



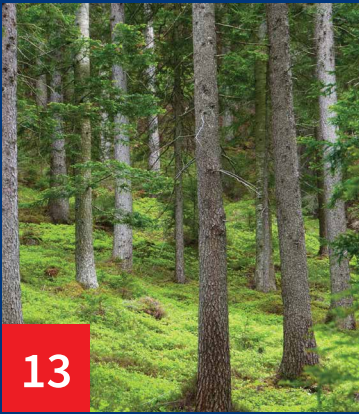
GenomeCanada

GENOMICS ON A MISSION

2020-21 ANNUAL REPORT



TABLE OF CONTENTS



13



15



17

04 Joint message from the President and the Board Chair

05 The year in review

05 Highlights

08 CanCOGeN marks one year

10 How we work

10 The Canadian Genomics Enterprise

11 Looking ahead

12 Achieving our objectives

24 Operations and management

24 Governance

26 Financial management

27 Acknowledgments

28 Appendices

29 Active projects funded 2020-21

43 Auditor's report

47 Audited financial statements



14



23

Joint message from the President and the Board Chair: In gratitude and appreciation



Dear Friends,

What an extraordinarily difficult year this has been. The COVID-19 pandemic has created so much suffering, stress and uncertainty for all Canadians. At Genome Canada, the year marked our 20th anniversary. At the same time, we were forming a bold vision for a brand new direction for our organization—one built on missions that generate solutions to global challenges. And then the pandemic struck.

COVID-19: A mission in real time

— Our rapid pandemic response was 20 years in the making!

As we mobilized our pandemic response, it became clear that COVID-19 was going to be our first genomics mission—in real time and at an accelerated pace. Through a bottom-up national response, we quickly brought researchers together with public health agencies, labs, the regional Centres and other institutions through the Canadian COVID-19 Genomics Network (CanCOGeN). The network generated genomics data to track virus transmission, understand host responses, inform policy decisions and guide testing and tracing strategies, vaccine development and drug treatments. CanCOGeN hit a virus sequencing milestone at the end of June 2021, surpassing its target of 150,000 sequences. We are immensely proud of CanCOGeN's work. An enormous thank you to everyone who contributed, especially the tireless researchers and provincial health laboratory teams.

— Awe-inspiring dedication of researchers

Tackling other urgent national & global challenges

COVID-19 is certainly not the only critical challenge that Canada and the world are facing. We're confronted every day by a host of health, environmental and economic issues and threats: the climate crisis, chronic diseases, future pandemics, food insecurity and the need for environmentally sustainable and inclusive economic growth. These problems are systemic, urgent and existential.

Where genomics can contribute to tangible impacts

COVID-19 showed us the incredible impact we can have when we make it our mission to use genomics to help solve complex global challenges. That's why we're going full steam ahead with a mission-driven approach. We were thrilled to get the federal government's vote of confidence for this direction in Budget 2021, in which we received substantial new funding to kickstart the Pan-Canadian Genomics Strategy. Genomics is truly a platform technology to drive Canada's future prosperity and well-being.

— (A \$400 million strategy)

— To advance genomics research + innovation

Your missions... if you choose to accept them

Join us on our missions

As we work collaboratively to develop and then embark on our missions, we will be relying on the strength of our research community, industry and other ecosystem partners, strategic oversight and support of our Board, the essential collaboration with the regional Centres, and of course our amazing and resilient staff. Again, heartfelt gratitude to all of you. Here's to the next groundbreaking 20 years!

Rob Annan, President

Elizabeth Douville, Board Chair -

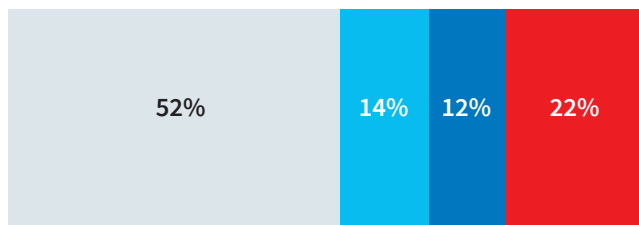
The year in review

HIGHLIGHTS

This was a milestone year for Genome Canada. We marked two decades of growth and impact—and played a key role in making Canada a world leader in the application of genomics to improve lives and drive solutions for health care, agri-food, climate action and environmental sustainability across the bioeconomy. Those two decades of investment and experience proved essential in the rapid response to the COVID-19 pandemic, where Genome Canada led national efforts in viral surveillance and host genomics.

The Canadian Genomics Enterprise—a federated ecosystem of Genome Canada and six regional Centres across Canada—invests in mission-driven research and innovation in genomics and biotechnology. We bring together provincial and regional players to create national solutions that provide economic and social benefits for all Canadians. Aligning regional strengths with national priorities, the Enterprise model leverages investments by federal and provincial governments and industry, university and non-profit partners. Last year the Enterprise supported research projects totalling \$205.7 million, including \$79.3 million from federal sources and \$126.4 million from co-funders.

2020-21 research funding supported by the Canadian Genomics Enterprise



\$205.7 M total

- Federal
- Provincial
- Industry
- Universities, Canadian not-for-profit organizations, foundations, and foreign governments and not-for-profit organizations

February 2000

Genome Canada is born

In the 1950s, the Human Genome Project captivates the world. But Canada doesn't have a coordinated national approach. A group of determined Canadian scientists convinces the federal government to make a bold investment in genomics to ensure Canada doesn't miss out on the benefits of this breakthrough science. Genome Canada is established on February 9, 2000. Our mandate is to build Canada's technological and human capacity in genomics. Six regional Genome Centres are established soon afterward (five in 2000 and one in 2005), ensuring regional relevancy in Canada's genomics mission.



Photo: Henry Frislan, Founding Chair of Genome Canada (Genome Canada 2000-2015 Annual Report)

2000

Where genomics and society intersect

We pilot *GenS* research (Genomics and Its Ethical, Environmental, Economic, Legal and Social aspects) and become a global leader in looking at the intersection of genomics and society - from addressing health inequities for Indigenous peoples, to assessing the economic impact of an unexpected trade ban on agricultural exports, to quickly considering the implications of benefit-sharing obligations in various countries when selecting plants for a research study.



Fall 2000

10 technology platforms launched

We launch Technology Platforms to provide researchers with easy, cost-effective access to leading-edge technologies that underpin research breakthroughs across diverse sectors, including health, agriculture, forestry, environment, fisheries and mining. By 2020 the 10 existing platforms are: the Pan-Canadian Proteomics Centre, the BC Cancer Agency Genomics Sciences Centre Genomics Technology Platform, the Metabolomics Innovation Centre, the Centre for Applied Genomics, the Centre for Phenogenomics, the Network Biology Collaborative Centre, the Canadian Data Integration Centre, the McGill Applied Genomics Innovation Core (MAGIC), the Centre for Advanced Proteomics and Chemo-genomic Analyses and the Canadian Centre for Computational Genomics.



2002-2003

Breeding better potatoes

Food security is a major focus of our genomics research, and potatoes - a vital food staple around the world - are a priority area. We are a global leader in funding research that improves potato quality and health, funding 33 research projects. For example, Genome Atlantic's Canadian Potato Genome Project, part of an international consortium, helps develop a "44k microarray chip" to identify genes related to tuber quality and tuber health traits, such as common scab and late blight.



2002-2003

Early immune response: Key host genes identified

Our funding of work on infectious disease, the leading cause of premature mortality around the world, grows with a ground-breaking *Genome Prairie* project. This research uses tools developed by the Human Genome Project and computational analysis to identify which host genes are turned on - or off - when cells are infected by bacteria or viruses. Researchers determine which genes are important in early immune response to infectious disease, and produce new computational methods of analysis, now freely available to the research community.



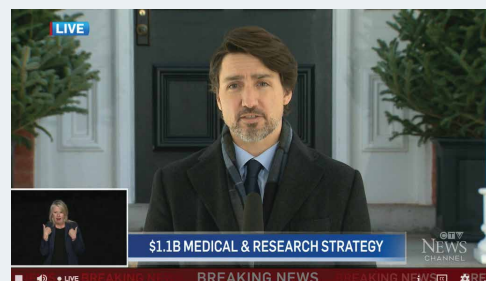
Photo courtesy of Dr. R.E.W. (Bob) Hancock (The University of British Columbia)

20 years in the making

At the 20-year mark, with \$3.9 billion in total investment, including \$1.6 billion in federal dollars and \$2.3 billion in co-funding, we launched a [digital timeline](#) that highlights our impacts, explores our key successes and shares our vision for the future.

April 23, 2020

Following an announcement by Prime Minister Justin Trudeau, we launched the [Canadian COVID-19 Genomics Network \(CanCOGeN\)](#), backed by \$38.4 million in federal funding. The network is led by Genome Canada, in partnership with the six regional Genome Centres, the Public Health Agency of Canada's National Microbiology Laboratory (NML) and provincial public health labs, genome sequencing centres through CGEn, hospitals, universities and the private sector. CanCOGeN coordinated and scaled up existing genomics-based COVID-19 research capacity in Canada to inform public health and public policy decision-making and support the development of therapies and vaccines. We are overseeing the sequencing of up to 10,000 host samples and up to 150,000 viral samples, while building in-house capacity in public health laboratories across the country and supporting a coordinated approach to data analysis and data sharing within Canada and internationally. The overall objective of CanCOGeN is to use genomic data to help us better understand and control the COVID-19 pandemic in Canada.



May 4, 2020

CanCOGeN entered a [partnership with the COVID-19 Genomics UK consortium \(COG-UK\)](#). By sharing knowledge, lessons learned and protocols, the partnership supports national efforts to coordinate the work of health-care, public, private and academic organizations to sequence and analyze the spread and evolution of the SARS-CoV-2 virus and its effect on patients.



October 26, 2020

The federal government announced [\\$16 million in support for 10 new genomics research projects](#) funded through Genome Canada, including nearly \$41 million in co-funding, for a total investment of almost \$57 million in health, agriculture and the environment to boost the Canadian economy. One of the projects falls under our [All for One mission](#) (see page 11), a pan-Canadian federated health data ecosystem to share knowledge and best practices to speed up medical diagnoses and improve patient care equitably across British Columbia, Alberta, Saskatchewan, Manitoba, Quebec and the Atlantic provinces.

February 2, 2021

Genome Canada was named a [2021 National Capital Region Top Employer](#) by Mediacorp Canada Inc., organizer of *Canada's Top 100 Employers* project. We were lauded for our leading role in Canada's COVID-19 public health response and received coverage in the [Ottawa Citizen](#) and a special [online feature](#). This recognition was a testament to our dynamic Team Genome Canada! In fact, last year, we recruited six new staff and two interns from the Munk School of Public Policy at the University of Toronto and Ryerson University's communications program.



February 12, 2021

Genome Canada was a key partner in the \$53 million [Government of Canada Variants of Concern Strategy](#). As new SARS-CoV-2 variants emerged in Canada, CanCOGeN accelerated collaboration with the NML, Health Canada, Canadian Institutes of Health Research (CIHR), and other provincial and territorial partners to quickly scale up genomic sequencing and research efforts to detect new variants, increase real-time data sharing capacity and inform appropriate public health responses.



March 9, 2021

The federal government announced \$8.6 million in investment in [five outstanding public-private collaborations](#) in our flagship industry-facing Genomic Applications Partnership Program (GAPP) to bring solutions to real-world challenges facing Canadians. Enhanced by another \$17.8 million in partner funding, these projects include new technologies for climate-adaptive food production, such as breeding better soybeans and developing an early warning system for identifying disease in coastal salmon farms.

March 25, 2021

Following the January 2020 request for applications for the [2020 Large-Scale Applied Research Project \(LSARP\) Competition: Genomic Solutions for Natural Resources and the Environment](#), our Board of Directors approved eight projects for funding in our first-ever entirely virtual LSARP review process. Once announced by Innovation, Science and Economic Development Canada in 2021, this \$25 million competition, in partnership with Natural Resources Canada (NRCan), will support projects that create new tools and technologies to assess environmental impacts, tree pest outbreaks and attenuation of oil spills.

Subsequent to year-end but included as a snapshot of what's to come.

April 19, 2021

The 2021 federal budget announced [\\$400 million for a new Pan-Canadian Genomics Strategy](#), including \$136.7 million for Genome Canada's mission-driven programming to kickstart the Strategy—a strong endorsement of our national leadership and new strategic direction. This investment will drive our mission framework in collaboration with the regional Genome Centres and other ecosystem partners to develop new knowledge, technologies, data assets and talent for solution-driving initiatives addressing Canada's biggest challenges.

April 27, 2021

We launched the [Canadian VirusSeq Data Portal](#), a much-anticipated pillar of the national data infrastructure that will bolster Canada's ability to manage the current pandemic—and any future ones—by sharing and resourcing viral genome sequences. This made-in-Canada data solution is a key deliverable of the national [Variants of Concern Strategy](#) and a key initiative coordinated by CanCOGeN. It gives Canadian researchers and public health experts a single platform from which to download comprehensive, standardized viral genomics data and allows experts to interact and collaborate with those who generate the data. Genome Canada serves as the data custodian. To support the launch, we ran five webinars tailored to specific and regional potential users.

“This data portal is an important step in enacting Canada's Variants of Concern Strategy. This made-in-Canada solution to rapidly share and investigate detailed genetic information of viruses will give Canadian scientists the critical information they need to tackle COVID-19 and future infectious disease threats.”

*- The Honourable Patty Hajdu,
Minister of Health*

CanCOGeN

CanCOGeN marks one year

GENOMICS ON A MISSION TO TACKLE COVID-19

When the pandemic hit in early 2020, we activated our community immediately, with rapid time to impact.

With the launch of CanCOGeN in April 2020, it became clear that genomics data was one of the strongest tools for short-term virus containment and long-term health-care response and management. As such, it dominated much of our work over the full fiscal year.

Over CanCOGeN's two-year mandate, we are funding the analysis of up to 150,000 viral genomes and, in partnership with [CGEn](#), of up to 10,000 genomes of individuals affected by the virus. The accessible and usable genomics data generated has improved understanding of the variability in clinical presentation in different individuals and populations, as well as developing real-time knowledge about virus behaviour and evolution.

Ongoing results have informed public health and policy decision-making, contributed to testing and tracing strategies, guided development of vaccines and therapies, helped mobilize Canada's rapid response to new variants of concern and been shared internationally in real time.

CanCOGeN by the numbers

\$38.4 M

CanCOGeN launched on April 23, 2020 with \$38.4M in federal funding

584

newsletter audience size and steadily growing

By June 30, 2021:



152,382

viral samples sequenced (CanCOGeN VirusSeq has exceeded its aim of sequencing up to 150K SARS-CoV-2 samples)

5,826

host samples committed (CanCOGeN HostSeq aims to sequence up to 10K genomes of patients diagnosed with COVID-19)

67,845

viral sequences uploaded to GISAID (based in Germany, the GISAID initiative promotes the rapid sharing of data from all influenza viruses and the coronavirus causing COVID-19)

3,677

host samples sequenced (all samples will have their whole genome sequenced)

23

HostSeq clinical studies recruited into CanCOGeN

6,127

viral sequences uploaded to the Canadian VirusSeq Data Portal (launched by Genome Canada, and for which we are the data custodians)

Through CanCOGeN, we also demonstrated the power of clear and timely science communications in building public interest in genomics. We mobilized experts from across our network to explain to Canadians—including federal policy and science leaders, businesses and researchers—the role of genomics in identifying, tracking and controlling COVID-19 and in protecting the health and safety of Canadians in future pandemics.

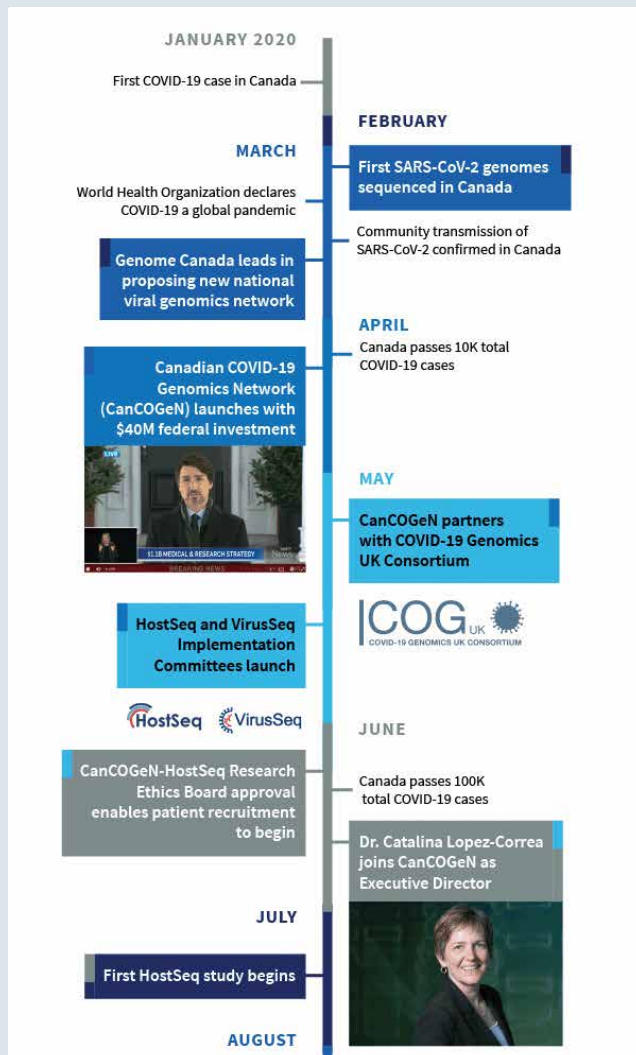
Highlights from our CanCOGeN communications include:

- A compelling [handout explaining CanCOGeN](#).
- A [monthly CanCOGeN briefing](#), with a 36% open rate and an average click rate of nearly 6%, featuring [infographic resources](#), [Q&A blogs](#) with lead CanCOGeN spokespeople.
- A popular video series on COVID-19 research and Canada’s [economic rebound](#).
- A [CanCOGeN timeline](#).



The COVID-19 Rebound

COVID-19 / Coronavirus / Health / Policy / Strategy



“Genome sequencing is a powerful tool in Canada’s public health response to COVID-19, allowing decision-makers to respond rapidly to new outbreaks and variants of concern. The Government of Canada is proud to work hand-in-hand with Genome Canada and the CanCOGeN network and partners to ensure Canada’s pandemic response is informed by real-time data and scientific evidence enabled by open data sharing and pan-Canadian collaboration. Since the launch of the Variants of Concern Strategy, CanCOGeN and its partners have been working to quickly scale up genomic sequencing and research efforts to detect new variants, increase real-time data sharing capacity, and inform appropriate public health responses.”

- Dr. Stephen Lucas, Deputy Minister of Health Canada (April 2021)

How we work

THE CANADIAN GENOMICS ENTERPRISE

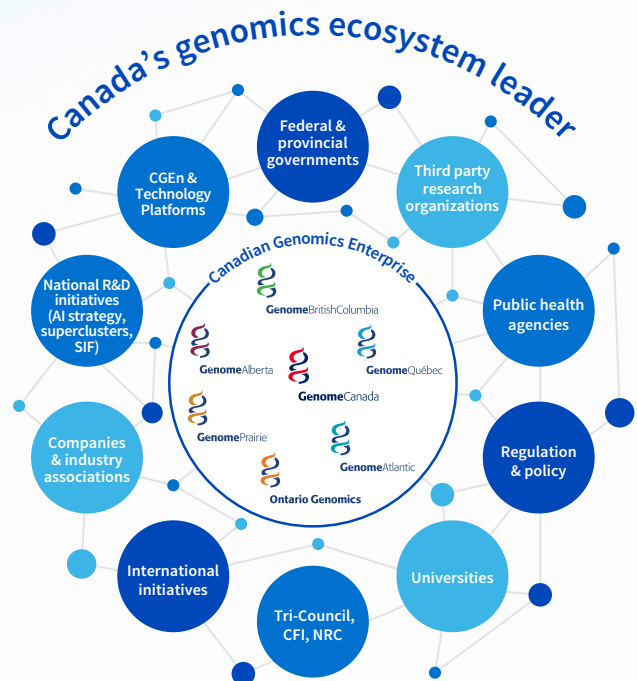
A mission-driven model for translating research into impact

Through our unique, collaborative pan-Canadian model—based on a federation of six independent regional Genome Centres and Genome Canada—we deliver research and innovation partnerships, including public-private partnerships, via a cross-sectoral platform. Our mission-driven model drives economic development by aligning regional strengths with national priorities, and leverages investments by government, industry, university and non-profit partners.

Genome Canada is the “connective tissue” between federally funded research and the commercial or social impacts delivered by provinces, industry and other users. The regional Genome Centres, funded primarily by provincial governments, broker relationships between researchers and users, and provide regional knowledge and project management to national initiatives.

Value-added elements of our model include:

- **Proactive business development** and project management involving boots-on-the-ground networks.
- **Applied research projects with interdisciplinary, multisectoral teams** of researchers and users who combine technology development with research on its ethical, environmental, economic, legal and social implications.
- **Demonstrated success in accelerating growth of and spinning out companies** from research projects.
- **Highly leveraged funding** with each federal dollar matched by 1.4 additional dollars from provinces, industry and others.
- **Robust international connections** that ensure Canadian researchers and firms benefit from and contribute to global perspectives, research results and partnerships.
- **Strong partnerships with Canada’s research ecosystem** for maximum impact.
- **Cooperation and coordination with federal departments and agencies** on research priorities.
- **Engagement with policy and regulatory bodies** and facilitation of researcher-policymaker dialogue.
- **Knowledge mobilization** through engagement with stakeholders.
- **Convening of diverse stakeholder groups** to launch bioscience research and innovation strategies in key economic sectors.



“Genomics has enormous potential to improve Canadians’ lives and to advance post-pandemic economic recovery. Investments, like the one we are making today in genomics research, help keep Canadians healthy and help keep our industries productive, sustainable and competitive globally.”

- *The Honourable François-Philippe Champagne, Minister of Innovation, Science and Economic Development*

LOOKING AHEAD

At Genome Canada, we're excited about the future and our evolution into a mission-driven, adaptive organization. With a Budget 2021 investment of \$136.7 million in our strategic vision, our new approach will mobilize genomics towards achieving tangible impacts for Canada. Our missions will translate the ideas and technologies generated through genomics research and innovation into impact in important challenge areas. We will accelerate groundbreaking missions in critical public health areas like pandemic surveillance and precision medicine in the clinic, while delivering made-in-Canada solutions to antimicrobial resistance, food security and biomanufacturing.

"Genomics on a mission" requires three key ingredients: strategy, structure and culture. Over the next year, an evolved organizational structure and new nimble ways of working will equip us to deliver missions laser-focused on impact. Thanks to our new Genome Canada Playbook, our values in action will emphasize purposeful partnerships led by an agile, digitally savvy Genome Canada team.

We will intentionally and deliberately embed IDEA (Inclusion, Diversity, Equity and Accessibility) policies and practices across our operations, workforce, programs, policies and governance structures. In particular, we will step up our commitment to Indigenous reconciliation through a distinctions-based Indigenous engagement and partnership strategy.

CanCOGeN

In 2021-22 we will deliver on year two of [CanCOGeN](#). We will continue to collaborate with the NML to develop VirusSeq into a vital and sustainable part of our national genomics surveillance infrastructure. We will also work with CGEN and other HostSeq partners to ensure the COVID-19 cohorts established last year become a central and readily accessible resource for years to come.

We will also continue our [All for One mission](#), a federated ecosystem that shares health data, knowledge and best practices to speed up medical diagnoses and improve patient care equitably across the country. With anchors in British Columbia, Alberta, Saskatchewan, Manitoba, Quebec and the Atlantic provinces, and a [policy toolkit](#) in place, this mission is operational. Future sites are planned in the coming year.



We also welcome the [Budget 2021 announcement](#) of a new \$400 million Pan-Canadian Genomics Strategy. This investment signals that genomics, a cross-sectoral platform technology, will be a future economic driver for our country. As Canada's national voice for genomics and a key policy partner in the development of the Strategy, we look forward to helping deliver world-class genomics impacts for Canada.

Our [2021-22 corporate goals](#) build on recent successes and learning. Working with ecosystem partners, we will develop and deliver a portfolio of impact-focused applied research, innovation and talent programming within our mission framework to solve Canada's big challenges while supporting the responsible and equitable application of genomics. We are retaining and growing the talent necessary to deliver on these goals.

ACHIEVING OUR OBJECTIVES

We envision Canada as a world leader in the application of genomics-based biosciences for human health, agriculture and the environment—and across the bioeconomy. To achieve this vision, we connect people and ideas across public and private sectors through mission-driven programming that harnesses the power of genomics research, innovation, data, talent and technologies 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.

Driving high-impact research to benefit Canada

We continued supporting large-scale, interdisciplinary research with line-of-sight to application. We funded strategic mission-driven research addressing social, societal and economic challenges, while providing access to leading-edge technologies and supporting research on genomics in society.

Genome Canada research projects are selected via world-class, international peer review. Reviewers are chosen for their recognized expertise in the science, technology and/or translation arena, and management of large-scale genomics projects. Drawing reviewers primarily from the international scientific community (85% of reviewers are from outside Canada) ensures that the research we fund is of the highest international standards and avoids conflict of interest.

Last year, Genome Canada recruited 137 reviewers from 17 countries. Our Board of Directors makes the final decision on which applications to fund, based on recommendations from the international panel of reviewers. Last year's virtual review process experience has helped us further innovate and ensure that all processes make the most strategic use of the time and expertise of reviewers and applicants.

“Genomics research is developing cutting-edge therapeutics and is helping Canada track and fight COVID-19. Canada was an early mover in advancing genomics science and is now a global leader in the field. A national approach to support genomics research can lead to breakthroughs that have real-world applications. There is an opportunity to improve Canadians’ health and well-being, while also creating good jobs and economic growth. Leveraging and commercializing this advantage will give Canadian companies, researchers, and workers a competitive edge in this growing field.”

- Canadian Federal Budget 2021, pg. 150

Continued investment in Genomics Technology Platforms.

We support [10 Technology Platforms](#) with a total of approximately \$133 million, including co-funding, over five years (2017-22). The platforms provide the research community with access to the latest high-throughput ‘omics technologies in such areas as DNA sequencing, proteomics and metabolomics. They also provide researchers with advice on new method and protocol development, data analysis and bioinformatics. To understand how best to support technology platforms in the long term, we formed an international working group and held a workshop in Vancouver in February 2020. The working group recommended that Genome Canada support platforms through strategic mission objectives, including alignment with other funders and an emphasis on coordination, emerging technologies, training and data. We are integrating these recommendations into our mission development planning. The platforms received \$12.5 million in 2020-21.

On a mission for precision health in Canada. We are advancing our national All for One mission to drive [precision health for Canadians](#) through the implementation of clinical genomics. The overall goals are for the All for One clinical implementation sites to share data for clinical research purposes and to serve as a model for health data sharing

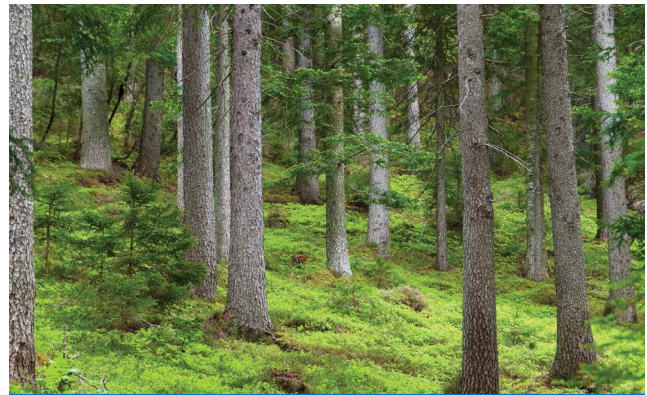
in Canada. Over the past year, we have broadened access to genome-wide sequencing and led patient-community engagement to align genomic solutions with relevant problems. Our focus is on rolling out clinical implementation projects and developing a data governance framework. As of March 31, 2021, [six clinical implementation projects](#) serving nine provinces have been approved for funding through the GAPP, of which five have been announced.

- 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 project is led by a clinical team, but driven by the provincial ministry or regional authority, and carried out in partnership with clinicians and diagnostic labs.
- The [All for One Policy Toolkit](#) establishes a data governance framework for clinical consent and genomic data sharing across other projects within the initiative.

Continued investment in the 2017 Bioinformatics and Computational Biology Competitions. This \$24 million competition (launched in December 2017) supports the [development of next-generation tools and methodologies](#) under two streams—one focused on human health and the other on 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 antimicrobial resistance. The 25 funded projects received \$4 million in investment in 2020-21.

Continued investment and support of industry-facing projects through the [Genomic Applications Partnership Program \(GAPP\)](#). To date we have funded 85 university-led, receptor-driven projects with total investment of approximately \$347.5 million. GAPP is designed to advance projects that address real-world challenges and opportunities through greater collaboration between genomics scientists and the users of genomics research. It also aims to stimulate public- and private-sector investment in Canadian genomics technologies, advancing technology uptake in receptors and moving technologies across readiness levels. We invested \$12.7 million in 2020-21.

Supporting next-generation researchers. Genome Canada partners with Mitacs through GAPP to provide placements and funding for graduate students and post-doctoral fellows working within receptor organizations. This partnership prepares Canada's next generation of innovators to advance the field of genomics by allowing candidates to apply their knowledge and skills in real-world settings while companies benefit from the high-quality research expertise. In 2020-21, this partnership supported 11 Mitacs Accelerate internships in GAPP projects.



PROTECTING CANADA'S FORESTS FROM PESTS

Invasive alien species cause irreversible damage to the environment and cost the Canadian economy hundreds of millions of dollars, affecting agriculture, trade and forestry. Canada's forest industry supported 211,075 direct jobs and 95,000 indirect jobs, accounted for 7% of total exports (\$34.4 billion) and injected roughly \$23 billion into the economy in 2016. A joint Canadian Food Inspection Agency (CFIA)-University of British Columbia project, funded by Genome Canada, [developed and deployed portable genome-based biosurveillance tools](#) for the Asian gypsy moth and *Phytophthora ramorum*.

Not only will these field detection tools decrease the need for inspection, surveillance and treatment in our forests, but they will also help maintain Canada's trusted pest-free status and reputation as a safe trading partner. This will ensure continued market access for our forest and nursery exports. CFIA is currently implementing the tools into its standard operation protocols, with estimated savings of \$374-625 million over three to five years. Other regulatory agencies, including the U.S. Department of Agriculture, have recently adopted the tools.

The recent announcement of a \$3.16 billion investment to plant two billion trees over 10 years, as part of Canada's strengthened [Climate Plan](#), reinforces the critical role of resilient and healthy forests in the path to achieve net-zero greenhouse gas emissions by 2050.

In partnership with Genome BC & Génome Québec



CULTIVATING MORE COMPETITIVE GREENHOUSE VEGETABLES

Ensuring a secure and sustainable food supply for Canadians is mission critical. COVID-19 exposed the vulnerabilities in food supply chains, including the importing of fresh fruits and vegetables from the U.S. to provide Canadians with nutritious and diverse food. Tomatoes, peppers and cucumbers generate more than \$1 billion in annual sales for the Canadian greenhouse vegetable industry. These plants are susceptible to many diseases that threaten crops and decrease producer profits, with estimated annual losses of \$200 million. Vineland Research and Innovation Centre, in a project funded by Genome Canada, is using proven [gene technologies to enhance vegetable disease resistance](#).

The project aims to develop new commercial varieties with improved disease resistance for Canada's greenhouse vegetable industry, making it more competitive by creating economic growth, increasing exports and reducing competition from imports and increasing food security for Canadians. Recent project results estimate a 25-30% increase in disease resistance. From this project, a spin-off trait development and genomics service company, [Platform Genetics Inc.](#), addresses the needs of seed companies and public-sector plant breeding programs.

In partnership with Ontario Genomics

Funding of one new and 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 \$25 million competition, including co-funding, launched in 2020 in partnership with NRCan, supports applied research projects that use genomic approaches to address challenges and opportunities in Canada's natural resources and environmental sectors. The resulting knowledge and innovation help drive sustainability, growth, productivity, commercialization and global competitiveness. Each project contributes to the Canadian bioeconomy, a healthy environment and the well-being of Canadians. Through a peer-review process, we selected eight projects for funding in 2021-22.
- **[2018 LSARP Competition – Genomic Solutions for Agriculture, Agri-food, Fisheries and Aquaculture](#)**. We launched this \$78.4 million competition, including co-funding, in partnership with Agriculture and Agri-Food Canada in June 2018. With funding until 2023-24, the eight projects will translate genomics research into solutions advancing the sustainability, productive capacity and competitive position of the Canadian agriculture/agri-food and fisheries/aquaculture sectors. We invested \$6.5 million in 2020-21.
- **[2017 LSARP Competition – Genomics and Precision Health](#)**. This \$163.9 million competition, including co-funding, was launched in January 2017 in partnership with CIHR. With funding until 2021-22, 15 projects will demonstrate how genomics-based research contributes to a more evidence-based approach to health. The projects must improve health outcomes or enhance the cost effectiveness of the health-care system, including diagnosing and treating cancers, reducing health-care disparities and improving diagnostic success for Indigenous children with genetic diseases, and diagnosing rare diseases and chronic illnesses. We invested \$10 million in 2020-21.
- **[2015 LSARP Competition – Natural Resources and the Environment](#)**. We launched this \$112.8 million competition, including co-funding, in June 2015. Genome Canada and co-funding partners are investing in 13 projects over four years. Projects include genomics research in energy, mining, forestry, water stewardship, wildlife management and conservation, and in bioproducts providing tools to help conserve natural resources and protect the environment. We invested \$5.2 million in 2020-21.

- **2014 LSARP Competition – Genomics and Feeding the Future.** We continued to fund 11 projects approved in 2015 via a \$94.4 million investment, including co-funding. The projects use genomics approaches within the agriculture/agri-food and fisheries/aquaculture sectors to address challenges and opportunities related to global food safety, security and sustainable production. Funding flowed to projects that apply genomics in multiple areas, including sustainable fisheries and honeybees; stress and disease resistance of crops and livestock; and, in partnership with the Western Grains Research Foundation, expedited breeding for desirable traits in wheat, lentils and soybeans. We invested \$2.3 million in 2020-21.

Delivering effective, purpose-fit programs that support our corporate missions

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

Increased focus on equity, diversity and inclusion (EDI).

We have taken proactive measures to step up our commitment to EDI and to Indigenous reconciliation:

- We launched an Inclusion, Diversity, Equity and Accessibility (IDEA) Committee, and five subcommittees (Education/ Training, Data Collection/Management, Human Resources/ Governance, Enterprise/Stakeholder Engagement, Mission Readiness) to work with and advise management on the development of an IDEA strategy and action plan to embed IDEA policies and practices across our operations, workforce, programs and governance structures.
- In March 2021, our Board of Directors unanimously approved our IDEA framework, and we began our inward reflection and journey toward being a more equitable organization. Through a planned series of “lunch and learns,” we will increase internal knowledge and capacity and develop deeper expertise in anti-racism, anti-oppression and anti-colonialism.
- We launched an EDI working group across the Enterprise, chaired by Genome Canada and involving senior staff from the six Genome Centres. The working group hosted external EDI experts and aligned activities for 2021 including data collection, sharing tools and resources, and progress towards the [50/30 challenge](#) goals across the Enterprise.
- We initiated a needs assessment and staff training, with the support of an Indigenous-led consulting firm, to develop a distinctions-based Indigenous engagement and partnership strategy to support and complement our IDEA strategy and action plan.



BRIDGING THE GENOMIC DIVIDE: BETTER HEALTH OUTCOMES FOR INDIGENOUS CHILDREN

Indigenous peoples across Canada face more barriers to health-care access than non-Indigenous Canadians, leading to poorer health outcomes. Although the rapid development of genomic technologies is advancing precision medicine—tailoring medical treatments to the specific needs of individuals—it is also widening the health inequity gap. Indigenous populations often have little or no access to genomic technologies and the research that drives them, thus intensifying the “genomic divide.” A key concern is the lack of background genetic variation data for Indigenous populations. This prevents accurate diagnosis because of the absence of the reference data needed for precise genetic diagnosis.

[Silent Genomes](#) is a game-changing partnership with First Nations, Inuit and Métis Peoples that will improve health outcomes for Indigenous children by enabling access to diagnosis and treatment of genetic disease. The project aims to establish processes for Indigenous governance of biological samples and genomic data; lead to policy guidelines and best practice models, bringing equitable genomic testing to Indigenous children with suspected genetic diagnosis; and develop an Indigenous Background Variant Library of genetic variation from a diverse group of First Nations.

In partnership with Genome BC

- In a unanimous decision, our Board of Directors signed on to the [50/30 challenge](#) in December 2020 to lead and accelerate organizational diversity actions to improve equity. As part of Board renewal and diversification, a new matrix for selection of Board members was developed and applied.



- We are signatories of [Canada's Dimensions Charter](#) and the [Declaration on Research Assessment](#) since 2019.

Rapid response to the COVID-19 pandemic. When the pandemic hit in early 2020, Genome Canada activated our community immediately, with rapid time to impact with a range of national and regional efforts.

- **Launch of the Canadian COVID-19 Genomics Network (CanCOGeN).** We launched [CanCOGeN](#) in April 2020. CanCOGeN leverages a \$38.4 million investment of new federal money to generate accessible and usable genomics data to inform public health and policy decisions, and guide treatment and vaccine development in Canada (see page 8).
- **Investment in COVID-19 Regional Genomics Initiative projects.** Beyond CanCOGeN, Genome Canada launched the [COVID-19 Regional Genomics Initiative](#) to support regional genomics projects that address specific, short-term needs of industry, not-for-profit and public-sector receptors through collaborative academic-receptor research. The initiative has funded eight projects to date, for an anticipated investment of \$4.1 million.
- **COVID-19 work in Emerging Issues.** In 2020-21, we added three COVID-19-related projects to our [Emerging Issues work](#). In partnership with CIHR, we funded the creation of tools to rapidly identify and test for the COVID-19 virus. The test will be bedside portable to patients under quarantine, helping prevent infected individuals from further transmitting the virus in hospitals and public places. Also within this portfolio, we partnered with CIFAR on two projects that were part of the AI-COVID-19 Catalyst Grants Program.

Investment in the Regional Priorities Partnership Program (RP3). This \$20.4 million initiative, including co-funding, supports cross-sectoral projects that advance genomics research and translation capacity in [regional areas of strategic priority](#). For example, in the Atlantic provinces, an RP3 project supports

a collaboration between industry, 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. Since RP3's inception in 2018, 21 projects have been approved across key sectors. We invested \$1.5 million in 2020-21.

Continued investment in Disruptive Innovation in Genomics. This program funds 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 \$37.6 million in [Disruptive Innovation projects](#) since the program was launched in 2015. We invested \$2 million in projects in 2020-21.

Enhancing of international leadership. We collaborate in international efforts to tackle global challenges with genomic solutions and maintain close relations with our counterparts around the world to share ideas, promote Canadian genomics leadership and strengthen strategic partnerships. In 2020-21, we supported international initiatives including the following:

- **Structural Genomics Consortium (SGC).** Established in 2004, this not-for-profit public-private partnership supports the discovery of new medicines through open access research. The SGC has catalyzed research on new areas of human biology and drug discovery by targeting less-studied areas of the human genome, making outputs available to the community and creating a network of scientists with global pharma companies. This approach reaps dividends in the most difficult conditions, such as when a new FDA-approved treatment for a previously drug-resistant lung cancer type could not have been developed without open-source SGC crystalline structure. We reconfirmed our investment in the SGC in March 2020, approving funding for Phase V with a total project budget of \$23.5 million and up to \$5 million from Genome Canada over two years. We invested \$2.7 million in SGC in 2020-21.
- **E-Rare-3 Joint Transnational Call (2015): Transnational Research Projects on Rare Diseases.** The total investment from all partners for the nine projects is \$13.4 million over three years. Genome Canada directly funds three projects, two of which were previously completed. We invested \$111,000 in the final project in 2020-21. These projects focus on topics such as harmonizing phenomics information and improving the diagnosis and treatment of a cardiac arrhythmia syndrome as well as studying a life-threatening autosomal skin disease to understand its pathophysiology, facilitating the development of targeted therapies. E-Rare-3 enables scientists in different countries to collaborate and share expertise on a common interdisciplinary research project.
- 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. 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, we have also reviewed and advised on research projects and working group initiatives within the consortium.

- The [Global Alliance for Genomics and Health](#) represents 500+ member organizations from 71 countries focused on improving human health through global genomics and clinical data sharing. As a member, we help 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. We also support the secretariat to keep the Alliance in Canada and fund some of its driver projects, which are real-world genomic data initiatives that guide its development efforts and pilot its tools.
- [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.
- Dr. Rob Annan is the Canadian representative in the [Global Biodata Coalition](#), a research funders' forum aimed at ensuring sustainable financial support for global biodata infrastructure and core data resources.



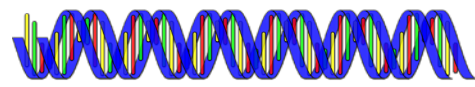
NATURE'S FIRST RESPONDERS TO ARCTIC OIL SPILLS

As a result of reduced sea ice cover and ice-free summers, the Northwest Passage is a high traffic route. With increased shipping and cruise ship activity, the risk of accidental releases of diesel or bunker fuel, or other transportation-related contaminants, has grown. Together with Genome Prairie and Genome Alberta, we support [GENICE: Microbial Genomics for Oil Spill Preparedness in Canada's Arctic Marine Environment](#). The project uses microbial genomics to generate credible, science-based evidence on the role and potential of bioremediation to deal with oil spills in the Arctic Ocean.

In partnership with Genome Alberta & Genome Prairie



Opinion



A DNA double helix consists of two spiral chains of deoxyribonucleic acid. Genomics is a big data science; one person's genome contains billions of data points that can be mined for actionable insights. Some researchers have suggested that genomics could produce more data by 2025 than ultra-high-resolution astronomy sites or platforms like YouTube and Twitter. Image courtesy of Pixabay

Putting genomics data to work for all Canadians

Our increasingly data-driven 'intangibles' economy favours physical assets, and our businesses and governments need a data infrastructure that can keep up. □

BY ROB ANNAN

We are living in the age of big data—a time where organizations are inundated by

suggested that genomics could produce more data by 2025 than ultra-high-resolution astronomy sites or platforms like YouTube and Twitter.

There is probably no better example of the importance of data right now than COVID-19. When our leaders announce decisions about mask use, lockdowns, border and school closures and economic recovery packages, they are basing them on plentiful data, properly analyzed.

The data generated is outpacing our systems to create optimal value from them. Our current systems for collecting, curating, comparing and analyzing data were built for the 20th century, and are under strain as we lean into the 21st. The pandemic has turned a spotlight on these pain points, revealing a data landscape where frag-

Genome Canada is well-positioned to contribute, working with others to develop a national genomics data strategy.

In April, Genome Canada launched CanCOGen, the Canadian COVID-19 Genomics Network. Its mission is to establish 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, and inform time-sensitive, critical decision-making by health authorities. Coordinating data analysis and sharing is central to this work.

In short, because we know genomics, we know data. This knowledge is being harnessed to help Canada make better decisions about our health, the economy, food systems and the

that is truly representative of the population as a whole, and getting data into the hands of a diverse set of stakeholders who can then create value from it for broad public benefit. With good models in place, that means researchers generating knowledge, clinicians helping patients, farmers producing food, policymakers improving lives, and companies engineering solutions.

Next, we need to secure our data (and Canadians' privacy) by creating standards for generating and anonymizing it, protocols for ensuring database security, and parameters that ensure access is on an as needed basis. And we need to develop more data assets in Canada, for Canadians. In an increasingly internationalized world, we need to put in place measures to ensure Canadians retain sovereignty over their own data and control how—and for what purposes—it is shared and used.

Finally, data interoperability means ensuring that our systems and services that generate, exchange and consume data are mutually compatible, with shared expectations for content and context. Important to realizing the value of genomic data is understanding its context. For example, linking disease or plant traits to genomic data enables the application of artificial intelligence to solve practical problems.

Our increasingly data-driven 'intangibles' economy favours knowledge over physical assets, and our businesses and governments need a data infrastructure that can keep up. Let's collaborate on a unified national genomics data ecosystem that



Photo credit: Truefaux Films

CLIMATE-PROOFING BLUE MUSSELS

Prince Edward Island is North America's top farmed mussel producer, accounting for 80% of all mussels sold. The provincial mussel industry accounts for \$60 million in direct economic growth, employing 1,500 Islanders and paying \$11 million in salaries. Changing ecosystem conditions and potential variability in the successful collection of naturally spawned seed are the biggest risks to the industry.

[An \\$800,000 venture](#) to create the genomics tools needed to develop a blue mussel selective breeding program for disease and temperature change will make the shellfish resistant to climate change. The initiative is predicted to double production within the next 10 years, from 50 million to 100 million pounds, significantly impacting regional employment and the P.E.I. economy.

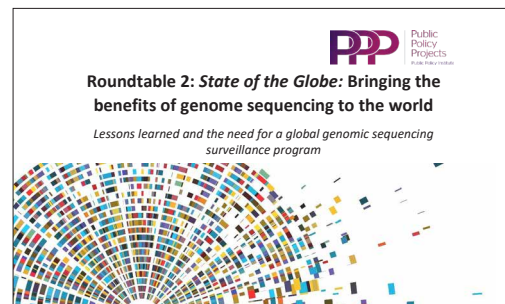
In partnership with Genome Atlantic

Promoting the responsible and equitable application of genomics in Canada

We demonstrated thought leadership through a genomics lens by our ongoing participation in the national dialogue on genomics and policy. We worked collaboratively with stakeholders to promote knowledge exchange and policy dialogue and develop our strategy. We also supported research on the implications of genomics in society.

COVID-19 storytelling. In the face of the pandemic, we engaged heavily in Canada's public health policy dialogue and undertook extensive science communications efforts to demonstrate the value of genomics to Canadians' health and safety.

- We presented to two Parliamentary Committees to help demystify the science of genomics for government allies.
 - In April 2020, Drs. Rob Annan and Cindy Bell presented to the [Standing Committee on Health](#) to help MPs understand the scientific response to COVID-19. The presentation gave a lay overview of genomics and its potential to contribute key solutions to the public health crisis and economic recovery.
 - In June, Dr. Annan and Ms. Pari Johnston presented on CanCOGeN before the [Standing Committee on Finance](#). The focus was on the bottom-up mobilization aspects of our COVID-19 work and the role of the Enterprise in Canada's recovery.
- Since July 2020, Dr. Annan has been an active member of the Forum on Major COVID-19 Initiatives, a senior leader's table chaired by the Deputy Minister of Health that meets monthly to share developments across Canada, strengthen collaborations and strategize on the way forward.
- As a key member of the Variants of Concern Leaders' Table chaired by the Deputy Minister of Health, Dr. Catalina Lopez-Correa, Executive Director of CanCOGeN, contributed to shaping the February 2021 [Government of Canada Variants of Concern Strategy](#).
- On the international front, we sit at a number of senior global genomics policy tables, including the [U.K.'s Public Policy Projects](#), which is leading a global conversation on issues of global reach, including the importance of improving data diversity, establishment of a global dataset and the future of rare diseases, using genomic data for research. Dr. Annan spoke at a roundtable and helped develop a paper on the need for a [global genomic sequencing surveillance program](#).



Highlights from the COVID-19 storytelling championed by Dr. Lopez-Correa before Canadian and international audiences on the work of CanCOGeN:

- Life Sciences Ontario, August 13, 2020
- Singularity University Digital Summit, August 18, 2020
- Research Money Webinar, September 22, 2020
- 7th FIP Pharmaceutical Sciences World Congress (PSWC2020), October 4, 2020
- International One Health Workshop, October 14, 2020
- 20th Annual Healthcare Summit, October 26, 2020
- EULAC International meeting, November 24, 2020
- UK Genomics and COVID-19: A virtual roundtable, December 3, 2020
- Canadian College of Medical Genetics, December 18, 2020
- Health Canada's DG-Science Information Session, December 18, 2020
- International Festival of Genomics, January 28, 2021
- Canada and U.K. Data Sharing Workshop, February 16, 2021
- Genome BC Genomics Forum, May 6, 2021

- Last year, we produced and posted 16 COVID-19 related [videos, webinars and podcasts](#) that have garnered over 2,900 post-event video views. The resulting mobilization of diverse experts from across the Canadian Genomics Enterprise to explain the science driving our COVID-19 response underlines the importance of our national coordination on this challenge and has built public interest in genomics.

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 2020-21. We also applied a strong EDI and next-generation talent lens to our engagement efforts:

• **Canadian Science Policy Centre (CSPC) Partnership:**

This strategic partnership, which centres genomics in national science policy, science communications and next-generation science talent initiatives, generated significant impact and reach:

- In April-May 2020, CSPC's online COVID-19 platform published an [editorial on the value of long-term investment in science](#) written by Dr. Annan and CEO Mehrdad Hariri [interviewed him about meeting the COVID-19 challenge](#). The discussion highlighted the effectiveness of long-term investments in science in producing a research community able to mobilize quickly on COVID-19.
- Genome Canada participated in a [Lifting the Curtain on CanCOGeN panel event](#) with five CanCOGeN members in July 2020. The panel defined the main elements of the network and its two-year mandate and provided an update on results.
- A Dr. Annan [interview marked Genome Canada's 20th anniversary](#) in August 2020, highlighting our 20-year legacy and laying out our forward-looking vision and linking it to the economic recovery.
- At the [CSPC conference](#) in November 2020, we hosted a pre-conference session: "Meat and Potatoes: Genomics and Agriculture in Canada's Economic Recovery" featured a panel of Canadian innovators, researchers and government policymakers discussing how to seize Canada's genomics opportunity in smart and sustainable agriculture. Ms. Pari Johnston also moderated a workshop on science communications and bridging the science/policy nexus for the incoming cohort of 12 Mitacs science policy fellows with placements across federal science-based departments and agencies.

- **The Future Economy (TFE):** We developed a six-part series on [diverse contributions of lead genomics researchers](#) to the pandemic response in Canada. As part of a COVID-19 Rebound series, the videos, with nearly 72,000 views, were released on the TFE thought leadership platform from April to June 2020. They focus on how to rebuild a stronger and wiser Canada that is better prepared to compete in the future economy.



10 Things We Learned From Genome Canada Researchers

Published on July 13, 2020

Tom Rosenthal
Founder @ RBC Disruptors

1 video 4 videos

Read or watch the full interview and others in our COVID-19 Rebound Series!

- **Public Policy Forum (PPF):** We participated in a PPF podcast series on the diverse policy implications of COVID-19 for Canada, targeted at an influential public policy audience. PPF CEO Ed Greenspon interviewed Dr. Annan and Dr. Bettina Hamelin (CEO, Ontario Genomics) in June 2020. The podcast positioned genomics as a key part of the public health solution and focused on how [genomics research can inform policy action](#) in a crisis and provide innovative solutions for economic recovery.



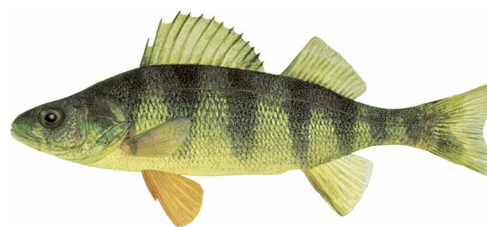
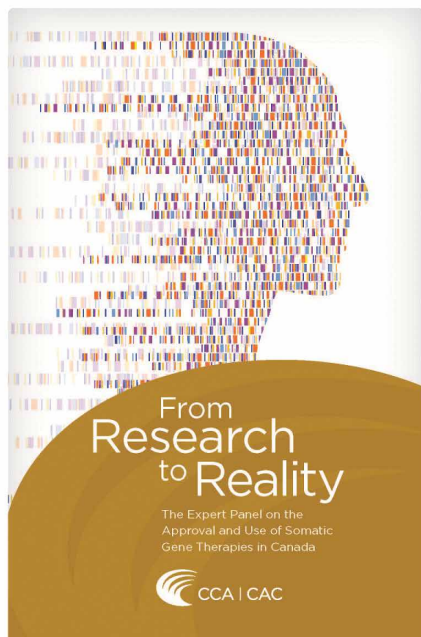
- **SING Canada 2020:** To deepen and strengthen our Indigenous engagement strategy, through a strategic partnership with [SING Canada](#) we are supporting SING's work to advance Indigenous approaches to genomics and the ethical, environmental, economic, legal, and social (GE3LS) implications. We provided \$10,000 to help develop a video and two online courses on [Indigenous Peoples and Technoscience](#) at the University of Alberta in fall 2020. This followed on the previous year's Enterprise-wide contribution of \$35,000 for direct program support.

- **One Health Workshop Series:** A series of seven virtual workshops began in September 2020. A full Summit will be held in 2021 involving researchers and federal and provincial policymakers in health, agriculture and the environment. Dr. Lopez-Correa gave the [keynote presentation at a related One-Health seminar](#) to over 60 international experts in October 2020, coordinated by Genome Alberta and University of Calgary. She outlined how innovative genomic solutions can help deliver high-quality patient-centric care and deliver affordable sustainable health care worldwide.
- **RBC Disruptors Series:** We worked with RBC's John Stackhouse to develop a podcast and blog on genomics in the new economy as part of the *RBC Disruptors* series on economic recovery solutions in September 2020. The podcast, featuring Drs. Annan and Hamelin, focused on [biomanufacturing and its potential for green growth in Canada](#). The podcast has approximately 4,000 listeners, primarily key influencers in Ottawa and in industry, and 2,100 downloads to date. The accompanying blog has had 2,500 views.



- **BIONATION 2020:** Genome Canada was a key sponsor of this event, organized by BIOTECCanada, showcasing cutting-edge life science and biotech. As part of the fall webinar series, Dr. Annan chaired a session on the [biotechnology ecosystem in Canada](#) in November 2020.
- **Canada Synbio 2020:** Ms. Pari Johnston was a panel member at an Ontario Genomics event in November 2020 with Policy Horizons Canada as part of Canada Synbio 2020, [Canada's Bio-Revolution Webinar Series](#). The panel examined engineering biology-driven manufacturing opportunities and specific initiatives and strategies in the U.S., U.K. and Canada.
- **BHER Canada Comeback Challenge:** We provided executive and staff participation to support this national competition that [connects students and employers](#) in the context of Canada's COVID-19 recovery, from fall 2020 through to spring 2021.

- **Gairdner Foundation:** We sponsored the high-profile Gairdner Ontario International Symposium (December 2020) — [Breaking Through: Delivering on the Promise of Gene Therapy](#). This event coincided with the release of a major new report from the Council of Canadian Academies: [From Research to Reality](#). Dr. Annan moderated the closing panel on the future of gene therapies and gene editing.



THE FUTURE STEWARDS OF QUEBEC'S WATERWAYS

[Mission eDNA](#) is an innovative citizen science project that allows young people to take part in real-world, scientific fieldwork by becoming researchers for a day. Supported by [Génome Québec](#), this initiative involves high school students across Quebec collecting genomic data to better understand the state of biodiversity in waterways through DNA. This activity, which works into the curriculum of secondary science courses of the Ministry of Education and Higher Education, is supervised by a team of scientists from [l'Université Laval](#), the Ministry of Forests, Wildlife and Parks, the Ministry of the Environment and the Fight against Climate Change and, most recently, [Hydro-Québec](#).

Ultimately, the data collected will provide valuable information on the status of invasive species and species at risk in rivers. These scientific data can also be used to develop management tools and protect the biodiversity of ecosystems. The data will be kept in a database and made available to the scientific community and appropriate ministries. This educational platform created by [Génome Québec](#) is funded by the Ministry of Economy and Innovation. [Hydro-Québec](#) has recently become a funding partner.

The second edition of the project, during the 2020-21 school year, involved 26 schools and more than 1,000 students in the regions of Capitale-Nationale, Beauce, Chaudière-Appalaches and Saguenay-Lac-Saint-Jean. Students collected a total of 660 samples, the equivalent of 165 litres of filtered water, from 44 sampling sites across 16 rivers and lakes. A third edition is in the works for 2021-22. Over several years, Mission ADN-eau will inspire a new generation of ambassadors for environmental genomics and help them explore their interests in scientific professions.

In partnership with [Génome Québec](#)

- **Let's Talk Science:** We collaborated on [two genomics symposia](#) attended by more than 700 high school students across Canada (and internationally) in March 2021—one on synthetic biology for which our talented coop student did a Twitter takeover, and the other, with Génome Québec, on environmental DNA and citizen science.



- **Continued investment in the Joint Initiative with SSHRC on Societal Implications of Genomics.** This \$1.3 million initiative with the Social Sciences and Humanities Research Council (SSHRC) jointly supports social sciences and humanities research and related activities that will enrich the understanding of the [societal implications of genomic research](#). With applications coming through and peer reviewed by SSHRC, a total of 10 projects have been approved for funding since 2013. We initiated dialogue with SSHRC on a strategic foresight collaboration for 2022 to launch a knowledge synthesis competition on the future of genomics and implications for society.

- **Continued funding of the Genomics in Society Interdisciplinary Research Teams program.** This \$5.8 million program, including co-funding, launched in February 2019, [brings researchers from different disciplines together](#) to investigate factors affecting the advancement, adoption, evaluation and governance of genomics research, and to 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. We invested \$0.4 million in 2020-21.
- **Continued funding of research on the implications of genomics in society (GE³LS) through the LSARP program.** All LSARP projects undertake research on the application and implications of genomics in society with the potential to inform and help implement changes in practices or policies related to use of genomics research and innovation or enhance understanding of the implications for society more broadly. Examples of the impacts of these components of LSARPs arising in 2020-21 include the public engagement with the Silent Genomes Project through a [Telus documentary](#) and the inclusion of bioremediation as an approach in the Government of Canada's new Ocean Protections Plan's [Alternative Response Measures](#) for oil spills. Since 2014, the LSARP program has committed an investment of \$46.5 million, including co-funding, in GE³LS research.

Operating challenges in 2020-21

An ongoing operating challenge remains co-funding. The current model of short-term funding agreements with the Government of Canada presents some 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 are motivated to secure longer-term federal funding that would position Genome Canada as a more stable and credible partner with industry and the provinces and territories. Many essential co-funding partners require a multi-year planning horizon for the kind of large-scale and long-term investments that genomics research and innovation entail. In addition, eased requirements for co-funding would positively affect equitable access to Genome Canada funding, as the current model can favour more experienced researchers with larger networks and those with a long track record of funding to attract co-funding partners.

Mission-related challenges for CanCOGeN revolve around data sharing. With the current model, completed sequencing in Canada is uploaded to the NML and then to GISAID. However, due to restrictions within GISAID, not all Canadian researchers have been able to access these data. To overcome this challenge, CanCOGeN launched a rapid request for proposals in February 2021 to create a national data portal to serve as a repository for Canadian SARS-CoV-2 data which will ensure Canadian researchers have the access they need.

The COVID-19 pandemic has presented unique challenges for the research sector. With the closing of academic institutions around the country, there have been delays in research projects with research labs closed, childcare centres shuttering their doors and researchers no longer able to be in close physical proximity to their teams. Economic effects have heightened the risk that co-funding will be difficult to obtain, as businesses and governments will have to adjust their budgets to account for reduced revenues.

Photo credit: Christina Weese



IMPROVING FOOD SECURITY: FIRST GLOBAL GENOMIC WHEAT ATLAS

Wheat is the most important crop for global food security, as it supplies the most calories and proteins to the global population. Wheat is also grown on more land area than any other commercial crop. Meeting the challenge of increasing wheat production to match the growing demand for food over the next 20–30 years is critical. Current yield gains (~0.67% per year) are impressive but will not meet the need (1.6–1.8%) of a growing global population and may become unsustainable due to lack of new genetic diversity. To meet these challenges, Genome Canada funded Dr. Curtis Pozniak and his Canadian Triticum Applied Genomics (CTAG2) team in the [application of genomic tools to advance diversity in wheat breeding](#).

Canada, under the leadership of the CTAG2 team, subsequently took part in an international collaboration that generated the most comprehensive atlas of wheat genome sequences ever reported. The [10+ Genome Project](#) involved more than 95 scientists from universities and institutes in Canada, Switzerland, Germany, Japan, the U.K., Saudi Arabia, Mexico, Israel, Australia and the U.S. The findings are enabling scientists and breeders to more quickly identify influential genes for improved yield, pest resistance and other important crop traits. This will help meet future food demands in Canada and across the globe, and strengthen Canada's export advantage in wheat. The study, which sequenced the genomes of 15 wheat varieties, is the start of a larger effort to generate thousands of genome sequences, including genetic material brought in from wheat's wild relatives.

In partnership with Genome Prairie

Operations and management

GOVERNANCE

Genome Canada is governed by our Board of Directors, comprising 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. New Directors are appointed for two-year terms, renewable up to a maximum of six years.

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 the Board with strategic advice, approaches and directions to help Genome Canada achieve our objectives.

NUMBER OF MEETINGS HELD BY THE BOARD AND ITS COMMITTEES IN 2020-21

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

BOARD OF DIRECTORS, EX-OFFICIO ADVISORS, AND SCIENCE AND INDUSTRY ADVISORY COMMITTEE MEMBERS IN 2020-21

Board of Directors

Elizabeth Douville (Chair)

Founder and Managing Partner
AmorChem Venture Fund
Montreal, Quebec

Jim Farrell (Vice-Chair)

Forest Sector Consultant
Ottawa, Ontario

Rob Annan

President and CEO
Genome Canada
Ottawa, Ontario

Eric Cook

CEO
Research and Productivity Council
Fredericton, New Brunswick

Jennifer Gardy

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

Ian Rae

Founder and CEO
CloudOps
Montreal, Quebec

Eddy Rubin

Chief Science Officer
Metabiota
San Francisco, California, U.S.

Bonnie Schmidt

Founder and President
Let's Talk Science
London, Ontario (as of June 2020)

Jacques Simoneau

Corporate Director
Fer 3 Capital Inc.
Montreal, Quebec

Andrew Stephens

Corporate Director and retired oil and gas executive
Canmore, Alberta (as of June 2020)

Janet Wightman

Managing Director
Kincannon & Reed
Regina, Saskatchewan

Ex Officio Advisors

Ted Hewitt

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

Michael J. Strong

President
Canadian Institutes of Health Research
Ottawa, Ontario

Roseann O'Reilly Runte

President and CEO
Canada Foundation for Innovation
Ottawa, Ontario

Alejandro Adem

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

Iain Stewart

President
National Research Council of Canada
Ottawa, Ontario (until December 2020)

Mitch Davies

President
National Research Council of Canada
Ottawa, Ontario (as of January 2021)

Science and Industry Advisory Committee

Doane Chilcoat (Chair)

Leader, Applied Science and Technology
Corteva Agriscience
Johnston, Iowa, U.S.

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, Pediatric Genetics
Invitae
San Diego, California, U.S.

Joan Lunney

Supervisory Research Scientist
Beltsville Agricultural Research Center
Beltsville, Maryland, U.S. (until June 2020)

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.

Cami Ryan

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

Julie Segre

Senior Investigator
National Institutes of Health
Bethesda, Maryland, U.S.
(until June 2021)

Dan Roden

Professor, School of Medicine
Vanderbilt University
Nashville, Tennessee, U.S. (until June 2020)

Jeremy Shears

Chief Scientist - Biosciences
Shell
London, England (as of June 2020)

Wyeth Wasserman

Executive Director
BC Children's Hospital Research Institute
Vancouver, British Columbia

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 (as of June 2020)

Management Team

Rob Annan

President and CEO

Cindy Bell

Executive Vice-President, Corporate
Development
(Retired in March 2021)

Scott Davies

Vice-President, Corporate Services
and CFO

Pari Johnston

Vice-President, Policy and Public Affairs

Karl Tibelius

Vice-President, Genomics Programs

“Congratulations to Dr. Cindy Bell, Executive Vice-President, Corporate Development, on her retirement. Over the past two decades, Cindy Bell has played a central role in Genome Canada’s development, growth and impact. She has been a tireless champion for genomics research in Canada and internationally – and her passion, vision and energy have been driving forces in our success.”

- Dr. Rob Annan, President and CEO, Genome Canada

Financial management

Genome Canada has invested approximately \$4 billion in genomics research since our creation in 2000, of which the federal government has provided \$1.7 billion, including investment income from this funding. The remaining \$2.3 billion has come from national and international partners, including provincial governments and private- and public-sector partners. Genome Canada's investments support 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 from other parties, including provincial governments, universities, the private sector and other national and international organizations. Genome Canada's 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 the annual requirements of research projects. This funding goes to the six Genome Centres, which direct the funds 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 quarterly to Genome Canada.

The total annual financial investment in projects is shown in the graph below. Genome Canada and the Centres monitor total project investment. Genome Canada project leaders managed \$205.7 million in funding in 2020-21, of which \$79.3 million was from Genome Canada and \$126.4 million from co-funding.

Genome Canada's operating costs were \$6.5 million in 2020-21. Operations include activities relating to genomics programs, strategy, fundraising, policy and communications, genomics in society, governance, performance and evaluation, and administration.

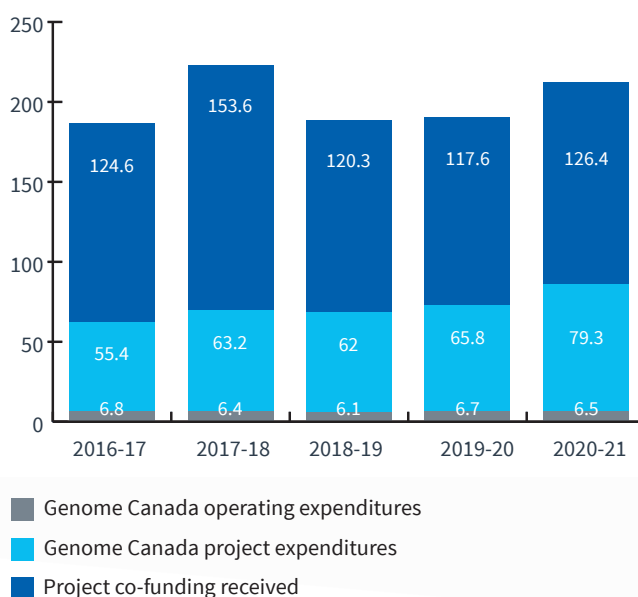
Our operating costs include the following remuneration. All Board members and Science and Industry Advisory Committee members receive remuneration from Genome Canada, and Genome Canada reimburses directors for expenses incurred in the performance of their duties. The compensation policy for our staff 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, 2021, the following are the annual salary ranges:

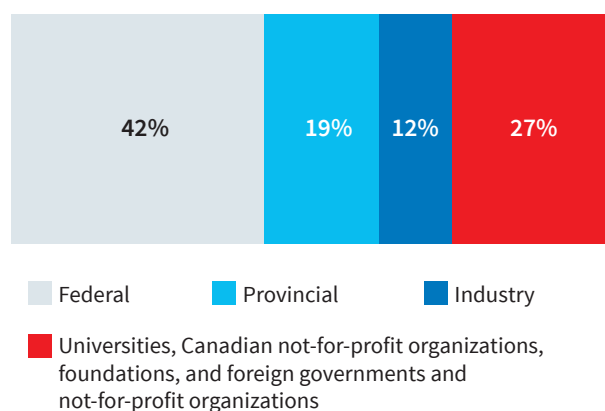
- President and CEO \$275,000 to \$340,000
- Vice-Presidents \$144,719 to \$217,078
- Directors (Band 4) \$112,460 to \$168,690
- Directors (Band 3) \$87,392 to \$131,086
- Managers (Band 2) \$67,911 to \$101,867

As of March 31, 2021, Genome Canada has \$34.3 million in investments, at market value. These investments are administered in accordance with the Board's approved investment policy and the terms and conditions of the contribution agreement with the federal government. The investment policy remained unchanged this past fiscal year.

Annual activity (in millions of dollars)



Investment by Genome Canada and co-funders since 2000



Total Genome Canada funding: \$1.7 B
Total co-funding: \$2.3 B
Total investment: \$4.0 B

Acknowledgments

Genome Canada gratefully acknowledges the support of the Government of Canada, the lead investor in our mission-driven vision. The federal government's announcement of \$400 million for a new Pan-Canadian Genomics Strategy in Budget 2021—and our role in kickstarting it—recognized the key role of genomics in developing cutting-edge therapeutics and in helping Canada track and fight COVID-19. The investment also acknowledged Canada's global leadership in the field and the potential of genomics to improve Canadians' health and well-being while also creating good jobs and economic growth.

With funding from

Canada 

We collaborate with partners across the ecosystem in program delivery and policy dialogue, and wish to acknowledge the following organizations for their partnership last year:

- Agriculture and Agri-Food Canada
- Brookfield Institute for Innovation and Entrepreneurship
- BIOTECanada
- Canadian Cancer Research Alliance
- Canada Foundation for Innovation
- Canadian Institutes of Health Research
- Canadian Public Health Laboratory Network
- Canadian Science Policy Centre
- CanCOVID Forum
- CGEn
- CIFAR
- Council of Canadian Academies
- DNASTack and COVID Cloud
- Environment and Climate Change Canada
- Gairdner Foundation
- Health Canada
- Let's Talk Science
- McGill University Centre for Computational Genomics
- Mitacs
- Natural Resources Canada
- National Digital Research Infrastructure Organization
- National Microbiology Laboratory
- National Research Council
- Natural Sciences and Engineering Research Council
- Office of the Chief Science Advisor
- Public Health Agency of Canada
- Public Policy Forum
- Social Sciences and Humanities Research Council
- SING Canada

Appendices



Active projects funded 2020-21

LARGE-SCALE SCIENCE

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding	Genome Canada contribution
Large-Scale Applied Research Projects (LSARP)						
Genome Alberta Genome Prairie	Agriculture	Dyck, Michael Harding, John Kemp, Bob	University of Alberta University of Saskatchewan PigGen Canada Inc.	Application of Genomics to Improve Disease Resilience and Sustainability in Pork Production	\$9,801,714	\$3,799,998
Genome Alberta Ontario Genomics	Agriculture	Schenkel, Flavio Stothard, Paul	University of Guelph University of Alberta	Increasing Feed Efficiency and Reducing Methane Emissions through Genomics: A new Promising Goal for the Canadian Dairy Industry	\$10,306,910	\$3,798,134
Genome Alberta Ontario Genomics Genome British Columbia Génome Québec	Agriculture	Baes, Christine Stothard, Paul Ceri, Ronaldo Sirard, Marc-André	University of Guelph University of Alberta University of British Columbia Université Laval	Integrating Genomic Approaches to Improve Dairy Cattle Resilience: A Vomprensive Goal to Enhance Canadian Dairy Industry Sustainability	\$12,541,132	\$3,997,769
Genome British Columbia	Agriculture	Birol, Inanc	University of British Columbia	PeptAid – Antimicrobial Peptides to Replace Antibiotics in Farm Veterinary Practice	\$6,887,638	\$3,441,747
Genome British Columbia	Agriculture	Rieseberg, Loren H. Burke, John M.	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	University of British Columbia York University	Sustaining and Securing Canada's Honey Bees Using 'Omic Tools	\$7,263,568	\$2,786,531
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
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	Agriculture	Belzile, François Bélanger, Richard	Université Laval	SoyaGen: Improving Yield and Disease Resistance in Short-Season Soybean -	\$8,235,673	\$1,602,591 -
Génome Québec	Agriculture	Goodridge, Lawrence Levesque, Roger C.	McGill University Université Laval	A SystOMICS Approach to Ensuring Food Safety and Reducing the Economic Burden of Salmonellosis -	\$9,708,401	\$3,787,861 -
Ontario Genomics Genome British Columbia	Agriculture	Zayed, Amro Foster, Leonard	York University University of British Columbia	BeeCSI: 'Omic Tools for Assessing Bee Health	\$9,922,052	\$3,849,471
Genome Alberta Genome Atlantic	Energy	Gieg, Lisa Wolodko, John Khan, Faisal	University of Calgary University of Alberta Memorial University	Managing Microbial Corrosion in Canadian Offshore and Onshore Oil Production	\$7,850,739	\$2,307,750
Genome Alberta	Environment	McKenzie, Debbie Wishart, David	University of Alberta	Systems Biology and Molecular Ecology of Chronic Wasting Disease	\$11,500,523	\$3,092,335

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding	Genome Canada contribution
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
Genome British Columbia	Environment	Schulte, Patricia M. Koop, Ben Farrell, Anthony	University of British Columbia University of Victoria	Sustaining Freshwater Recreational Fisheries in a Changing Environment	\$4,386,173	\$1,460,163
Génome Québec	Environment	Sauvé, Sébastien 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
Genome British Columbia Génome Québec	Fisheries	Koop, Ben Bernatchez, Louis	University of Victoria Université Laval	Enhancing Production in Coho: Culture, Community, Catch (EPIC4)	\$9,709,592	\$3,796,910
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	Fisheries	Walker, Virginia K. Lougheed, Stephen C. Schott, Stephan van Coeverden de Groot, Peter	Queen's University Carleton University	Towards a Sustainable Fishery for Nunavummiut	\$5,652,792	\$2,124,674
Ontario Genomics Genome Prairie	Fisheries	Health, 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 Genome British Columbia	Forestry	Thomas, Barb Erbilgin, Nadir El-Kassaby, Yousry	University of Alberta University of British Columbia	Resilient Forests (RES-FOR): Climate Pests & Policy – Genomic Applications	\$5,678,657	\$1,762,342
Genome British Columbia Genome Alberta Génome Québec	Forestry	Aitken, Sally Yeaman, Samuel Hamelin, Richard	University of British Columbia University of Calgary Université Laval	CoAdapTree: Healthy Trees for Future Climates	\$5,800,000	\$1,881,454
Genome British Columbia Génome Québec	Forestry	Bohlmann, Joerg Bousquet, Jean	University of British Columbia Université Laval	Spruce-Up: Advanced Spruce Genomics for Productive and Resilient Forests	\$10,417,352	\$3,000,000
Genome British Columbia Génome Québec	Forestry	Hamelin, Richard Duff, Cameron Porth, Ilga	University of British Columbia Canadian Food Inspection Agency Université Laval	BioSurveillance of Alien Forest Enemies (BioSAFE)	\$8,730,760	\$2,763,989

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding	Genome Canada contribution
Ontario Genomics Genome British Columbia	Forestry	Master, Emma Brumer, Harry	University of Toronto University of British Columbia	SYNBIOMICS: Functional Genomics and Techno-Economic Models for Advanced Biopolymer Synthesis	\$10,725,222	\$2,830,771
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.	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.	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 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 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	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	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 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
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

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding	Genome Canada contribution
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 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
Ontario Genomics	Mining	Warren, Lesley A. Banfield, Jillian	University of Toronto	Mine Wastewater Solutions: Next Generation Biological Treatment through Functional Genomics	\$3,682,691	\$1,181,739

Emerging Issues

Genome British Columbia	Agriculture	Rieseberg, Lorne	University of British Columbia	DivSEEK Canada: Harnessing Genomics to Accelerate Crop Improvement in Canada	\$751,552	\$242,800
Genome Prairie	Agriculture	Murphy, Lee Anne Navabi, Katayoon	University of Manitoba	DivSEEK International Network	\$742,073	\$242,073
Genome Alberta	Health	Pillai, Dylan R.	University of Calgary	Development and Implementation of Rapid Metagenomic Sequencing Coupled with Isothermal Amplification Point of Care Testing for Viral Diagnostics	\$957,700	\$244,715
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	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
Ontario Genomics Génome Québec	Health	Rabusseau, Guillaume Makarenkov, Vladimir Mazoure, Bogdan	Canadian Institute for Advanced Research Université de Montréal Université du Québec à Montréal McGill University	Modeling the Transmission of SARS-CoV-2 Between Zoonotic Sources on a Gene Level Collaborators	\$30,000	\$15,000

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	\$5,303,081	\$5,303,081
All	Health	VirusSeq Implementation Committee	Canadian Public Health Laboratory Network (CPHLN)	VirusSeq: Sequencing of Genomes of Canadian SARS-CoV-2 Viral Samples	\$6,399,125	\$6,399,125
Genome BC	Health	William Hsiao	Simon Fraser University	VirusSeq: Metadata Specifications Development, Sharing and Curation	\$437,500	\$437,500
Genome BC	Health	Terrance Snutch	University of British Columbia	VirusSeq: ARTIC Protocol Development and Modification	\$188,968	\$188,968
Genome BC	Health	Fiona Brinkman	Simon Fraser University	VirusSeq: IRIDA Support and Dissemination	\$80,000	\$80,000
Génome Québec	Health	Yann Joly	McGill University	VirusSeq: Ethics & Governance	\$130,000	\$130,000
Ontario Genomics	Health	Jared Simpson	Ontario Institute for Cancer Research (OICR)	VirusSeq: Development of Quality Control Criteria and Standards	\$100,000	\$100,000
Génome Québec	Health	Guillaume Bourque	McGill University	VirusSeq: National Data Portal	\$100,000	\$100,000

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding	Genome Canada contribution
Regional, national and international initiatives						
Genome British Columbia	Agriculture	Lu, Xiaonan Hsiao, William	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 Prairie	Agriculture	Pozniak, Curtis	University of Saskatchewan	An Integrated Approach for Enhancing Fusarium Head Blight Resistance in Durum	\$1,475,000	\$475,000
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
Genome Atlantic	Environment	Finn, Dave Cote, David Hajibabaei, Mehrdad	Petroleum Research, Newfoundland and Labrador Fisheries and Oceans Canada University of Guelph	Advancing Environmental Genomics in the Marine Environment	\$1,304,000	\$200,000
Genome British Columbia	Environment	Prystajecy, Natalie Levett, Paul	University of British Columbia BC Centre for Disease Control	Unified Pathogen Control One Health Approach Specifically Targeting Norovirus (UPCOAST-N)	\$499,990	\$166,663
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 Atlantic	Fisheries	Santander, Javier	Memorial University	Whole Genome Sequencing and Transcriptome Profiling in Response to Vaccination of Cleaner Fish Cyclopterus Lumpus and Tautoglabrus Adspereus	\$840,000	\$200,000
Genome Alberta	Health	Bernier, Francois Kellner, Jim	University of Calgary	COVID-19 Precision Health Genomics for Children: A Multiomic Study of the ABCCC (Alberta Childhood COVID-19 Cohort)	\$577,500	\$143,750
Genome Alberta	Health	Croxen, Matthew Chui, Linda	University of Alberta	Genomics-Enhanced Rapid COVID-19 Pandemic Response	\$237,500	\$18,750
Genome Alberta	Health	Lewis, Ian A. Gregson, Daniel	University of Calgary	Enabling Widespread COVID-19 Testing via High-Throughput Proteomics Detection	\$200,000	\$75,000

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 Alberta Génome Québec	Health	McCabe, Christopher Rousseau, François	University of Alberta	Genomics and Personalized Health GE3LS Network Program	\$1,996,945	\$998,473
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	Health	Joly, David Filion, Martin	Université de Moncton	TRICHUM: Translating Research into Innovation for Cannabis Health at Université de Moncton	\$1,227,800	\$200,000
Genome Atlantic	Health	Kelvin, David J. Kelvin, Alyson	Dalhousie University	Identification of Biomarkers that Predict Severity of COVID-19 Patients	\$237,500	\$118,750
Genome Atlantic	Health	Thomas, Nikhil Archibald, John Langille, Morgan	Dalhousie University	Massive High Throughput COVID-19 Testing Using Next Generation Sequencing (NGS): Addressing the Urgent Need for Widescale Testing Capacity Within Communities	\$178,750	\$118,750
Genome British Columbia	Health	Bryan, Stirling Austin, Jehannine	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	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	Health	Pimstone, Simon Krajden, Mel Penninger, Josef Bubela, Tania	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
Genome British Columbia	Health	Sanatani, Shubhayan	BC Children's Hospital	Improving Diagnosis and Treatment of Catecholaminergic Polymorphic Ventricular Tachycardia	\$4,640,290	\$333,000
Genome Prairie	Health	Cameron, Andrew	University of Regina	Targeted Metagenomic Detection and Characterization of SARS-CoV-2 and Co-infecting Viruses	\$468,000	\$240,000
Genome Prairie	Health	Spriggs, Beth Banerji, Shantanu Wilcox, Ayn	Shared Health Manitoba University of Manitoba	Genome360 Phase II: Manitoba's Provincial Applied Genomics Enterprise Platform	\$2,027,496	\$475,000
Génome Québec	Health	Knoppers, Bartha Maria	McGill University	Can-SHARE Connect (2019-2020): Supporting the Regulatory and Ethics Work Stream	\$500,000	\$166,667
Génome Québec	Health	Knoppers, Bartha Maria	McGill University	Canadian Genomics Partnership for Rare Disease - The Regulatory and Ethics Toolbox	\$329,715	\$244,715
Génome Québec	Health	Tyers, Michael	Université de Montréal	Integration of Genomics and AI to Accelerate Drug Discovery Against COVID-19	\$1,011,079	\$237,500
Ontario Genomics	Health	Arrowsmith, Cheryl Edwards, Aled	University of Toronto	The Structural Genomics Consortium V	\$23,442,800	\$4,992,801
Ontario Genomics	Health	Brudno, Michael	The Hospital for Sick Children	Harmonising Phenomics Information for a Better Interoperability in the RD Field	\$4,429,833	\$333,000

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding	Genome Canada contribution
Ontario Genomics	Health	Diamandis, Eleftherios	University of Toronto	Netherton Syndrome: From Mechanisms to Therapies	\$4,358,669	\$333,000
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	Health	Gattinger, Monica	University of Ottawa	@Risk: Strengthening Canada's Ability to Manage Risk	\$195,166	\$97,583
Ontario Genomics	Health	Goodhand, Peter	Ontario Institute for Cancer Research	Canadian Genomics Partnership for Rare Disease	\$488,000	\$244,000
Ontario Genomics	Health	Sargent, Ted	University of Toronto	Bio-inspired Solar Energy Network	\$500,000	\$250,000
Ontario Genomics	Health	Stein, Lincoln	University of Toronto	Advancing Big Data Science in Genomics Research Project - The Cancer Genome Collaboratory	\$5,999,860	\$2,000,000
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

LEADING-EDGE TECHNOLOGY

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding*	Genome Canada contribution
Support for Technology Platforms						
Genome Alberta Genome British Columbia Génome Québec	All	Wishart, David Borchers, Christoph Li, Liang	University of Alberta McGill University	The Metabolomics Innovation Centre	\$8,088,844	\$8,088,844
Genome British Columbia Génome Québec	All	Goodlett, David Borchers, Christoph Foster, Leonard	University of Victoria McGill University University of British Columbia	The Pan-Canadian Proteomics Centre	\$8,115,330	\$8,115,330
Genome British Columbia	All	Marra, Marco Jones, Steven Hirst, Martin	BC Cancer University of British Columbia	BC Cancer Agency Genome Sciences Centre Genomics Technology Platform	\$8,101,750	\$8,101,750
Génome Québec	All	Lathrop, Mark Ragoussis, Ioannis Bourque, Guillaume Pastinen, Tomi	McGill University	McGill Applied Genomics Innovation Core	\$8,111,584	\$8,111,584
Génome Québec	All	Thibault, Pierre Tyers, Michael	Université de Montréal	Centre for Advanced Proteomic and Chemogenomic Analyses	\$3,014,780	\$3,014,780
Génome Québec Ontario Genomics	All	Bourque, Guillaume Burdno, Michael	McGill University The Hospital for Sick Children	Canadian Centre for Computational Genomics	\$6,206,097	\$6,206,097
Ontario Genomics	All	Awadalla, Philip Bartlett, John Pugh, Trevor Simpson, Jared Stein, Lincoln	Ontario Institute for Cancer Research	Canadian Data Integration Centre	\$5,665,792	\$5,665,792
Ontario Genomics	All	Scherer, Stephen Strug, Lisa	The Hospital for Sick Children	The Centre for Applied Genomics	\$8,110,420	\$8,110,420

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding*	Genome Canada contribution
Ontario Genomics	All	Wrana, Jeff Gingras, Anne-Claude	Lunenfeld-Tanenbaum Research Institute Sinai Health System	Network Biology Collaborative Centre	\$4,457,958	\$4,457,958
Ontario Genomics Génome Québec	All	Justice, Monica Vidal, Sylvia	The Hospital for Sick Children McGill University	The Centre for Phenogenomics	\$5,346,369	\$5,346,369

* Total funding for the Technology Platforms does not include co-funding, which at a minimum will equal the Genome Canada contribution over the term of the platform.

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	Agriculture	Hsiao, William Van Domselaar, Gary	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
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
Genome British Columbia	Environment	Biroł, Inanc	BC Cancer Agency	AnnoVis: Annotation and Visualization of De Novo Genome and Transcriptome Assemblies	\$1,000,000	\$500,000
Genome British Columbia	Environment	Hallam, Steven	University of British Columbia	Global Scale Metabolic Pathway Reconstruction from Environmental Genomes	\$1,028,699	\$499,962
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
Ontario Genomics	Environment	Adamowicz, Sarah Hebert, Paul	University of Guelph	Extracting Signal from Noise: Big Biodiversity Analysis from High-Throughput Sequence Data	\$482,070	\$250,000
Ontario Genomics	Forestry	Provar, Nicholas Bohlmann, Joerg	University of Toronto 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
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
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
Genome British Columbia	Health	Foster, Leonard Wishart, David	University of British Columbia University of Alberta	Illuminating the Dark Matter of the Metabolome with Convolutional Neural Networks	\$500,000	\$250,000

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding	Genome Canada contribution
Genome British Columbia	Health	Joy, Jeffrey B. Montaner, Julio S.G.	University of British Columbia	Development and Implementation of Bioinformatics Tools for HIV and HCV Phylogenetic Monitoring Platforms	\$1,249,397	\$499,992
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	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	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	Health	Boone, Charles Myers, Chad L.	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 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
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	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

Ontario Genomics	Agriculture	Krell, Peter Doucet, Daniel	University of Guelph	Cell Biosensors for Rapid Screening of Insect Attractants	\$233,901	\$233,901
Genome British Columbia	Health	Borchers, Christoph Sickmann, Albert	University of Victoria	Replacing Immunoassays with MS-based Technology: Quantitative Proteomics Kits Enabling Deep Molecular Phenotyping of the Mouse	\$3,865,231	\$999,695
Genome British Columbia	Health	Hansen, Carl	University of British Columbia	Next Generation Immune Profiling Technology based on Microfluidic Single Cell Analysis	\$2,993,509	\$991,185
Génome Québec	Health	Juncker, David	McGill University	Digital Omics of Single Exosomes	\$2,001,438	\$667,157

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding	Genome Canada contribution
Génomique 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	Boone, Charles Moffat, Jason	University of Toronto	AbSyn Technology for Identification of Synergistic Cancer Therapeutics	\$249,389	\$249,389
Ontario Genomics	Health	Boone, Charles Moffat, Jason	University of Toronto	AbSyn Technology for Identification of Synergistic Cancer Therapeutics	\$2,468,009	\$896,331
Ontario Genomics	Health	Dowling, James Brudno, Michael	The Hospital for Sick Children	RNA-seq in Patient-Derived ex-vivo Models: Genetic Diagnostics beyond Whole Exomes	\$250,000	\$250,000
Ontario Genomics	Health	Emili, Andrew	University of Toronto	Massively Parallel Single Molecule Protein Sequencing in Situ	\$250,000	\$250,000
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	Finan, Turlough	McMaster University	Development of Advanced Genetic Toolbox for <i>Sinorhizobium Meliloti</i> to Enable Genome Scale Engineering	\$250,000	\$250,000
Ontario Genomics	Health	Scherer, Stephen Lok, Si	The Hospital for Sick Children	Economical High Throughput de novo Whole Genome Assembly	\$241,467	\$241,467
Ontario Genomics	Health	Shlien, Adam Dowling, James	Hospital for Sick Children	Beyond the Genome: Transcriptome Based Diagnostics for Rare Diseases and Cancer	\$2,999,944	\$999,419
Ontario Genomics	Health	Sidhu, Sachdev	University of Toronto	Synthetic Inhibitors of Ubiquitin-Binding Cancer Targets	\$3,009,018	\$1,000,000
Ontario Genomics	Health	Stagljär, Igor	University of Toronto	The Mammalian Membrane Two-Hybrid (MaMTH) Assay - an Advanced Proteomics Technology for Biomedical Research	\$3,034,211	\$1,000,000
Ontario Genomics	Health	Stagljär, Igor	University of Toronto	Interactome Mapping of Disease-Related Proteins Using Split Intein-Mediated Protein Ligation (SIMPL)	\$2,223,117	\$741,039
Ontario Genomics	Health	Tabard-Cossa, Vincent	University of Ottawa	Solid-State Nanopore-based Quantification of Low-Abundance Biomarkers	\$250,000	\$250,000
Ontario Genomics	Health	Taylor, Michael Khokha, Rama	The Hospital for Sick Children	Functional Genomics in Human Cells for Drivers of Lethal Metastatic Human Cancers	\$250,000	\$250,000
Ontario Genomics	Health	Wheeler, Aaron Kolomietz, Elena Chitayat, David	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	Wilson, Michael Shlien, Adam	University of Toronto	SANGRE (Systematic Analysis of Blood Gene Regulation by Sequencing) – Bringing RNA-seq to Clinical Diagnostics	\$249,934	\$249,934

TRANSLATION

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding	Genome Canada contribution
Genomic Applications Partnership Program (GAPP)						
Genome Alberta	Agriculture	Dyck, Michael Kemp, Bob	University of Alberta PigGenCanada	Application of Genomics-based Tools to Select for Pig Disease Resilience	\$1,026,200	\$340,200
Genome British Columbia	Agriculture	Rieseberg, Lorne Baute, Greg	University of British Columbia	Fast-Track Breeding of Powdery Mildew-Resistant Cannabis	\$4,265,446	\$1,421,673
Genome Prairie	Agriculture	Yost, Christopher Whiting, Mike	University of Regina Lallemand Plant Care	Improving On-Seed Survival and Performance of Legume Inoculants Using Genome Shuffling	\$427,491	\$142,491
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
Génome Québec	Agriculture	Martin, Vincent Pouliot, Michel	Concordia University Agropur Cooperative	Bioprocess Development for Lactose Valorisation	\$1,950,000	\$650,000
Génome Québec	Agriculture	Robert, Claude Sullivan, Brian	Université Laval Canadian Centre for Swine Improvement	Chips for Better Chops: Commercial Application of Genomics for Accelerated Swine Genetic Improvement	\$6,550,103	\$1,996,186
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	\$6,000,000	\$2,000,000
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	Guttman, David Paulter, Michael	University of Toronto Vineland Research and Innovation Centre	Broad-Range Disease Resistance in Greenhouse Vegetables	\$2,008,200	\$668,291
Ontario Genomics	Agriculture	LaPointe, Gisele Pepe, Maria	University of Guelph Parmalat Canada	Translating OMICS for Competitive Dairy Products	\$1,339,129	\$446,077
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
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
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
Genome Prairie Génome Québec	Environment	Palace, Vince Smyth, Patrick	IISD - Experimental Lakes Area Canadian Association of Petroleum Producers	Floating Wetland Treatments to Enhance Remediation (FLOWTER)	\$3,905,267	\$1,119,560
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	Environment	Edwards, Elizabeth A. Dworatzek, Sandra	University of Toronto SiREM	Field Validation of Technologies for Anaerobic Benzene and Alkylbenzene Bioremediation	\$2,752,161	\$926,160

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding	Genome Canada contribution
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	Environment	Mahadevan, Radhakrishnan Dugar, Deepak	University of Toronto Visolis Inc.	Genomics Driven Engineering of Hosts for Bio-Nylon	\$5,700,000	\$1,900,000
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
Genome Atlantic	Fisheries	Rise, Matthew Taylor, Richard	Memorial University EWOS Innovation	Integrated Pathogen Management of Co-Infection in Atlantic Salmon	\$4,533,102	\$1,509,113
Genome Atlantic Génome Québec	Fisheries	Bernatchez, Louis Mallet, André	Université Laval L'Étang Ruisseau Bar Lée	Genomics for Developing the first Canadian Production Ready Strain of Selectively Bred Eastern Oyster	\$3,806,291	\$1,249,924
Genome British Columbia	Forestry	Bohlmann, Joerg Russell, John H.	University of British Columbia British Columbia Ministry of Forests, Lands and Natural Resource Operations	Cedar Enhanced Durability and Resistance (CEDaR): Sustainability of Canada's Western Redcedar Forestry Sector	\$2,150,779	\$716,811
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
Genome Alberta	Health	Lewis, Ian Benediktsson, Hallgrimur	University of Calgary Calgary Lab Services	Device for the Rapid Detection of Seven Common Bloodstream Infections and Assessment of Antibiotic Susceptibility	\$6,024,695	\$1,999,812
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
Genome British Columbia	Health	Carleton, Bruce Coté, Yvan	University of British Columbia Dynacare	Integrating Pediatric Pharmacogenomic Testing into the Canadian Health Care System	\$2,809,934	\$936,512
Genome British Columbia	Health	Lehman, Anna Ivany, Craig	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
Genome British Columbia	Health	Rossi, Fabio Heyries, Kevin	University of British Columbia AbCellera Biologics	Antibody Therapeutics for Duchenne Muscular Dystrophy	\$6,506,824	\$1,998,726
Génome Québec	Agriculture	Bélangier, 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	\$3,257,944	\$956,081
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
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
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

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding	Genome Canada contribution
Génomique Québec	Health	Thibault, Pierre Dunyach, Jean-Jacques	Université de Montréal Thermo Fisher Scientific	Bridging the ProteoGenomics Gap for Personalized Medicine Using Transformative Mass Spectrometry Technologies	\$1,737,722	\$522,730
Génomique 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	Bartlett, John Sadis, Seth	Ontario Institute for Cancer Research Thermo Fisher Scientific	Targeted Next Generation Sequencing Panels for Clinical Disease Management	\$6,000,000	\$2,000,000
Ontario Genomics	Health	Bramson, Jonathan Helsen, Christopher	McMaster University Triumvira Immunologics Inc.	Validation of TAC Receptors for Use against Liquid and Solid Tumors	\$2,256,179	\$723,883
Ontario Genomics	Health	Cowen, Leah Jaikaran, Dominic	University of Toronto Bright Angel Therapeutics	Targeting Fungal Stress Responses to Provide First-in-Class Treatment for Drug Resistant Fungal Pathogens	\$5,994,687	\$1,986,029
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	Health	Kelley, Shana Ambler, Natalie	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	Health	Lye, Stephen Liu, Xin	Lenefeld-Tanenbaum Research Institute BGI-Research	Leveraging Leukocytes as Endogenous Biosensors to Create Novel Diagnostics for Preterm Birth	\$4,565,893	\$1,503,307
Ontario Genomics	Health	McQuibban, Angus Li, Zheng	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
Ontario Genomics	Health	Moffat, Jason Singh, Sheila	University of Toronto Century Therapeutics	Systematic Evaluation and Optimization of Immune-Targeting Modalities for GBM and Brain Metastases	\$4,581,669	\$1,375,100
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
Ontario Genomics	Health	Stewart, David Sekhon, Harmon	Ottawa Hospital University of Ottawa Eastern Ontario Regional Laboratory Association	Standardization of Molecular Diagnostic Testing for Non-small Lung Cancer	\$2,054,798	\$595,197
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
Ontario Genomics Génomique 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

Centre(s)	Sector	Leader(s)	Organization(s)	Title	Total funding	Genome Canada contribution
Genomics in Society Interdisciplinary Research Teams						
Genome British Columbia Ontario Genomics	Agriculture	Regier, Dean A. Bubela, Tania Hanna, Timothy	BC Cancer Research 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 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

Auditor's report & audited financial statements

GENOME CANADA

Index

Year ended March 31, 2021

	Page
Independent Auditors' Report	
Financial Statements	
Statement of Financial Position	1
Statement of Operations and Changes in Net Assets	2
Statement of Cash Flows	3
Notes to Financial Statements	4



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

INDEPENDENT AUDITORS' 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, 2021
- 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, 2021, 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 "**Auditors' Responsibilities for the Audit of the Financial Statements**" section of our auditors' 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 auditors' report thereon, included in the Annual Report document.

KPMG LLP, an Ontario limited liability partnership and member firm of the KPMG global organization of independent member firms affiliated with KPMG International Limited, a private English company limited by guarantee. KPMG Canada provides services to KPMG LLP.

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 auditors' report thereon, included in the Annual Report document as at the date of this auditors' 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 auditors' 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.

Auditors' 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 auditors' 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 auditors' 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 auditors' 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.



Chartered Professional Accountants, Licensed Public Accountants

Ottawa, Canada

June 23, 2021

GENOME CANADA

Statement of Financial Position

March 31, 2021, with comparative information for 2020
(in thousands of dollars)

	2021	2020
Assets		
Current assets:		
Cash	\$ 5,388	\$ 7,515
Short-term investments (note 3)	46,445	34,280
Interest receivable	50	75
Other receivables	218	90
Prepaid expenses	226	243
	52,327	42,203
Capital assets (note 4)	25	31
	\$ 52,352	\$ 42,234

Liabilities and Net Assets

Current liabilities:		
Accounts payable and accrued liabilities (note 5)	\$ 1,127	\$ 831
Deferred contributions - research projects (note 6(a)i)	37,110	40,249
Deferred contributions - CanCOGeN (note 6(a)ii)	12,722	–
	50,959	41,080
Deferred lease inducements (note 7)	168	173
Deferred contributions (note 6)		
Deferred contributions - internally restricted	1,200	950
Deferred contributions related to capital assets	25	31
	1,225	981
Commitments (note 10)		
	\$ 52,352	\$ 42,234

See accompanying notes to financial statements.

On behalf of the Board:



Director

Rob Annan, President & CEO



Director

Elizabeth Douville, Chair

GENOME CANADA

Statement of Operations and Changes in Net Assets

Year ended March 31, 2021, with comparative information for 2020
(in thousands of dollars)

	2021	2020
Revenue:		
Research projects (note 6(a)i)	\$ 72,534	\$ 72,524
Research projects - CanCOGeN (note 6(a)ii)	13,218	–
Amortization of deferred contributions related to capital assets (note 6(b))	6	8
	<u>85,758</u>	<u>72,532</u>
Expenses:		
Projects and Genome Centres	66,619	65,810
Projects and Genome Centres – CanCOGeN	12,671	–
Corporate services	2,302	2,453
Strategy, development and external relations	1,970	2,097
Program management	1,643	2,164
Program management - CanCOGeN	547	–
Amortization of capital assets	6	8
	<u>85,758</u>	<u>72,532</u>
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, 2021, with comparative information for 2020
(in thousands of dollars)

	2021	2020
Cash provided by (used in):		
Operating activities:		
Excess of revenue over expenses	\$ –	\$ –
Items not affecting cash:		
Amortization of capital assets	6	8
Amortization of deferred lease inducement	(5)	(4)
Deferred contributions – research projects	(72,534)	(72,524)
Deferred contributions – CanCOGeN	(13,218)	–
Amortization of deferred contributions related to capital assets	(6)	(8)
Excluded from the increase in deferred contributions (note 9)	(155)	72
	(85,912)	(72,456)
Grants received from Government of Canada (note 6)	69,500	71,800
Grants received from Government of Canada – CanCOGeN (note 6)	25,940	–
Changes in non-cash operating working capital items:		
Increase in other receivables	(128)	(15)
Decrease in prepaid expenses	17	1
Increase in accounts payable and accrued liabilities	296	50
	95,625	(620)
Investing activities:		
Increase in short-term investments	(12,165)	(3,284)
Interest received on investments	377	791
Portfolio investment management	(52)	(44)
	(11,840)	(2,537)
Net change in cash	(2,127)	(3,157)
Cash, beginning of year	7,515	10,672
Cash, end of year	\$ 5,388	\$ 7,515

See accompanying notes to financial statements.

GENOME CANADA

Notes to Financial Statements

Year ended March 31, 2021
(in thousands of dollars)

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.

GENOME CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2021
(in thousands of dollars)

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.

GENOME CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2021
(in thousands of dollars)

3. Short-term investments:

	2021		2020	
	Cost	Fair market value	Cost	Fair market value
Government of Canada				
Treasury bills	\$ 1,710	\$ 1,710	\$ 4,474	\$ 4,475
Bank deposits/Bankers'				
Acceptance	17,720	17,728	4,083	4,099
Commercial paper	999	1,000	279	280
Provincial/Municipal Short-term				
bills and notes	5,014	5,016	11,628	11,670
Federal government bonds	12,096	12,071	3,796	3,796
Provincial government bonds	7,906	7,915	4,839	4,906
Corporate bonds	1,019	1,005	5,098	5,054
	\$ 46,464	\$ 46,445	\$ 34,197	\$ 34,280

The interest rates at the end of the year range from 0% to 2.873% (2020 - 0% to 5.187%) and mature at varying dates in 2022 (2020 - varying dates in 2021).

4. Capital assets:

	2021		2020	
	Cost	Accumulated amortization	Net book value	Net book value
Furniture, fixtures and office equipment	\$ 442	\$ 417	\$ 25	\$ 31

Cost and accumulated amortization at March 31, 2020, amounted to \$442 and \$411, respectively.

5. Accounts payable and accrued liabilities:

Included in accounts payable and accrued liabilities are \$Nil (2020 - \$Nil) for goods and services tax/harmonized sales tax and payroll-related taxes due to government entities.

GENOME CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2021
(in thousands of dollars)

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 three active Funding Agreements with the Government of Canada. As at March 31, 2021, Innovation, Science and Economic Development Canada had committed \$376,100 in grants to the Corporation under these agreements, of which \$239,640 has been received as at March 31, 2021. 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, 2021, the Corporation received \$38,000 under the agreement dated May 19, 2017, \$31,500 under the agreement dated April 1, 2020 and \$25,940 under the agreement dated July 8, 2020.

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

i. Deferred contributions – research projects:

	2021	2020
Balance, beginning of year	\$ 40,249	\$ 40,091
Add: grants received	69,500	71,800
Add: investment income	145	882
Less: amounts reflected in revenue	(72,534)	(72,524)
Less: amount internally allocated to wind-down costs (note 6(c))	(250)	–
Balance, end of year	\$ 37,110	\$ 40,249

ii. Deferred contributions – CanCOGeN:

	2021	2020
Balance, beginning of year	\$ –	\$ –
Add: grants received	25,940	–
Less: amounts reflected in revenue	(13,218)	–
Balance, end of year	\$ 12,722	\$ –

GENOME CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2021
(in thousands of dollars)

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:

	2021		2020	
Balance, beginning of year	\$	31	\$	39
Less: amounts amortized to revenue		(6)		(8)
Balance, end of year	\$	25	\$	31

(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.

GENOME CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2021
(in thousands of dollars)

7. Lease inducements:

The lease inducements include the following amounts:

	2021	2020
Leasehold improvement allowances	\$ 136	\$ 136
Free rent	32	37
Total lease inducements	\$ 168	\$ 173

The leasehold improvement allowance remained unspent during the 2021 period and was therefore not amortized. The amortization of leasehold improvement allowances and free rent are \$Nil and \$5, respectively (2020 - \$Nil and \$4, 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 \$246 (2020 - \$189).

9. Supplemental cash flow information:

	2021	2020
Gain (loss) on disposal of investments	\$ (53)	\$ 30
Fair value adjustment	(102)	42
	\$ (155)	\$ 72

GENOME CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2021
(in thousands of dollars)

10. Commitments:

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, 2021, the payments committed are approximately \$52,205 in 2022 and \$23,091 for other future years.

Operating leases:

The Corporation leases its premises and equipment under long-term operating leases, which expire at various dates between 2022 and 2028. The minimum aggregate lease payments are approximately as follows:

2022	\$	98
2023		101
2024		102
2025		107
2026		107
Thereafter		244
	\$	759

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. Foreign currency risk:

Foreign 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 \$6 (2020 - \$7) 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.

GENOME CANADA

Notes to Financial Statements (continued)

Year ended March 31, 2021
(in thousands of dollars)

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.

(d) Impact of COVID-19:

In March 2020, the COVID-19 outbreak was declared a pandemic by the World Health Organization and has had a financial, market and social dislocating impact.

As at March 31, 2021, the impact of the pandemic on the Corporation from a financial risks perspective has been minimal. The Corporation has seen significant new research projects funding to support genomic research in the fight against COVID-19. The situation remains fluid and the ultimate duration and magnitude of the impact on the economy and on all aspects of operations are unknown.

There has been no significant change in the risk exposures of the Corporation compared to the fiscal year 2020.







GenomeCanada

**150 METCALFE STREET, SUITE 2100
OTTAWA, ON K2P 1P1**

WWW.GENOMECANADA.CA

 **@GENOMECANADA**

 **GENOME-CANADA**

 **GENOMECANADA**

