STRATEGIC VISION 2030

CGEn

Board Chair message

The Board of Directors is proud to endorse CGEn's Strategic Vision 2030. Since its founding in 2015, CGEn has significantly expanded Canada's capacity for genome sequencing and analysis, supporting large-scale projects and groundbreaking research and discoveries across human health, biodiversity, and innovation.

Strategic Vision 2030 builds on this strong foundation and articulates the four core priority areas that guide CGEn's work: delivering high-quality data at scale, fostering technology development, cultivating talent and skills, and promoting genomics community engagement. These priorities have been shaped through ongoing collaboration and consultation with leading scientists, partners, and other organizations across Canada and internationally.

On behalf of the Board, I thank all who contributed to CGEn's Strategic Vision 2030. We look forward to working with CGEn and Canada's research community to realize this vision, advancing genomics research through collaboration, innovation, and sustained national leadership.

Gordon C McCauley
Chair, CGEn Board of Directors
President & CEO,
adMare BioInnovations

CEO message

CGEn provides Canada's leading genomic infrastructure, empowering research and innovation across the country. CGEn has played a critical role in Canada's largest genomics projects while supporting over 3,000 unique research groups working across human health, biodiversity, agriculture and many other sectors.

By connecting researchers to cutting-edge technology and genomics expertise, CGEn ensures that vast amounts of data can be turned into actionable insights to enable discoveries, drive innovation, strengthen Canada's research ecosystem and accelerate impact.

Strategic Vision 2030 provides the guiding priority areas that shape our work: delivering high-quality data at scale, fostering technology development, cultivating talent and skills, and promoting genomics community engagement. Grounded in a culture of excellence, connectivity and agility, these priority areas ensure CGEn can respond to evolving scientific, technical, and societal opportunities to help sustain Canada's leadership in genomics research.

I am grateful to our Board of Directors, Scientific Advisory Board, Executive Committee, and many others for their guidance in shaping this vision. We look forward to working with the research community to advance this next era of genome science by fostering collaboration, innovation and long-term impact.

Meredith McLaren
CGEn CEO


CGEn-Toronto


CGEn-Montreal


CGEn-Vancouver

About CGEn

CGEn is Canada's national platform for genome sequencing and analysis.

Established in 2015, CGEn employs over 200 staff and is funded primarily by the Canada Foundation for Innovation (CFI) through its Major Science Initiatives Fund (MSIF) and Innovation Fund (IF), leveraging investments from the provincial governments of Ontario, Quebec, and British Columbia, Genome Canada, host institutions, and other sources of funding. CGEn operates as an integrated national platform with nodes in Toronto (The Centre for Applied Genomics at The Hospital for Sick Children), Montréal, (McGill Genome Centre at McGill University) and Vancouver (Canada's Michael Smith Genome Sciences Centre at the Provincial Health Services Authority), leading large-scale projects and providing advanced genomic services to enable research by over a thousand research groups every year, spanning the public and private sectors, including those working in human health, agricultural sciences, fisheries and oceans, ecology, biodiversity, and many other disciplines.

CGEn Impact at a Glance

3 nodes and **220+ staff** serving

550+ institutions **3,000+ laboratories** **1,000s of research projects**

Advancing Canada's most impactful genomics research programs through leadership, collaboration and high-quality data

Canadian Biogenome Project · HostSeq · Marathon of Hope Cancer Centres Network · CARE forRARE · Canadian Precision Health Initiative

15.8 petabases
of data generated

3.4 petabases
publicly accessible for re-use

3,500+ publications
by staff and users

250+ international
co-authorships with CGEn scientific leaders

Driving research, development, application & commercialization across many important sectors

CGEn Vancouver · CGEn Montreal · CGEn Toronto

Technology Development for emerging technologies, enhancing service and developing new tools

Training the next generation of genomics leaders to keep pace with large-scale genomics and its growing applications

Our Partners & Funders

Innovation Canada Foundation for Innovation · Provincial Health Services Authority · SickKids · McGill · Genome Canada · British Columbia · Ontario · Québec

Current Context and Landscape

Genomic research in Canada continues to evolve rapidly, shaped by many intersecting forces. For CGEn, Canada's national platform for genome sequencing and analysis, this complex environment presents significant opportunities, distinct responsibilities, and potential challenges. CGEn celebrated its 10th anniversary in 2025 and has been renewed through 2029 as a Major Science Initiative of the Canada Foundation for Innovation (CFI), providing an opportune time to take stock of our achievements and develop future plans to refresh our strategic vision for the next five years.

Canada's science policy direction continues to reinforce the strategic importance of research across many sectors, broadly emphasizing the sovereignty and security of Canadian research and data while promoting worldwide collaboration. Governments, funders, and industry have recognized genomics research, in particular, as a critical engine for precision medicine, public health, climate resilience, food security, and economic development amongst many other impacts. As demand grows for large-scale, high-quality genomic data, CGEn's national capacity and capabilities are central to supporting progress in these areas and maintaining Canada's global competitiveness. Coordination with Genome Canada, its regional Genome Centres, the Tri-Agency funding agencies, the CFI and many other enabling organizations working in genomics and related disciplines continues to strengthen our collective impact in Canada and abroad.

At the same time, public interest in genomics-based precision medicine, personal genomic information, and health innovation is growing, as are concerns around privacy, inclusion, and equity. The legal and regulatory landscape, shaped by ongoing discussions around data governance and interoperability, requires careful attention. CGEn plays an important role in building public trust by modelling transparent, ethical practices, supporting inclusive research, ensuring genomic data security, and aligning with legal frameworks around consent and data sharing.

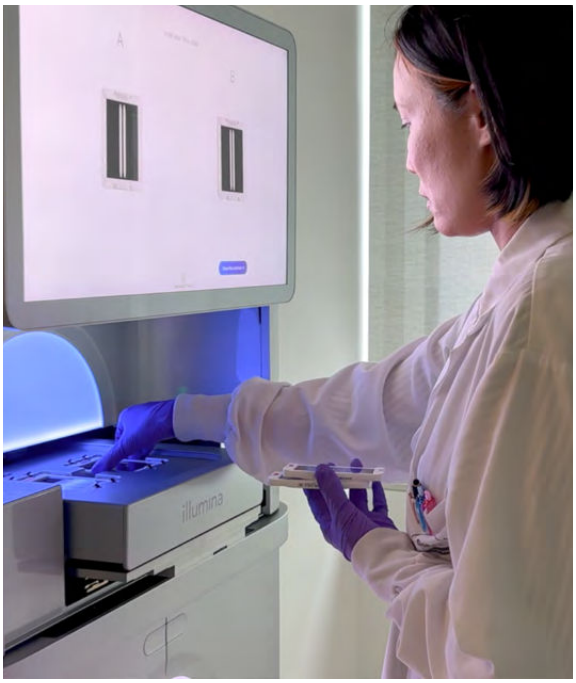
On the technological front, ongoing advancements continue to redefine what is possible in genomics. Emerging sequencing technologies, cloud computing, artificial intelligence-driven analysis, and secure data platforms are transforming how data are generated, interpreted, and shared.
In Canada, CGEn is impacted by, and contributes

to, these shifts. Informed by user needs alongside our deep expertise and connections to technology providers, technology assessment and development remains a mission-critical activity for CGEn. While enabling researchers to access cutting-edge infrastructure, CGEn also contributes to the development, adoption, and implementation of new genomic tools and solutions.

Canada's genomics research ecosystem is supported by a diverse and evolving network of infrastructure. Complementing CGEn's national reach and impact are core facilities (usually embedded within academic settings) that can provide support to their institutions through specialized services but operate with varying levels of capacity, service types, and funding stability—all of which are required to provide consistent, cost-effective and scalable service in broad domains of genomic science.

As genomics continues to be more embedded across disciplines, the need for a cohesive and connected national platform has become increasingly important. CGEn is uniquely positioned to continue fulfilling this role, enabling Canada's genomics ecosystem to succeed through integrated service provision, collaborative expertise, and cutting-edge technology. Over the last decade, CGEn has demonstrated how coordination across its three nodes strengthens Canada's genomics ecosystem. We have enabled a diversity of Canadian initiatives with our expertise and delivery of high-quality data—from smaller-scope user projects to flagship national efforts like HostSeq, the Canadian BioGenome Project, PRecision Oncology For Young peopLE (PROFYLE), the Terry Fox Marathon of Hope Cancer Centres Network, and the recently launched Genome Canada Canadian Precision Health Initiative (CPHI). This diverse catalogue of research will address some of Canada's most important challenges and opportunities, shaping the future for patients and health care, our environment, well-being and economy.

Built on deep scientific knowledge, scalable infrastructure, collaborative leadership, and a reputation for excellence, CGEn's continued success depends on staying connected to the evolving needs of researchers, maintaining agility in the face of change, and upholding our ambition to extend the reach of Canadian genomics into new sectors and new partnerships, for maximum impact in Canada and internationally.



Vision

Every biological study powered by genomic data—driving a healthier, more sustainable future for all Canadians.

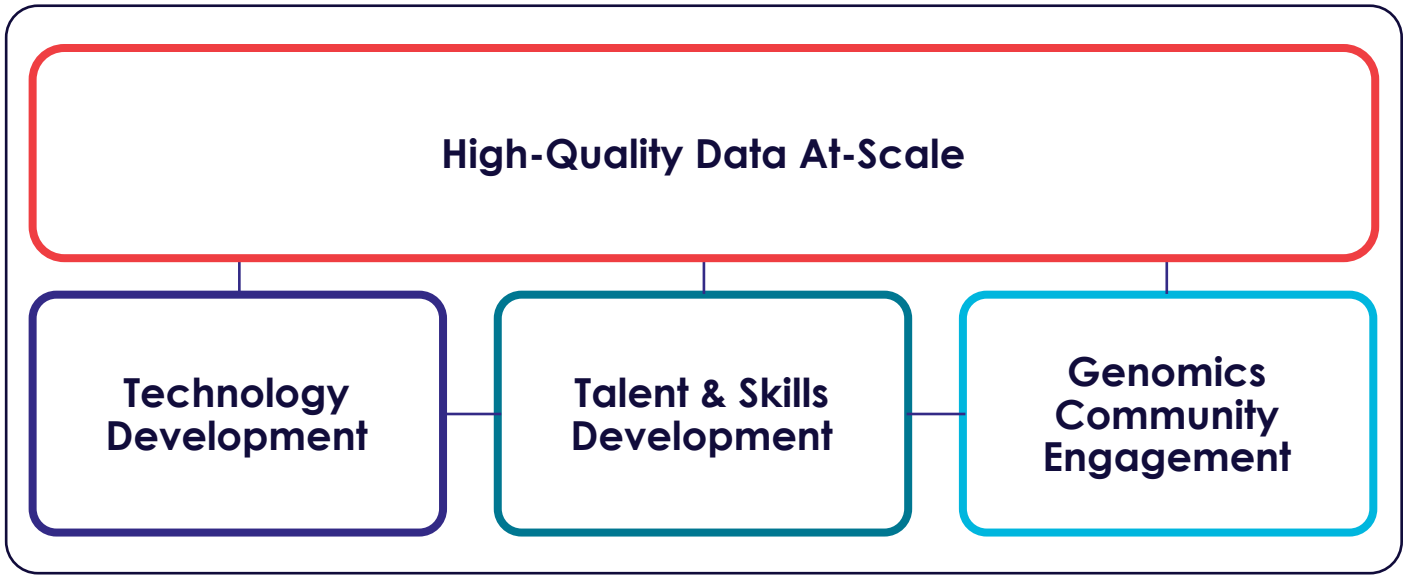
Mission

Strengthen Canada's national capacity for genome sequencing and analysis, enabling impactful regional, national, and international research with large-scale, high-quality data.

Accelerate Canadian genomic science and solidify Canada's global reputation by uniting the country's top genomics expertise.

Anchor strategic collaborations across initiatives, funders, companies, and organizations, positioning Canadian genomics initiatives for the greatest possible impact.

Priority Areas



PRIORITY AREA 1

High-Quality Data At Scale

Genomic data is at the heart of an increasing number of biological studies, and is a foundational element across CGEn activities. From large-scale population cohorts used for hypothesis-free investigations, disease-focused discovery and clinical research, to the study of genomic applications in biodiversity, agriculture and other sectors, genomic data is fuelling academic, industrial and government research teams focused on the most pressing scientific questions facing Canada and Canadians.

Data Generation

Genomic data (including short- and long-read whole genome and transcriptome, and epigenome, amongst other data types) is generated by CGEn's comprehensive technology fleet which features the most current sequencers and supports growing demand in single-cell, spatial transcriptomics and proteomic applications. Critical for the research community, CGEn generates data at the specific scale and depth needed for a particular study—whether that is providing genomics service for tens, hundreds or thousands of samples, or producing a single, but technically challenging, reference genome.

The delivery of high-quality, usable data—especially for large-scale projects—is dependent on each step of the data generation process. From experimental design, sample preparation and technology selection through to informatic and statistical analyses, CGEn staff bring years of experience to each stage, and leverage their expertise to ensure research needs are met. Where relevant, CGEn nodes maintain GLP, ISO and clinical certifications and accreditations, further supporting excellence in data generation, and expanding our ability to collaborate with clinical and private sector research partners. CGEn will continue its broad support of the Canadian research community, remaining accessible and providing service at the highest level to projects across the country. This excellence is supported by a decade of connectivity between CGEn nodes, facilitating the sharing of scientific and operational insights, best practices, and lessons learned.

The distributed CGEn nodes, located in the most research-intensive areas of the country (Vancouver, Toronto, and Montreal), enable regional genomic projects which are often required to engage with service providers within their province, while also providing standardized capacity and collective knowledge that can be leveraged for national projects. This agility was exemplified by the CGEn-led HostSeq Initiative, which engaged 15 regional studies and sequenced thousands of samples at each CGEn node to create Canada's largest genomic health resource to date. HostSeq demonstrated CGEn's capacity and capability to deliver a large-scale, high-quality databank in partnership with researchers, funders, and technology providers, while continuing broad support of research projects across the country. Other large initiatives (Terry Fox Marathon of Hope Cancer Centres Network, the Canadian BioGenome Project) also continue to benefit from the connectivity of CGEn nodes for information sharing and technology development while meeting regional expectations.

The advantage of a coordinated, distributed genomics infrastructure is also demonstrated in the design and implementation of Genome Canada's Canadian Precision Health Initiative (CPHI), which will be a major driver of CGEn's sequencing activities until 2029. The CPHI includes 12 projects that will together generate whole genome sequence data for 100,000 participants representing the Canadian population—the largest genomic initiative in Canada's history. CGEn nodes have been working together since the CPHI call for proposals was announced, to share insights and operational expertise to prepare for this initiative.

CGEn remains committed to leading and supporting additional large-scale genomics projects in the next five years that will benefit from the capacity and capabilities across our distributed network. For example, population-scale long-read sequencing projects are being established in various countries (Estonia, Singapore, UK), to provide researchers with access to more detailed genomic information that will inform precision medicine research. Having brought current long-read technologies into production-scale sequencing across the three nodes, alongside our track record of success, CGEn is ideally suited to deliver large-scale, long-read sequencing projects in Canada.

Data Storage, Analysis and Sharing

As genomic technologies transform biomedical research and produce vast volumes of data, storage, analysis, and secure sharing are ongoing critical challenges. CGEn and its partners will continue to harness their extensive expertise in these areas to ensure the impact of large-scale genomic data is fully realized. Over the past decade, CGEn has deposited 3.4 petabases of sequence data (including over 48,000 whole genome sequences) into accessible research repositories, actively promoting "open science" and data re-use within relevant ethical and legal frameworks. Building on foundational projects (Canadian Digital Infrastructure for Genomics (CanDIG), Personal Genome Project Canada, HostSeq, Database of Genomic Variants, and more), CGEn investigators continue to develop and inform Canada's emerging genomic data initiatives.

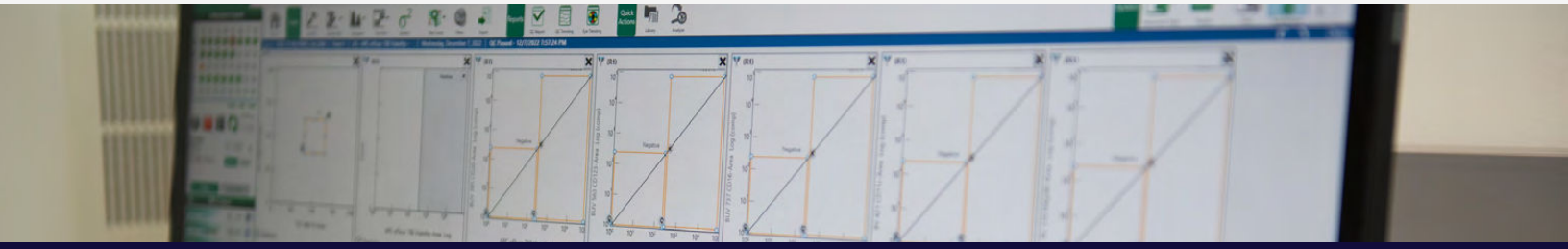
Dr. Steven Jones (CGEn-Vancouver Scientific Director) led the formation of the Canadian Genome-Phenome Archive (CGA), the first non-European node of the Federated European Genome-Phenome Archive, which is establishing a network of locally-archived but globally-

accessible genomic datasets. Dr. Guillaume Bourque (associated with CGEn-Montreal) leads the Pan-Canadian Genome Library (PCGL), which will manage and share human genomic data and is linked to the CGA. In the context of Genome Canada's CPHI, CGEn is continuing to collaborate with partners (Genome Canada, PCGL, and funded projects) to ensure data generation, analysis, storage and transfer policies and processes are co-developed to support efficiency and ultimate success in reaching CPHI's goals.

Further, CGEn oversees management of the HostSeq databank. As one of Canada's first broadly-consented genomic health datasets, HostSeq will continue to be an important pilot for genomic data sharing and linkage. CGEn has been working with the PCGL and the CGA to establish legal and ethical processes for data transfer and wider sharing. This work has already informed ingestion processes, and will continue to inform future deposits of data into the PCGL (much of which will be generated at CGEn nodes, including for CPHI and many other future projects). HostSeq data are also consented for linkage with administrative health data and other data sets. This will be a key area of focus, not only to vastly increase HostSeq data use cases and the value to the research community, but to pave the way for linkage of future genomic datasets and maximize impact within biomedical and clinical research communities.

Some of the ways we will work within this priority include:

- Participating in national, large-scale genomics projects while remaining broadly accessible to the research community.
- Fostering collaboration and operational expertise across our nodes to effectively and consistently serve the research community.
- Proactively addressing genomic complexities with platform users, ensuring solutions are fit-for-purpose, and leveraging in-house bioinformatics expertise to ensure data (re-)usability.
- Supporting secure, ethical, and coordinated frameworks for large-scale human genomic data analysis, sharing, and linkage in Canada to leverage national initiatives and partnerships and maximize research impact.



PRIORITY AREA 2

Technology Development

By congregating Canada's leading genomic scientists, enabling collaboration between technical experts across the country, and leveraging established relationships with sequencing technology providers, CGEn provides an ideal environment for impactful technology development that enhances genomic services at our nodes and advances genomic science more broadly.

A core CGEn activity is the ongoing evaluation and adoption of emerging technologies. When user demand, operational efficiency, or cost savings justify it, these innovations are integrated into production-scale services. Given the speed of genomics technological evolution (with major sequencing platforms cycling through acquisition, testing, implementation, production, and deprecation roughly every 2-3 years), consistent investments of time, effort, and funding to keep pace are essential. These are best delivered through large genome centres that possess the required resources and expertise.

For example, driven by demand and need from the scientific community, over the past five years alone, CGEn has systematically updated its sequencing infrastructure by retiring older instruments such as the Illumina HiSeq X and NovaSeq 6000, and Pacific Biosciences Sequel IIe, while deploying state-of-the-art platforms including the Illumina NovaSeq X Plus, PacBio Revio, Ultima Genomics UG100 and upgrading the Oxford Nanopore PromethION. Moving forward, CGEn will continue to serve as Canada's testbed for production-scale sequencing, assessing emerging technologies to deliver the highest quality data at the lowest cost. This may include evaluations of emerging technologies like Element Biosciences AVITI24 and Roche's Sequencing by Expansion (SBX). CGEn's commitment to innovation will ensure Canadian research initiatives access the latest sequencing technologies and remain competitive internationally.

Technology development efforts also extend to critical supporting elements, including sample and library preparation, as well as informatics innovations in long-read sequencing, single-cell analysis, spatial transcriptomics, and sequencing-informed proteomics. In these areas and others, collaboration across CGEn's three nodes harnesses diverse perspectives

and expertise, and sharing of results maximizes effective resource use, accelerating progress. Engagement with the international Scientific Advisory Board, technology providers, and other ecosystem partners further strengthens these efforts.

Benchmarking studies will continue to monitor and compare data quality across nodes, ensuring CGEn's readiness to meet emerging large-scale genomic needs and opportunities, such as the recent international shift toward population-scale, long-read sequencing. Aligning with Priority Area 4, CGEn will continue to engage leading genomics projects, technology providers, and international centres to understand research priorities and the requirements to build solutions. These technology development efforts have been designed to fulfil customer needs and gaps in current approaches and will continue to ensure that CGEn services are optimized for Canadian researchers. Extending CGEn's commitment to "open science" and the broader use of genomics, where appropriate, internally developed methods and tools will also be made available to the research community, maximizing the benefit of CGEn's activities. Securing ongoing support for these critical technology development activities will be a strategic focus in the coming years.

Some of the ways we will work within this priority include:

- Maintaining partnerships with technology providers to assess and implement emerging genomic technologies, including new sequencers and informatics tools.
- Driving optimization of sample preparation, genomic data analysis, and statistical techniques.
- Promoting collaboration within CGEn and with the wider ecosystem to develop and implement protocols and tools that benefit Canadian research.
- Continuing to demonstrate the benefits of CGEn technology development activities.

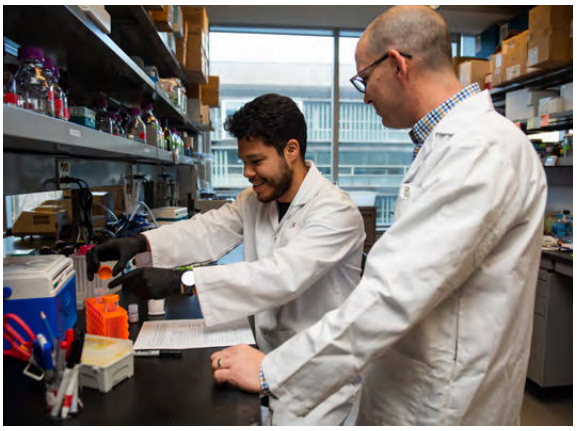
PRIORITY AREA 3

Training and Skills Development

As Canada's national platform for genomic sequencing and analysis, CGEn is uniquely positioned to contribute to the training and development of highly qualified personnel across the genomics research ecosystem. CGEn's approach to talent development is inclusive and strategically aligned with both our internal scientific mission and Canada's long-term vision for genomic science. CGEn recognizes that sustained investment in people (including scientists, technologists, and users) is essential to cultivate a national talent pipeline that is ready to meet future demands in genomic research, innovation and application, maintaining both CGEn's and Canada's global competitiveness.

Staff development at CGEn is fostered through a variety of structured opportunities aimed at strengthening technical and professional competencies. Alongside attendance at and contributions to major scientific and technical conferences to stay current with rapidly evolving technologies and methods, vendor-led infrastructure training is integrated with rigorous in-house validation procedures, enabling staff to develop expertise with new instruments and workflows. Internal learning and knowledge transfer is formalized through mechanisms such as the Technical Experts Committee, which promotes cross-node information sharing and standardization to address emerging large-scale genomics needs.

CGEn also embraces inclusion, diversity, equity and accessibility (IDEA) as fundamental components of excellence in research and innovation. Our workforce represents a broad range of cultural and national backgrounds, contributing to a dynamic culture of collaboration. In 2023, CGEn launched an IDEA survey across all nodes to inform the development of an IDEA Strategic Action Plan.



This plan, together with an education series, has guided efforts to create an even more inclusive work environment. Working with our nodes and host institutions, CGEn has contributed to outreach within employment equity groups to support recruitment and implemented mentorship programs to support career development and retention.

Training extends beyond CGEn staff to include users and the broader Canadian genomics ecosystem. Through user consultations and collaborative data analyses, CGEn provides

meaningful opportunities for trainees to develop advanced skills in genomic science—including computational biology and data interpretation. The 15 petabases of data generated by CGEn for academic, government, and industry organizations over the last decade have supported thousands of students and research personnel, serving as a foundational resource for training in genomic research as well as downstream application and, in some cases, commercialization of results. Strategic partnerships have furthered CGEn's training impact. Collaborations with CIHR and Canadian Statistical Sciences Institute (CANSSI)-Ontario supported postdoctoral research fellowships working with CGEn's HostSeq dataset, contributing to the building of long-term capacity in genomic and health data science, which will be critical for advancing precision medicine in Canada.

Finally, CGEn nodes engage broadly in education and outreach across the talent pipeline, from seeding interest in genomics and its applications at high school (Geneskool, Kids Science, and CanSeq150 programs) through undergraduate and graduate levels (courses, seminars, and mentorship of trainees' research experiences).

Over the next five years, CGEn will continue to foster internal development and collaborate on broader initiatives that enhance knowledge, skills, and equitable participation in genomics. Doing so will support the growth of a sustainable, globally competitive workforce capable of using genomic science to drive innovation in healthcare, agriculture, environmental science, and beyond.

Some of the ways we will work within this priority include:

- Supporting internal and external training and skills development opportunities for staff and users to keep pace with evolving genomic science.
- Continuing to implement the CGEn IDEA Strategic Action Plan, using it to guide inclusive career development in the field of genomics, and other workplace initiatives across CGEn nodes.
- Deepening partnerships with academic institutions and national training networks to support development of trainees that are aligned with Canada's genomics and innovation strategies.

PRIORITY AREA 4

Genomics Ecosystem Engagement

Canada's genomics landscape is varied and diverse. Funders, researchers, institutions, infrastructures, service providers, companies, regional projects and flagship initiatives together create opportunities for collaboration and coordination that can deepen the impact of genomic science in Canada and beyond. CGEn, through its scientific directors and node staff, brings sought-after expertise, international experience, and a proven track record of delivering some of Canada's most significant genomics projects. As a distributed network, CGEn enables collaborations that amplify the platform's activities and impact at regional, national, and international levels.

CGEn's leadership, staff, and extensive network consolidates much of Canada's leading expertise in genomic science. Positioned at the intersection of infrastructure and technology, scientific excellence, and Canadian projects, CGEn's national platform is entrusted to broadly promote and facilitate the use of genomic data in research. CGEn nodes already actively engage, both formally and informally, with numerous Canadian programs, serving not only as service providers but also as collaborative subject matter experts in data storage, analysis, sharing, and relevant ethical issues. CGEn and its nodes also partner in many international initiatives (e.g. Earth BioGenome Project, COVID-19 Host Genetics Initiative, Federated European Genome-Phenome Archive, Global Alliance for Genomics in Health), reinforcing Canada's role in the global genomics community.

CGEn additionally uses its collective expertise and relationships to anticipate and respond to emerging opportunities in genomic science, engaging government and funding bodies to support evidence-based decision-making. The HostSeq initiative exemplified this capacity. Beyond possessing the technical resources, CGEn leadership drew on prior experience and strong relationships to rapidly design a complex study, secure $20M in government funding support, and engage contributing projects and other partners across the country.

The "democratization" of sequencing over the past two decades has resulted in an expansion of the types of services, user profiles and application areas related to genomic science (for example, expanding beyond the health sector). CGEn has both adapted to and helped shape this transformation in Canada, which has also featured an evolving infrastructure landscape as institutions and researchers make strategic technology investments. CGEn nodes have responded by building relationships with other Canadian genomics facilities, for example routing service referrals best accommodated by CGEn's technology, pricing, and expertise. Reinforcing partnerships like these will support Canada's overall competitiveness in genomic science. Similarly, genome centres and distributed infrastructure platforms in other countries provide additional opportunities to work together to enhance scientific and technology development activities, and their downstream impacts.

By continuing to engage proactively and thoughtfully with ecosystem partners within the Canadian and international research communities over the next five years, CGEn will enable impactful genomic advancements across Canada.

Some of the ways we will work within this priority include:

- Leading, in collaboration with ecosystem partners, strategic large-scale data generation projects across sectors.
- Collaborating with regional initiatives and centres to accelerate Canadian genomics research broadly.
- Acting as a hub of expertise, advising and supporting Canadian and international genomics initiatives.
- Strengthening international connections to position CGEn and Canada as global leaders in genomic science.

Conclusion

CGEn's Strategic Vision 2030 positions the organization to meet Canada's growing needs in genomics, supporting research that spans human health, environmental sustainability, agriculture, and biodiversity. By prioritizing **high-quality data at scale**, CGEn ensures that researchers across the country have access to the reliable, comprehensive genomic information required to drive discovery and innovation. The commitment to **technology development** enables the adoption and creation of cutting-edge tools and platforms, ensuring Canadian scientists remain at the forefront of genomics-enabled research.

Investing in **talent and skills** strengthens Canada's genomics workforce, equipping the next generation of scientists with the expertise needed to tackle complex scientific and societal challenges. Equally, **genomics community engagement** reinforces connections across research groups, institutions, funders, and international partners, fostering collaboration and knowledge sharing that magnifies the impact of Canada's genomic infrastructure. Through these priorities, CGEn extends the reach of Canadian genomics, cultivating inclusive and diverse research practices that reflect the values of excellence, connectivity, innovation, and diversity.

Strategic Vision 2030 is a living framework, guiding CGEn's activities while remaining responsive to evolving scientific, technical, and societal landscapes. We will continue to measure impact across these priority areas, assessing outcomes such as research engagement, data utilization, technology uptake, and workforce development, and make adjustments as needed to maximize benefit. In doing so, CGEn will ensure that its infrastructure, expertise, and partnerships continue to deliver meaningful outcomes for Canada and the global genomics community.


CGEn