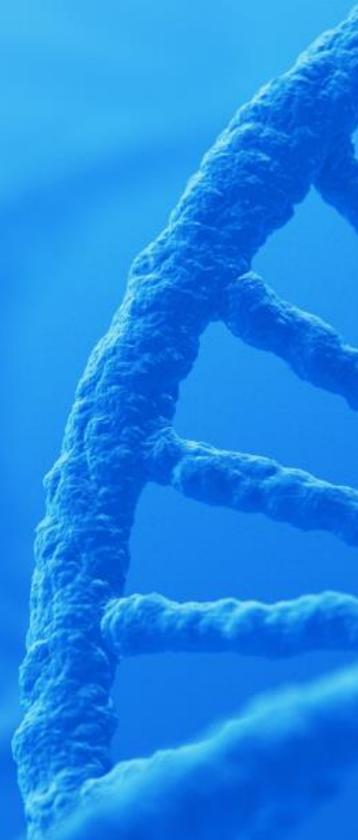




GenomeCanada

JANUARY 2022

**Genome Canada
Corporate Plan
2022-23**



Published by Genome Canada

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1.0 About Genome Canada

Organizational context

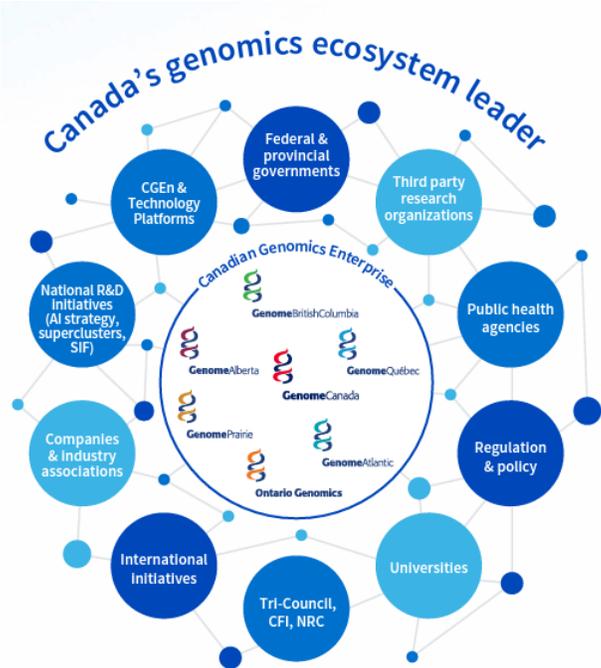
Genome Canada is on a mission to improve lives, strengthen communities and drive economic growth for the benefit of all Canadians.

As an independent, federally funded not-for-profit organization, we provide national leadership to Canada’s genomics ecosystem. We work in partnership and across sectors to drive investment and coordinate, connect and diversify genomics research, innovation, data and talent initiatives to meet global challenges. And we work closely with the Canadian government and other federal Research and Development ecosystem partners to address national priorities. We do this in partnership with a pan-Canadian network of Genome Centres to reflect regional and provincial priorities and extend our impact through regionally focused programs, proactive business development and strong industry connections. Finally, we are on the path to ensuring that our operations, governance, policies, procedures and programs are executed through an Inclusion, Diversity, Equity and Accessibility (IDEA) lens.

We are Canada’s genomics voice on the global stage and world leaders in the exploration of the intersection of genomics and society—promoting the equitable and responsible uptake of genomics for the benefit of communities. We are working to redress historic inequities in genomics and committing to action to advance an equity agenda for genomics in Canada and abroad, as well as lift up Indigenous genomics leadership in this country.

The Canadian Genomics Enterprise is a pan-Canadian network comprising Genome Canada and six independent regional Genome Centres. This federated model optimizes investments in genomics research and innovation by aligning regional strengths and needs with national priorities—and by mobilizing industry-academic partnerships.

This unique pan-Canadian model delivers research and innovation partnerships via a cross-sectoral, collaborative platform. Genome Canada’s mission-driven approach brings together a genomics ecosystem to address challenges and opportunities, leveraging investments by government, industry, university and non-profit partners to drive commercial and social impacts. Regional Genome Centres, funded primarily by provincial governments, have significant expertise in knowledge translation, economic development and brokering impact-oriented relationships between researchers and users which they combine with deep regional knowledge and project management excellence.



Value-add elements of our unique model include:

Pan-Canadian strategy and coordination

- **Convening of diverse stakeholder groups** to develop and implement bioscience research and innovation strategies in key economic sectors.
- **Robust international connections** that ensure Canadian researchers and firms benefit from and contribute to global perspectives, research results and partnered initiatives.
- **Highly leveraged funding** with each federal matched dollar matched by 1.4 additional dollars from provinces, industry and other sources.

Research and development

- **Collaborative applied research projects with interdisciplinary, multi-sector teams** of researchers who combine genomics research, technology development and research on the ethical, environmental, economic, legal and social implications.
- **Strong partnerships with Canada's research ecosystem**, including the Tri-Agency, Canada Foundation for Innovation (CFI) and Mitacs, to cooperate and coordinate for maximum impact.
- **Cooperation and coordination with science-based federal departments and agencies** on research priorities and projects.

Commercialization and innovation

- **Demonstrated success at accelerating the growth of existing companies and spinning out companies** from research projects (more than 80 to date) and skills development for trainees (2/3 of receptor-driven project partners hire trainees).
- **Proactive business development** and ongoing project management involving boots-on-the-ground networks. Having direct access to local knowledge and stakeholder priorities allows us to deploy investments with maximized impact and uptake.
- **Link between the diverse elements of the innovation value chain**, both upstream (i.e., researchers, inventors) and downstream (i.e., commercialization, scaling, financing), to realize the value potential created through investments in genomics and biotechnology.

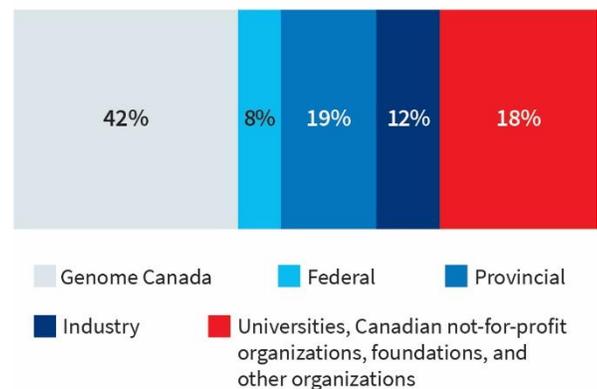
Translation and implementation

- **Engagement with policy and regulatory bodies**, and facilitation of dialogue between leading researchers and policymakers.
- **Knowledge mobilization** through engagement with key stakeholders and the public.

Charting our way forward

Securing co-funding through partnerships is central to our business model. Bringing together diverse partners to co-invest in Canadian genomics research aligns efforts and benefits society. In collaboration with the Genome Centres, Genome Canada has leveraged \$1.8 billion in federal funding plus \$2.3 billion in co-funding, for a total investment of \$4 billion for genomics research in Canada since 2000. This includes funds announced in Budget 2019, as well as \$38.4 million announced in April 2020 to fund the Canadian COVID-19 Genomics Network (CanCOGen) as part of federal countermeasures to address the pandemic.

Investment by Genome Canada and co-funders since 2000



Drawing on [21 years of experience](#) engaging at the regional, national and international levels, and as Canada's national organization dedicated to harnessing the power and potential of genomics, we are committed to mobilizing the capacity of this cutting-edge science and technology to improve the lives of Canadians. We welcomed the federal government's recognition in Budget 2021 of genomics—along with AI and quantum—as platform technologies that will drive growth as an innovative sector of the future. The federal Budget announcement of the Pan-Canadian Genomics Strategy and investment in Genome Canada to kick-start the strategy via our mission strategy was a strong vote of confidence in our national leadership.

As part of this national leadership, Genome Canada is shifting our efforts to support strategic, mission-driven research—with line-of-sight to application and the potential to solve challenges of national and global importance. Building on the success and experience of our large-scale research program, applied partnership projects, technology platforms, trainee development and other programs, we are orienting the organization around a mission-driven framework, identifying and focusing on missions where genomics will contribute to tangible, impactful and equitable outcomes. These missions will develop and diversify the talent and translate the ideas, data and technologies generated through research and innovation into impact. They will improve innovation-based productivity, boost Canadians' health, ensure a secure and sustainable food supply, and support Canada's climate action and decarbonisation goals.

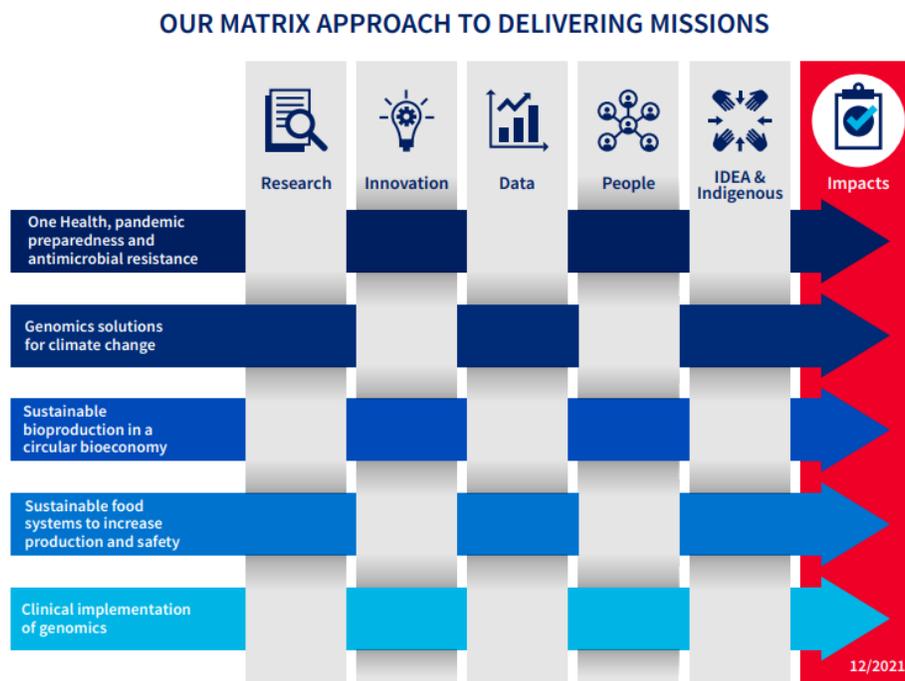
As Canada charts a course for resilient post-pandemic recovery and growth, harnessing the game-changing potential of genomics research and innovation—key drivers of the bioeconomy—can deliver homegrown solutions, drive green growth and position Canada for global market leadership in key sectors and, most fundamentally, protect and improve Canadians' lives. Genome Canada's mission-oriented multi-stakeholder approach can serve to mobilize the national genomics ecosystem to meet these goals.

This is an exhilarating time for genomics as its enormous potential is being realized. Thanks to sustained federal funding over the last two decades and the achievements of researchers and innovators supported by Genome Canada, the Genome Centres and other partners, Canada is now a powerhouse in genomics. We are poised to build on this success, bring ecosystem elements together, and strategically marshal and mobilize our country’s genomics research, innovation, data and talent assets to generate solutions to the big challenges facing Canadians.

Our range of programs

Genome Canada supports the advancement of genomics in Canada. The knowledge and technologies generated through our programs strengthen Canada’s bioeconomy, support evidence-based policymaking, and improve the health and quality of life of Canadians.

Mission-Driven Initiatives address big cross-cutting challenges where genomics will have a transformational impact. Missions are goal oriented with targeted economic, health, environmental and social benefits: the **CanCOGeN** mission is helping address the ongoing pandemic in Canada through national coordination and capacity building for viral and host genomic sequencing, data sharing and analysis, to inform public health policies and decisions, while the **All for One** mission is improving the health and wellness of Canadians with serious genetic conditions by enabling access to a timely and accurate genomic-based diagnosis. Building and innovating from our programmatic toolbox, we design, develop and lead new missions in collaboration with the Centres, end users and key partners. Multisectoral and fit-for-purpose programming is delivered through a combination of open competitions and directed funding opportunities, supported by five pillars of activity: research, innovation, data and data platforms, talent and IDEA. See figure below for a graphical representation of this matrix approach to mission delivery.



Large-Scale Applied Research Project (LSARP) competitions fuel the innovation pipeline. Through the LSARP program, Genome Canada supports interdisciplinary research teams using a variety of research strategies and methodologies, contributing to a broader understanding of specific research problems. LSARP competitions encourage investigators to explore the potential uses of their discoveries by engaging with those who can help translate the research into applications that benefit Canadian society and the bioeconomy. All LSARP projects must undertake research into the application and implications of genomics in society (GE³LS research), either as the major project focus or as an integrated project component that both is shaped by, and helps shape, the research.

The **Genomic Applications Partnership Program (GAPP)** brings together science and implementation to address real world challenges identified by genomic technology users from the private to the non-profit worlds. Explicitly designed to accelerate the movement of genomics to social and economic impact, GAPP provides the space for research, innovation and application to thrive collaboratively.

The **Emerging Issues/Opportunities** and **Regional Priorities Partnership Programs** are two additional initiatives that respond to regional and national strategically identified needs. Both programs allow for rapid, flexible responses.

Our research funding programs are underpinned by our **Technology Programs**, including **Bioinformatics/Computational Biology, Disruptive Innovation in Genomics** and **Genomics Technology Platforms**. We support 10 platforms across Canada that provide researchers with access to high-throughput genomic technologies such as DNA sequencing, RNA expression, protein identification and quantitation, and metabolomics, as well as new method and protocol development, data analysis and bioinformatics. The platforms also help researchers develop research proposals by providing advice on appropriate technologies, study design, data analysis and bioinformatics, thus enabling and improving research quality. The platforms develop new and improved genomic technologies, ensuring that the services they provide can support cutting-edge genomics research, such as that required for COVID-19.

Genome Canada plays an important role in numerous global genomics initiatives including the **Global Alliance for Genomics and Health, Global Biodata Coalition, Structural Genomics Consortium, DivSeek** and **Public Policy Projects' Global Genomics Program**.

We also support projects that address the application and implications of genomics in society (GE³LS research), either as an integrated component of other programs (such as through LSARP) or as standalone projects such as the **Genome Canada and Social Sciences and Humanities Research Council (SSHRC) Joint Initiative on Societal Implications of Genomics Research** and our **Genomics in Society Interdisciplinary Research Teams** initiatives.

Our commitment to accountability

In delivering our mandate, Genome Canada is committed to applying the highest standards of accountability and transparency to our operations. We provide a high level of assurance through mechanisms and instruments such as:

- corporate plans and annual reports;
- independent performance audit, compliance audit and evaluation studies;
- peer review and research oversight committee processes;
- annual attest audits;
- continuous risk management assessment; and
- effective oversight by the Board of Directors.

We rigorously monitor our expenditures to manage operations in a fiscally prudent manner.

2.0 Results 2021-22

The global pandemic continued to create challenges for all of society in 2021-22, including for the support of genomics across Canada. Genome Canada built on strategies developed at the outset of COVID-19 to address both ongoing and future project work during a pandemic. We continue to monitor the ongoing impacts on research teams and the larger research ecosystem.

Short- and medium-term outputs and outcomes from 2021-22

In 2021-22, we achieved a broad and substantial range of short- and medium-term outputs and outcomes.

PROGRAMMATIC

- **Canadian COVID-19 Genomics Network (CanCOGeN).** CanCOGeN continues to provide national coordination for viral and host genomic sequencing during the ongoing COVID-19 pandemic in Canada and has been presented in several international forums. **VirusSeq**, the effort to coordinate and fund expanded genome sequencing efforts and support the sharing of the data within an open, ethical framework, has generated over 300,000 sequences. VirusSeq has built up sequencing capacity nationally, allowing an increase in sequencing from 5% to ~15% of total positive cases Canada of SARS-CoV-2 in Canada. Data generated through VirusSeq has been used by provincial and federal public health officials to inform public health and policy decisions. A major outcome in 2021-22 was the creation of the **VirusSeq Data Portal**, an open-source and open-access data portal for all Canadian SARS-CoV-2 sequences and associated data. The portal has released over 100,000 SARS-CoV-2 viral sequences and has been instrumental in advancing data sharing and data access to scientists, academics and public health officials across Canada. The **HostSeq** initiative, which sequences the genomes of patients diagnosed with COVID-19, has now sequenced more than 6,000 human samples, and clinical data has been linked with approximately half of these sequences. HostSeq's Data Access Compliance Office was successfully launched, with researchers and private

companies requesting access to host and clinical data. We invested \$22.1 million (\$8.4 million in VirusSeq and \$13.7 million in HostSeq) in 2021-22.

- **COVID-19 Impact Relief Funding.** To facilitate our transition to a mission approach, we must demonstrate that existing research commitments are valued and prioritized. COVID-19 has had a significant impact on many projects. Relief funding has helped ensure the delivery of project outputs and the meeting of objectives, the continuity of research teams and infrastructure, and the maintenance of positive relationships with the researcher community and partners. Based on a fair and equitable distribution across Centres and projects, we committed \$10 million to COVID-19 impact relief funding beginning in 2021-22.
- **Investment in the COVID-19 Regional Genomics Initiative (CRGI).** Beyond CanCOGeN, Genome Canada launched CRGI, which has funded eight projects for a total investment of \$1.5 million, and established partnerships with the Canadian Institutes of Health Research (CIHR) and the Canadian Institute for Advanced Research (CIFAR) to fund three additional COVID-19 related projects. We invested \$0.4 million in 2021-22.
- **Investment in the 2020 LSARP Competition – Genomic Solutions for Natural Resources and the Environment.** This \$58.6 million competition, including co-funding, was launched in January 2020 in partnership with Natural Resources Canada (NRCan). It supports eight projects that use genomic approaches to address challenges and opportunities in Canada’s natural resources and environmental sectors such as the impact of climate change on Canada's biodiversity and conservation of endangered species such as the North Atlantic right whale. We invested \$2.5 million in 2021-22.
- **Continued investment in the 2018 LSARP Competition – Genomic Solutions for Agriculture, Agri-food, Fisheries and Aquaculture.** This \$78.4 million competition, including co-funding, was launched in January 2018 in partnership with Agriculture and Agri-food Canada (AAFC). It supports eight projects that demonstrate how genomics research can be translated into solutions advancing the sustainability, productive capacity and competitive position of the Canadian agriculture/agri-food and fisheries/aquaculture sectors. Projects include improving the capability and agility of a lentil breeding program and monitoring DNA from water samples to assess the health of freshwater fish. We invested \$5.8 million in 2021-22.
- **Continued investment in the 2017 LSARP Competition – Genomics and Precision Health.** This \$163.9 million competition, including co-funding, was launched in January 2017 in partnership with CIHR. It supports 15 projects that demonstrate how genomics-based research can contribute to a more evidence-based approach to health. These projects are expected to improve health outcomes and/or enhance the cost-effectiveness of the health-care system. A broad range of projects were funded, including several on diagnosis and treatment for cancers, reducing

health-care disparities and improving diagnostic success for children with genetic diseases from Indigenous populations, diagnosis of rare diseases, and several chronic illnesses, including cystic fibrosis, inflammatory bowel disease and childhood arthritis. We invested \$8.4 million in 2021-22.

- **Continued investment in the 2015 LSARP Competition – Natural Resources and the Environment.** Genome Canada and co-funding partners are investing a total of \$112.8 million in 13 projects. The scope of this competition includes genomics research in energy, mining, forestry, water stewardship, wildlife management and conservation. It also includes genomics research in bioproducts that will provide tools to help conserve natural resources and protect the environment. We invested \$2.4 million in 2021-22.
- **Continued investment in the 2014 LSARP Competition – Genomics and Feeding the Future.** Genome Canada has continued to fund the 11 projects announced in 2015 via a \$94.4 million investment, which includes 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. We support projects focused on the application of 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, using genomics to expedite breeding for desirable traits in wheat, lentils and soybeans. We invested \$800,000 in 2021-22.
- **Support for genomics applications in Canada’s economy through GAPP.** Throughout 2021-22, Genome Canada continued to invest in GAPP, disbursing approximately \$12 million during the fiscal year. Through Round 20, we have funded 94 receptor-led projects to date for a total investment of approximately \$375 million, including \$114 million from Genome Canada. With three rounds per year providing flexibility for applicant teams, GAPP is designed to increase collaboration between genomics scientists and users of genomics research to advance the use and implementation of genomic technologies in all sectors of the economy in Canada. GAPP is also intended to stimulate investment from private and public partners in Canadian genomics technologies. GAPP has continuously evolved since inception in 2013 and, in this spirit of continuous improvement, we are working with the Centres to identify possible enhancements to ensure the program continues to support our vision while meeting the needs of receptors, Centres and other stakeholders.
- **Continued partnership with Mitacs through GAPP to provide training opportunities in the private sector.** This partnership leverages Mitacs programs to provide placements and funding for graduate students and post-doctoral fellows to work on GAPP projects within industry partners’ operations. It prepares Canada’s next generation of innovators to advance the field of genomics by allowing candidates to apply their knowledge and skills in a real-world setting. Companies, meanwhile, benefit from the high-quality research expertise. During 2021-22, this

partnership supported nine Mitacs Accelerate internships through GAPP projects.

- **Continued investment in the Regional Priorities Partnership Program.** This \$20.4 million initiative (including co-funding) supports the Centres in developing initiatives that advance genomics research and translation capacity in areas of strategic priority to their regions. Twenty-one projects have been approved thus far across key sectors including agriculture, fisheries and aquaculture, human health and data science. We invested \$1.4 million in 2021-22.
- **Continued investment in the Genomics Technology Platforms.** Ten technology platforms are being supported with a total of approximately \$133 million, including co-funding, over five years (2017-22). The platforms provide researchers access to the latest high-throughput omics technologies in areas such as DNA sequencing, proteomics and metabolomics. The platforms also provide researchers with advice on new method and protocol development, data analysis and bioinformatics. They received \$8 million in 2021-22.
- **Continued investment in the 2017 Bioinformatics and Computational Biology Competitions.** This \$24 million competition launched in December 2017. It supports the development of next-generation tools and methodologies under two streams: those mainly impacting the human health sector, and those mainly impacting one or more of the other sectors that we focus on. The 25 projects funded received a \$2.7 million investment in 2021-22.
- **Continued Investment in Disruptive Innovation in Genomics.** Genome Canada and co-funding partners have invested \$37.6 million in Disruptive Innovation projects since the program was launched in 2015. One outcome is that technology to analyze immune systems and find antibodies may be developed into new therapeutics. We invested \$1.9 million in 2021-22.
- **Continued investment in the Global Alliance for Genomics and Health (GA4GH).** Genome Canada has been a member and supporter of the GA4GH since 2014. We provided approximately \$0.1 million in 2021-22 to support convening activities to advance the research efforts of the alliance and to support the secretariat staying in Canada.
- **Continued support for the Structural Genomics Consortium (SGC).** Established in 2004, the SGC is a not-for-profit public-private partnership that supports the discovery of new medicines through open access research. We reconfirmed our investment in the SGC in March 2020, approving funding for Phase V. This phase will employ innovative strategies including artificial intelligence to develop tools to better understand proteins involved in many cancers and other debilitating and rare diseases. It has a total project budget of \$23.5 million and a maximum of \$5 million from Genome Canada over two years. We invested \$2 million in 2021-22.

- **Continued investment in the Joint Initiative with SSHRC on Societal Implications of Genomics.** This \$2 million initiative jointly supports social sciences and humanities research and related activities that will enrich the understanding of the societal implications of genomic research. SSHRC is the lead on peer review as applicants apply through its regular programs. A total of 14 projects have now been approved for funding through 2021-22 and are providing insight into topics that may inform future missions such as consumer attitudes towards genetically modified food and enabling the growth of Indigenous-led and cross-cultural community-based wildlife monitoring programs that lead to a more resilient Arctic.
- **Continued funding of the Genomics in Society Interdisciplinary Research Teams program.** This \$5.8 million knowledge translation program, launched in February 2019, brings researchers from different disciplines together to (i) investigate factors affecting the advancement, adoption, evaluation and governance of genomics research; and (ii) address issues at the intersection of genomics and society that will ultimately contribute to Canada's leadership and social and/or economic benefits in various sectors. It is designed to support and enhance GE³LS research that addresses important and overarching challenges that affect the adoption and uptake of the outcomes from genomics research and/or accelerate the synthesis and dissemination of research pertinent to users, including policymakers, within a sector. We invested \$1 million in 2021-22.

OUTREACH, ENGAGEMENT AND STRATEGIC PARTNERSHIPS

We led several stakeholder outreach, thought leadership and public engagement initiatives in 2021-22, most importantly our national dialogue on the future of genomics in Canada. We also supported key strategic partnerships and activities to advance genomics science, knowledge mobilization and policy leadership, amplify new and emerging voices in genomics science and advance the responsible and equitable uptake of genomics in Canada.

Dialogue on the Future of Genomics in Canada: For 20 years, we have invested in building Canada's genomics capacity across sectors through applied research and innovation partnerships. As we look to the next 20 years and the recently announced federal Pan-Canadian Genomics Strategy, we are engaging Canada's genomics ecosystem community in ongoing national dialogue. The aim is to identify future opportunities and challenges for Canadian genomics and to inform our strategic direction and mission-driven approach. Our cross-disciplinary and cross-sectoral conversation on delivering greater impact for Canada featured three main elements:

- **Leaders' Roundtables:** Over 250 stakeholders from research, industry, government, and civil society engaged in the pan-Canadian roundtables, and in the opening words of Algonquin Elder Claudette Commanda, fostered a community of sharing in which "the knowledge we share and the knowledge that we gain is sacred." Sparked by keynotes from genomics leaders in Canada and abroad, discussions addressed three key components for addressing the future of genomics in Canada: strategizing the ecosystem approach, strengthening the science and

innovation, and supporting the delivery of the promise of genomics advances. The summary report is available at genomecanada.ca/future

- **Public Townhall:** With over 450 people registered from across the country, our townhall on the future of genomics in Canada showcased the roundtable learnings and underscored the appetite for mobilizing genomics—and Canada’s genomics ecosystem—around shared priorities and national challenges. Genome Canada plans to continue to serve as a national convener of public conversations on genomics in Canada and of leaders of the broad genomics ecosystem to drive impact for Canada.
- **Online Engagement:** We have created an online hub on our [website](#) and undertaken social media engagement on the future of genomics in Canada. This is to provide outreach space for those unable to participate in meetings at set times and to provide additional opportunities for accessible content for individuals.

COVID Data Portal Outreach: As part of the development and deployment of CanCOGeN’s VirusSeq Data Portal, we held one on one meetings with each of the provincial laboratories and two online outreach events to engage the broad set of stakeholders needed to facilitate viral sequence data sharing across Canada. The first meeting looked most broadly at providing outreach on the why and how of data sharing for COVID viral sequences. It included representation from provincial health ministries, public health units, privacy commissioners and data experts. The second focused specifically on the role of public health laboratories in transitioning data from their own sequencing activities into the pan-Canadian data portal.

Global Genomic Medicine Collaborative (G2MC): As part of our international outreach, our Chief Scientific Officer, Dr. Catalina Lopez-Correa, participated in two sessions and gave closing remarks at the G2MC International Conference in Fall 2021. This conference targets an engaged audience of leaders and stakeholders in genomic medicine from across the world, providing an ideal outreach tool to reinforce our reputation as a global leader in genomics. The event offered closed captioning in multiple languages and showcased the talent of young investigators through the Young Investigator Competition.

Global Biodata Coalition (GBC). The GBC is a forum for research funders to better coordinate and share approaches for the efficient management and growth of biodata resources worldwide. It aims to stabilize and ensure sustainable financial support for the global biodata infrastructure, and to identify, for prioritized long-term support, a set of Global Core Data Resources crucial for sustaining this infrastructure. Genome Canada became a GBC member because of the importance of these biodata resources to genomics researchers in Canada. As the Canadian member of the GBC Board of Funders, we bring a broad Canadian perspective to discussions by consulting other Canadian parties interested in GBC work and informing them of GBC activities.

Business Council of Canada. We are a member of the Coalition for a Better Future, led by Public Policy Forum and Business Council of Canada, which brings together a broad range of leading Canadians and Canadian organizations to build consensus on the need for an ambitious plan for Canada’s economic future with a clear focus on measures to reduce inequality, raise living standards and tangibly improve the lives of all Canadians. The



Coalition includes business leaders, community and civic organizations, social policy advocates, Indigenous groups, environmental NGOs and public policy research institutes. Through our membership, we have been able to provide outreach to the business and innovation sectors on how mission-based genomics can address major economic challenges and engage the private sector in delivering impacts.

Bio Digital International 2021. We sponsored a digital booth in the Canada pavilion on the Global Marketplace virtual tradeshow floor, where we showcased the Enterprise as a federated model of six regional Centres (June 10-18). One staff member attended sessions, networked, gathered inbound opportunities and reported back on key trends in the investment and technology development space in global biotechnology and biomanufacturing industries. This was part of a broader relationship with BIOTECanada, which included a Spring 2021 [op-ed on the future of Canadian life sciences](#) in the *Insights* magazine, featuring our President, Dr. Rob Annan, and our Board Chair, Dr. Elizabeth Douville.

Public Policy Forum (PPF). We collaborated with PPF on a CanCOGeN case study, [Sequencing the Crisis](#), that examines lessons learned during the pandemic that could inform new practices and policies on how we work across public services and with other sectors, with input from interviews with eight CanCOGeN leaders. Dr. Lopez-Correa presented the case study at the PPF Fall dinner (October 26), attended by over 400 federal policy influencers and leaders. The report was read more than 2,432 times on PPF's website in three days, making it the third most read page that month. Dr. Annan participated in a senior leader panel at the event discussing public trust and multisectoral collaboration, alongside keynote speaker Bob Rae, Ambassador and Permanent Representative of Canada to the UN.

Brookfield Institute for Innovation and Entrepreneurship and PPF. In collaboration with the Brookfield Institute and PPF, we are working on an initiative called [Canada's Moonshot: Charting a Mission-Oriented Innovation Strategy](#). The project is supported by an [Expert Advisory Panel](#) of which Pari Johnston, Vice-President of Policy and Public Affairs at Genome Canada is a member, and will deliver a policy report in early 2022 that will examine how a mission-oriented approach to innovation policy can help harness Canada's strengths and resources to solve our most pressing collective challenges.

Canadian Science Policy Conference (CSPC). Genome Canada and the Centres were involved as strategic partners at this [premiere science policy event](#) (November 8-26). We led three panels and participated in an adMare panel on a life science strategy for Canada. Our panel topics were *Bringing the bio-revolution to Canada; The role of genomics and Big Data in re-shaping public health policy; and Mission possible: Using genomics missions to build back stronger post-COVID*. Ontario Genomics and Génome Québec also each led a panel and Dr. Lopez-Correa participated in two other COVID-19 related panels. We ran a virtual booth with materials from across the Enterprise, showed a video interview with Dr. Annan and CSPC President Mehrdad Hariri, distributed 22 free tickets to the Centres and partners, and sponsored a wellness break yoga class attended by 40 people.

Let's Talk Science. As part of a collaboration started in early 2021, Genome Canada and Let's Talk Science have provided outreach on genomics to high school students through five online symposia. In addition, the Royal Society of Canada, the Canadian Space Agency and Genome Alberta have partnered on sessions with us. Free and open to high schools across Canada and internationally, these sessions built curiosity/interest in genomics related to key challenge areas with next-generation scientists. Three symposia held in Fall 2021 (two in English and one in French) focused on One Health, climate change efforts on biological systems, and antimicrobial resistance. The sessions featured a diverse panel of experts, thought leaders and researchers from across Canada. More than 4,000 young people have been able to participate in these sessions since the inception of the partnership.

The Conversation Canada (TCC). We continue our sustained partnership with TCC to advance the common goal of building public awareness of genomics science, technology and its broad benefits across sectors as well as the societal implications of genomics. More broadly, we are both focused on supporting innovative digital media and a healthy journalism landscape in Canada, mobilizing knowledge, creating opportunities for early career, Indigenous and researchers from equity-deserving groups to showcase their research, and create an enabling environment for evidence-informed policymaking. In early 2022, we will offer a targeted set of TCC-led science communications webinars for Genome Canada-funded early career and established researchers on writing for mainstream media outlets.

Summer internship for Indigenous peoples in Genomics Canada (SING Canada). We are committed to a long-term sustaining [partnership with SING](#) and to supporting its growth plans. Support this fiscal year from across the Enterprise (Genome Canada, Genome BC, Genome Prairie and Genome Atlantic) helped procure mobile genome sequencing kits from Oxford Nanopore to support the lab component of the Summer 2022 cohort initiative called #LandBack. This is an opportunity to bring Indigenous knowledge and a decolonization lens to the field of genomics and study of the microbiome.

Black Excellence in Science, Technology, Engineering, Mathematics and Medicine/Health (BE-STEMM 2022). We are a Platinum Sponsor of the [inaugural BE-STEMM event](#) in early 2022, a four-day virtual conference supporting the research and careers of Black Canadians across a range of sectors, with a focus on removing barriers and boosting retention of these scholars. This bilingual, accessible event will feature both established and early-career Black keynotes and showcase the work of scientists, educators, applied professionals, undergraduates and high school students. Programming will include a Career Fair, a Leadership Summit and other initiatives to support Black Canadians in STEMM.

Mission eDNA. Partnering with Génome Québec and the Fonds de recherche du Québec, we are [supporting a pilot underway](#) to adapt an established high school educational initiative for two Indigenous communities with up to 10 high schools. After receiving two support resolutions from Eastmain and Waskaganish Chief and Council, Génome Québec is working with Eeyou Marine Region Wildlife Board to adapt the activity and keep the communities on board. There is potential, in the long term, to expand the project to include Inuit, Cree and Dene communities across Quebec—and to eventually replicate it in other

provinces. Well suited to Indigenous culture and connection to natural resources, this project aligns with our commitment to expanding our work on Indigenous truth, reconciliation and engagement.

We were actively involved in a range of events and conferences to support the genomics research and innovation and to convene genomics researchers to share the latest discoveries, developments and issues. Among others, we provided support for these key events:

- [Festival of Genomics and Biodata](#) (Jan. 26-29, 2021)
- [Canada-UK Genomic Data Sharing Workshop](#) (Feb. 16-18, 2021)
- [Science and Technology Awareness Network Conference](#) (Feb. 23-25, 2021)
- [Student Society for Stem Cell Research](#) (Feb. 27, 2021)
- [Canadian National Proteomics Network \(CNP\)](#) (May 10-12, 2021)
- [Forest Genetics Student Symposium](#) (May 19-20, 2021)
- [OECD meeting on Improving academia-private sector collaborations in times of COVID-19](#) (Sept. 16, 2021)
- [2021 BSL4ZNet International Conference](#) (Sept. 23 -Oct. 14, 2021)
- [Global Alliance for Genomics and Health \(GA4GH\) 9th Annual Plenary](#) (Sept. 28-29, 2021)
- [Global Genomic Medicine Collaborative \(G2MC\) 6th International Conference](#) (Sept. 29-Oct. 1, 2021)
- [21st Annual Healthcare Summit](#) (Oct. 21-22, 2021)

STRATEGIC COMMUNICATIONS AND STORYTELLING

Projecting a new voice. Our Communications team began using a fresh new Genome Canada voice in external communications across all digital platforms. We used digitally-friendly, blog-style funding announcements for the benefit of key audiences, with visually engaging content that could be quickly repurposed on social media and other platforms. This approach worked well in drawing in Centre and funding partners for amplification and improved web analytics metrics and social engagement across the board. As part of our new way of working, we created space for others to showcase their stories, work and voices on our platforms. We did this through the *Dialogue on the Future of Genomics* series where we highlighted stakeholders as speakers, ensuring people had space to discuss and talk, and chose those from diverse background to be the leaders.

Media outreach. As a trusted national resource on genomics research and innovation knowledge, we worked closely with media to support their science communications about challenge areas in which we work. Specifically, we worked proactively with leading national outlet journalists who cover COVID-related stories as we observed new developments in the pandemic. We were in frequent touch with writers at *The Globe and Mail*, *National Post*, *Toronto Star* and *Research Money*, among others, regarding the pandemic, but also on other life science stories. On the day we launched the Canadian VirusSeq Data Portal (April 27), we hosted a media briefing attended by 36 people, including six national outlets: CBC, *Toronto Star*, *National Post*, *The Canadian Press*, *The Conversation Canada* and *Maclean's*.

Celebration of life’s work of Dr. Michel Bergeron. In collaboration with G nome Qu bec, we supported a major supplement in *La Presse* (November 17) and production of a video to honour the career of Dr. Michel Bergeron of Universit  Laval. The initiative celebrates his contribution to life sciences research and innovation in Canada—a body of work supported through \$28 million in genomics funding from G nome Qu bec and Genome Canada throughout his career. His work has had significant impacts on the economies of both Quebec and Canada, including attracting US companies to Quebec and creating hundreds of jobs.

Mission storytelling. In preparation for a January 2022 launch of our mission strategy and the April 2022 announcement of our next missions, we ramped up our mission storytelling. We did this by highlighting funding impacts through regular updates on capacity building and progress for our CanCOGeN (COVID-19) and All for One (precision health) missions. We made complex research, coordination and administration efforts more understandable and relevant to a broader audience—specifically, government, the public, and the broader research and innovation ecosystem. We cultivated and gave voice to mission experts and champions, underlining our vital role as facilitator and ecosystem builder. In the final quarter of this fiscal year, in collaboration with [The Future Economy](#), we will release a 12-part series of 20-minute videos featuring a diverse set of Genome Canada-funded researchers working on innovative mission-driven initiatives that impact Canadian health, food security and natural resources. The series positions genomics as a key element of a strong bioeconomy in Canada, which is critical to economic recovery and growth and the health and well-being of Canadians.

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

- All documents and graphics posted to our website or included in our newsletters are now certified accessible, in keeping with best practices for Web Content Accessibility Guidelines 2.1 and Accessibility for Ontarians with Disabilities Act compliance.
- Seven videos from the *Dialogue on the Future of Genomics* series in Fall 2021 were posted with subtitles in both English and French to improve accessibility for the francophone research community. We began offering live closed captioning at large virtual events.
- Dr. Lopez-Correa participated in a Global Alliance for Genomics and Health (GA4GH) [kickoff event](#) on November 8. She spoke with GA4GH CEO Peter Goodhand as part of a fireside chat series with members of the genomics and health community, underscoring the importance of moving beyond diversity in data sets to advancing a global equity agenda for genomics.
- We launched a series of “Inclusive Genomics” learning events for staff, Centres and Board members in November. The inaugural session on November 9 featured Dr. Malinda Smith, Vice-Provost and Associate Vice-President, Research (EDI) and Professor of Political Science at University of Calgary, and Dr. Juliet Daniel, Professor and Associate Dean of Research and External Relations, Faculty of Science, and

Professor of Biology at McMaster University and explored exclusion in higher education and research, and where we can drive meaningful change. It was moderated by Koko Agborsangaya, Program Director of CanCOGeN.

- In collaboration with CoVaRR-Net and GA4GH, we supported an event on December 6 on Indigenous peoples and genomics featuring four outstanding Indigenous women scholars: Dr. Jessica Kolopenuk, Assistant Professor, Faculty of Native Studies at University of Alberta; Taylor Morriveau, PhD candidate at University of Manitoba; and Leona Star, Director of Research for the First Nations Health and Social Secretariat of Manitoba. Dr. Kimberly Huyser, Associate Professor of Sociology, University of British Columbia, moderated the event which focused on the imperative of Indigenous-led genomics governance, data sovereignty and training Indigenous genomics researchers.

The CanCOGeN story. As the pandemic wore on, key developments in CanCOGeN were pushed out to mainstream media to advance genomics science literacy, inform policymakers about the role of genomics in the COVID response, and share the research outcomes and advances of lead CanCOGeN researchers. Top national stories focused the network's successes, lessons learned and long-term contributions to pandemic preparedness for Canada's future, and helped build awareness about the power of genomics in a health crisis.

- COVID-19 related stories continued to lead our earned media results across all platforms—TV, radio, podcasts, niche journals/blogs, policy portals, as well as traditional print media. In the first three quarters of fiscal year 2021-22 we tracked 592 stories about Genome Canada in mainstream media, with 139 unique stories and a potential reach of 292 million readers. Recent highlights include a [Globe and Mail story on variants](#) by Canada's lead science reporter Ivan Semeniuk (November 25), a [Radio-Canada story on variants](#) (September 5), and a [lessons-learned article in the World Healthcare](#) journal published by Public Policy Projects (June 16).
- The [CanCOGeN monthly newsletter](#) (steady open rate of 35%, well above the industry average of 21%) continues to be an excellent communications tool for the network, featuring [monthly blogs](#) from lead researchers, explanatory [infographics](#), and new developments and [publications](#) coming out of the network. It tracks progress across sequencing initiatives and explains the science, technology and tools at the heart of the mission, thus amplifying the scientific leadership of CanCOGeN members across Canada and underlining the value of national collaboration enabled through the network.
- The CanCOGeN landing page is consistently in the top three most visited pages on our website. New CanCOGeN [Digital Timeline](#), [Resources](#) and [Progress Report](#) web pages were developed in Summer 2021. [CanCOGeN blog posts](#) drive considerable traffic to our site and boast the highest click rate in the newsletter.

ORGANIZATIONAL HIGHLIGHTS

Mission-readiness: Our mission strategy is led by Dr. Lopez-Correa, Chief Scientific Officer (CSO), in a new position that strengthens our scientific leadership. Dr. Lopez-Correa is a

renowned genomics leader with global industrial experience and deep international networks, as well as experience leading Genome Canada's CanCOGeN mission, and working in similar CSO roles at Génome Québec and Genome British Columbia. Dr. Lopez-Correa and an internal missions working group have been collaborating closely with the Centres as partners in the co-creation of Genome Canada's mission strategy, with a strong alignment of strategic plans. Across the Enterprise, our alignment, cohesion and collaboration is strengthened by the various networks that meet regularly to exchange information, align strategies, amplify efforts and co-create programs and initiatives.

Operational excellence: Our approach to operational evolution to a mission-driven organization focuses on *strategy, structures* and *culture*. We are driving our strategy through implementation of five strategic objectives with linked key results for the year. We have evolved our structures through the strategic reallocation of resources, the implementation of an adaptive corporate structure and the hiring of fresh top talent and next generation interns. And we have strengthened our culture through completion of a corporate values exercise and the launch of the [Genome Canada Playbook](#), which puts five values into action with the support of team charters. This focus on operational planning will support our transition to a post-COVID hybrid working model and set us up for continued growth, evolution and impact.

Research security and cybersecurity: Research security is receiving increasing attention in Canada. Concerns include protecting Canadian intellectual property for economic competitiveness, and ensuring research, technology and data assets do not undermine Canadian values or contribute to human rights abuses abroad. We have put in place an internal staff committee to develop research security guidelines based on the [National Security Guidelines for Research Partnerships](#) to promote the integration of national security considerations into the development, evaluation, and funding of research partnerships. Genome Canada is working closely with the federal granting agencies and CFI to align efforts and review and update security policies and procedures to better integrate national security considerations into activities. Genome Canada participates in the TC3+ Research Security Working Group (TRSWG) meetings to ensure that our guidelines and processes are aligned with the TC3+. Furthermore, we and Genome Centre representatives have participated in a number of briefing sessions with Canadian Security Intelligence Service (CSIS), Canadian Centre for Cyber Security (CCS) and Public Safety Canada, including a briefing session that was organized by Genome Canada. Regarding cybersecurity, we have undertaken two independent cybersecurity exercises to help identify gaps in processes, documentation, policies, and defences. Board oversight has been enhanced with the responsibilities of the Audit and Investment Committee of the Board expanded in 2020 to include cybersecurity. Over the last nine months, formal policies on training and awareness, incident management and password management were developed and deployed. Employees must now complete a mandatory awareness program and yearly refresher. We have initiated the Cybersecure Canada certification process, which should be complete by the end of March 2022.

IDEA and Indigenous Truth, Reconciliation and Engagement: We are committed to intentionally and deliberately embedding IDEA policies and practices across our operations,

workforce, programs, policies and governance structures. Over the last year, we have taken several proactive measures to step up our commitment to IDEA. 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. One of our five values in our Playbook is to be “intentionally inclusive” and sets out expectations for staff of integrating our IDEA framework, and our commitment to Indigenous reconciliation and engagement, in everything we do. We have engaged a consulting firm to inform our approach to equity and inclusion and advice on the execution/implementation of an IDEA strategy. The firm has audited Genome Canada’s policies, procedures, and practices and will be providing us with a final report with specific recommendations to inform our strategy and action plan in 2022. With the advice of Indigenous partners and organizations, we are also committed to developing a distinctions-based Indigenous truth, reconciliation and engagement strategy to guide our work in 2022. As a first step, this summer we conducted a staff survey to create a baseline of knowledge on cultural awareness, cultural competencies, cultural safety and cultural agility related to Indigenous issues in Canada

Remaining challenges from 2021-22

As the Government of Canada implements the Strategic Science Fund and moves towards the announcement of successful national organizations in the first round of the in January 2023, there remains a challenge for organizations such as Genome Canada in securing long-term funding and the ripple effect on co-funding from partners. 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. 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. Investing in projects led by researchers earlier in their career or projects that include representatives from equity-deserving groups and other small or start-up enterprises would be facilitated by a reduced need for co-funding and would allow us to better promote equity and inclusion; foster diversity of principles, ideas and values; and bring more young thinkers and diverse voices into the national research and innovation ecosystem. We welcome the opportunity provided by the Strategic Science Fund for predictable, stable and long-term funding as this would allow us to fully realize our mission strategy and mobilize and deploy the national genomics ecosystem to meet Canada’s current and future challenges where genomics can make a real difference.

As in 2020-21, the global COVID-19 pandemic has created numerous challenges for organizations. At Genome Canada that has included the ability of research projects to continue to deliver their outputs in a timely fashion, and to cover the additional costs of performing genomics research during the pandemic. Part of this has been mitigated through

targeted support for projects and programs disproportionately affected by COVID-19. Economic effects associated with COVID-19 have continued to heighten the risk that co-funding will be difficult to obtain as businesses and governments adjust their budgets to account for reduced revenues.

Despite these challenges, we will continue to build on the main opportunities and strategic pillars of focus from 2021-22: (a) deploying mission-driven genomics research and innovation in key challenge areas, (b) driving a Genomics in Society (GiS) approach to linking genomics to broad societal needs and impacts, and (c) applying an IDEA lens to our activities and approaches.

3.0 Moving forward into 2022-23

Genome Canada Strategic Vision

Our Vision

Canada is a world-leader in the application of genomics-based biosciences for human health, the environment, and across the bioeconomy.

Our Mission

Genome Canada commits to put genomics in the hands of those who will use it to create health, environmental, and economic benefits for Canadians.

Our Objectives

1. Drive high-impact research to benefit Canada
2. Deliver effective, purpose-fit programs that support our mission
3. Promote the responsible application of genomics in Canada.

We envision Canada as a world leader in the application of genomics-based biosciences for human health, agriculture, fisheries and aquaculture, 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 and talent for the benefit of all Canadians.

At Genome Canada, we're excited about the future and our evolution into a mission-driven, adaptive organization. With the Budget 2021 announcement of a new federal Pan-Canadian Genomics Strategy and 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 such as climate change, the circular bioeconomy and One Health, while delivering made-in-Canada solutions to pandemic

surveillance and precision medicine in the clinic. This mission strategy will serve to mobilize the national genomics ecosystem around shared priorities and support the federal government's development of the Pan-Canadian Genomics Strategy during 2022. We are also working in strategic partnership with other federal research and innovation funders such as the Tri-Agency, CFI, NRC and Mitacs to support the federal biomanufacturing and life science strategy and advance other shared research and talent development. For the 2022-23 fiscal year, we will continue to manage ongoing programs and initiatives funded by the various agreements noted in Table 1 (at the end of this report). Additionally, we will continue to monitor the COVID-19 pandemic and its effects on funded researcher teams. Table 2 includes a list of our funded programs that will be active in 2022-23.

Drive high-impact research to benefit Canada

We are continuing the evolution of the Enterprise into an impact-driven genomics funding and investment organization. This includes new thinking around mission structure, key principles and core elements, and selection criteria and considerations, as well as the evolution of current programs and projects to support a mission-driven focus.

To support this objective, we will:

- Launch our next flagship mission and other strategic investments with up to \$46 million of the funding allocated in Budget 2021, for a total investment of at least \$92 million with co-funding. This initiative will be the first for which we deliberately institute a process of mission selection, design and delivery. We will engage the Genome Centres, our existing ecosystem and additional industry partners, federal R and D funders as well as of voices traditionally excluded from these processes such as Indigenous voices, Black and racialized voices, and those from other equity-deserving groups. Based on extensive consultations in 2021-22, we have shortlisted three challenge areas to be advanced as a flagship mission (Climate Change Genomics) and for strategic investments (Circular Bioeconomy and One Health). Consultation will continue with federal stakeholders with interests in climate change science and with the Centres to finalize the mission focus and target impacts as well as develop the portfolio of programs to be deployed as missions and strategic investments.
- Transition oversight and coordination for ongoing viral surveillance from CanCOGeN to the Public Health Agency of Canada's National Microbiology Laboratory. Anticipated outcomes for CanCOGeN in 2022-23 will be capturing the impact of genomics in informing public health and policy decisions during the entire pandemic; furthering international connections with other COVID-19 genomics leaders; maintaining connections with other national initiatives (e.g., CoVaRR-Net); using VirusSeq and HostSeq data to advance pandemic understanding and preparedness; and connecting viral and host genomic information. Ongoing work is required to maintain the VirusSeq Data Portal, a repository for Canadian SARS-CoV-2 data, as well as the CanCOGeN newsletter to continually engage with stakeholders and the international scientific community. The infrastructure built by CanCOGeN will be transitioned to embed sustained viral genomics surveillance capacity in Canada's

national and provincial public health systems and lay the foundation for Canadian engagement in global surveillance efforts to ensure Canada is well prepared for any future pandemics. Finally, an equity strategy for CanCOGeN is being developed to ensure that the outcomes are relevant for all Canadians.

- Advance the goals of the All for One precision health initiative in rare disease by continuing to support the six clinical implementation projects, policy toolkit and the Development Phase of the Health Data Ecosystem (HDE) with an investment of \$2.5 million in 2022-23. The HDE will allow All for One clinical implementation sites to share data with each other for clinical and research purposes related to rare diseases, and to serve as a model for health data sharing in Canada. We also plan to foster connections between All for One and HostSeq to build the basis of a pan-Canadian precision medicine and genomics strategy.
- Continue to support ongoing large-scale interdisciplinary research via LSARP projects (in natural resources and the environment, precision health, and agriculture and aquaculture/fisheries) with line-of-sight to application by investing \$29.3 million in 2022-23. We will also foster connections and interactions between these sector-based projects to build on their successes and amplify their impact.
- Invest at least \$26 million in ongoing and new GAPP projects in 2022-23 to capitalize on translational and economic development opportunities across our mandate. We will deploy the GAPP in two ways: via targeted programs integrated into missions where GAPP will be a core component of a well-designed mission portfolio of investments; and, stand-alone GAPP projects that will seed new discoveries and products and inform future missions.
- Invest in a one-time, one-year extension of \$6.7 million in 2022-23 to support operations at the 10 currently funded Technology Platforms. The aim is to maintain the genomics infrastructure developed over the last 20 years until the first missions are selected and we know what platform technologies will be required. We will also continue to work closely with CFI to ensure Genome Canada's ongoing support for platforms is coordinated with theirs.
- Continue to support Phase V of the Structural Genomics Consortium (SGC) by investing \$1.2 million in 2022-23. The SGC accelerates research by making all its research output available to the scientific community with no strings attached, and by creating an open collaborative network of scientists in hundreds of universities around the world and in nine global pharmaceutical companies.
- Continue to support our three Genomics in Society Interdisciplinary Research Teams by investing \$1.3 million in 2022-23.
- Continue to support key international data initiatives, such as DivSeek, the Global Alliance for Genomics and Health (GA4GH), and the Global Biodata Coalition to ensure that Canadian data policies are aligned with international standards and that

Canadian voices are heard when formulating international policies, by investing \$0.8 million in 2022-23.

Deliver effective, purpose-fit programs that support our mission

We will continue to play a key role in Canada's research and innovation ecosystem by working to coordinate activities across the genomics research ecosystem and connecting them into the broader research initiatives supported by the Tri-Agency and industry-led government innovation supported through innovation programs. We will continue coordinating our programs with provincial and regional initiatives and investments through the national network of regional Centres. This innovative model has resulted in collective action on genomics and shared costing for national research projects and has promoted alignment and cooperation across Canada.

To support this objective, we will:

- **Develop and deliver relevant, purpose-fit programs focused on research excellence and impact.** Missions are complex innovation programs involving multiple stakeholders and a variety of investments. They pursue target impacts rather than short-term research outputs, while being focused enough to align stakeholders and inform real-time decisions on design and changes to the funding approaches. We will adopt a diversified portfolio with multiple missions and strategic investments, each with a fit-for-purpose programmatic toolbox. We will co-develop these toolboxes with the Centres to reflect regional strengths and opportunities as well as the needs and interests of the users. In their ultimate realization, our missions will ensure sufficient flexibility to adapt and pivot according to pressing needs and changing environments. This will help ensure that we are proactively and transparently managing our investments to successful outcomes and as efficiently as possible.
- **Embed equity, diversity and inclusion in everything we do.** We are committed to supporting an equitable and inclusive research program focused on excellence and impact. We will continue to strengthen the impact of research and innovation through collaboration and coordination within academia and industry, nationally and internationally. Genome Canada and the Centres are putting in place processes, procedures and policies in place to increase inclusion, diversity, equity and accessibility (IDEA) and Indigenous truth, reconciliation and engagement in our research programs. This includes embedding inclusive design into our funding opportunities and review criteria for key programs; encouraging applications involving research projects that incorporate Indigenous knowledge systems carried out by and with Indigenous peoples; encouraging the incorporation of new researchers and researchers from equity-deserving (or historically excluded) communities into teams; diversifying our pool of reviewers; and, enhancing reviewer training to emphasize our IDEA requirements.

- **Strengthen the impact of the research and innovation ecosystem through collaboration and coordination with key players.** We have a long history of working alongside federal departments and agencies, bringing genomics expertise in Canada and abroad to support and add value to federal priorities and initiatives. As part of our talent strategy, we are planning a new partnership with the Natural Sciences and Engineering Research Council (NSERC) to support more Indigenous undergraduates to increase the genomics talent pipeline. In partnership with CIHR, we have led an engagement on the enhancement of the population cohort landscape in Canada. This consultation included a diverse set of voices to inform a report containing recommendations for consideration. We continue to collaborate with several of the CIHR Institutes on initiatives informing where genomics can enhance disease diagnostics, management, and prevention, pathogen surveillance and inform pandemic preparedness. We are also working to build on our existing coordination of funding with CFI to help ensure that the platform technologies required for future missions are robust and available. This could be accomplished through the CFI Major Science Initiatives program and complementary funding streams.
- **Continue to lead a national Genomics Enterprise that recognizes Canada's economic and geographic diversity.** The Genome Centres provide a hands-on approach and deep expertise in brokering successful cross-sectoral partnerships with researchers, industry and other users through project development, mentoring, coaching, pitch support and more. We will continue to optimize the impact of national initiatives through the Centres' in-depth regional knowledge, strong links with provincial governments and regional innovation initiatives and communities, and project management excellence. The Centres will continue to support numerous initiatives to build capacity and address issues in their respective regions.
- **Demonstrate accountability and continually improve programs through robust metrics and measurements.** Research and innovation funding organizations are duty-bound to show that their investments bring value to the communities they serve (deliver impact). We are developing an integrated impact assessment framework for our activities and investments. The framework will outline the impact process of our work, facilitate impact creation and continuous improvement, and capture evidence on impacts. These improvement cycles will occur within missions, ensuring that they stay on track to deliver on targeted impacts and maximizing return on investment. They will also occur between missions, ensuring that each successive mission will incorporate best practices and key learnings from previous iterations to reflect the evolving innovation ecosystem.
- **Develop and implement a research security plan.** We have started to develop a research security plan required by our new contribution agreement with ISED which will be delivered by July 31, 2022. In the meantime, we plan to begin applying research security guidelines consistent with those being implemented by other federal organizations as our new missions and programs are deployed.

- **Strengthen the connections between new knowledge sources and the receptors that translate that knowledge into social, economic or environmental value for Canadians.** Though already substantial, we will increase our level of engagement with the private sector to ensure that our mission investments are well-positioned to generate follow-on investment from commercial acceleration and venture capital partners. By better engaging with a broader and more diverse group of receptors that will convert research outcomes into innovative products and solutions, we will enable the researchers that we invest in to convert their work from lab-scale to commercial-scale impacts. This will accelerate getting genomics out of the lab and into the hands of users.

Promote the responsible and equitable application of genomics in Canada

Genome Canada and the Centres are world leaders in research on the societal implications of genomics to understand barriers and support the responsible and equitable implementation and uptake of genomics. Among global genomic funders, a dedicated mandate to advance genomics in society is a standout hallmark of the Enterprise, with the Centres driving knowledge mobilization, translation and public engagement across the regions.

To support this objective, we will:

- Integrate Genomics in Society (GiS) into all our missions—from the start of design and planning, through execution and implementation, all the way to transition and hand off. We will design missions based on stakeholder needs and societal challenges, and leverage GiS work from missions to inform policy, regulation and direction. Specifically, each mission will include a dedicated strategy for knowledge mobilization, co-creation and support for GE³LS research that investigates aspects of responsible and equitable innovation including, for example, key factors that may facilitate or hinder the effective translation of research and the uptake of genomic-based applications. Implementation strategies will support the development of innovative processes, services and improvements to existing products and technologies. Each mission will have a GiS strategy to identify the policy and regulatory barriers along with opportunities for societal uptake of results and technologies from the mission.
- Continue to invest in GE³LS interdisciplinary research to maximize impact and benefits. This includes continuing to fund large-scale standalone GE³LS research projects, which allow researchers to delve deeply into critical issues. It also involves continuing to fund GE³LS research as integrated components of large-scale genomic-based projects, which delivers key insights that inform projects from a broader societal perspective.
- Further leverage, action and amplify existing GE³LS research and investments. There has been significant investment in both standalone and integrated GE³LS research

with many products, tools and new pieces of knowledge developed. We will build on this work through further investments, policy recommendations, and other knowledge translation to support uptake and implementation of genomics.

- Continue to partner with national policy organizations such as the Public Policy Forum and Canadian Science Policy Centre to strengthen our policy dialogue and outreach, engage with others in the policymaking process, and influence those in the policy realm.
- Amplify and extend the impact of Centre leadership in GiS. The Centres excel in knowledge mobilization to build public awareness and genomics literacy in their provinces and regions. Several are active in mobilizing genomics knowledge via high school and citizen science partnerships, high-profile public genomics conferences and multimedia digital efforts to reach new and younger audiences and we are exploring ways with the Centres on how we can support them to scale up in their ecosystem and also better promote their efforts to national audiences.
- Continue to scale up national partnerships that amplify education and awareness activities to increase knowledge, build capacity and improve genomics literacy. We will continue to partner directly with Let's Talk Science, McMaster Forum and The Conversation Canada (among others), to reach youth, early career researcher and other influencer audiences. We will examine ways to continue our storytelling success with the CanCOGeN newsletter, media outreach and digital hub by adapting those tools to our next mission. We will prioritize strengthening partnerships with national science-based organizations led by equity-deserving groups (e.g., IndigeSTEAM, our sponsorship of BE-STEMM in early 2022) to invest in their activities to bring in and amplify new voices and those that have often been left behind in genomics research.
- Expand our partnership with SSHRC. This is an opportune moment to harness our existing partnerships with SSHRC and put a renewed focus on genomics and future challenges based on SSHRC's emergent priorities and our mission-driven framework. To inform mission design and outcomes, we are planning to partner with SSHRC's Future Challenges program through Ideas Labs and knowledge synthesis grants in cross-cutting challenge areas relevant to the societal implications of genomics.

4.0 Financial management

The federal government, through Innovation, Science and Economic Development Canada (ISED), has committed \$1.8 billion in funding to Genome Canada since 2000-01. This includes the most recent support of \$136.7 million in Budget 2021 (for which we are in the process of finalizing the Contribution Agreement). All funding is provided through funding agreements between Genome Canada and ISED. Genome Canada and the Genome Centres raise co-funding from others, including the public, not-for-profit and private sectors.

Investment and management of funds

The Audit and Investment Committee supports Genome Canada's Board of Directors in fulfilling its fiduciary responsibilities with respect to the management of funds. The Committee meets quarterly and reports to the Board on the outcome of its deliberations.

The Committee is responsible for:

- overseeing the investment and management of funds received from the Government of Canada as per a Board-approved investment policy that outlines guidelines, standards and procedures for the prudent investment and management of funds; and
- overseeing Genome Canada's policies, processes and activities in the areas of accounting and internal controls, risk management, cybersecurity, auditing and financial reporting.

The Board's Programs Committee brings further oversight to the management of funds by ensuring research funding and activities are aligned with Genome Canada's strategic priorities and review policies. The Committee provides advice to the Board of Directors on research programs and projects, research partnerships and collaborations, competitions, and program evaluation.

Source and use of funds

Genome Canada currently manages funds arising from the following Contribution Agreements.

TABLE 1: GENOME CANADA FUNDING AGREEMENTS WITH INNOVATION, SCIENCE AND ECONOMIC DEVELOPMENT CANADA

Federal budget	Competitions and projects funded
Budget 2008 (\$140 million)	Competition in applied genomics research in bioproducts and crops Two research projects through the Cancer Stem Cell Consortium and the International Barcode of Life project Support for the Science and Technology Innovation Centres The operations of six regional Genome Centres and Genome Canada through to 2012-13
Budget 2010 (\$75 million)	Competition in forestry and the environment Multi-sector competition Competition for operations support for the Genomics Innovation Network
Budget 2011 (\$65 million)	Competition in applied genomics research in personalized health Funding of Phase III of the Structural Genomics Consortium (SGC) and continued funding for the International Barcode of Life project Funding for the Public Population Project in Genomics Competition in bioinformatics and computational biology Contribution to the operations of six regional Genome Centres and Genome Canada for 2013-14
Budget 2012 (\$60 million)	Funding for the Genomic Applications Partnership Program Funding for renewal of the Genomics Innovation Network for two years Funding of the SGC and the International Barcode of Life project
Budget 2013 (\$165 million)	Two competitions in large-scale applied genomics research Funding for Genomics Innovation Network operations in 2015-16 and 2016-17, as well as related technology development Funding for disruptive innovation in genomics and in bioinformatics and computational biology Funding for national and international partnerships, including the SGC and the International Barcode of Life project Contribution to the operations of six regional Genome Centres and Genome Canada through to 2016-17
Budget 2016 (\$237 million)	Two competitions in large-scale applied genomics research Support for genomics Technology Platforms and for bioinformatics and computational biology competitions Funding for the Genomic Applications Partnership Program Funding for national and international partnerships and strategic initiatives Contribution to the operations of six regional Genome Centres and Genome Canada through to 2019-20
Budget 2019 (\$100 million)	One competition in large-scale applied genomics research Funding for Technology Platforms and research projects in bioinformatics and computational biology, technology development and disruptive technology Support for translational research Operating costs of Genome Canada and contribution to the operations of six regional Genome Centres through 2021-22
Canadian COVID Genomics Network (CanCOGeN) (\$38.4 million)	The CanCOGeN initiative to coordinate and fund national genome sequencing efforts and share the resultant data, nationally and internationally, in support of large-scale research to combat COVID-19 Creation of a coordinated national genomics-related network to build capacity to address future pandemic outbreaks
Budget 2021 (\$136.7 million)	Mission-driven programming to kick-start the new Pan-Canadian Genomics Strategy and complement the government's existing genomics research and innovation programming



Cash management

Genome Canada disburses funds on a quarterly basis through the six regional Genome Centres (for approved research projects) and the technology platforms. On a quarterly basis, each Genome Centre is required to review the expenditures to date. Each Centre is also required to estimate cash requirements for Centre operations and for each project and technology platform that it manages. It then submits a “draw request” to Genome Canada, indicating the cash needs for the subsequent quarter.

The Genome Centres assess the project/technology platform needs against the approved budget, actual expenditures, scientific progress to date and co-funding received from other sources. Genome Canada then conducts a thorough review of the draw request submission before releasing funds.

Receipts and disbursements

Table 2 provides an estimate of the receipts and disbursements for the funding agreements.

TABLE 2: SUMMARY OF RECEIPTS AND DISBURSEMENTS

Details (in millions of dollars)	Actual 2000-20	Forecast 2021-22	Forecast 2022-23	Forecast Other	Total	Estimated co-funding	Genome Canada and co-funding	%
RECEIPTS								
Government of Canada								
Previous budgets	1,205.0				1,205.0		1,205.0	27.7%
Budget 2016	182.2	30.0	20.0	5.0	237.2		237.2	5.5%
Budget 2019	31.5	18.0	23.0	28.0	100.5		100.5	2.3%
Canadian COVID Genomics Network (CanCOGeN)	25.9	12.5			38.4		38.4	0.9%
Budget 2021	0		36.7	100.0	136.7		136.7	3.1%
Investment income	92.6	0.2			92.8		92.8	2.1%
Co-funding						2,352.7	2,352.7	58.3%
	1,537.2	60.7	79.7	133.0	1,810.6	2,352.7	4,343.3	100.0%
DISBURSEMENTS								
Research projects and Genome Centres funding								
Projects and programs completed in previous years	868.8				868.8	1,091.1	1,959.8	45.2%
2012 LSARP*: Genomics and Personalized Health	46.2	0.6			46.8	103.2	150.0	3.5%
2014 LSARP*: Genomics and Feeding the Future	31.8	0.8			32.6	61.8	94.4	2.2%
2015 LSARP*: Natural Resources and the Environment	30.4	2.4	1.6		34.4	78.4	112.8	2.6%
2017 LSARP*: Genomics and Precision Health	24.2	8.4	12.2		44.8	119.1	163.9	3.8%
2018 LSARP*: Genomics and Agriculture, Agri-Food, Fisheries and Aquaculture	9.3	5.8	7.8	7.8	30.7	47.8	78.5	1.8%
2020 LSARP*: Natural Resources and the Environment	0.0	2.5	7.7	14.3	24.5	33.9	58.4	1.3%
Genomics Technology Platforms	78.4	8.0	11.4		97.8	113.2	211.0	4.9%
Genomic Applications Partnership Program	67.8	12.0	25.8	42.7	148.3	327.2	475.5	11.0%
Cancer Stem Cells Consortium	22.7				22.7	34.8	57.5	1.3%
Disruptive Innovation in Genomics	13.7	1.9			15.6	22.1	37.7	0.9%
Bioinformatics and Computational Biology	15.1	2.7	1.0		18.8	20.5	39.3	0.9%
Structural Genomics Consortium	12.0	2.0	1.2		15.2	121.3	136.5	3.1%
Strategic Initiatives	4.2	1.3	0.8	0.2	6.5	27.1	33.6	0.8%
Advancing Big Data Science	1.9	0.1			2.0	4.0	6.0	0.1%
GE ³ LS Third Modality	0.9	0.1			1.0	1.0	2.0	0.0%
Regional Priorities	3.6	1.4	1.0		6.0	15.0	21.0	0.5%
Genomics in Society Interdisciplinary Research Teams	0.4	1.0	1.3		2.7	3.1	5.8	0.1%
All For One Health Data Ecosystem	0.0		2.5	1.7	4.2	4.2	8.4	0.2%
COVID Regional Genomics Initiative	1.1	0.4			1.5	3.0	4.5	0.1%
Canadian COVID Genomics Network (CanCOGeN)	13.2	22.1	3.1		38.4		38.4	0.9%
Mission-readiness	0.0		3.0	53.0	56.0	123.2	179.2	4.1%
COVID Relief Funding	0.0		10.0		10.0		10.0	0.2%
Genome Centres' operations	107.0	5.2	5.0	5.0	122.2	177.8	300.0	6.9%
	1,352.7	78.7	95.4	124.7	1,651.5	2,532.7	4,184.2	96.5%
Genome Canada operations	132.6	7.3	7.1	7.0	154.0	0.0	154.0	3.5%
Total disbursements	1,485.3	86.0	102.5	131.7	1,805.5	2,532.7	4,338.2	100.0%
Excess receipts over disbursements	51.9	-25.3	-22.8	1.3	5.1			
Opening cash balance	0.0	51.9	26.6	3.8	0.0			
Closing cash balance	51.9	26.6	3.8	5.1	5.1			

5.0 Risk assessment, mitigation measures and performance monitoring

Genome Canada has a wide array of policies, systems and processes that have been developed over time to address issues of risk assessment and mitigation strategies. They also address ongoing performance and evaluation monitoring. An updated *Performance, Evaluation, Risk, and Audit Framework* was approved by the Board of Directors in December 2019.

Risk management

Risk management is integrated into all our operational, managerial and governance activities. A formal risk management framework is in place and is annually updated and approved by the Board of Directors. Strategic risks arising from the external operating environment, as well as the internal operating environment, are assessed on an ongoing basis.

- At the project selection level, risk is managed and mitigated through a process that restricts funding to certain projects. Namely, these are projects judged to have the greatest probability of success from both a scientific and managerial point of view. The viability of each project's success is further mitigated through ongoing monitoring and reviews.
- At the operational level, officers of Genome Canada identify risks and propose strategies for mitigating and reporting. Examples include due diligence routines for reviews of draw requests and for reviews of funded projects.
- At the managerial level, policies, systems, processes and procedures (administrative, financial, human resource management, cybersecurity and research security) are developed, implemented and monitored.
- At the governance level, the Board of Directors and its Committees are aware of their risk management responsibilities. They exercise modern governance practices with respect to policy approval and oversight.
- The Audit and Investment Committee is responsible for the monitoring of risk and mitigation strategies and regularly reviews the organization's corporate risk profile.
- The Genome Canada internal working environment culture is one that values honesty, integrity and ethical conduct.

Annual audit

The annual audit of Genome Canada's financial statements is conducted in accordance with generally accepted Canadian auditing standards. The statements are filed with Innovation, Science and Economic Development Canada (ISED) by July 31 of each fiscal year. The objective is to express an opinion on whether Genome Canada's financial statements present fairly—in all material respects—the financial position, results of operations and cash flow of the corporation.

Upon completion of the audit, the financial statements and a summary of audit findings are presented to the Audit and Investment Committee. They are then presented to the Board of

Directors for approval. The financial statements can be found on our website: www.genomecanada.ca.

Recipient audit

Genome Canada has developed and implemented a recipient audit framework in consultation with the Genome Centres. As part of this exercise, a risk assessment tool was developed to enable the Genome Centres to identify projects that would undergo a detailed compliance audit. This includes the Technology Platforms. This framework was introduced to bring a common approach to recipient audits across Canada and to improve the management control framework within which genomics research is administered.

Performance measurement and evaluation

Genome Canada's funding agreement with ISED specifies that Genome Canada will provide reporting on data collected in the past fiscal year. This is described in the *Performance Information Strategy*.

Performance monitoring

Genome Canada has adopted a corporate scorecard to monitor the organization's performance. This scorecard monitors performance in five key areas: delivering high-impact research that benefits Canada; delivering effective, purpose-fit programs that support the mission; promoting responsible application of genomics; demonstrating financial success; and indicators related to our COVID-19 initiatives. The scorecard is reviewed by the Board every quarter.

ACKNOWLEDGEMENT

Genome Canada thanks the Government of Canada for its support.

With funding from

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