Genome Alberta

Annual Report

2022-2023

As a not-for-profit research funding organization, we're here to help initiate, fund and manage genomics partnerships and research. Together, we will catalyze genomics solutions that benefit Albertans and the world.

Genome Alberta is part of a Canadian network, established in 2000, to build international leadership in genomics and other 'omics research, develop specific Life Sciences research platforms and address and support regional priorities.

Since our establishment, Genome Alberta has enabled **$572.6M** of genomics research and has helped secure **$126M** of federal research funds for Alberta-led projects, creating thousands of Alberta jobs and 26 spin-off companies.

We add significant value to the provincial innovation ecosystem by:

- Working collaboratively with innovation entities to drive technology development and implementation.
- Securing significant federal funds for Alberta-led research and increasing innovation support for our provincial priorities.
- Ensuring scientific excellence is supported by social sciences research and addressing ethical, legal and environmental barriers.

OUR VISION

To inspire and catalyze genomics solutions that benefit Albertans and the world.

OUR MISSION

To promote and support genomics solutions for end-user needs to create value and investment opportunities through excellent science, technology and application development, collaborations and partnerships.

GENOMICS AT WORK FOR A BETTER ALBERTA

Welcome to the Genome Alberta 2022-2023 Annual Report.

Throughout these pages, we highlight our sustained dedication to providing substantial value to Alberta, underlining our strong track record of mobilizing funding and expertise to address the province's unique challenges. Genomics remains a powerful technology with new tools we are putting to work to contribute to a better Alberta.

On a regional level throughout 2022-23, Genome Alberta prioritized moving from innovation to impact, placing significant emphasis on the extension of the application of genomics solutions and talent development of the skilled workforce needed to propel Alberta toward a more competitive and prosperous future.

Further, we continued to support research and innovation for our healthcare system and its resilience in the face of evolving challenges. Our unwavering commitment to advancing healthcare delivery and improving patient outcomes underscores the significance of not only addressing the immediate needs of our system but also fortifying its capacity to adapt and deliver in the face of unforeseen circumstances.

Nationally, through the leadership of Genome Canada, we continued on the path to shifting from large-scale applied research to a challenge/mission-driven approach. This strategic shift has paved the way for a more targeted and results-oriented approach to genomics research.

In May 2022, the **Climate-Smart Agriculture and Food Systems Genomics Initiative** was announced by Genome Canada with $30M in cutting-edge genomic research and innovation to reduce the carbon footprint of Canada's food production systems — building their resiliency, environmental sustainability and economic viability.

With a laser focus on strengthening the environmental sustainability and performance of Alberta's agriculture and food producers, we worked hard with teams to prepare highly competitive Alberta-led proposals to stand out at the national level with compelling rationale on their ability to provide new solutions and achieve goals.

At our June 2022 Annual General Meeting, we welcomed Oryssia Lennie as our new Board Chair, whose extensive experience in strategic leadership and deep understanding of the role of innovation as an economic driver will further steer our mission to bring genomics-based innovation for the needs and benefit of Alberta. Lennie's visionary approach aligns with our commitment to pioneering advancements, ensuring Genome Alberta's continued impact on the province.

The momentum around the potential of genomics continued at the national level with the release of the **Canadian Genomics Strategy: What We Heard Report** from Innovation, Science and Economic Development Canada (ISED). The report highlights several key findings and what is needed to support the commercialization and adoption of genomics innovations and technologies and ensure Canada remains a strong player and beneficiary of the social and economic impacts in this global innovation arena.

Also in the Summer of 2022, Genome Alberta and Results Driven Agriculture Research (RDAR), in collaboration with the Government of Canada and Alberta's Department of Agriculture at the time, announced a **$5.1 million funding allocation under the Canadian Agricultural Partnership** (CAP). This funding was designated for initiatives aimed at leveraging genomics to tackle various challenges and opportunities within Alberta's agricultural sector, encompassing diverse areas such as livestock (including beef, dairy and pork), crops (comprising wheat, canola, and potatoes), and soil health.

> **"Together, we are better positioned to make positive and lasting changes for Alberta, capitalizing on the transformative potential of genomics innovation."**
>
> Oryssia Lennie, Genome Alberta Board Chair

Looking ahead, we are optimistic about the growing opportunities for genomics innovation in Alberta across our key economic sectors, driven by global demand and recognition of technological advancements and a broader scope for biology-based innovation. This outlook fuels our commitment to being a catalyst and connector, bringing solutions from the lab to life for driving progress toward a brighter future.

VOICES OF VISION: INSIGHTS ON GENOME ALBERTA'S PROGRESS

Oryssia Lennie
BOARD CHAIR

In this first year in the role of Board Chair for Genome Alberta, it's been my privilege to witness the incredible amount of work underway and the advances to tackle challenges from patient care, to sector sustainability, to big data analysis and interpretation. The power and promise of genomics for Alberta are vast, presenting us with opportunities to harness momentum in this field from around the world. The potential of genomics to be a game-changer here at home requires a "better together" approach built on strong relationships with industry, government and academic partners. Together, we are better positioned to make positive and lasting changes for Alberta, capitalizing on the transformative potential of genomics innovation.

David Bailey
PRESIDENT AND CEO

As CEO of Genome Alberta, I am immensely proud of our collaborative efforts in propelling our province towards a brighter future. We've diligently worked hand in hand with Alberta partners to integrate groundbreaking genomics innovations where they matter most, fostering a landscape where technology meets necessity. Our journey has been nothing short of remarkable. Since 2005, we've leveraged substantial investments to drive this progress, laying a sturdy foundation for transformative change. Over these years, I've been fortunate to see the astonishing evolution of genomics technology firsthand, from its discovery research stages in the early 2000s to the immense data-driven, impactful solutions we are seeing implemented in healthcare settings, agriculture and agri-food systems, and various natural resource sectors today. Alberta is poised and prepared for the future — our accomplishments and advancements stand as a testament to our readiness for what lies ahead.

Gijs van Rooijen
CHIEF SCIENTIFIC OFFICER

Genome Alberta can be very proud of its achievements to date, supporting great science and innovation. This year, I am especially excited about a new partnership with an Indigenous-led initiative 'Summer internship for INdigenous peoples in Genomics'. SING Canada is designed to build Indigenous capacity and scientific literacy through classroom, lab and field training in genomic sciences and Indigenous knowledge. Genome Alberta is committed to building a path to better relationships with Indigenous peoples and the environment around us through opportunities in genomics innovation.

This partnership represents a meaningful step forward in that journey. Our role as a funder has evolved from supporting genomics research activities to delivering impact through omics-based innovation in many areas. I continue to be motivated by the fact we have only scratched the surface of the potential benefits for Alberta. It will be up to all of us to go beyond the surface to unlock the full potential of genomics innovation which will supercharge the bio-revolution that is upon us. Genome Alberta is ideally positioned to ensure that Alberta is a prime beneficiary of this revolution and I am excited to be able to make my contribution to that effort.

GENOME ALBERTA: DRIVING CHANGE, EMPOWERING IMPACT

Who We Are

At Genome Alberta, we're working towards a better future through genomics innovation.

An economic and social impact organization at the forefront of enhancing Alberta's future through research and innovation, we understand how genomics changes our world for the better and enthusiastically pursue and celebrate that impact.

Our projects are driven by real-world needs, in all their complexity.

We're a champion for provincial priorities and a conduit to national funding opportunities, working across sectors and research disciplines to create the genomics solutions Alberta – and the world – needs, including:

- Health
- Agriculture and Agri-Food
- Forestry
- Technology Platforms
- Environment and Energy

How We Help

At Genome Alberta, we stand at the frontier of innovation, leveraging the power of genomics to navigate the complexities of modern challenges. Our commitment is not just to provide assistance. It's to make innovation funding go further, bridging the gap between potential and success.

Understanding the complexity of today's challenges, we pride ourselves on our agility and responsiveness. We recognize that the landscape of research, industry and societal needs is ever-evolving, demanding a nimble approach to find and implement effective solutions.

Collaboration lies at the heart of our mission. We don't operate in isolation but work closely with a national genomics network and a diverse array of regional partners. Through these collaborations, we identify opportunities and develop solutions that address the multifaceted challenges faced by researchers, industry partners and the non-profit and public sectors.

Researchers

Researchers are central to our mission of advancing genomics research and innovation in Alberta. We provide them with the resources and support they need to maximize their success in funding opportunities.

Industry Partners

We understand the importance of continuous innovation to adapt to changes in the global marketplace and demonstrate leadership in ESG performance. We're here to help industry partners by assessing the potential of genomic solutions to meet their needs and connect them to world-leading expertise, cutting-edge technology platforms and innovation funding opportunities to help de-risk R&D investments.

Non-Profit and Public Sector

We understand the complexity of addressing today's challenges and bring an interdisciplinary approach to finding solutions that are not only about new technology and innovation but also incorporate social dimensions and consider the ethics, environment, economic and legal aspects for successful adoption. We're here to help the non-profit and public sector by assessing the potential of genomic solutions to meet their needs and connect them to world-leading expertise, potential project partners, cutting-edge technology platforms and investment opportunities.

THE POWER OF GENOMICS **FOR A BETTER ALBERTA**

We are leveraging genomic technologies and broadening the suite of challenges where bio-based innovations can be applied for finding better solutions. Our portfolio reflects the new technologies, data and information requirements, as well as product and service diversification our key economic sectors are looking to for their future growth and sustainability.

IN 2022-23 GENOME ALBERTA WAS:

Lead on	Co-lead on	Participant in
20 projects	10 projects	3 projects

TOTAL PROJECTS:

33 Projects	$190+ Million

7 Projects

$22M

Agriculture and Agri-Food Projects

Genomics is bolstering the resilience and sustainability of our food system, boosting productivity, improving animal health and ensuring the safety of food products.

13 Projects

$84M

Health

Genomics innovation is changing the ways we approach health care delivery, arming us with better tools for personalized medicine, increasing our ability to effectively diagnose and treat disease, and ultimately enhancing health outcomes for all Albertans.

6 Projects

$36M

Environment and Energy

Genomics is digging down to the tiny molecules to improve our understanding of natural processes and apply these insights towards biodiversity conservation, mitigating environmental risks, reducing emissions and applying nature-based strategies for reclamation and remediation.

4 Projects

$29M

Forestry

Genomics is equipping forest management professional in the public and private sectors with the knowledge they need to sustain the long-term health of Alberta's forests, supporting resiliency and sustainability of the forest sector.

3 Projects

$19M

Technology Platforms/Other

Foundational advancements in key technologies continue to draw and retain top talent, attract additional investments and increase Alberta's reputation as a global innovation hub.

DRIVING CHANGE:
INVESTMENT TO IMPACT ACROSS ALBERTA

Genome Alberta's impact on Alberta is unmistakable.

Driven by our commitment to enable applied research and translate new knowledge to private and public sector partners, we've helped to bring Albertans better outcomes in their health care, created skilled jobs and contributed to sector sustainability and profitability.

Our endeavours have yielded game-changing innovations across various sectors, from health care and agriculture to forestry, energy and the environment, supporting Alberta's economic landscape.

We add significant value to the provincial innovation ecosystem by:

- Fostering collaboration with key entities, propelling technology development and ensuring its effective implementation.
- Securing substantial federal funds for Alberta-led research and increasing innovation support for our priorities.
- Ensuring scientific excellence is supported by social sciences research and addressing ethical, legal and environmental barriers.

Health Sector

ADVANCING PRECISION HEALTH FOR **ENHANCED, INDIVIDUALIZED PATIENT CARE**

Innovation in human health and health care is vitally important to ensuring our health care system provides the best in patient care while delivering services efficiently. Albertans deserve world-class health care that can provide them with cutting-edge improvements and treatment options.

Genomic technologies are making huge strides in advancing personalized medicine where diagnosis, care and treatment are uniquely tailored to each patient based on their genetic make up. Genome Alberta has a strong portfolio of health research initiatives to bring Albertans improved health outcomes from advances in genomic medicine. Here are a few highlights from 2022-23:

Advancing Precision Health in Alberta

The pan-Canadian **All for One** initiative was launched to increase equitable and timely access to accurate, genomics-enabled clinical diagnosis for Canadians with serious genetic diseases. Under this national initiative, Alberta researchers are leading the way in **using clinical genomics to help diagnose rare genetic diseases**. Patients with or suspected of having rare genetic diseases continue to face lengthy diagnostic odysseys, and clinical genome wide sequencing has emerged as a rapid and cost-effective approach to diagnosis. A major milestone achieved in this work has been the approval of the business case to move ahead with integrating this novel technology into Alberta's health care system, via Alberta Precision Laboratories (APL).

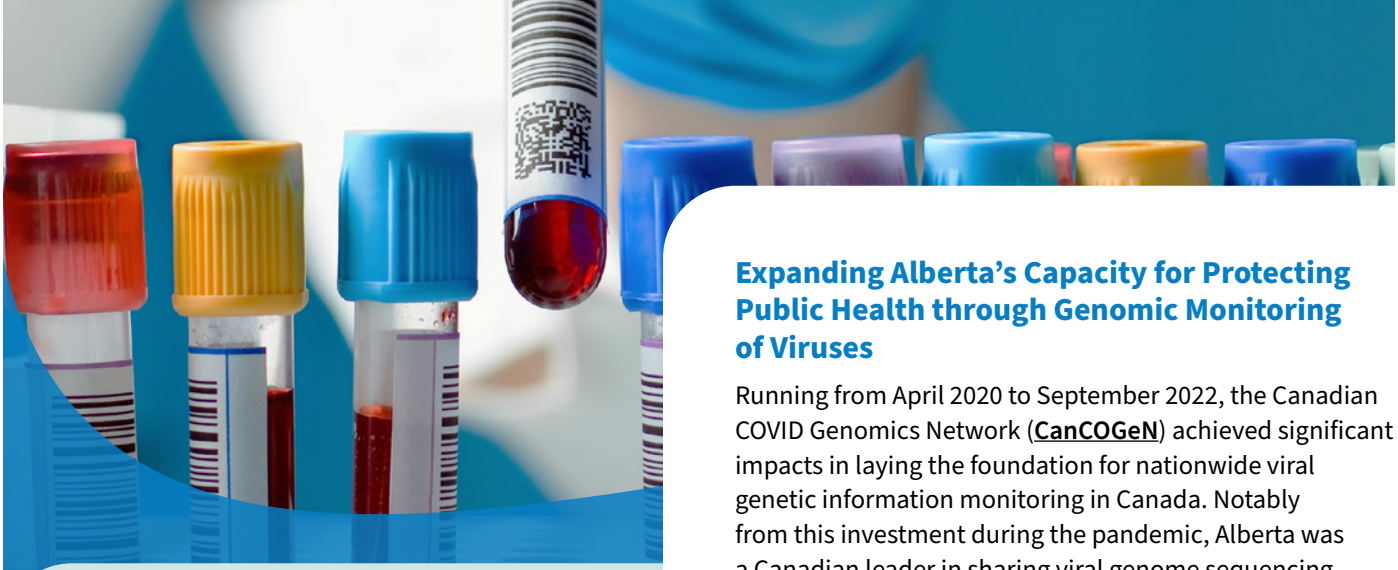
Additionally, in April 2022, the development phase for the Canadian Health Data Ecosystem kicked off. This critically important data infrastructure is tackling barriers to data sharing through a digital platform where clinical genome wide sequencing (GWS) data can be shared to open up more ways to a diagnosis as well as further research. Alberta is co-lead with other Genome Centres on this national initiative led by Ontario Genomics.

Using Precision Infection Management for Diagnosing Bloodstream Infections

Bloodstream infections cause over 80,000 deaths per year in North America and it currently takes two to five days to identify the pathogen and measure their susceptibility to antimicrobials – contributing to preventable deaths. **A team of Alberta researchers** have developed new technology that identifies pathogens and determines their antimicrobial susceptibility profiles faster than the current standards, publishing findings in an academic journal in June 2022. This new technology reduces timelines from 40 hours to 20 hours, which allows effective treatment to be administered quickly saving lives. The research team continues to work through the Alberta Diagnostic Ecosystem Platform for Translation (ADEPT) program, a province-wide network of diagnostic lab providers who prioritize the use of mass spectrometry for moving findings into clinical diagnostic settings so they are available to Albertans.

Expanding the World's Most Comprehensive Metabolomic Databases on Human Metabolism, Pharmaceuticals and Foods

A world-renowned facility, The Metabolomics Innovation Centre (**TMIC**), continues to build on the technologies, equipment and expertise housed at the University of Alberta campus in Edmonton. They now provide services to a wide variety of clients, including the research community, medical technology and pharmaceutical companies, and the food and beverage industry.



> **Molecular You is an AI-powered molecular blood testing platform that has benefited entirely from investments into research in genomics, proteomics and metabolomics like the ones Genome Alberta has committed. Without this foundational structure, companies like Molecular You would not exist.**
>
> Rob Fraser, Chief Scientific Officer and Co-Founder, Molecular You

Recognizing the incredible potential for the broad application of this small molecule chemistry, Genome Alberta has been a proud supporter of the facility, which has resulted in:

$35+M in leveraged funds	**380** presentations	**8** companies*
12 patents	**370** publications	**263** jobs

*Molecular You, a successful company born from TMIC, has become a leading provider of personalized predictive health insights in Canada and has recently announced its expansion to the US market.

Expanding Alberta's Capacity for Protecting Public Health through Genomic Monitoring of Viruses

Running from April 2020 to September 2022, the Canadian COVID Genomics Network (CanCOGeN) achieved significant impacts in laying the foundation for nationwide viral genetic information monitoring in Canada. Notably from this investment during the pandemic, Alberta was a Canadian leader in sharing viral genome sequencing information, ranking third across the country (April 2022 statistics) in numbers of genome sequence uploads to national (44,609) and international (43,785) databases. From this foundation, Genome Alberta helped secure additional funding of $3.2 million (with no provincial government matching required) for Alberta's Precision Laboratories (APL) to increase their sequencing capacity and employ specialized personnel for continuing these activities.

Gaining Valuable Health Insights from Large & Complex Data Sets

High volumes of genomic data are generated in vast databases when using sequencing technologies. When it comes to human health, these datasets hold an immense array of insights into diseases and patient treatment, infection prevention and monitoring bacterial and viral pathogens to name a few. Unlocking these insights requires skilled specialists with knowledge of bioinformatics and computational biology to query the data and interpret the results. Genome Alberta, in partnership with Genome Canada, Alberta Innovates and the Government of Alberta, funded smaller scale investments through the Enabling Bioinformatics Solutions (EBS) program to deliver near-term results which included:

- Developing technology for improving public health efforts in disease surveillance, treatment and prevention of bacterial and viral infections (such as *M. tuberculosis, E.coli* and other antibiotic-resistant bacteria). A **new platform has been developed by a dedicated team of researchers** working to provide medical professionals and health authorities better access to crucial information. The platform enables better organization and analysis of extensive data from high-throughput sequencing in order to share information that is easier to interpret. It is intended to be used by microbiologists and clinicians at Alberta Precision Laboratories (APL).

TRANSFORMING FOOD SYSTEMS **FOR A SUSTAINABLE FUTURE**

Agriculture is both a significant economic sector in our province as well as part of Alberta's cultural fabric. Genomics is playing an increasingly important role in equipping food producers with new tools and insights that are contributing to increasing productivity, competitiveness and sustainability of this sector.

Advanced technologies, together with machine learning and artificial intelligence, are providing crucial insights to empower producers to make informed, data-driven decisions impacting animal health, food safety, crop yields and environmental performance.

Research and Modernization Investments Improve the Competitiveness of Alberta's Agriculture and Agri-food Industry

Genomics was identified as an emerging field that could significantly drive research and innovation to advance progress on critical challenges facing Alberta's agricultural sector. With a $2M investment, in partnership with the Government of Alberta (now through Results Driven Agriculture Research), Genome Alberta successfully managed the Alberta Applied Agricultural Genomics Program (A3GP), wrapping up nine projects in 2022-23. Highlights of key outcomes from this program include:

- Providing cattle producers with a **web-based, user-friendly platform** of consolidated Canadian data for beef cattle with decision-support tools for genomic predictions of desired genetic traits to improve herd production efficiency.
- **Development of drought-tolerant wheat cultivars** through the identification of traits (phenotypes) for improved drought tolerance. With validation and propagation, improved performance of the cultivars would substantially improve wheat yield and financial stability of wheat farmers, ensuring resilient agriculture-based economies. This work has also been transferred to wheat breeding lines for further assessment.

Increasing Efficiency of Dairy Production

Not all dairy cows are equal when it comes to their ability to produce milk. Researchers studying herds in Alberta and Ontario using genomics technologies have discovered the links between the specific genes (and heritable traits) and the ability to more efficiently convert feed into milk while producing less methane and manure. These new insights, known as **Feed Efficiency evaluation**, can now reduce costs for feed and reduce emissions in dairy production. In 2022, Lactanet, the industry partner and top provider of dairy farming solutions in Canada, updated their Feed Efficiency evaluation, adding second lactation data, which represents a 30% increase in the animals with feed intake data and genotypes, providing a better predication of an animal's lifetime feed efficiency. This is excellent progress and is helping the Dairy Farmers of Canada meet their net zero goals.

> **"With a new dairy industry objective of Net-Zero by 2050, Lactanet wants to be there to help everyone reach this important goal. Together, we are making progress with our herds by using insights from genomics data and applying the tools that exist to work towards sustainability. Lactanet's new genetic evaluations for Feed Efficiency, and now the world-leading introduction of Methane Efficiency, are supporting industry efforts."**
>
> Barbara Paquet, Board Chair Lactanet,
> Dairy Producer from Saint-Côme-Linière, QC

Climate-Smart Agriculture and Agri-food Challenge

In May 2022, Genome Canada launched the **Climate-Smart Agriculture and Food Systems initiative**, with a $30 million commitment for pioneering genomic research targeted at reducing the carbon footprint of food production across Canada. The investment seeks to bolster the resilience, sustainability and economic viability of our food systems, which feed Canadians and others around the world. Bringing together world-class expertise from Alberta's academic institutions and regional agricultural partners, Genome Alberta worked hard to ensure Alberta-led proposals were in strong competitive positions for successfully attracting federal investment. Alberta is a leader in agricultural innovation and is also now positioned to drive new solutions for sequestering carbon and emissions from agricultural and food systems.

Genomics is empowering producers to make informed, data-driven decisions impacting animal health, food safety, crop yields and carbon footprint.

Developing the Tools Needed to Decode Genetic 'Recipes'

The genetic material in every living thing provides the instructions or 'recipe' for how it develops and functions throughout its life. Genome sequencing technology can tell us about the 'recipe' through vast amounts of data generated in short pieces. To make sense of the 'recipe', we need sophisticated computer science to decode the information in useful ways depending on how it is needed.

With funding from the Bioinformatics and Computational Biology Competition, **a team of experts have developed a sophisticated platform** designed for managing, analyzing and interpreting bacterial genome sequences, called Proksee. Proksee offers a suite of tools to organize fragmented sequences from genome sequencing instruments, identifying genes and delivering insights for researchers. Within nine months of release, over 40,000 genome sequences were analyzed using Proksee, referenced in 18 publications. This resource facilitates microbial genomic discoveries that could impact food quality and safety, bio-fermented products, crop and livestock health, environmental monitoring, and drive future innovations.

Environment Sector

ENHANCING STEWARDSHIP OF OUR ENVIRONMENT AND NATURAL RESOURCES

Individual Albertans, communities, regulators and companies all have a vested interest in the stewardship of Alberta's environment for current and future generations. Genomics tools and technologies continue to expand in their applications and generate large datasets producing new insights for improving conservation and management of our natural resources.

From natural biodegradation solutions to reducing emissions and environmental risks of oil spills or pipeline failure to expanding access to genomics tools for measuring and monitoring biodiversity with eDNA technologies, here are a few highlights from 2022-23:

> **"The GenoMIC project has provided essential progress in sampling, analysis and assessment of microorganisms affecting industrial infrastructure. This paves the way for these technologies to inform integrity management, minimize use of toxic chemicals, reduce environmental risks, and make pipelines safer."**
>
> Trevor Place, Senior Specialist, Enbridge Pipelines

Breaking Down Barriers to Accessing Genomics Data, Technology and Innovation Opportunities

In Summer, 2022, the Summer Internship for INdigenous Peoples in Genomics Canada (**SING Canada**) workshop offered a week-long, hands-on experience to participants in bioinformatics, genomics and Indigenous and decolonial bioethics. This program is breaking down barriers to ensuring access to genomics data, technology and innovation opportunities are equitable. The 2022 workshop focused on the use of portable genome sequencing technologies tools for studying soil microorganisms. Participants learned to identify organisms via their genetic code, understand their prevalence in the soil and compare diverse microorganisms across locations. This approach was taught within an Indigenous relational research framework, fostering support and training for Indigenous scientists, policy experts and leaders in related fields.

New Knowledge for Mitigating the Risks of Pipeline Failure

Pipeline leaks pose both environmental and reputational risk for energy transportation companies. A contributing factor influencing pipeline corrosion and potential structural breakdowns are the microbial communities within them. With the successful wrap-up of the microbial corrosion project (**GenoMIC**), new insights have empowered industry partners with comprehensive data and essential knowledge for making well-informed decisions regarding their pipeline operations. Key outcomes included the development of standard operating procedures for precise sampling and preservation for genomic analysis, the creation of new models for risk-based prediction and inspection as well as on-site support for the assessment of microbiologically influenced corrosion (MIC). Several of these models were collaboratively developed with partners and are currently undergoing active assessment by key stakeholders, such as Enbridge and the Alberta Energy Regulator.

Exploring Nature-based Solutions to Safer Oil Exploration and Shipping Practices

Oil spills can have devastating impacts on marine ecosystems, especially in extremely cold water found in artic and sub-artic environments. However, there are naturally occurring microorganisms that can both aid in oil spill response plans as well as mitigate greenhouse gas emissions. As marine traffic and activities continue to expand in the Arctic, new insights gained through the **GENICE** project, using genomics to evaluate the potential of biodegradation of oil by natural microorganisms, has been applied to modelling estimated losses, and determining insurance premiums, from potential ship-source oil spills in the region.

Knowledge exchange with Indigenous groups in the region around the use of genomics tools supported dialogue on assessing the risks and opportunities for sustainable development in the Arctic, with strong interest in using genomics for monitoring microbial communities through community-based environmental monitoring initiatives.

A major asset arising from this work was the significant expansion of the Arctic marine microbiome database, offering the research community a unique Canadian Arctic dataset. This resource helps national and international researchers understand the stability and functions of Arctic microbial communities, their hydrocarbon degradation potential and the impact of pollution on biodiversity.

The 2022 Summer Internship for INdigenous Peoples in Genomics Canada workshop focused on the use of portable genome sequencing technologies tools for studying soil microorganisms taught within an Indigenous relational research framework.

GENOME ALBERTA **IMPACT**

Genome Alberta stands as a catalyst for bold progress in our province, playing a pivotal role in expanding innovation opportunities, providing skilled jobs, and realizing economic growth.

Our organization's initiatives have led to the creation of numerous jobs, a supportive environment for spin-off company establishment, and a stream of groundbreaking innovations emerging from Alberta-led projects, significantly shaping the landscape of genomics technology applications within the region.

$572.6M
Total Genome Alberta Enabled Portfolio

26
Companies Created

2,100+
Jobs Created

$31.5M
Industry Investments into Genome Alberta-Led Projects

$126M
Federal Funds for Alberta-Led Projects

115+
Innovations Arising from Alberta-Led Projects

ENRICHING FUTURES: **INVESTING IN LIFE SCIENCE TALENT**

Genome Alberta continues to make strides in developing the talented workforce needed for a thriving life sciences sector in our province.

Through training, developing, recruiting and retaining talent in the province, we are advancing the vision in the Alberta 2030: Building Skills for Jobs strategy for a prosperous Alberta fueled by innovation.

Labour in Demand for the Bio-Economy

We know demand is currently outpacing supply of the highly-skilled and competitive workforce in the life sciences sector and it is critical that we continue to train and support personnel who will help meet the workforce needs. BioTalent Canada's Labour Market Intelligence Report, "**Close-up on the bio-economy**," indicates that current estimates project an impending shortage of skilled workers to meet the escalating labour demand by 2029. The report anticipates a job-opening-to-candidate ratio approaching 4:1 in Canada, with this scarcity attributed to shifting demographics and compounded by the bio-economy's expansion post-pandemic.

BioTalent Canada's Labour Market Intelligence Report anticipates a job-opening-to-candidate ratio approaching 4:1 in Canada.

Talent for Alberta's Sector Needs:

2,000+
jobs across Alberta-led national and regional scale projects

85%
of jobs were equal to or greater than 0.5 FTE

Genome Alberta is a Catalyst for Developing Talent and Skills

Investing in new graduates and employment opportunities within the life sciences plays a pivotal role in addressing potential talent supply shortages. Genome Alberta is improving access and student experience, developing skills for jobs, supporting innovation and commercialization, and strengthening Internationalization. Through funding of research projects, Genome Alberta provides opportunities to train and deploy a diversity of science and innovation professionals, while also bridging academia and industry to ensure the skills being developed in post-secondaries will translate into the needs of Alberta employers in key economic sectors.

GENOME ALBERTA
SUPPORTS TALENT DEVELOPMENT

32%
Agriculture & Agri-food

17%
Human Health

13%
Natural Resources & Environment

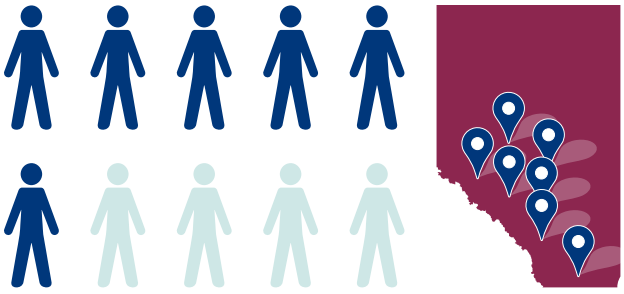
6%
Forestry

32%
Technology Platforms

GENOME ALBERTA SUPPORTS A VARIETY OF TYPES OF JOBS IMPORTANT FOR:

- Research & Development
- Business Development & Operations Management
- Bioinformatics & Data Science
- Communications & Policy Analyst

**Jobs are located in academic institutions, provincial and federal government agencies and labs, Industry and not-for-profit*



6 out of 10
jobs are located in Alberta

Genome Alberta investments in talent and skill development through research and innovation projects help to deliver on the Alberta 2030 vision of an innovative and prosperous Alberta through training, developing, recruiting and retaining talent in the province.

OUR **TEAM**

BOARD OF **DIRECTORS**

Oryssia Lennie
CHAIR

Geoff Pradella
VICE-CHAIR

Donna Hildebrant

Fred Wrona

Hilary Rose

Jason Krips

Jay Ingram

Lisa Crossley

Michael Lohuis

MANAGEMENT

David Bailey
PRESIDENT & CEO

Gijs van Rooijen
CHIEF SCIENTIFIC OFFICER

Tawnya Morrison
CONTROLLER
(to October 2022)

Matt Bryman
DIRECTOR PROGRAMS

Erin Tessier
DIRECTOR OF COMMUNICATIONS AND PARTNERSHIPS
(effective October 2022)

Mitthua Sarkar-Banks
HUMAN RESOURCES MANAGER

GENOME ALBERTA
FINANCIAL STATEMENTS

FOR THE YEAR ENDED MARCH 31, 2023

And Independent Auditor's Report thereon

Genome Alberta

GENOME ALBERTA FINANCIAL STATEMENTS
FOR THE YEAR ENDED MARCH 31, 2023

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INDEPENDENT AUDITOR'S REPORT

To the Board of Directors of Genome Alberta

Opinion

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

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

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

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

Basis for Opinion

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

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

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

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

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

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

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

Auditor's Responsibilities for the Audit of the Financial Statements

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

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

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

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

We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion.
- The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Entity's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Entity's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Entity's to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Chartered Professional Accountants

Calgary, Canada

June 27, 2023

GENOME ALBERTA
STATEMENT OF FINANCIAL POSITION

	As at March 31, 2023	As at March 31, 2022
	$	$
CURRENT ASSETS		
Cash	8,335,759	8,309,177
Funding receivable	584,242	140,724
GST receivable	10,409	7,621
Prepaid expenses	34,166	15,036
Project advances	2,629,690	3,174,564
	11,594,266	11,647,122
RESTRICTED INVESTMENT (Note 3)	70,000	70,000
PROPERTY & EQUIPMENT (Note 4)	18,909	13,212
	11,683,175	**11,730,334**
LIABILITIES		
CURRENT LIABILITIES		
Accounts payable and accrued liabilities	758,470	619,859
DEFERRED CONTRIBUTIONS (Note 6)	10,905,796	11,097,263
DEFERRED CONTRIBUTIONS RELATED TO PROPERTY & EQUIPMENT (Note 6)	18,909	13,212
	11,683,175	**11,730,334**
Commitments (Note 9)		

The accompanying notes are an integral part of these financial statements.

Approved by the Board:

[signed on original copy]

Lisa Crossley - Chair, Audit Committee

[signed on original copy]

Oryssia Lennie - Chair, Board of Directors

GENOME ALBERTA
STATEMENT OF OPERATIONS AND CHANGES IN NET ASSETS

	Year Ended March 31, 2023	Year Ended March 31, 2022
	$	$
REVENUES		
Recognition of deferred contributions (Note 6)	10,834,384	11,775,556
Amortization of deferred contributions related to capital assets (Note 6)	10,547	7,058
	10,844,931	11,782,614
EXPENSES		
Research project expenditures (Note 7)	8,744,176	9,825,718
Project development and management (Note 5)	1,904,484	1,756,860
Communications and public outreach	163,463	179,676
External committees (Note 5)	22,261	13,302
Amortization of property and equipment	10,547	7,058
Total Operating Costs	10,844,931	11,782,614
Excess of revenues over expenses and net assets - beginning and end of year	-	-

The accompanying notes are an integral part of these financial statements.

GENOME ALBERTA
STATEMENT OF CASH FLOWS

	Year Ended March 31, 2023	Year Ended March 31, 2022
	$	$
Cash provided by:		
Operating Activities		
Excess of revenues over expenses	-	-
Items not involving cash:		
Recognition of deferred contributions	(10,844,931)	(11,782,614)
Amortization of capital assets	10,547	7,058
Contributions received in year (Note 6)	10,462,543	7,708,771
Interest Income (Note 6)	196,618	26,697
	(175,223)	(4,040,088)
Change in non-cash working capital:		
(Increase) decrease in funding receivable	(443,518)	18,448
(Increase) decrease in GST receivable	(2,788)	1,941
Decrease in other accounts receivable	-	19,348
(Increase) decrease in prepaid expenses	(19,130)	11,521
Decrease in project advances	544,874	1,613,693
Increase (decrease) in accounts payable and accrued liabilities	138,611	(125,586)
Net cash used in operating activities	42,826	(2,500,723)
Investing Activities		
Purchase of property & equipment	(16,244)	(6,951)
Net cash used in investing activities	(16,244)	(6,951)
Increase in cash	26,582	(2,507,674)
Cash, beginning of year	8,309,177	10,816,851
Cash, end of Period	8,335,759	8,309,177

The accompanying notes are an integral part of these financial statements.

GENOME ALBERTA
NOTES TO FINANCIAL STATEMENTS
For the year ended March 31, 2023

1. Purpose of Organization

Genome Alberta (the "Corporation") was incorporated in 2005 under the Canada Corporation Act as a Not- for-profit Corporation and was continued in 2014 under the Canada Not-for-profit Corporations Act.

Genome Alberta is exempt from income and capital taxes. The Corporation has the following objectives:

a) Develop and establish a coordinated strategy for genomics research to enable Canada to become a world leader in a few selected areas such as health, agriculture, environment, forestry and energy;

b) Provide leading-edge technology to researchers in all genomics-related fields in Alberta;

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

d) Ensuring leadership in the area of social, environmental, ethical and legal issues related to genomics by organizing intellectual resources and to effectively communicate genomics to the public, helping Albertans and Canadians understand the relative risks and rewards of genomics; and

e) Encouraging investment by other organizations to fund genomics research.

2. Significant Accounting Policies

These financial statements are prepared in accordance with Canadian accounting standards for not-for- profit organizations ("ASNPO") in Part III of the Chartered Professional Accountants ("CPA") Handbook and include the following significant accounting policies:

a) Cash

Cash consists of cash on hand and account balances with the Corporation's bank.

b) Funding Receivable

Funding Receivable represents amounts that are payable to the Corporation within the next fiscal year.

In the course of its ongoing operations, the Corporation receives funding from government bodies under terms and conditions as specified by the associated funding contracts. Certain contracts require specific deliverables to be performed by the Corporation before such funding becomes receivable. Consistent with such terms and conditions, the Corporation therefore records the associated funding receivable only when the underlying deliverables have been approved by the funder and the funding is therefore available to the Corporation.

c) Revenue Recognition

The Corporation follows the deferral method of accounting for contributions which includes funding from Genome Canada, provincial ministries, the commercial sector and other funding sources.

Contributions received for property and equipment expenditures are deferred and recognized as revenue as the related property and equipment are amortized.

2. Significant Accounting Policies (continued)

c) Revenue Recognition (continued)

Externally restricted contributions are recognized as revenue in the year in which the related expenses are incurred.

Investment income is recognized in deferred contributions as received. The Corporation does not receive unrestricted contributions.

d) Property & Equipment

Property and equipment are recorded at cost. Amortization is recorded using a straight-line basis over their estimated useful lives at the following rates:

Furniture and equipment	5 years
Computer equipment	3 years

e) Use of Estimates

The preparation of financial statements in conformity with ASNPO requires the use of estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of assets and liabilities at the dates of the financial statements and the reported amounts of revenues and expenses during the reporting period. Significant item subject to such estimates and assumptions is Contribution Receivable from Genome Canada. Actual results could differ from those estimates.

f) Financial Instruments

Financial instruments are recorded at fair value on initial recognition. Freestanding derivative instruments that are not in a qualifying hedging relationship and equity instruments that are quoted in an active market are subsequently recorded at fair value. All other financial instruments are recorded at cost or amortized cost, unless management has elected to record at fair value.

Transaction costs related to financial instruments measured at fair value are expensed as incurred. For all other financial instruments, the transaction costs are added to the carrying value of the asset or netted against the carrying value of the liability and are then recognized over the expected life of the instrument using the straight-line method. Any premium or discount related to an instrument measured at amortized cost is amortized over the expected life of the item using the straight-line method and recognized in the statement of operations.

With respect to financial assets measured at cost or amortized cost, the Corporation recognizes in the statement of operations an impairment loss, if any, when it determines that a significant adverse change has occurred during the period in the expected timing or amount of future cash flows. If an asset that was previously written down becomes less impaired and the recovery in value relates to an event occurring subsequent to the impairment write-down, the asset can be written back up, but only to the extent of the original impairment adjustment. This reversal of the previously recorded impairment loss is recorded in the statement of revenues and expenses in the period the reversal occurs.

2. Significant Accounting Policies (continued)

g) Related Party Transactions

Monetary related party transactions and non-monetary related party transactions that have commercial substance are measured at the exchange amount when they are in the normal course of business, except when the transaction is an exchange of a product or property held for sale in the normal course of operations. Where the transaction is not in the normal course of operations, it is measured at the exchange amount when there is a substantive change in the ownership of the item transferred and there is independent evidence of the exchange amount.

All other related party transactions are measured at the carrying amount.

3. Restricted Investment

Includes security deposit of $70,000 held by the bank that matches the limit on the Corporation's credit card facility. The amount is held in a Guaranteed Investment Certificate, which earns interest at 4.65% and matures on March 8, 2024. Upon maturity, amount is intended to be reinvested.

4. Property and Equipment

			March 31, 2023	March 31, 2022
	COST	ACCUMULATED DEPRECIATION	NET BOOK VALUE	NET BOOK VALUE
	$	$	$	$
Furniture and office equipment	12,815	12,767	48	334
Computer equipment	48,467	29,606	18,861	12,878
	61,282	42,373	18,909	13,212

5. Related Party Transactions

During the year, Genome Alberta paid $11,276 (2022 - $7,198) relating to expenses incurred by key executives on behalf of the Corporation incurred in the normal course of operations and are measured at the exchange amount, which is the amount of consideration established and agreed to by the related parties. These expenses are included in project development and management, and external committees expenses on the statement of operations.

6. Deferred Contributions

Deferred Contributions represent unspent externally restricted funding and related investment income, which are for the purposes of providing funding to approved projects and for corporate operations in future years.

	March 31, 2023	March 31, 2022
	$	$
Opening balance	11,097,263	15,144,302
Contributions for the period:		
Genome Canada	6,999,126	6,320,581
Alberta Ministry of Technology and Innovation	3,094,645	950,000
Alberta Innovates	12,590	59,855
Results Driven Agriculture Research (RDAR)	89,950	75,000
Other	266,232	492,228
Closed projects: Unspent funds returned to Funders	-	(188,893)
	10,462,543	7,708,771
Investment Income	196,618	26,697
	10,659,161	7,735,468
Total opening balance, contributions and interest:	21,756,424	22,879,770
Amounts recognized in revenue	(10,834,384)	(11,775,556)
Transfer to deferred contributions - property & equipment	(16,244)	(6,951)
Closing balance	10,905,796	11,097,263

Deferred contributions have been externally restricted for the following purposes:

	March 31, 2023	March 31, 2022
Project expenses	7,653,103	9,001,034
Administration and other costs	3,252,694	2,096,229
	10,905,797	11,097,263

Changes in Deferred Contributions reported for Property and Equipment:

	March 31, 2023	March 31, 2022
Opening balance	13,212	13,319
Transferred from deferred contributions	16,244	6,951
Amounts recognized in revenue	(10,547)	(7,058)
Closing balance	18,909	13,212

7. Research Project Expenditures

As part of its strategic role in the support of genomic research, the Corporation provides scientific, financial and administrative support to a variety of genomic research projects under the auspices of funding and management agreements with third party institutions. Each project operates under an approved budget and scope, and provides the Corporation with regular reports describing the scientific progress against agreed milestones and of financial performance against budget.

Funding has been received or is receivable from Genome Canada and the agencies of the Alberta Government, either individually or jointly, to support the following projects and programs:

1.	Alberta Applied Agriculture Genomics Program	A3GP
2.	CanCOGeN Virus Genome Sequencing Project	APLCPA
3.	A comprehensive analytical toolkit and high-performance genome browser for rapid, reliable and in-depth characterization of bacterial genomes	BCB1701
4.	Illuminating the dark matter of the metabolome with convolutional neural networks	BCB1702
5.	BioNet Alberta	Bionet/RP3
6.	From sequencer to results: enabling routine genomics use for clinical and public health microbiology in Alberta	EBS11L
7.	BeeBiome Data Portal	EBS14
8.	TIGER: Translational Implementation of Genomics for Rare Disease	GAP16B
9.	Application of Genomics-based Tools to Select for Pig Disease Resilience	GAP17D
10.	Validation and integration of genomics solutions for offshore oil exploration in Nova Scotia and beyond	GAPH2
11.	Understanding the Role of Genomics in Fostering and Supporting Arctic Biodiversity	GSAB
12.	Integrating genomic approaches to improve diary cattle resilience: A comprehensive goal to enhance the Canadian dairy industry	L18DCR
13.	Genomic Assets (Antimicrobial Stewardship systems from Evidence-based Treatment Strategies) for Livestock	L18GAL
14.	Application of Genomics to Enhance Wetland Treatment systems for Remediation of processed Water in Northern Environment	L20WT
15.	TRIA-FoR: Transformative Risk Assessment and Forest Resilience Using Genomic Tools for the Mountain Pine Beetle Outbreak	L20TF
16.	CoAdapTree: Health Trees for Future Climates	LAT
17.	Harnessing Multi-Omics to Deliver Innovative Diagnostic Care for Rare Genetic Diseases in Canada (C4R-SOLVE)	LC4S
18.	Childhood Asthma and the Microbiome - Precision Health for Life: The Canadian Healthy Infant Longitudinal Development (CHILD) Study	LCAM
19.	GENICE: Microbial Genomics for Oil Spill Preparedness in Canada's Arctic Marine	LGO
20.	CanPREVENT AMR: Applying Precision Medicine Technologies in Canada to Prevent Antibody Mediated Rejection and Premature Kidney Transplant Loss	LKCP
21.	Managing Microbial Corrosion in Canadian Offshore & Onshore Oil Production	LMC
22.	UCAN CURE: Precision Decisions for Childhood Arthritis	LPCA
23.	Reducing the Global Burden of Infectious Diseases Through Precision Population Health	LPIM
24.	Pegasus 2: Personalized Genomics for Prenatal Abnormalities Screening Using Maternal Blood Towards First Tier Screening and Beyond	LRP2
25.	The Metabolomics Innovation Centre	MC4
26.	An "Omics" approach to the characterization of the microactome and identification of new therapeutic targets for the prevention of liver abscesses and bovine respiratory disease in feedlot cattle	MGLA
27.	Summer internship for Indigenous peoples in Genomics (SING)	SING22
28.	Developing collaborative research to identify the impacts of Helicobacter pylori genomics research on northern Canadian Indigenous communities	SSHRC
29.	Transcriptional and Epigenetic Events Underpinning Navaciminduced TR1 Cell Formation and Expansion	GAP22S

Project advances are comprised of amounts provided by the Corporation to approved research projects and the Science Technology and Innovation Centre which have not yet been spent. Amounts not spent upon completion of the project are recoverable by the Corporation.

8. Financial Instruments

(a) Liquidity risk:

The Corporation's objective is to have sufficient liquidity to meet its liabilities when due. The Corporation monitors its cash balances and cash flows generated from operations to meet its requirements.

(b) Credit risk:

The Corporation is exposed to credit risk as it relates to cash and receivables. Cash is held with Canadian financial institutions, and accounts receivable is due from reputable funders and donors with no history of non-payment.

It is management's opinion that the Corporation is not exposed to significant interest rate, currency or market risks arising from these financial instruments.

9. Commitments

Genome Alberta has entered into 2 lease agreements for office equipment that will expire on July 31, 2027 and May 18, 2028. The Corporation has also entered into a lease agreement for office space that will expire on May 31, 2026. The obligation for these leases over the current and next fiscal years is as follows:

2024	$19,312
2025	$41,438
2026	$41,438
2027	$10,968
2028	$2,290

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