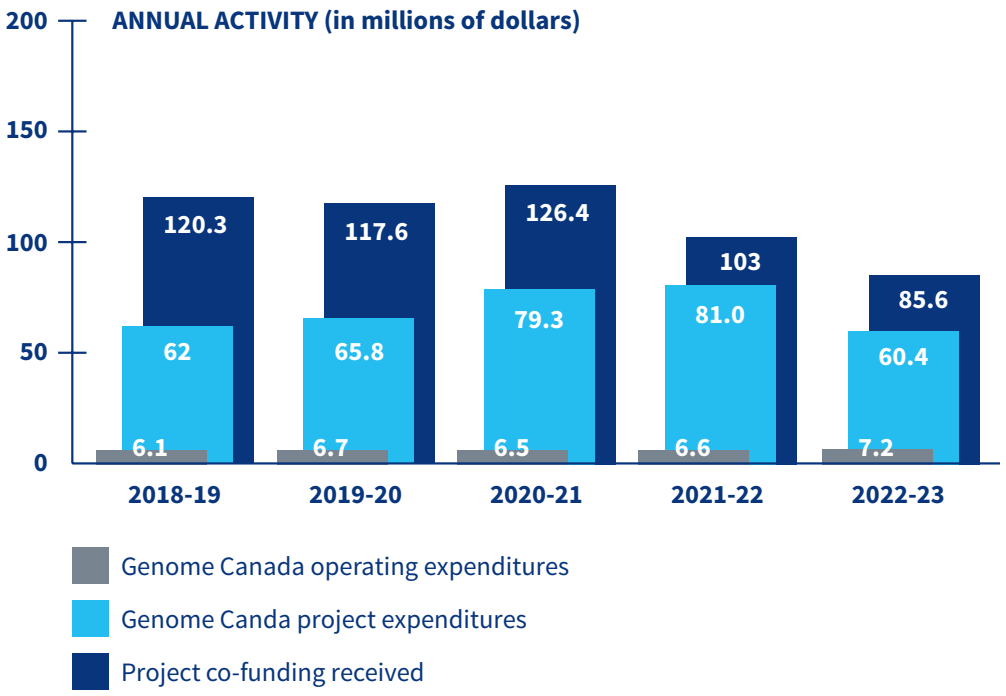
All research projects, with few exceptions, require co-funding to be secured by the applicants. Our required funding ratio for co-funding was 1:1 prior to 2012 and has risen to 1:1.4 since that time, reflective of our commitment to growing our partnership model.

We receive funding each year from the federal government based on active contribution agreements. Most of this funding is distributed to the six regional Genome Centres, which oversee and direct the funding to the individual projects located in their regions. In addition, the projects, administered at institutions, receive funding directly from the required co-funders. The Centres and project leaders must report co-funding secured quarterly to us to ensure co-funding requirements in the program are met. Through this process, both Genome Canada and the Centres monitor total project investment.

The total annual financial investment is shown in the graph below. Project leaders managed $146 million in funding in 2022-23, of which $60.4 million was from Genome Canada and $85.6 million was through co-funding.

A small portion of the federal funding is also dedicated to support our operations. In 2022-23 our operating costs were $7.2 million. Operations include, but are not limited to, activities relating to genomics programs, strategy, policy and communications, genomics in society, governance, performance and evaluation, and administration.

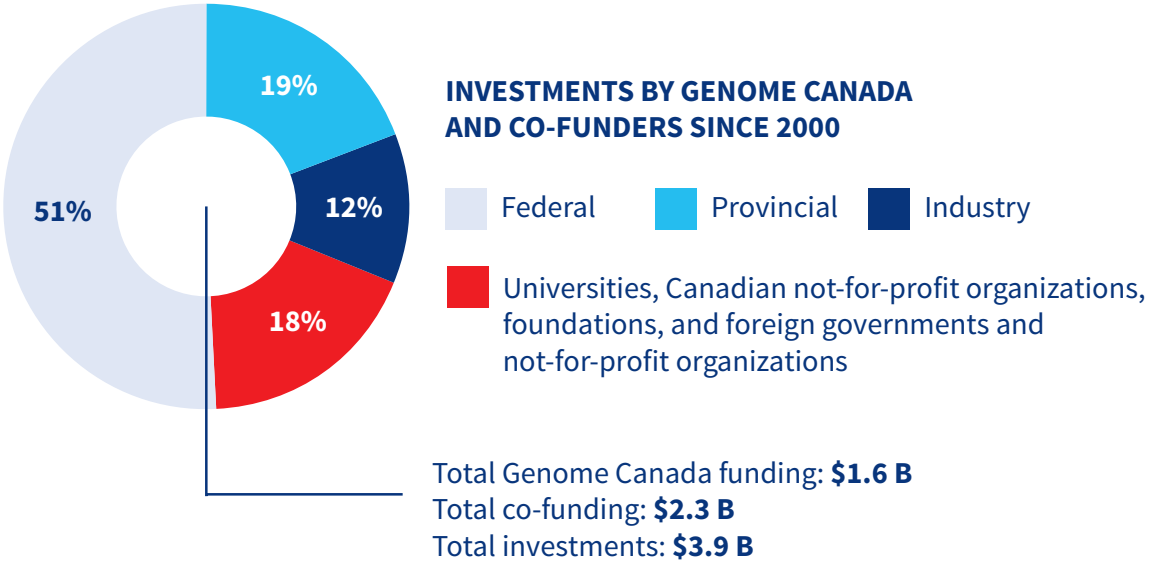
Our operating costs include the following remuneration in relation to governance. All Board members and Science and Industry Advisory Committee members receive remuneration from us. We also reimburse directors for expenses to attend meetings.



The compensation policy for our staff includes job classifications and related salary ranges. Our employees are eligible for annual performance awards ranging from 10% to 25%. For positions that exceeded $100,000 in the year ended March 31, 2023, the following were the annual salary ranges:

- President and CEO: $280,000 to $347,000
- Vice-Presidents: $148,691 to $223,036
- Directors (Band 4): $115,546 to $173,320
- Directors (Band 3): $89,790 to $134,684
- Managers (Band 2): $69,775 to $104,663

As of March 31, 2023, Genome Canada has approximately $37.0 million in short-term investments recorded at market value on the Statement of Financial Position. These investments are administered in accordance with the Board's approved investment policy and the terms and conditions of the contribution agreements with the federal government. The investment policy remained unchanged this past fiscal year.



APPENDICES

ACTIVE PROJECTS FUNDED 2022-23

LARGE-SCALE SCIENCE

CENTRE(S)	SECTOR	LEADER(S)	ORGANIZATION(S)	TITLE	TOTAL FUNDING	GENOME CANADA CONTRIBUTION
LARGE-SCALE APPLIED RESEARCH PROJECTS (LSARP)						
Genome Alberta	Forestry	Cooke, Janice Cullingham, Catherine	University of Alberta Carleton University	TRIA-FoR: Transformative Risk Assessment and Forest Resilience Using Genomic Tools for the Mountain Pine Beetle Outbreak	$6,431,135	$2,999,994
Genome Alberta	Environment	Muench, Douglas Martineau, Christine	University of Calgary Natural Resources Canada	Application of Genomics to Enhance Wetland Treatment Systems for Remediation of Processed Water in Northern Environments	$6,379,093	$2,983,534
Genome British Columbia	Environment	Helbing, Caren Langlois, Valerie Dupras, Jérôme Bernatchez, Louis	University of Victoria Institut national de la recherche scientifique Université du Québec en Outaouais Université Laval	iTrackDNA: Non-Destructive Precision Genomics for Environmental Impact Tracking in a Global Climate Change Era	$11,979,761	$3,000,000
Genome British Columbia	Environment	Jones, Steven Murray, Maribeth	BC Cancer Michael Smith Genome Sciences Centre University of Calgary	The Canadian BioGenome Project	$6,294,530	$2,999,963
Genome Alberta	Environment	Frasier, Timothy Hamilton, Philip	Saint Mary's University New England Aquarium	Conservation Genomics of the Endangered North Atlantic Right Whale	$6,020,874	$2,119,435
Genome Prairie	Environment	Stern, Gary Collins, Eric	University of Manitoba	Reimagining Monitored Natural Attenuation as an Oil Spill Response Strategy in the Arctic	$6,570,702	$2,998,477
Ontario Genomics	Environment	Yang, Laurence Zechel, David DiCenzo, George McLellan, P. James	Queen's University	Optimizing a Microbial Platform to Break Down and Valorize Waste Plastic	$7,675,843	$3,000,000
Ontario Genomics	Environment	Hébert, Paul	University of Guelph	BIOSCAN–Canada	$6,999,588	$3,000,000
Genome Alberta Ontario Genomics Genome British Columbia Génome Québec	Agriculture	Baes, Christine Stothard, Paul Cerri, Ronaldo Sirard, Marc-André	University of Guelph University of Alberta The University of British Columbia Université Laval	Integrating Genomic Approaches to Improve Dairy Cattle Resilience: A Comprehensive Goal to Enhance Canadian Dairy Industry Sustainability	$12,541,132	$3,997,769
Genome British Columbia	Agriculture	Birol, Inanc	The University of British Columbia	PeptAid – Antimicrobial Peptides to Replace Antibiotics in Farm Veterinary Practice	$6,887,638	$3,441,747
Genome Prairie	Agriculture	Bett, Kirstin Vandenberg, Albert	University of Saskatchewan	Enhancing the Value of Lentil Variation for Ecosystem Survival (EVOLVES)	$7,432,398	$3,519,023
Genome Prairie Genome Alberta	Agriculture	Waldner, Cheryl Otto, Simon	University of Saskatchewan University of Alberta	Genomic ASSETS (Antimicrobial Stewardship Systems from Evidence-based Treatment Strategies) for Livestock	$5,678,154	$2,540,323

CENTRE(S)	SECTOR	LEADER(S)	ORGANIZATION(S)	TITLE	TOTAL FUNDING	GENOME CANADA CONTRIBUTION
Genome Prairie Ontario Genomics	Agriculture	Pozniak, Curtis Cloutier, Sylvie	University of Saskatchewan Agriculture and Agri-Food Canada	4DWheat: Diversity, Discovery, Design and Delivery	$11,166,747	$3,999,856
Génome Québec Ontario Genomics	Fisheries	Bernatchez, Louis Moore, Jean-Sebastian Fraser, Dylan J. Schott, Stephan	Université Laval Concordia University Carleton University	FISHES: Fostering Indigenous Small-Scale fisheries for Health, Economy, and Food Security	$14,404,554	$4,000,000
Ontario Genomics Genome British Columbia	Agriculture	Zayed, Amro Foster, Leonard	York University The University of British Columbia	BeeCSI: 'Omic Tools for Assessing Bee Health	$9,922,052	$3,831,866
Ontario Genomics Genome Prairie	Fisheries	Heath, Daniel Docker, Margaret Cooke, Steven J.	University of Windsor University of Manitoba Carleton University	GEN-FISH: Genomic Network for Fish Identification, Stress and Health	$9,072,963	$3,999,815
Genome Alberta	Health	Lewis, Ian Benediktsson, Hallgrimur	University of Calgary Calgary Laboratory Services	Reducing the Global Burden of Infectious Diseases through Precision Population Health	$11,030,405	$2,103,371
Genome British Columbia	Health	Arbour, Laura Caron, Nadine Wasserman, Wyeth W.	The University of British Columbia BC Children's Hospital Research Institute	Silent Genomes: Reducing Health-Care Disparities and Improving Diagnostic Success for Indigenous Children with Genetic Disease	$9,673,479	$2,200,000
Genome British Columbia	Health	Carleton, Bruce C. Ross, Colin J.	The University of British Columbia	Genomic and Outcomes Database for Pharmacogenomics and Implementation Studies (Go-PGx)	$10,517,507	$1,899,963
Genome British Columbia	Health	Steidl, Christian Marra, Marco Scott, David	BC Cancer Research Centre The University of British Columbia	Deciphering the Genome Biology of Relapsed Lymphoid Cancers to Improve Patient Management	$11,926,360	$2,100,000
Genome British Columbia Génome Québec	Health	Elliott, Alison M. Knoppers, Bartha Lynd, Larry Austin, Jehannine	BC Provincial Health Services Authority McGill University The University of British Columbia	GenCOUNSEL: Optimization of Genetic Counselling for Clinical Implementation of Genome-wide Sequencing	$3,943,809	$1,004,017
Genome British Columbia Génome Québec Genome Alberta	Health	Keown, Paul Sapir-Pichhadze, Ruth Caulfield, Timothy Bryan, Stirling	The University of British Columbia McGill University University of Alberta	Precision Medicine CanPREVENT AMR: Applying Precision Medicine Technologies in Canada to Prevent Antibody-Mediated Rejection and Premature Kidney Transplant Loss	$10,834,538	$2,036,000
Genome British Columbia Ontario Genomics	Health	Turvey, Stuart Kobor, Michael Finlay, Brett Subbarao, Padmaja	The University of British Columbia The Hospital for Sick Children	Childhood Asthma and the Microbiome - Precision Health for Life: The Canadian Healthy Infant Longitudinal Development (CHILD) Study	$8,580,968	$4,569,644
Génome Québec	Health	Sauvageau, Guy Hébert, Josée	Institute for Research in Immunology and Cancer Hôpital Maisonneuve-Rosemont	Interrogating and Implementing Omics for Precision Medicine in Acute Myeloid Leukemia	$12,785,000	$5,000,000
Génome Québec Genome British Columbia	Health	Rousseau, François Langlois, Sylvie	Université Laval The University of British Columbia	PEGASUS-2 - Personalized Genomics for prenatal Abnormalities Screening Using maternal blood: Towards First Tier Screening and Beyond	$12,241,625	$2,198,882
Génome Québec Ontario Genomics	Health	Jabado, Nada Taylor, Michael Majewski, Jacek	Research Institute of the McGill University Health Centre The Hospital for Sick Children	Tackling Childhood Brain Cancer at the Root to Improve Survival and Quality of Life	$12,997,397	$2,349,822

CENTRE(S)	SECTOR	LEADER(S)	ORGANIZATION(S)	TITLE	TOTAL FUNDING	GENOME CANADA CONTRIBUTION
Génome Québec Ontario Genomics	Health	Simard, Jacques Chiarelli, Anna Maria	Université Laval Cancer Care Ontario	Personalized Risk Assessment for Prevention and Early Detection of Breast Cancer: Integration and Implementation	$15,217,975	$100,000
Ontario Genomics	Health	Ratjen, Felix	The Hospital for Sick Children	Personalized Therapy for Individuals with Cystic Fibrosis	$9,488,508	$4,999,907
Ontario Genomics	Health	Stintzi, Alain Mack, David	University of Ottawa Children's Hospital of Eastern Ontario	Microbiome-Based Precision Medicine in Inflammatory Bowel Disease	$9,266,995	$4,555,624
Ontario Genomics Genome Alberta	Health	Yeung, Rae S.M. Benseler, Susanne M.	The Hospital for Sick Children University of Calgary	UCAN CURE: Precision Decisions for Childhood Arthritis	$9,298,208	$5,000,000
Ontario Genomics Genome Alberta Genome British Columbia	Health	Boycott, Kym Brudno, Michael Bernier, Francois van Karnebeek, Clara	Children's Hospital of Eastern Ontario Research Institute The Hospital for Sick Children University of Calgary The University of British Columbia	Care4Rare Canada: Harnessing Multi-Omics to Deliver Innovative Diagnostic Care for Rare Genetic Diseases in Canada (C4R-SOLVE)	$10,096,606	$2,198,898
Genome Alberta Genome Prairie	Environment	Hubert, Casey Stern, Gary	University of Calgary University of Manitoba	GENICE: Microbial Genomics for Oil Spill Preparedness in Canada's Arctic Marine Environment	$10,612,988	$2,999,422
Génome Québec	Environment	Sauvé, Sébastian Shapiro, Jesse Dorner, Sarah	Université de Montréal Polytechnique Montréal	ATRAPP – Algal Blooms, Treatment, Risk Assessment, Prediction and Prevention Through Genomics	$12,304,536	$3,166,666
Génome Québec Genome Prairie	Environment	Basu, Niladri Hecker, Markus Crump, Doug	McGill University University of Saskatchewan Environment and Climate Change Canada	EcoToxChip: A Toxicogenomics Tool for Chemical Prioritization and Environmental Management	$9,786,922	$3,104,002
Ontario Genomics	Environment	Lougheed, Stephen C. van Coeverden de Groot, Peter Whitelaw, Graham Dyck, Markus	Queen's University Government of Nunavut	BEARWATCH: Monitoring Impacts of Arctic Climate Change using Polar Bears, Genomics and Traditional Ecological Knowledge	$9,219,247	$2,708,282
Ontario Genomics	Mining	Warren, Lesley A. Banfield, Jillian	The University of Toronto	Mine Wastewater Solutions: Next Generation Biological Treatment through Functional Genomics	$3,682,691	$1,181,739
Ontario Genomics Genome British Columbia	Forestry	Master, Emma Brumer, Harry	The University of Toronto The University of British Columbia	SYNBIOMICS: Functional Genomics and Techno-Economic Models for Advanced Biopolymer Synthesis	$10,725,222	$2,830,771
Genome British Columbia	Agriculture	Rieseberg, Loren H. Burke, John M.	The University of British Columbia	Genomics of Abiotic Stress Resistance in Wild and Cultivated Sunflowers	$7,879,009	$3,054,485
Genome British Columbia Ontario Genomics	Agriculture	Foster, Leonard Zayed, Amro	The University of British Columbia York University	Sustaining and Securing Canada's Honey Bees Using 'Omic Tools	$7,263,568	$2,786,531
EMERGING ISSUES						
Genome Atlantic	Health	Hatchette, Todd Ogden, Nicholas Lindsay, Robbin	Dalhousie University Public Health Agency of Canada	Lyme Disease in NS: The influence of Strain Variation on Clinical Disease	$780,801	$242,800
Genome British Columbia	Health	Hieter, Philip	The University of British Columbia	Research Network: Expanding Collaboration between Basic and Clinician Scientists in Functional Studies of Novel Rare Diseases	$1,679,500	$560,000

CENTRE(S)	SECTOR	LEADER(S)	ORGANIZATION(S)	TITLE	TOTAL FUNDING	GENOME CANADA CONTRIBUTION
Genome British Columbia	Health	Pimstone, Simon Krajden, Mel Penninger, Josef Bubela, Tania	The University of British Columbia British Columbia Center for Disease Control Simon Fraser University	SARS-CoV-2 Study for Eased Restrictions in British Columbia (SAfER BC)	$1,215,596	$237,500
Ontario Genomics	Health	Goodridge, Lawrence Delatolla, Robert	University of Guelph Univesrity of Ottawa	Ontario SARS-CoV-2 Variants of Concern Surveillance in Wastewater Pilot Program	$338,446	$237,500
CANADIAN COVID-19 GENOMICS NETWORK (CanCOGeN)						
All	Health	CGen - Canada's platform for genome sequencing and analysis	The Hospital for Sick Children	HostSeq: Sequencing of Genomes of Canadian Human Hosts of SARS-CoV-2 Viral Samples	$19,250,000	$19,250,000
All	Health	VirusSeq Implementation Committee	Canadian Public Health Laboratory Network (CPHLN)	VirusSeq: Capacity Building for Large-Scale SARS-CoV-2 Genomic Surveillance in Canada	$6,307,072	$6,307,072
All	Health	VirusSeq Implementation Committee	Canadian Public Health Laboratory Network (CPHLN)	VirusSeq: Sequencing of Genomes of Canadian SARS-CoV-2 Viral Samples	$8,102,092	$8,102,092
Genome British Columbia	Health	Hsiao, William	Simon Fraser University	VirusSeq: Metadata Specifications Development, Sharing and Curation	$932,500	$932,500
Genome British Columbia	Health	Snutch, Terrance	The University of British Columbia	VirusSeq: ARTIC Protocol Development and Modification	$188,968	$188,968
Genome British Columbia	Health	Brinkman, Fiona	Simon Fraser University	VirusSeq: IRIDA Support and Dissemination	$80,000	$80,000
Génome Québec	Health	Joly, Yann	McGill University	VirusSeq: Ethics & Governance	$428,740	$428,740
Ontario Genomics	Health	Simpson, Jared	Ontario Institute for Cancer Research (OICR)	VirusSeq: Development of Quality Control Criteria and Standards	$200,000	$200,000
Génome Québec	Health	Bourque, Guillaume	McGill University	VirusSeq: National Data Portal	$1,100,000	$1,100,000
NATIONAL AND INTERNATIONAL INITIATIVES						
Ontario Genomics Genome Alberta	Health	Dirks, Peter Weiss, Samuel	The Hospital for Sick Children University of Calgary	Brain Cancer Stem Cell Dream Team	$10,577,948	$8,500,000
Génome Québec	Health	Knoppers, Bartha Maria	McGill University	Can-SHARE Connect (2019-2020): Supporting the Regulatory and Ethics Work Stream	$500,000	$166,667
Ontario Genomics	Health	Boycott, Kym Sommerville, Martin	Children's Hospital of Eastern Ontario Research Institute	Defining a Canadian Data Solution that will Deliver Precision Health for Rare Genetic Disease	$950,000	$950,000
Génome Québec	Health	Knoppers, Bartha Maria	McGill University	Canadian Genomics Partnership for Rare Disease - The Regulatory and Ethics Toolbox	$329,715	$244,715
Genome Alberta Génome Québec	Health	McCabe, Christopher Rousseau, François	University of Alberta	Genomics and Personalized Health GE3LS Network Program	$1,996,945	$998,473
Ontario Genomics	Health	Stein, Lincoln	The University of Toronto	Advancing Big Data Science in Genomics Research Project - The Cancer Genome Collaboratory	$5,999,860	$2,000,000

CENTRE(S)	SECTOR	LEADER(S)	ORGANIZATION(S)	TITLE	TOTAL FUNDING	GENOME CANADA CONTRIBUTION
Genome Alberta	Health	Zovoilis, Athanasios	University of Lethbridge	BioNet Alberta	$2,950,000	$950,000
Genome Atlantic	Health	Alda, Martin Uher, Rudolf	Nova Scotia Health Authority Dalhousie University	Early Detection of Bipolar Disorder and Optimized Selection of Long Term Treatment	$974,996	$199,996
Genome Atlantic	Fisheries	Hori, Tiago	PEI Department of Agriculture and Fisheries	Breeding Better Blue Mussels (Mytilus edulis): Developing Genomic Tools for the Implementation of a Modern and Sustainable Mussel Breeding Program	$779,339	$200,000
Genome British Columbia	Health	Bryan, Stirling Austin, Jehannine	The University of British Columbia	Towards Clinical Implementation of Pharmacogenomics to Improve the Treatment of People with Depression in BC	$1,449,460	$483,154
Genome British Columbia	Health	Hoang, Linda Eloranta, Katie	The University of British Columbia BC Centre for Disease Control Canadian Food Inspection Agency	Unified Pathogen Control Onehealth Approach Specifically Targeting Vibrio (UPCOAST-V)	$498,010	$166,003
Genome British Columbia	Agriculture	Lu, Xiaonan Hsiao, William	The University of British Columbia BC Centre for Disease Control	One Health Syst-Omics Approach to Reduce Campylobacter in Agri-Food Chain	$500,000	$166,667
Genome British Columbia	Environment	Prystajecky, Natalie Levett, Paul	The University of British Columbia BC Centre for Disease Control	Unified Pathogen Control One Health Approach Specifically Targeting Norovirus (UPCOAST-N)	$499,990	$166,663
Génome Québec	Health	Lettre, Guillaume Gravel, Simon	Montréal Heart Institute McGill University	Whole-Genome Sequence Reference-Québec (GenoRef-Q) Initiative	$3,402,974	$1,000,000
Ontario Genomics	Agriculture	Baes, Christine Lohuis, Michael	University of Guelph Semex Alliance	Precision Fertility and Resiliency Phenotyping in Dairy Cattle	$499,899	$166,633
Ontario Genomics	Agriculture	Barta, John Brisbin, Jennifer	University of Guelph Ceva Animal Health Inc.	A Genomics-Derived Assay for Rapid Determination of Eimeria spp. Oocyst Viability: Improving Coccidiosis Management in the Poultry Industry	$366,628	$122,210
Ontario Genomics	Agriculture	Emery, Neil Tanaka, Kelly	Trent University NutriAg Ltd.	Metabolomic-Based Strain Selection of Microbial Bioinoculants which Alleviate Impacts of Drought Stress in Crop Production	$358,250	$119,417
Ontario Genomics	Agriculture	Eskandari, Milad Reid, Jeff	University of Guelph SeCan	Using New Emerging Genomic Tools to Improve Soybean Yield and Seed Compositions in Ontario	$180,000	$60,000
Ontario Genomics	Agriculture	Lee, Elizabeth Cowan, Josh	University of Guelph Grain Farmers of Ontario	Application of Genomic-Based Technologies to Improve the Rate of Genetic Gain in Ontario Winter Wheat Breeding	$400,000	$133,333
Ontario Genomics	Agriculture	Lu, Ray Vanderbroek, Dave	University of Guelph Alliance Genetics Canada	Genomics Tools to Reduce Sow Stress and Improve Piglet Survival and Overall Performance	$480,000	$160,000
Ontario Genomics	Agriculture	Saxena, Praveen Yates, Barbara	University of Guelph Ferrero Canada	Introducing Cold Tolerance in Hazelnut	$274,058	$91,352
Ontario Genomics	Agriculture	van der Merwe, George Preiss, Richard	University of Guelph Escarpment Laboratories	Development of an Omics-Driven Beer Yeast Performance Database to Support the Ontario Craft Brewing Industry	$366,165	$122,055
Ontario Genomics	Health	Duggan, Ana	McMaster University	Jenner's Legacy: Uncovering the Origins and Dissemination of Smallpox Vaccines in the 19th-20th Centuries	$48,030	$24,015
Ontario Genomics	Energy	Gattinger, Monica	University of Ottawa	@Risk: Strengthening Canada's Ability to Manage Risk	$195,166	$97,583

LEADING-EDGE TECHNOLOGY

CENTRE(S)	SECTOR	LEADER(S)	ORGANIZATION(S)	TITLE	TOTAL FUNDING	GENOME CANADA CONTRIBUTION
CORE OPERATIONS SUPPORT FOR TECHNOLOGY PROGRAMS						
Genome Alberta Genome British Columbia Génome Québec	All	Wishart, David Borchers, Christoph Li, Liang	University of Alberta McGill University	The Metabolomics Innovation Centre	$8,846,948	$8,846,948
Genome British Columbia	All	Marra, Marco Jones, Steven Hirst, Martin	BC Cancer The University of British Columbia	BC Cancer Agency Genome Sciences Centre Genomics Technology Platform	$9,090,202	$9,090,202
Genome British Columbia Génome Québec	All	Goodlett, David Borchers, Christoph Foster, Leonard	University of Victoria McGill University The University of British Columbia	The Pan-Canadian Proteomics Centre	$14,283,661	$8,765,107
Génome Québec	All	Lathrop, Mark Ragoussis, Ioannis Bourque, Guillaume Pastinen, Tomi	McGill University	McGill Applied Genomics Innovation Core	$8,801,833	$8,801,833
Génome Québec	All	Thibault, Pierre Tyers, Michael	Université de Montréal	Centre for Advanced Proteomic and Chemogenomic Analyses	$3,388,479	$3,388,479
Génome Québec Ontario Genomics	All	Bourque, Guillaume Brudno, Michael	McGill University The Hospital for Sick Children	Canadian Centre for Computational Genomics	$6,890,786	$6,890,786
Ontario Genomics	All	Awadalla, Philip Bartlett, John Pugh, Trevor Simpson, Jared Stein, Lincoln	Ontario Institute for Cancer Research	Canadian Data Integration Centre	$6,136,306	$6,136,306
Ontario Genomics	All	Scherer, Stephen Strug, Lisa	The Hospital for Sick Children	The Centre for Applied Genomics	$8,888,251	$8,888,251
Ontario Genomics	All	Wrana, Jeff Gingras, Anne-Claude	Lunenfeld-Tanenbaum Research Institute Sinai Health System	Network Biology Collaborative Centre	$4,838,813	$4,838,813
Ontario Genomics Génome Québec	All	Justice, Monica Vidal, Sylvia	The Hospital for Sick Children McGill University	The Centre for Phenogenomics	$6,046,189	$6,046,189
BIOINFORMATICS AND COMPUTATIONAL BIOLOGY						
Genome Alberta	Agriculture	Stothard, Paul Van Domselaar, Gary	University of Alberta Public Health Agency of Canada	A Comprehensive Analytical Toolkit and High-Performance Genome Browser for Rapid, Reliable and In-Depth Characterization of Bacterial Genomes	$940,977	$458,368
Genome Atlantic Ontario Genomics	Agriculture	Beiko, Rob McArthur, Andrew	Dalhousie University	Rapid Prediction of Antimicrobial Resistance from Metagenomics Samples: Data, Models, and Methods	$1,398,943	$499,051
Genome British Columbia	Health	Borchers, Christoph Mohammed, Yassene	University of Victoria	Proteogenomics-Improved and –Guided Quantification Pipeline (PIGQpipe): Targeted Proteomics with Internal Proteogeno-typic Peptide Standards to Quantify Variants Identified by Proteogenomic Experiments	$556,472	$273,860

CENTRE(S)	SECTOR	LEADER(S)	ORGANIZATION(S)	TITLE	TOTAL FUNDING	GENOME CANADA CONTRIBUTION
Genome British Columbia	Health	Foster, Leonard Wishart, David	The University of British Columbia University of Alberta	Illuminating the Dark Matter of the Metabolome with Convolutional Neural Networks	$500,000	$250,000
Genome British Columbia	Environment	Hallam, Steven	The University of British Columbia	Global Scale Metabolic Pathway Reconstruction from Environmental Genomes	$1,028,699	$499,962
Genome British Columbia	Agriculture	Hsiao, William Van Domselaar, Gary	The University of British Columbia Public Health Agency of Canada	Bioinformatics Tools to Enable Federated, Real Time Genomic Epidemiology Data Sharing and Analysis in a One Health Framework	$1,164,488	$500,000
Genome British Columbia	Health	Joy, Jeffrey B. Montaner, Julio S.G.	The University of British Columbia	Development and Implementation of Bioinformatics Tools for HIV and HCV Phylogenetic Monitoring Platforms	$1,249,397	$499,992
Genome British Columbia	Health	Libbrecht, Maxwell Chindelevitch, Leonid Shapiro, Jesse	Simon Fraser University McGill University	Machine Learning Methods to Predict Drug Resistance in Pathogenic Bacteria	$1,000,000	$499,886
Génome Québec	Health	Blanchette, Mathieu Majewski, Jacek Waldispühl, Jérôme	McGill University	Bioinformatics Tools for Integrative 3D Epigenomics	$1,122,405	$500,000
Génome Québec	Health	Bourque, Guillaume Joly, Yann	McGill University	Epigenomics Secure Data Sharing Platform for Integrative Analyses (EpiShare)	$1,000,000	$500,000
Génome Québec	Agriculture	Butler, Gregory	Concordia University	TooT Suite: Predication and Classification of Membrane Transport Proteins	$600,000	$300,000
Génome Québec	Agriculture	Diallo, Abdoulaye Baniré Sirard, Marc-André	Université du Québec à Montréal Université Laval	Bioinformatics and Artificial Intelligence to Leverage Predictive Models of Dairy Production	$1,004,258	$499,070
Génome Québec	Health	Greenwood, Celia Oualkacha, Karim	Lady Davis Institute for Medical Research Université du Québec à Montréal	Precision Medicine in Cellular Epigenomics	$660,512	$317,220
Génome Québec	Health	Najmanovich, Rafael	Université de Montréal	Next-Generation Molecular Docking Leveraging Artificial Intelligence Techniques to Understand Large-Scale Ligand Binding Data Sets	$500,000	$250,000
Génome Québec	Environment	Xia, Jianguo Basu, Niladri	McGill University	Development and Validation of a Web-Based Platform for Environmental Omics and Toxicology	$1,047,507	$500,000
Génome Québec	Health	Xia, Jianguo Bourque, Guillaume Jacques, Pierre-Etienne	McGill University Université de Sherbrooke	An Integrative Platform for Metabolomics and Systems Biology	$1,094,607	$500,000
Ontario Genomics	Environment	Adamowicz, Sarah Hébert, Paul	University of Guelph	Extracting Signal from Noise: Big Biodiversity Analysis from High-Throughput Sequence Data	$482,070	$250,000
Ontario Genomics	Health	Boone, Charles Myers, Chad L.	The University of Toronto University of Minnesota	BridGE-SGA: A Novel Computational Platform to Discover Genetic Interactions Underlying Human Disease	$990,910	$494,552
Ontario Genomics	Health	Gingras, Anne-Claude Rost, Hannes	Lunenfeld-Tanenbaum Research Institute The University of Toronto	Computational Tools for Data-Independent Acquisition (DIA) for Quantitative Proteomics and Metabolomics	$1,000,000	$500,000
Ontario Genomics	Health	Haibe-Kains, Benjamin	University Health Network	SYNERGx: A Computational Framework for Drug Combination Synergy Prediction	$972,700	$486,336

CENTRE(S)	SECTOR	LEADER(S)	ORGANIZATION(S)	TITLE	TOTAL FUNDING	GENOME CANADA CONTRIBUTION
Ontario Genomics	Health	Ma, Bin Moran, Michael	University of Waterloo Hospital for Sick Children	Software for Peptide Identification and Quantification from Large Mass Spectrometry Data using Data Independent Acquisition	$925,987	$462,998
Ontario Genomics	Forestry	Provart, Nicholas Bohlmann, Joerg	The University of Toronto The University of British Columbia	From ePlants to eEcosystems: New Frameworks and Tools for Sharing, Accessing, Exploring and Integrating 'Omic Data from Plants	$999,999	$499,999
Ontario Genomics	Health	Pugh, Trevor Brudno, Michael	Princess Margaret Cancer Centre Hospital for Sick Children	CReSCENT: CanceR Single Cell ExpressioN Toolkit	$917,861	$499,900
Ontario Genomics	Health	Stein, Lincoln Fiume, Mark	Ontario Institute for Cancer Research DNAstack	Dockstore 2.0: Enhancing a Community Platform for Sharing Cloud-Agnostic Research Tools	$809,249	$437,610
DISRUPTIVE INNOVATION IN GENOMICS						
Génome Québec	Health	Juncker, David	McGill University	Digital Omics of Single Exosomes	$2,001,438	$667,157
Génome Québec	Health	Lécuyer, Eric Blanchette, Mathieu Waldispühl, Jérôme	Institut de recherche clinique de Montréal McGill University	The RNA Zipcode Discovery Pipeline: Emerging Tools for Therapeutic Targeting at Subcellular Resolution	$3,164,100	$999,997
Ontario Genomics	Health	Figeys, Daniel Stinzi, Alain	University of Ottawa	RapidAIM: A Technology to Rapidly Assess the Effects of Compounds on Individual Microbiomes	$2,888,563	$757,358
Ontario Genomics	Health	Stagljar, Igor	The University of Toronto	Interactome Mapping of Disease-Related Proteins Using Split Intein-Mediated Protein Ligation (SIMPL)	$2,223,117	$741,039
Ontario Genomics	Health	Wheeler, Aaron Kolomietz, Elena Chitayat, David	The University of Toronto Sinai Health Systems	Development of a Digital Microfluidic Platform to Identify and Target Single Cells from a Heterogeneous Cell Population for lysis in an Ultra-Low Volume for Non-Invasive Prenatal Diagnosis	$3,002,970	$1,000,000
Ontario Genomics	Health	Stagljar, Igor	The University of Toronto	The Mammalian Membrane Two-Hybrid (MaMTH) Assay - an Advanced Proteomics Technology for Biomedical Research	$3,034,211	$1,000,000

TRANSLATION

CENTRE(S)	SECTOR	LEADER(S)	ORGANIZATION(S)	TITLE	TOTAL FUNDING	GENOME CANADA CONTRIBUTION
GENOMICS APPLICATIONS PARTNERSHIP PROGRAM						
Génome Québec	Forestry	Bousquet, Jean Lenz, Patrick	Université Laval Natural Resources Canada	FastTRAC2: Fast Tests for Rating and Amelioration of Conifers 2	$6,143,852	$2,000,000
Génome Québec	Agriculture	Pilote, Régis Azar, Christian	Agrinova Sollio Groupe Coopératif	Genomics of Milling Oat Breeding and Selection	$1,823,860	$585,346
Génome Québec	Health	Borchers, Christoph Zahedi, Renée	McGill University MRM Proteomics	MutaQuant: A Powerful Proteogenomic Phenotyping Tool for Precision Medicine	$3,029,985	$1,008,522

CENTRE(S)	SECTOR	LEADER(S)	ORGANIZATION(S)	TITLE	TOTAL FUNDING	GENOME CANADA CONTRIBUTION
Genome Prairie	Agriculture	Adams, Gregg Shury, Todd	University of Saskatchewan Parks Canada	Bison Integrated Genomics (BIG)	$10,193,818	$3,328,766
Génome Québec	Agriculture	Landry, Christian Dufresne, Phillippe	Université Laval Le Laboratoire de santé publique du Québec (LSPQ - INSPQ)	Genomics Tools for the Prediction of Antifungal Resistance in Clinical Samples	$3,360,546	$786,030
Génome Québec	Agriculture	Comte, Jerome Levesque, Roger Verreault, Daniel	Université Laval Ministère de l'Environnement et de la Lutte contre les changements climatiques, Québec	RosHAB: Rapid on-site Detection of Harmful Algal Blooms	$5,400,000	$1,800,000
Genome Alberta	Fisheries	Fast, Mark Frisch, Kathleen Hewison, Tim	University of Prince Edward Island Cermaq Canada Grieg Seafood	Complex Gill Disease Initiative (CGDI)	$4,690,770	$1,537,846
Genome Prairie	Health	Rockman-Greenberg, Cheryl Topp, Adam	University of Manitoba Shared Health	Canadian Prairie Metabolic Network	$6,068,618	$1,996,716
Génome Québec	Agriculture	Belzile, Francois Cowan, Josh	Université Laval Canadian Field Crop Research Alliance Grain Farmers of Ontario	Development and Implementation of a Toolkit for Genomics-Assisted Breeding in Soybean	$7,001,050	$2,000,000
Ontario Genomics	Health	Liu, Peter Ziegler, André	University of Ottawa Roche Diagnostics International Ltd.	Cardiovascular Biomarker Translation 2 (CBT2) – Atrial Fibrillation	$5,955,141	$1,983,487
Genome Alberta	Fisheries	Garber, Amber Guest, Dean	Huntsman Marine Science Centre Mowi Canada East	Advancing Commercial Performance of North America Origin Atlantic Salmon through Integration of Genomic Selection	$4,679,944	$1,398,095
Génome Québec	Agriculture	Robert, Claude Dion, Nicole	Université Laval Olymel	ALPHAgenomics: Integrating Genomics and Phenomics for the Swine Industry	$1,998,527	$649,649
Génome Québec	Agriculture	Tsang, Adrian Escobar, Jeffery	Concordia University Elanco Animal Health Eli Lilly and Company	Lysozyme Feed Additives to Improve Gut Health and Productivity of Food Animals for Swine and Poultry	$6,147,400	$2,000,000
Ontario Genomics	Health	Bartlett, John Sadis, Seth	Ontario Institute for Cancer Research Thermo Fisher Scientific	Development of an Epigenomic Profiling Tool to Facilitate Precision Medicine in Early Breast Cancer	$2,400,000	$800,001
Ontario Genomics	Environment	Ensminger, Ingo Isabel, Nathalie	The University of Toronto Natural Resources Canada	Fast Track Diagnosis of Stress, Disease, Phenology and Growth - Drone-Based High-Throughput Field Phenotyping for Genome Assisted Tree Breeding and Selection (FastPheno)	$4,744,502	$1,581,501
Ontario Genomics	Health	McPherson, Peter Raina, Chetan	McGill University YCharOS Inc.	Antibody Characterization for Open Science – Towards Characterized Antibodies for the Human Proteome	$3,979,175	$959,982
Genome British Columbia	Agriculture	Poojari, Sudarsana Zhang, Xuekui Rott, Mike Schenck, Bill	Brock University University of Victoria Canadian Food Inspection Agency Canadian Grapevine Certification Network	CLEan plAnt extractioN SEquencing Diagnostics (CLEANSED) for Clean Grapevines in Canada	$6,228,081	$2,000,000
Genome British Columbia	Agriculture	Rieseberg, Lorne Baute, Greg	The University of British Columbia	Fast-Track Breeding of Powdery Mildew-Resistant Cannabis	$4,265,446	$1,421,673

Génome Québec	Agriculture	Bélanger, Richard Vivancos, Julien	Université Laval Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec	Development and Validation of a Genomic-Based Diagnostic Tool of the Virulence Profile of Phytophthora Sojae, a Major Pathogen of Soybean	$3,259,878	$956,081
Génome Québec	Environment	Sunday, Jennifer Rubidge, Emily Stanley, Ryan	McGill University Fisheries and Oceans Canada	Optimizing the eDNA Approach to Monitor Biodiversity in Canada's Marine Protected Areas	$757,409	$242,100
Genome Atlantic	Health	Bedard, Karen Vandersteen, Anthony Brock, Jo Ann Dyack, Sarah	Dalhousie University IWK Health Centre	Implementation of Clinical Exomes in a Pre- and Peri-Natal Setting	$4,758,489	$1,580,695
Génome Québec	Agriculture	Martin, Vincent Pouliot, Michel	Concordia University Agropur Cooperative	Bioprocess Development for Lactose Valorisation	$1,950,000	$650,000
Ontario Genomics	Environment	Wilson, Paul Roberts, Mary Jane	Trent University Environment and Climate Change Canada	Caribou Genomics: A National Non-Invasive Monitoring Approach for an Iconic Model Species-At-Risk	$4,631,620	$1,354,800
Ontario Genomics Génome Québec	Health	Goodridge, Lawrence Levesque, Roger Landgraff, Chrystal	University of Guelph Université Laval Public Health Agency of Canada	Stopping Enteric Illnesses Early (Sentinel)	$6,490,662	$1,907,690
Genome Alberta	Health	Bernier, Francois O'Hara, Carolyn	University of Calgary Alberta Precision Laboratories	TIGeR: Translational Implementation of Genomics for Rare diseases	$6,089,492	$2,000,000
Génome Québec	Health	Gilbert, Lucy Rouleau, Guy	McGill University OPTILAB - McGill University Health Centre	Detecting Ovarian and Endometrial Cancer Early Using Genomics (DOvEEgene)	$6,241,573	$2,000,000
Ontario Genomics	Energy	Rehmann, Lars Paik, Nak	University of Western Ontario World Energy Hamilton	Strain Development for Butanol Process Addition to Existing Biodiesel Plants	$796,745	$265,499
Genome British Columbia	Health	Lehman, Anna Ivany, Craig	The University of British Columbia Provincial Health Services Authority	Implementation of Diagnostic Whole Genome Sequencing for Rare Diseases in British Columbia	$8,124,794	$1,999,086
Ontario Genomics	Health	Sadikovic, Bekim Kadour, Mike	Lawson Health Research Institute/ Western University London Health Sciences Centre	Beyond Genomics: Assessing the Improvement in Diagnosis of Rare Diseases using Clinical Epigenomics in Canada (EpiSign-CAN)	$4,787,447	$1,588,260
Génome Québec	Health	Michaud, Jacques Ouellet, Denis	Centre Hospitalier Universitaire Sainte-Justine Ministère de la Santé et des Service sociaux	Rapid Whole-Genome Sequencing in Acute Care Neonates and Infants	$6,165,469	$2,000,000
Ontario Genomics	Health	Cowen, Leah Jaikaran, Dominic	The University of Toronto Bright Angel Therapeutics	Targeting Fungal Stress Responses to Provide First-in-Class Treatment for Drug Resistant Fungal Pathogens	$5,516,034	$1,986,029
Génome Québec	Health	Waldispühl, Jérôme Szantner, Attila	McGill University Massively Multiplayer Online Science	Crowdsourcing Sequence Alignments in a AAA Game for Microbiome Research	$2,953,319	$803,250
Ontario Genomics	Health	Boycott, Kym Somerville, Martin Sarta, Neeta	Children's Hospital of Eastern Ontario Research Institute The Hospital for Sick Children Ontario Ministry of Health	Optimization and Implementation of a Clinical Genome-Wide Sequencing Service for Rare Disease Diagnosis in Ontario	$6,000,000	$2,000,000

CENTRE(S)	SECTOR	LEADER(S)	ORGANIZATION(S)	TITLE	TOTAL FUNDING	GENOME CANADA CONTRIBUTION
Ontario Genomics	Health	McQuibban, Angus Li, Zheng	The University of Toronto Cyclica Inc.	Validating and Improvement of in silico Proteome Screening and Drug Design Technologies by Experimental Drug Discovery for Neurodegenerative Diseases	$2,303,527	$609,776
Genome Atlantic Genome Alberta	Energy	Hubert, Casey Ventura, Todd MacDonald, Adam	University of Calgary Saint Mary's University Nova Scotia Department of Energy	Validation and Integration of Genomics Solutions for Offshore Oil Exploration in Nova Scotia and Beyond	$6,479,444	$1,999,864
Génome Québec	Agriculture	Labrie, Steve Fraud, Sebastian	Université Laval General Mills	Genomic-Based Approach to Optimize the Development of Texturizing Bacterial Strains in Yogurt	$1,170,675	$390,225
Ontario Genomics	Health	Moffat, Jason Singh, Sheila	The University of Toronto Century Therapeutics	Systematic Evaluation and Optimization of Immune-Targeting Modalities for GBM and Brain Metastases	$4,581,669	$1,375,100
Genome Atlantic	Fisheries	Bernatchez, Lewis Mallet, André	Université Laval L'Étang Ruisseau Bar Ltd	Genomics for Developing the First Canadian Production Ready Strain of Selectively Bred Eastern Oyster	$3,806,291	$1,249,924
Génome Québec	Health	Borchers, Christoph Spatz, Alan Leduc, Claude	Lady Davis Institute Jewish General Hospital MRM Proteomics Inc.	Developing the Next Generation PD-L1 Assays Using Precision Mass Spectrometry	$1,449,026	$478,138
Ontario Genomics	Environment	Edwards, Elizabeth A. Dworatzek, Sandra	The University of Toronto SiREM	Field Validation of Technologies for Anaerobic Benzene and Alkylbenzene Bioremediation	$2,752,161	$926,160
Ontario Genomics	Health	Hawkins, Cynthia Ferree, Sean	The Hospital for Sick Children Nanostring Technologies	NanoString nCounter Vantage 3D Platform-Based Complementary Diagnostic Tests for Precision Medicine in Pediatric Cancers	$4,045,291	$1,300,000
Ontario Genomics	Environment	Hajibabaei, Mehrdad Hendriks, Elizabeth	University of Guelph World Wildlife Fund Canada	Assessing Freshwater Health Through Community Based Environmental DNA Metabarcoding	$2,608,784	$866,852
Ontario Genomics	Health	Kelley, Shana Ambler, Natalie	The University of Toronto Charlotte Products Ltd.	Devices for Detection and Identification of Surface Microbial Contamination in High-Risk Facilities	$4,469,365	$1,485,636
Ontario Genomics	Agriculture	Mallard, Bonnie Lohuis, Michael	University of Guelph The Semex Alliance	Translating High Immune Response (HIRTM) Genomics to Improve Beef Cattle Health and Welfare	$1,617,164	$538,601
Genome British Columbia	Health	Rossi, Fabio Heyries, Kevin	The University of British Columbia AbCellera Biologics	Antibody Therapeutics for Duchenne Muscular Dystrophy	$6,288,178	$1,998,726
Génome Québec	Health	Goodyer, Paul Huertas, Pedro	McGill University Health Centre Eloxx Pharmaceuticals	Novel Aminoglycoside Readthrough Reaction for Nonsense Mutations	$2,051,396	$671,720
Génome Québec	Environment	Robert, Claude Rioux, Réjean	Université Laval Protection de la faune du Québec	Use of Genomics to Manage and Protect Caribou Populations	$3,043,190	$1,011,323
Ontario Genomics	Agriculture	Guttman, David Paulter, Michael	The University of Toronto Vineland Research and Innovation Centre	Broad-Range Disease Resistance in Greenhouse Vegetables	$2,008,200	$668,291
Ontario Genomics	Health	Surette, Michael Magarvey, Nathan Haigh, Andrew	McMaster University Adapsyn Bioscience Inc.	Applying the Adapsyn Genomics Platform to the Identification, Isolation, and Characterization of Immune Modulators from the Human Microbiome	$6,034,102	$1,990,459
Génome Québec	Agriculture	Tsang, Adrian Matzat, Paul	Concordia University Elanco Animal Health	Lysozyme Feed Additives to Improve Gut Health and Productivity of Food Animals	$6,000,000	$2,000,000

CENTRE(S)	SECTOR	LEADER(S)	ORGANIZATION(S)	TITLE	TOTAL FUNDING	GENOME CANADA CONTRIBUTION
Ontario Genomics	Health	Lye, Stephen Liu, Xin	Lenenfeld-Tanenbaum Research Institute BGI-Research	Leveraging Leukocytes as Endogenous Biosensors to Create Novel Diagnostics for Preterm Birth	$4,565,893	$1,403,307
Ontario Genomics	Environment	Mahadevan, Radhakrishnan Dugar, Deepak	The University of Toronto Visolis Inc.	Genomics Driven Engineering of Hosts for Bio-Nylon	$5,700,000	$1,900,000
Ontario Genomics	Agriculture	Baes, Christine Wood, Ben	University of Guelph Hybrid Turkeys	Application of Genomic Selection in Turkeys for Health, Welfare, Efficiency and Production Traits	$6,039,988	$1,999,422
Ontario Genomics	Agriculture	Pauls, Peter Oufattole, Mohammed	University of Guelph Benson Hill Biosystems	Increasing yield in Canola Using Genomic Solutions	$3,682,897	$1,147,374
Ontario Genomics	Health	Stewart, David Sekhon, Harmon	Ottawa Hospital Research Institute University of Ottawa Eastern Ontario Regional Laboratory Association	Standardization of Molecular Diagnostic Testing for Non-small Lung Cancer	$2,054,798	$595,197
GENOMICS IN SOCIETY INTERDISCIPLINARY RESEARCH TEAMS						
Genome British Columbia Ontario Genomics	Agriculture	Regier, Dean A. Bubela, Tania Hanna, Timothy	BC Cancer Research Centre Simon Fraser University Queen's University	Canadian Network for Learning Healthcare Systems and Cost Effective 'Omics Innovation	$2,628,837	$1,000,000
Ontario Genomics Genome British Columbia	Agriculture	von Massow, Michael Weary, Dan	University of Guelph The University of British Columbia	Barriers and Opportunities for Commercialization of Gene-Edited Beef and Dairy Products	$1,424,374	$711,354
Genome Alberta Ontario Genomics	Health	Murray, Maribeth S. Pulsifer, Peter	University of Calgary Carleton University	The Role of Genomics in Fostering and Supporting Arctic Biodiversity: Implications for Wildlife Management, Policy and Indigenous Food Security	$1,879,203	$932,330
STRUCTURAL GENOMICS						
Ontario Genomics	Health	Arrowsmith, Cheryl	The University of Toronto	Target 2035: WDR Proteins as a Technology Test-Bed for Illuminating the Dark Proteome	$23,442,800	$4,992,801

AUDITORS REPORT AND AUDITED FINANCIAL STATEMENTS

GENOME CANADA

Index

Year ended March 31, 2023

KPMG LLP
150 Elgin Street, Suite 1800
Ottawa ON K2P 2P8
Canada
Telephone 613-212-5764
Fax 613-212-2896

INDEPENDENT AUDITOR'S REPORT

To the Directors of Genome Canada

Opinion

We have audited the financial statements of Genome Canada (the "Entity"), which comprise:

- the statements of financial position as at March 31, 2023
- the statements of operations and changes in net assets for the year then ended
- the statements of cash flows for the year then ended
- and notes to the financial statements, including a summary of significant accounting policies

(Hereinafter referred to as the "financial statements").

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the Entity as at March 31, 2023, and its results of operations, its changes in net assets, and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the "***Auditor's Responsibilities for the Audit of the Financial Statements***" section of our auditor's report.

We are independent of the Entity in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada and we have fulfilled our other ethical responsibilities in accordance with these requirements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Other Information

Management is responsible for the other information. Other information comprises:

- the information, other than the financial statements and the auditor's report thereon, included in the Annual Report document.

Our opinion on the financial statements does not cover the other information and we do not and will not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information identified above and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit and remain alert for indications that the other information appears to be materially misstated.

We obtained the information, other than the financial statements and the auditor's report thereon, included in the Annual Report document as at the date of this auditor's report. If, based on the work we have performed on this other information, we conclude that there is a material misstatement of this other information, we are required to report that fact in the auditor's report.

We have nothing to report in this regard.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Entity's ability to continue as a going concern, disclosing as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Entity or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Entity's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists.

Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit.

We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion.

  The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Entity's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Entity's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Entity to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

- Communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

KPMG LLP

Chartered Professional Accountants, Licensed Public Accountants

Ottawa, Canada

June 29, 2023

GENOME CANADA

Statement of Financial Position

March 31, 2023, with comparative information for 2022
(in thousands of dollars)

	2023	2022
Assets		
Current assets:		
Cash	$ 855	$ 10,842
Short-term investments (note 3)	37,101	16,530
Other receivables	343	138
Prepaid expenses	352	275
	38,651	27,785
Capital assets (note 4)	15	19
	$ 38,666	$ 27,804
Liabilities and Net Assets		
Current liabilities:		
Accounts payable and accrued liabilities (note 5)	$ 954	$ 2,789
Deferred contributions - research projects (note 6(a)i)	36,337	19,199
Deferred contributions - CanCOGeN (note 6(a)ii)	–	4,432
	37,291	26,420
Deferred lease inducements (note 7)	160	165
Deferred contributions (note 6)		
Deferred contributions - internally restricted	1,200	1,200
Deferred contributions related to capital assets	15	19
	1,215	1,219
Commitments (note 10)		
	$ 38,666	$ 27,804

See accompanying notes to financial statements.

On behalf of the Board:

DocuSigned by:
Rob Annan
A3C25C22F78A466...
Rob Annan, PhD, President and CEO

DocuSigned by:
Elizabeth Douville
AF151B9EF5754C6...
Elizabeth Douville, PhD, ICD.D, Board Chair

GENOME CANADA

Statement of Operations and Changes in Net Assets

Year ended March 31, 2023, with comparative information for 2022
(in thousands of dollars)

	2023	2022
Revenue:		
Research projects (note 6(a)i)	$ 62,958	$ 65,980
Research projects - CanCOGeN (note 6(a)ii)	4,432	21,700
Sector strategy development	213	–
Amortization of deferred contributions related to capital assets (note 6(b))	4	6
	67,607	87,686
Expenses:		
Projects and Genome Centres	56,073	59,985
Projects and Genome Centres – CanCOGeN	4,303	21,076
Office of the President	912	–
Corporate services	1,924	2,482
Strategy, development and external relations	1,683	2,362
Program management	2,366	1,151
Sector strategy development	213	–
Program management - CanCOGeN	129	624
Amortization of capital assets	4	6
	67,607	87,686
Excess of revenue over expenses, being net assets, end of year	$ –	$ –

See accompanying notes to financial statements.

GENOME CANADA

Statement of Cash Flows

Year ended March 31, 2023, with comparative information for 2022
(in thousands of dollars)

	2023	2022
Cash provided by (used in):		
Operating activities:		
Excess of revenue over expenses	$ –	$ –
Items not affecting cash:		
Amortization of capital assets	4	6
Amortization of deferred lease inducement	(5)	(3)
Deferred contributions – research projects	(63,171)	(65,980)
Deferred contributions – CanCOGeN	(4,432)	(21,700)
Amortization of deferred contributions related to capital assets	(4)	(6)
Excluded from the increase in deferred contributions (note 9)	589	(27)
	(67,019)	(87,710)
Grants received from Government of Canada (note 6)	79,300	48,000
Grants received from Government of Canada – CanCOGeN (note 6)	–	13,410
Changes in non-cash operating working capital items:		
Decrease (increase) in other receivables	(205)	80
Increase in prepaid expenses	(77)	(49)
Increase in accounts payable and accrued liabilities	(1,835)	1,662
	10,164	(24,607)
Investing activities:		
Decrease (increase) in short-term investments	(20,571)	29,915
Interest received on investments	475	170
Portfolio investment management	(55)	(24)
	(20,151)	30,061
Net change in cash	(9,987)	5,454
Cash, beginning of year	10,842	5,388
Cash, end of year	$ 855	$ 10,842

See accompanying notes to financial statements.

GENOME CANADA

Notes to Financial Statements

Year ended March 31, 2023
(in thousands of dollars)

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1. Description of the organization:

Genome Canada (the "Corporation") was incorporated on February 8, 2000, under the Canada Corporations Act and continued on December 11, 2012. The Corporation is a not-for-profit organization and has the following objectives:

(a) The development and establishment of a co-ordinated strategy for genomics research to enable Canada to become a world leader in areas such as health, agriculture, environment, forestry, fisheries, mining and energy;

(b) The provision of leading-edge technology to researchers in all genomics-related fields through regional Genome Centres across Canada, of which there are currently six, one each in British Columbia, Alberta, the Prairies, Ontario, Quebec and the Atlantic;

(c) The support of large-scale projects of strategic importance to Canada by bringing together industry, government, universities, research hospitals and the public;

(d) The assumption of leadership in the area of ethical, environmental, economic, legal, social and other issues related to genomics research, and the communication of the relative risks, rewards and successes of genomics to the Canadian public; and

(e) The encouragement of investment by others in the field of genomics research.

2. Significant accounting policies:

The financial statements have been prepared by management in accordance with Canadian accounting standards for not-for-profit organizations and include the following significant accounting policies:

(a) Revenue recognition:

The Corporation follows the deferral method of accounting for contribution for not-for-profit organizations received from the Government of Canada.

Externally restricted contributions and related investment income are recognized as revenue in the year in which the underlying expenses are incurred. A receivable is recognized if the amount to be received can be reasonably estimated and collection is reasonably assured.

Externally restricted contributions for the purchase of capital assets are deferred and amortized to revenue on a declining balance basis at a rate corresponding to the amortization rate for the related capital assets.

(b) Investments:

Investments are recorded at fair value. Fair value is determined at quoted market prices. Sales and purchases of investments are recorded at the settlement date. Short-term investments can be easily converted to cash during the period. Transaction costs related to the acquisition of investments are expensed.

2. Significant accounting policies (continued):

(c) Capital assets:

Capital assets are stated at their net book value. Amortization is provided for using the declining balance method at the following annual rates or term:

Asset	Rate
Furniture, fixtures and office equipment	20%

(d) Financial instruments:

The Corporation records interest receivable, other receivables and accounts payable and accrued liabilities at amortized cost using the effective interest method of amortization.

(e) Use of estimates:

The preparation of financial statements in conformity with Canadian accounting standards for not-for-profit organizations requires the use of estimates and assumptions that affect the reported amounts of assets and liabilities, disclosures of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting periods. Accordingly, actual results could differ from these estimates. The most significant estimates used in the preparation of the financial statements include the fair value of investments and the amount of certain accrued liabilities. These estimates are reviewed annually and as adjustments become necessary, they are recorded in the financial statements in the year in which they become known.

(f) Lease inducements

Lease inducements, consisting of free rent and improvement allowances granted to the Corporation for the leased offices, are amortized on a straight-line basis over the term of the lease or over the useful life of the purchased asset.

3. Short-term investments:

	2023		2022	
	Cost	Fair market value	Cost	Fair market value
Government of Canada Treasury bills	$ 10,859	$ 10,952	$ –	$ –
Bank deposits/Bankers' Acceptance	2,736	3,080	8,103	8,105
Mutual funds	5,851	5,851	–	–
Provincial/Municipal Short-term bills and notes	5,936	5,964	5,528	5,531
Federal government bonds	–	–	2,002	1,994
Provincial government bonds	1,981	1,989	899	900
Corporate bonds	9,154	9,265	–	–
	$ 36,517	$ 37,101	$ 16,532	$ 16,530

The interest rates at the end of the year range from 1.909% to 4.400% (2022 - 0% to 0.743%) and mature at varying dates in 2024 (2022 - varying dates in 2023).

4. Capital assets:

	2023		2022
	Cost	Accumulated amortization	Net book value	Net book value
Furniture, fixtures and office equipment	$ 442	$ 427	$ 15	$ 19

Cost and accumulated amortization at March 31, 2022, amounted to $442 and $423, respectively.

5. Accounts payable and accrued liabilities:

Included in accounts payable and accrued liabilities are $Nil (2022 - $Nil) for goods and services tax/harmonized sales tax and payroll-related taxes due to government entities.

6. Deferred contributions:

The Corporation receives contributions from the Government of Canada to be held, invested, administered and disbursed in accordance with the related funding agreement between the Corporation and the Government of Canada.

(a) Deferred contributions - research projects:

The Corporation operates under four active Funding Agreements with the Government of Canada. As at March 31, 2023, Innovation, Science and Economic Development Canada had committed $513,750 in grants to the Corporation under these agreements, of which $380,350 has been received as at March 31, 2023. The terms and conditions of these agreements call for remaining grants to be paid to the Corporation annually, subject to the appropriation by the Parliament, based on the estimated cash requirements for the year. During the year ended March 31, 2023, the Corporation received $20,000 under the agreement dated May 19, 2017, $23,000 under the agreement dated April 1, 2020, $Nil under the agreement dated July 8, 2020 and $36,300 under the agreement dated April 1, 2022.

The changes in the deferred contributions balance for the year are as follows:

i. Deferred contributions – research projects:

		2023		2022
Balance, beginning of year	$	19,199	$	37,110
Add: grants received		79,300		48,000
Add: investment income		1,009		69
Less: amounts reflected in revenue		(63,171)		(65,980)
Balance, end of year	$	36,337	$	19,199

ii. Deferred contributions – CanCOGeN:

		2023		2022
Balance, beginning of year	$	4,432	$	12,722
Add: grants received		–		13,410
Less: amounts reflected in revenue		(4,432)		(21,700)
Balance, end of year	$	–	$	4,432

6. Deferred contributions (continued):

(a) Deferred contributions - research projects (continued):

Expenses of future years:

Deferred contributions related to expenses of future years represent unspent externally restricted funding received to date, together with investment revenue earned, for the purpose of providing funds to eligible recipients and paying for operating and capital expenditures in future years.

(b) Deferred contributions related to capital assets:

Deferred contributions related to capital assets represent restricted contributions with which capital assets were originally purchased.

The changes in the deferred contributions balance for the year are as follows:

	2023	2022
Balance, beginning of year	$ 19	$ 25
Less: amounts amortized to revenue	(4)	(6)
Balance, end of year	$ 15	$ 19

(c) Deferred contributions - internally restricted:

On March 21, 2019, the Board of Directors approved an internally restricted reserve from previously received deferred contributions of $950. On March 31, 2021, the reserve was increased by $250 to $1,200 to take into account the increase in the payroll component of the reserve. The amount will be held to cover costs of a potential wind-down of the organization. Interest and investment income earned from these restricted amounts is recognized as income during the year it is earned and redistributed to the deferred contributions for future research project distribution.

7. Lease inducements:

The lease inducements include the following amounts:

		2023		2022
Leasehold improvement allowances	$	136	$	136
Free rent		24		29
Total lease inducements	$	160	$	165

The leasehold improvement allowance remained unspent during the 2023 period and was therefore not amortized. The amortization of leasehold improvement allowances and free rent are $Nil and $5, respectively (2022 - $Nil and $5, respectively).

8. Employee pension plan:

The Corporation maintains, for the benefit of most of its employees, a defined contribution pension plan. The cost of the plan is recorded in the statement of operations and changes in net assets as it is incurred. The charge for the year totals $268 (2022 - $268).

9. Supplemental cash flow information:

		2023		2022
Gain (loss) on disposal of investments	$	3	$	(44)
Fair value adjustment		586		17
	$	589	$	(27)

10. Commitments:

(a) Committed funding:

The Corporation is committed to finance approved research projects, science and technology platforms and Genome Centre operations in accordance with established agreements. As at March 31, 2023, the payments committed are approximately $29,457 in 2024 and $17,159 for other future years.

(b) Operating leases:

The Corporation leases its premises and equipment under long-term operating leases, which expire at various dates between 2023 and 2028. The minimum aggregate lease payments are approximately as follows:

2024	$	156
2025		122
2026		119
2027		124
2028		125
Thereafter		21
	$	667

11. Financial risk management:

The Corporation is subject to the following risks due to its financial instruments:

(a) Market risk:

Market risk is the risk that fair value of future cash flows of a financial instrument will fluctuate because of changes in market prices. Market risk comprises three types of risk, namely currency risk, interest rate risk and other price risk:

i. Currency risk:

Currency risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates. The Corporation holds $16 (2022 - $12) in foreign currency.

ii. Interest rate risk:

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in interest rates. The Corporation is exposed to interest rate risk with respect to its interest-bearing investments as disclosed in note 3 to the financial statements.

11. Financial risk management (continued):

(a) Market risk (continued):

iii. Other price risk:

Other price risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices. The fair value of investments is disclosed in note 3 to the financial statements.

(b) Liquidity risk:

Liquidity risk is the risk that the Corporation will be unable to fulfill its obligations associated with financial liabilities or to meet cash requirements on a timely basis or a reasonable cost. The Corporation manages its liquidity risk by monitoring its operating requirements. The Corporation prepares budgets and cash forecasts to ensure it has sufficient funds to fulfill its obligations.

(c) Credit risk:

Credit risk refers to the risk that a counterparty may default on its contractual obligations resulting in a financial loss. The Corporation is exposed to credit risks with respect to its interest-bearing investments. The Corporation invests in government bonds to reduce the credit risk to an acceptable level.

The Corporation's financial risks have increased during the year due to rising interest rates, inflation, and fluctuations in market prices. Management believes that these financial risks are appropriately mitigated and do not pose significant risk to the Corporation's operations. There have been no significant changes in the policies, procedures and methods used to manage these risks in the year.

ACKNOWLEDGEMENTS

Genome Canada gratefully acknowledges the support of the Government of Canada, the lead investor in our challenge-driven genomics initiatives. This investment supports our focus on mobilizing Canada's genomics research, innovation, data and talent ecosystem on areas of strategic importance for Canada where genomics can promote a healthier population, a stronger economy and a more sustainable planet.

With funding from

Canada

In addition to the diverse project partners who participate in our research initiatives, we collaborate broadly across Canada's research and innovation ecosystem in program development, delivery and policy dialogue. We wish to acknowledge these strategic partners for their value-add collaboration last year. We are grateful for our ongoing engagement with the research, industry, public and community sectors at home and abroad.

adMare BioInnovations

Advancing and Evaluating the Societal Impact of Science (Netherlands)

Agriculture and Agri-Food Canada

Agri-Food Innovation Council

All of Us Research Program, National Institutes of Health (United States)

Australian Genomics (Australia)

BIOTECanada

Canada Foundation for Innovation

Canadian Black Scientists Network

Canadian Cancer Research Alliance

Canadian Chamber of Commerce

Canadian Food Innovation Network

Canadian Institute for Advanced Research

Canadian Institutes of Health Research and CIHR Institute for Genetics

Canadian Organization for Rare Disorders

Canadian Public Health Laboratory Network

Canadian Science Policy Centre

Canadian Water Network

CGEn

Council of Yukon First Nations (Champagne and Aishihik First Nations)

CoVaRR-Net

CropLife Canada

Digital Research Alliance of Canada

Digital Technology Supercluster

DNAstack and COVID Cloud

Environment and Climate Change Canada

Federation for the Humanities and Social Sciences

First Nations Information Governance Centre

Fisheries and Oceans Canada

Genomics England (United Kingdom)

Genomics Research and Development Initiative

Global Affairs Canada

Global Alliance for Genomics and Health

Global Biodata Coalition

Global Genomic Medicine Consortium

Health Canada

Indigenous Works

Institute for Research on Public Policy

Institute on Governance

International Development Research Centre

Inuit Tapiriit Kanatami

KAIROS Canada

Let's Talk Science

Mādahòkì Farm

Mitacs

National Human Genome Research Institute,

National Institutes of Health (United States)

National Microbiology Laboratory

National Research Council of Canada

Native Women's Association of Canada

Natural Sciences and Engineering Research Council

Novo Nordisk Foundation (Denmark)

NutriAg Ltd

Office of the Chief Science Advisor and Youth Council

Personalized Medicine Coalition (United States)

Public Health Agency of Canada

Public Policy Forum

Public Policy Projects (United Kingdom)

Summer internship for INdigenous peoples in Genomics Canada

Social Sciences and Humanities Research Council

Society for Canadian Women in Science and Technology

Stem Cell Network

Terry Fox Research Institute

The Conversation Canada

Woman Abuse Council of Toronto

GenomeCanada

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