

GENOMICS IN ACTION





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WHAT IS GENOMICS?

Genomics is the science that deciphers and understands the genome – the code or blueprint of a living organism (humans, animals, plants, microbes) – to better understand biological systems at a molecular level.

The knowledge and innovations emerging from genomics are unearthing solutions to complex biological challenges including applications in health, forestry, fisheries, aquaculture, agrifood, energy, mining and the environment. In addition, these new approaches give rise to the need for dialogue regarding societal, economic and ethical implications.



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Genomics in Action

Genomics could very well be described as the single most ground-breaking science of our time. Where the 20th century was dominated by computer science, the 21st century is likely to be dominated by life sciences.

DNA was discovered over 100 years ago, but since the mapping of the human genome in 2003, next generation sequencing technologies and advancements in genomics research have accelerated at an incredible pace. Now, this disruptive technology seems to be at the precipice of another turning point in history—innovations discovered in the laboratory are finding utility and realizing true potential through applications in the real world.

As both a catalyst and a proponent of credible research that addresses issues of economic and social importance, Genome British Columbia (Genome BC) has been a driver; connecting ideas to funding, researchers to industry, people to solutions and BC to the world. BC's genomics capabilities are world-class, and enable us to partner with the world's best. Our province is well positioned to lead the way as we apply genomics to some of life's greatest challenges.

Genome BC's 2015–2020 Plan, "Powering BC's Bioeconomy" outlines our vision for BC's bioeconomy and Genome BC's strategy for realizing the potential of genomics research.

Our plan sets out five socio-economic objectives:

1

Enhance BC's recognition as a bioeconomy leader, attracting top talent and new investments



2

Support innovation and sustainability in BC's key socio-economic sectors through translation of research



3

Promote and support world-class genomics research



4

Develop a vibrant life science cluster



5

Enhance recognition of the value of genomics, while addressing societal concerns



Genome BC in Action

Since 2000, Genome BC has led genomics innovation on Canada's West Coast, and facilitated the integration of genomics into society.

Managing a cumulative portfolio of over **\$850 million** in more than **315** genomics research projects and science and technology platforms, our actions have helped to create

jobs in Canada while addressing challenges in key sectors such as health, forestry, fisheries, aquaculture, agrifood, energy, mining and the environment.

Economic Action

764

Partnerships



40

Companies advanced



\$646M

Direct co-investment attracted



576

Patent applications*



21,149

Jobs created**



\$1.4B

Economic impact to BC's GDP**



*in all countries including provisional **Economic and Social Impact Analysis, MNP LLP, 2014

Projects and Funding



Health

\$368.3 Million



Tech Development and Platforms

\$119.1 Million



Agrifood

\$56.0 Million



Forestry

\$107.6 Million

Active in the Community

Genome BC's outreach activities are helping BC's life sciences community to thrive. Programs like Geneskool engage youth in

discovery, while community events and outreach provide opportunities for people of all ages to participate in science and discussion.

Social Media

8,254



Twitter Followers

965



Facebook Likes

2,333



LinkedIn Followers

4,400



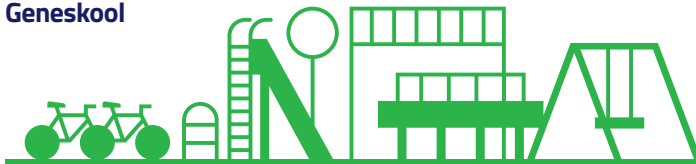
YouTube Subscribers

1.7M+



YouTube Views

Geneskool



37 Communities visited

7,860 Students engaged

83 Schools visited

109 Teachers trained

Public Engagement/Outreach 2016/17

93

Unique Media Stories

14

Community Events

19,146

People reached through events

14,346

Visitors to our booth at Community Science Celebrations

7th Annual Don Rix

Distinguished Keynote Address – Richard Resnick presented to a sold out crowd



Environment

\$16.1 Million



Fisheries and Aquaculture

\$65.5 Million



Mining and Energy

\$34.7 Million

These figures are cumulative as of March 31, 2017

SECTION

Adapting to environmental challenges



The scientific evidence is irrefutable. Climate change is a significant threat to the social, economic and cultural well-being of British Columbians.

The average annual temperature has increased across our province, rainfall has increased over southern BC, glaciers have retreated and sea levels are rising. These changes affect our daily life through impacts on agriculture, forestry, marine systems and the environment. Genomics can provide a richer and deeper understanding of climate change and its impacts, and can contribute toward efforts to mitigate or adapt to climate change.

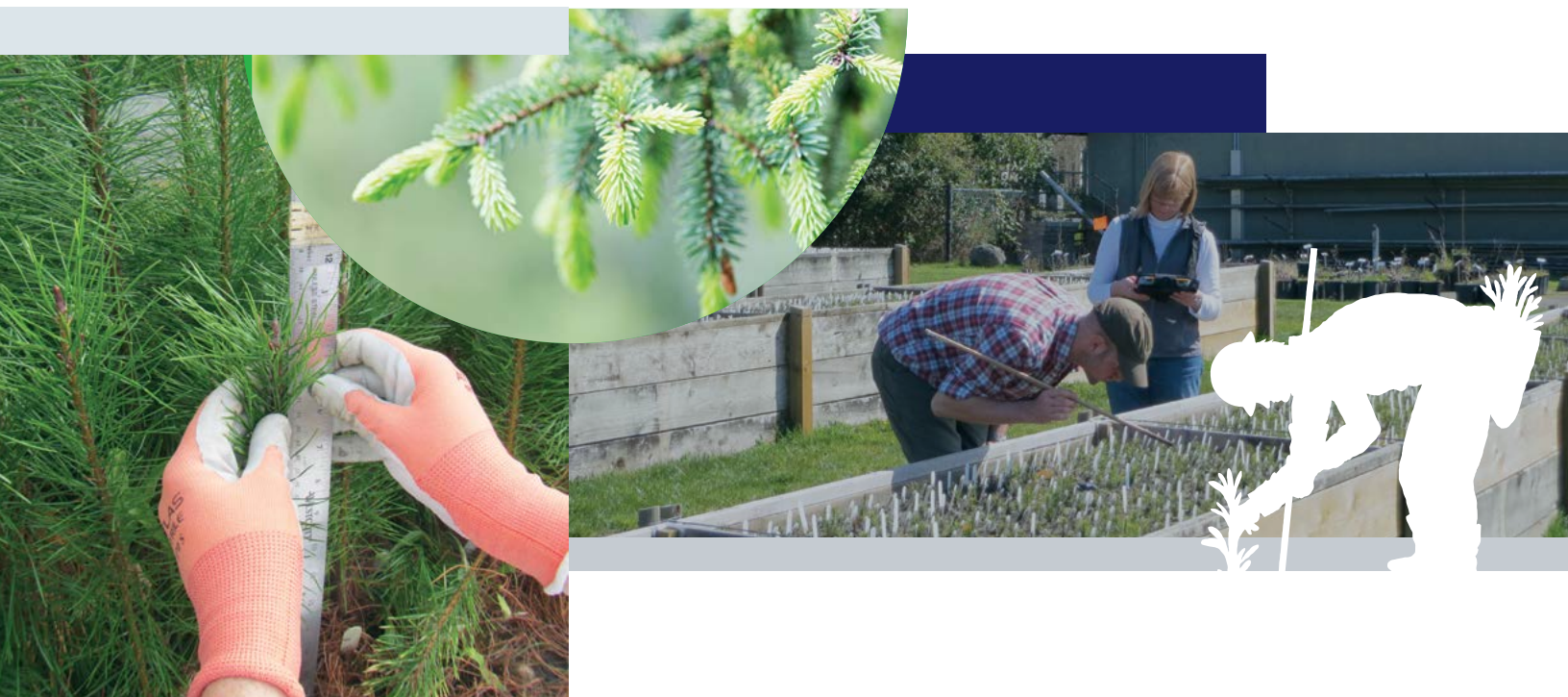
Genomics is a tool that can provide solutions for society and a competitive edge for industry.

Genomics is helping us to understand, at a molecular level, the impacts of environmental change. It also helps us to understand the genetic diversity and resilience encoded in organisms and ecosystems that allows them to respond to changes that affect our environment. Once molecular drivers of function and resilience are understood, genomics can provide further tools to help us adapt to our changing climate. In forestry, new genomics tools can help identify which trees are better suited for temperature variation and/or drought tolerance and pest resistance at specific locations.

These tools are being incorporated into mitigation strategies and processes for sustainable management of our resources to keep our soil, water and air clean for future generations.

In Genome Canada's last national competition, focused on natural resources, Genome BC-supported projects received 35% of all available federal dollars. These six projects secured \$24.4 million in federal investment leveraging Genome BC's investment of \$8 million to \$32.4 million. Five of these projects were within the forestry sector and include focus on climate change mitigation tools, further demonstrating BC's global leadership in this area.

To better understand and support government and industry needs, Genome BC hosted two Climate Change Workshops. These sessions brought together academics, government and industry experts to discuss common issues and drive collaboration. These workshops will help prioritize Genome BC's resource-based programs and enhance the development of innovative solutions for climate-related challenges.



CoAdapTree

Healthy trees for future climates

Developing better reforestation options for high-value tree species such as Douglas fir and lodgepole pine, as well as western larch and jack pine. This work aims to achieve up to 30 per cent greater timber yields, with a proportional impact on the economy and employment, as well as protect the ecological and environmental benefits of our forests.

Project Leaders

Sally Aitken
University of British Columbia

Samuel Yeaman
University of Calgary

Richard Hamelin
Université Laval

Project Value

\$5.9
Million

Spruce-Up

Advanced spruce genomics for productive and resilient forests

This project is using genomics to accelerate the development and deployment of improved spruce stock making this significant forest resource more resistant to insects and drought, and improve nutrient efficiency resulting in increased wood quality and productivity. Spruce-Up, if successful, is estimated to more than double the net economic output value of spruce forests, increasing the value of new trees and reducing losses due to environmental disturbances.

Project Leaders

Joerg Bohlmann
University of British Columbia

Jean Bousquet
Université Laval

Project Value

\$10.5
Million



BioSAFE

BioSurveillance of alien forest enemies

Genome sequencing and bioinformatics analysis are being used to develop a suite of tools to rapidly and accurately detect alien invasive species and diseases in our forests. This work will enable forest health professionals to track and determine the source of these threats and develop measures to prevent further invasions. The team's work could generate economic impacts of at least \$3 billion annually.

Project Leaders

Richard Hamelin
University of British Columbia

Cameron Duff
Canadian Food Inspection Agency

Ilga Porth
Université Laval

Project Value

\$8.6
Million

Resilient Forests (RES-FOR)

Climate, pests and policy – genomic applications

Climate change incites insect outbreaks and drought. The time it takes to create seedlings adapted to these conditions is threatening both our forests and the communities that depend on them. Researchers are integrating genomics, metabolic profiling and mathematical modeling into current tree breeding programs to develop pest and drought resistant trees with improved wood quality, while shortening the tree-breeding cycle from ~30 to ~10 years.

Project Leaders

Barb Thomas and Nadir Erbilgin
University of Alberta

Yousry El-Kassaby
University of British Columbia

Project Value

\$5.7
Million



SYNBIOMICS

Functional genomics and techno-economic models for advanced biopolymer synthesis

SYNBIOMICS is focused on harnessing the genetic potential of microorganisms to identify and develop new biocatalysts that can be used to create materials from trees, such as resins, coatings, bioplastics and adhesives. The project will also foster small and medium-sized enterprises that will work together synergistically with nearby pulp mills, creating lasting knowledge-based economic opportunities for Canada's forest sector and rural communities.

Project Leaders

Emma Master
University of Toronto

Harry Brumer
University of British Columbia

Project Value

\$9.5
Million

Recreational Fishing

Sustaining freshwater recreational fisheries in a changing environment

Rainbow trout are a cornerstone of Canada's \$8 billion recreational fishing industry, but wild populations are in danger due to climate change and human impacts. This project uses conservation genomics to provide the tools, information and policy recommendations needed to stock fish that are resilient to the effects of climate change. The team's work will monitor genetic health to manage and preserve rainbow trout, helping preserve this recreational fishery for generations to come.

Project Leaders

Patricia M. Schulte
University of British Columbia

Ben Koop
University of Victoria

Anthony Farrell
University of British Columbia

Project Value

\$4.8
Million

Making old growth new again

British Columbia (BC)'s western redcedar (WRC) industry, currently valued at over \$1 billion, is facing a decline because of a shift from old growth to second growth forests and climate-driven challenges.

Second-growth forests are not nearly as productive or valuable as old growth forests – they produce less timber volume and wood that is less durable for outdoor wood products. In addition, shifting global temperatures make the future stability of forests uncertain.

A new Genome Canada Genomic Applications Partnership Program (GAPP) project, *Cedar Enhanced Durability and Resistance (CEDaR): Sustainability of Canada's Western Redcedar Forestry Sector* stems from a collaboration initiated in 2014 through a Genome BC program oriented towards matching academic researchers with end users. UBC's Dr. Joerg Bohlmann and the BC Ministry of Forests, Lands and Natural Resource Operations (MFLNRO)'s Dr. John Russell have been awarded \$2 million to apply genomic tools to breed and select

WRC that have the high-value attributes of old growth trees, are more resistant to pathogens and browsing wildlife, and are better adapted to future climates. Genomics offers a much deeper understanding of the biology behind desirable traits for WRC, which means that future breeding will be much more efficient and productive with a direct impact on BC's forest economy.

Current breeding strategies for WRC use expensive and difficult traditional approaches to measuring tree performance phenotypes in trials, a very slow process through long-term field trials. The team is applying genomic selection to reduce the current breeding time by up to 75% (i.e. 10 years versus 40 years). Because the key producers of these trees are actively participating in the project, uptake of the results will be rapid.



Protecting endangered species

Better information and tools developed through 'omics datasets will help wildlife experts to make better decisions.

A subspecies of the Northern Goshawk, *Accipiter gentilis laingi*, is known to inhabit forests of Haida Gwaii but it is unclear where else this rare bird lives. Understanding the geographic range and genetic make-up of the laingi subspecies and discerning it from the more common subspecies, *Accipiter gentilis atricapillus*, is critical to protecting it. The challenge is that it is difficult to distinguish the two forms of this forest-living raptor based on appearance alone.

Dr. Darren Irwin of UBC in collaboration with Mr. Steve Gordon, a biologist with the MFLNRO, and Mr. Bryce Bancroft with the Coast Forest Products Association, represent a unique collaboration between academic researchers, government, and industry associations.

This team is using genomic tools to enable accurate species designation for provincial management efforts for species at risk, including such measures as the establishment of Wildlife Habitat Areas for key breeding which dictates how forest tenure holders conduct their operations.



SECTION

Generating economic value through investment, mentorship and collaboration

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There is an identifiable gap in the pathway from great idea to commercialization.

One of Genome BC's key goals is to bridge this gap through targeted investment and membership support. This past year Genome BC made a number of new investments through the Industry Innovation Program (I²) to help early stage companies move from seed to Series A or other significant financing events. Formal relationships with local accelerators, entrepreneurship@UBC (e@UBC) and the British Columbia Technology Industry Association's (BC Tech) HyperGrowth program, were also established.

The I² program offers repayable growth capital to businesses commercializing innovative life science technology-based products, processes or services. The first three companies supported through Genome BC's I² Program illustrate a concrete step towards bridging the gap between innovation and commercialization in BC's economy:

- Anandia Labs (Anandia) is a biotechnology company providing leading analytical testing services to the regulated cannabis industry in Canada and developing improved cannabis and hemp strains for safe and effective medical applications. Genome BC is supporting Anandia's applications of genomics and modern plant breeding approaches to create next generation cannabis varieties combining optimized therapeutic properties with desirable grower-focused traits.
- ViewsIQ's innovative digital slide imaging platform, Panoptiq™, vastly improves the workflow for pathologists, increasing speed of diagnosis and treatment for patients. Through integration with a user's existing microscope, Panoptiq takes many tiny fields of view and stitches them together into one panoramic digital image. Genome BC's investment supports the global expansion of the Panoptiq customer and distributor base, the rollout of a 'software as a service' pricing model and the launch of the cloud-based Panoptiq Portal system.



- Augurex is transforming disease management and health outcomes for patients with autoimmune diseases affecting joints such as rheumatoid arthritis. Its flagship product, JOINTstat, is enabling early diagnosis, providing for early intervention and tighter control of treatment so that clinical and remission targets can be reached. Genome BC's investment will help the company launch several other blood test products from its pipeline and advance its therapeutic program.

Genome BC and BC Tech developed BC's first cohort-based program designed to advance technology companies in the healthtech and life sciences industries – HyperGrowth:Life. Building on the demonstrated success of previous HyperGrowth programs, this is a 12-month cohort-based program providing revenue and sales support to growth-stage tech companies in healthtech, digital health, life sciences, agritech and related industries. The program includes workshops, mentorship, and advisory support from

industry leaders and practicing executives at some of Vancouver's top companies.

Genome BC has also invested in the e@UBC program. The program is designed to help UBC entrepreneurs build sustainable, scalable ventures based on UBC innovation. Genome BC and e@UBC are working together to translate research outputs, related to genomics and life sciences, into social and economic benefits. Genome BC's investment in e@UBC is contributing what new companies need the most: qualified advice through mentors and entrepreneurs, and early stage risk capital.

Supporting growers in BC

BC growers produce 95% of Canada's cherries and it is estimated that 80% of new cherry plantings in the world are of varieties developed in BC.

BC's interior tree fruit industry generates \$130 million in wholesale revenue, contributes \$900 million in economic activity, and directly employs 1,500 people annually. Genome BC is investing in genetic resources for fruit tree breeders that will help them maintain a global competitive edge. The ability to quickly identify 'bred in BC' fruit will protect new cultivars and keep them unique to BC. For the first time in BC, genomics tools are enabling a unique genetic analysis for desirable types of fruit, including cherries and apples, rather than relying on visual and taste characteristics alone. This will keep BC fruit at a market premium and provide BC fruit tree breeders with undisputed genomics tools to protect their breeding rights.

SECTION



Creating better health outcomes

The advancements in health care throughout modern history are nothing short of astonishing.

Some stand above all others as significant markers on the timeline—vaccines, anaesthetic and antisepsis, the introduction of antibiotics and antivirals, lifesaving surgical advancements in organ transplantation and cardiac care—where would we be without these innovations? Each of these represent turning points in history, having a profound impact on health outcomes and the standard of patient care.

The mapping of the human genome in 2003 has certainly established its place in history, signalling a new beginning in the age of genomics. Coincidentally, the pace of advancement and innovation in genomics, since this landmark achievement, is impressive. In the past decade alone, discoveries in genomics have been enabled by rapid advances in technology.

Today, the blueprint of life encrypted in our DNA can be deciphered at a speed and cost unimaginable just ten years ago. This is helping make genomics much more affordable and accessible. Likewise, societal attitudes toward genomics in clinical care are shifting. We are no longer asking ‘if’ genomics should be integrated with clinical care. Instead we are asking ‘when’ and ‘how’ we can use genomics to benefit as many people as possible.

Precision health care holds the promise to predict, diagnose and guide treatment based on a person’s genome. If clinicians can measure and test for the expression of multiple genes, detect genetic variations and quantify proteins and other molecules in the body, they can gain substantially more information about a specific patient’s condition, allowing them to refine their diagnosis and tailor the treatment plan.

The use of genomics in the analysis of cancer tumours is leading to greater success in treatment. By revealing the molecular properties of tumours, treatment decisions are better informed. Clinical tests that detect mutations in multiple genes associated with a predisposition to certain types of cancers are now offered as part of standard cancer care in BC.

Pharmacogenomics—identifying genes that predispose people to serious side effects of medications or that alter the way your body will interact with drugs—can be used to make treatments for many conditions safer and more effective. A BC-based research study is already poised to enable widespread collection of DNA samples and report back to the patient through their local pharmacy.

The use of genomics to diagnose and treat familial cancers, cardiovascular disease, and immunodeficiencies are also on the horizon. Clinical applications of genomics will affect many areas of medicine over the next 10–20 years.

When patients are matched with diagnosis and treatment specific to their individual disease or “omic” information, they have the greatest chance of better health outcomes.

As clinical applications continue to evolve, it’s not difficult to imagine a future when ‘precision’ is the gold standard of day-to-day clinical health care. Never before has a broader realization of delivering on the promise of precision health seemed so close.

However, there is much work to be done before we see widespread integration of genomics into clinical care. Vast amounts of reference data is required for comparative analysis. Our understanding of disease will be better informed through the discovery and comparison of genomic variation among large groups of patients and larger datasets.

Ongoing education opportunities will be essential to enhance uptake and understanding for those clinicians who did not study genomics through their training. We’ll need more genetic counsellors and physicians to make genomic medicine interpretable, accessible and applicable.

The way forward will be challenging. It will require time, dedication, and collaboration among stakeholders, including medical professionals, health authorities, funders, and health researchers. Genome BC is fulfilling an important role—uniting the community around a common vision that puts genomics into action for precision health in BC.





National Access Program

Revolutionary cancer screening program through Contextual Genomics

The National Access Program (NAP) is a groundbreaking move to establish equitable access to state-of-the-art cancer diagnostics across Canada. Using Contextual Genomics' Find-It™ (Cancer Hotspot Panel), the NAP profiles a patient's tumour to match that patient to the most effective treatment options. The program is designed to change clinical practice for solid tumour cancers by allowing medication selection based on an individual's genetic tumour profile.

Project Leader

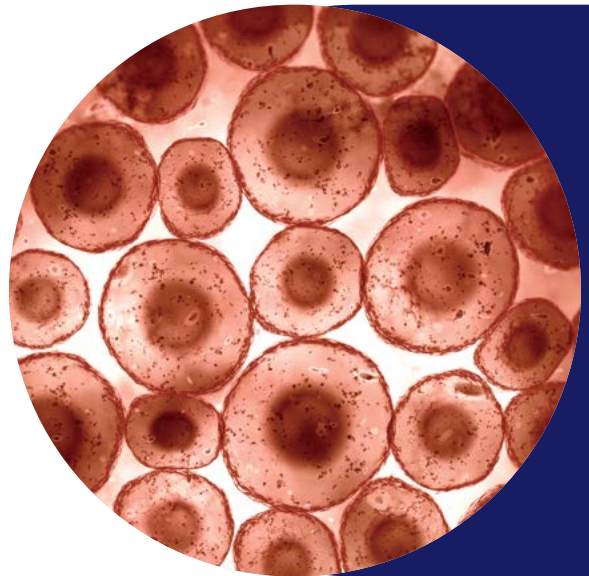
David Huntsman
University of British Columbia

Project Value

Co-funders

Genome BC, AstraZeneca Canada, Contextual Genomics Inc., Pfizer Canada, and Sanofi Canada





SAVE BC

Preventing premature cardiac events

The Study to Avoid cardioVascular Events in British Columbia (SAVE BC) is aimed at identifying and closely observing patients with extremely premature cardiovascular disease (CVD) over an extended period of time, including their first-degree relatives who are also at increased risk. An alarming fact is that close relatives of individuals diagnosed with premature CVD are up to 10x more likely to also develop the condition.

The goal is to gain a better understanding of the genetic risks factors in these families in an effort to significantly reduce the burden of premature CVD in BC.

Project Leaders

Liam Brunham
Paul Man
Simon Pimstone
University of British Columbia

Co-funders

Genome BC and Providence Health
Care Research Institute

Project Value

\$400
Thousand





PHOTO CREDIT: Paul Joseph

Bringing DNA testing into BC Pharmacies

"This is about moving the work out of the lab and giving patients actionable results that can change their lives."

— Dr. Corey Nislow

Imagine if, before taking a medication, you could walk into your local pharmacy and take a test that could accurately predict whether the medication would work for you and the dosage best suited to you—all based on your DNA.

Genomics has been used to predict how patients will respond to certain medications for some time. However, this type of testing has historically been done in research settings and for limited types of medications.

Phase 1 of this initiative through Genome BC's User Partnership Program proved that community pharmacies could be the conduit for collecting DNA samples for testing. Now in phase 2, Dr. Corey Nislow, Director, University of British Columbia Sequencing and Bioinformatics Consortium, will analyze the DNA of patients to optimize the type of medication and dosage for patients taking mental health medications and other common prescriptions, such as cardiovascular and pain medications. As the key partner, the BC Pharmacy Association is developing training materials and processes, establishing the infrastructure that will bring this innovation into communities, improving health outcomes across the province.

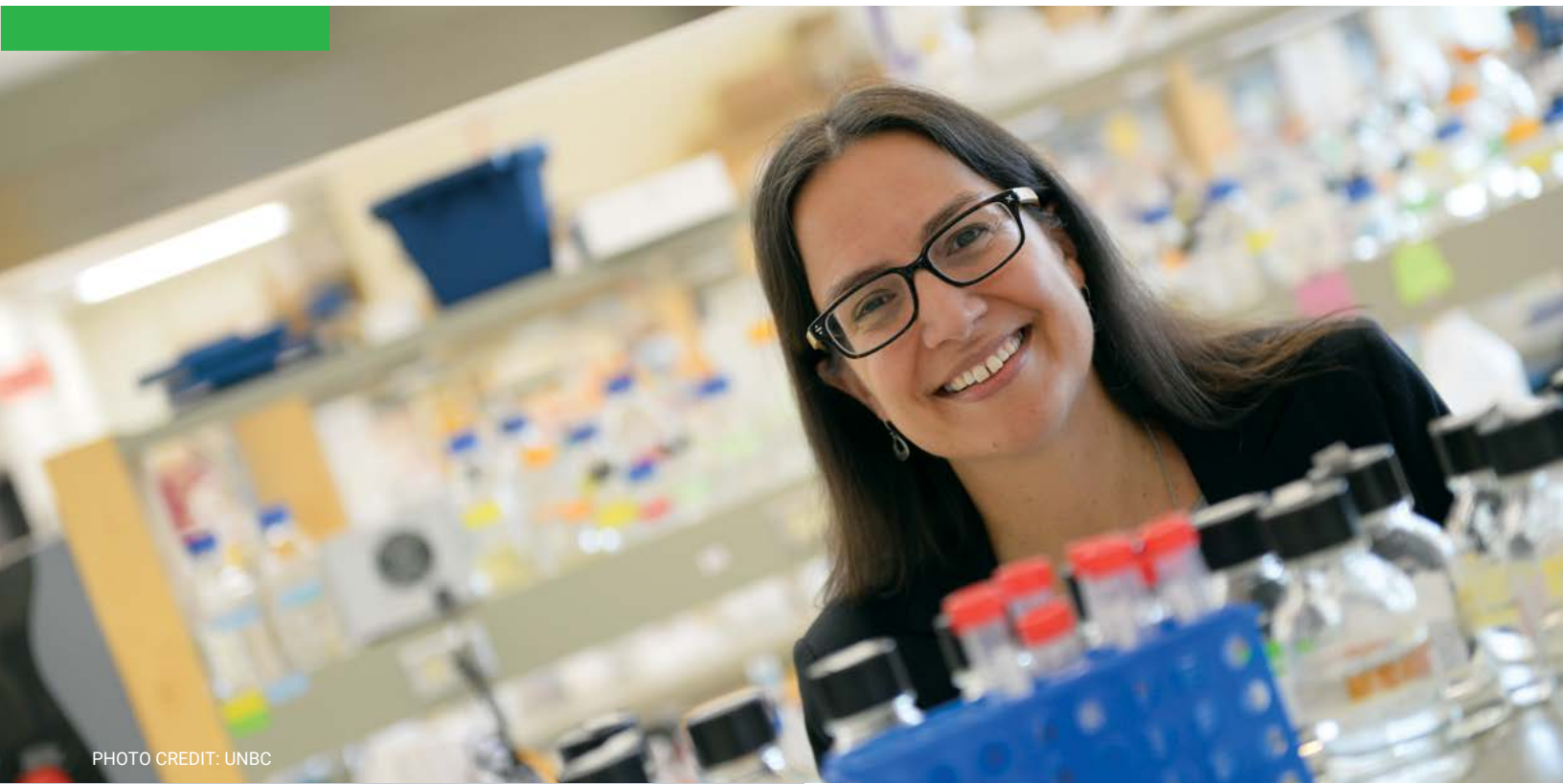


PHOTO CREDIT: UNBC

Cutting edge health care in Northern British Columbia

"Having a local biobank means that people of the North can keep pace with and benefit from the rapid advances being made in precision health. This project will allow us to optimize our understanding of our northern and Aboriginal patient populations and inform the approaches best suited for our community. It will also better enable this community to contribute to large-scale research happening across the province and nationally."

— Dr. Nadine Caron

The Northern Biobank Initiative is the first biobank of its kind in BC.

It will enable Northern BC to better contribute to large-scale provincial and national research by helping to understand the demographic and genetic makeup of different populations throughout the province.

A biobank is a collection of biological samples, such as blood and tissue. These samples, along with associated health information, are collected with donor consent under stringent ethical guidelines. Biobanks are often located in large research hospitals in metropolitan cities and the population demographics they capture, therefore, differ greatly from northern, rural First Nations and Aboriginal communities. The Northern Biobank will be critical to understanding the nuances of these distinct populations to better develop health programs and improve health outcomes.

Led by Dr. Nadine Caron – associate professor, UBC Department of Surgery, Affiliate University of Northern British Columbia (UNBC) faculty member with the Northern Medical Program – this project is part of Genome British Columbia's User Partner Program and funded by Genome BC, Northern Health Authority, the First Nations Health Authority, Provincial Health Services Authority and the BC Cancer Foundation. The project totals \$1.25 million with each partner group contributing \$250,000. UNBC is the lead academic institution managing the research administration for the project.

SECTION

Transforming big data into meaningful information

Humanity's passion for exploration is what drives innovation forward.

This drive expands our potential. When we research genomics, we literally seek a better understanding of ourselves and the world around us. Throughout the process, we discover ways to enrich our lives and make the world a better place.

Genomics is the science of variation. It reveals the secrets encrypted in the genomic sequence of all living things and converts them into massive amounts of data. It is the analysis of this data, in the context of other variables, that will inform our understanding of life and drive progress.

The cost of genome sequencing is rapidly declining—whole genome sequencing could drop to \$100 within the next decade. It has been estimated that by 2025 between 100 million and 2 billion human genomes could have been sequenced requiring as much as 40 exabytes (a single exabyte is 1 billion gigabytes or the equivalent of 50,000 years' worth of video). In comparison, YouTube estimates it will need between 1–2 exabytes by the same time.¹ That is big data on its own. The numbers increase exponentially when you consider the storage of non-human genomes or the incredible amount of information from other data streams that would be part of any comparative analysis.

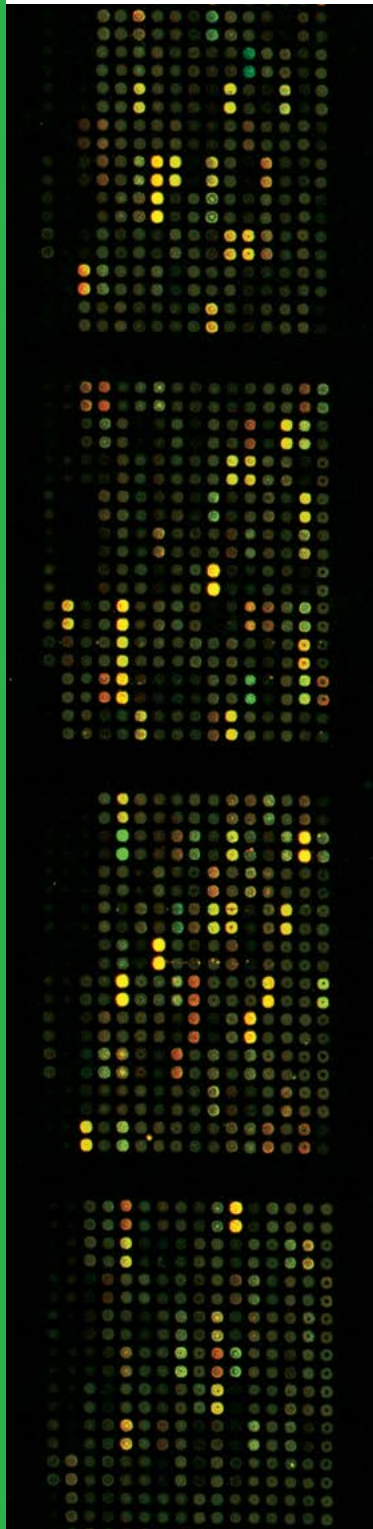
Storage needs will offer real challenges, but the computing requirements for the analysis and interpretation of genomic data may be even more demanding

in the future. Comparing vast quantities of data requires high performance processing power. New tools, customized to help visualize and deliver the information in the context of other non-genomic data streams to make it meaningful for interpretation.

It is through analysis and interpretation that we find utility in the information. Imagine if clinicians could query a shared library holding millions of genomes. Comparing the genomic information of millions of people would remove barriers which could help identify the causes of rare disorders and enable life saving medical discoveries in the future. Similarly, analyzing genomic information of various organisms across all key sectors could lead to solutions to the greatest environmental and economic challenges of our time.

Stakeholders across various disciplines will need to work collaboratively through developing standard formats and vocabularies so that data can be integrated and interpreted. The complexities of data integration and sharing will also need the support of sound governance and policy to ensure effective, secure and appropriate use of data.

The ability to scale these evolving technologies will have a continuing impact on genomics research. As the volumes of sequenced data grows, new models for data storage and analysis are more than increasingly important—they are critical.



¹ <http://www.nature.com/news/genome-researchers-raise-alarm-over-big-data-1.17912>

Can-SHARE “New Initiatives” address big data challenges in health care

Can-SHARE is a pan-Canadian research initiative whose goal under the Global Alliance for Genomics and Health, is to enable innovation in the use of genomic data for health care for patients in Canada and worldwide. Projects

under the initiative create policies and tools for Canadian clinicians and researchers to share genomic and clinical datasets across Canada and with international partners.

Genomic Epidemiology Entity Mart (GE²M) — Data Harmonization Made Easier

William Hsiao, *University of British Columbia*



\$200K

in funding through
Genome BC.

User-Centric Genomics Data Exchange and Aggregation with Blockchain Technologies

Bruce McManus, Raymond Ng,
University of British Columbia



\$400K

in funding through Genome BC
and TELUS Health.

Beacons for Genomic and Clinical Data Discovery

Marc Fiume, *University of Toronto*



\$100K

in funding through
TELUS Health.

BC researchers find success in disruptive innovation

Genome Canada's Disruptive Innovation in Genomics Competition aims to surpass incremental improvement of existing technologies, seeking solutions that previously were believed not possible.

BC researchers secured over 31% of the funding available from this national program. Continued investment in this technology is helping to keep BC on the international stage and cutting-edge of translational research.

A chemo-affinity toolkit for methylation proteomics

Fraser Hof, *University of Victoria*

\$239K in funding through Genome Canada.

Reimagining genome browsing for the era of single cell genomics

Sohrab Shah, Cydney Nielsen, *University of British Columbia*

\$250K in funding through Genome Canada.

GNOmics: Graphs 'N' Omics

Wyeth Wasserman, *University of British Columbia*

\$250K in funding through Genome Canada.

Replacing Immunoassays with Msbased Technology: Quantitative Proteomics Kits Enabling Deep Molecular Phenotyping of the Mouse

Christoph Borchers, *University of Victoria*; Albert Sickmann, *ISAS*

\$3.9M in funding through Genome Canada, Genome BC, the Institute for Analytical Science (ISAS), and MRM Proteomics Inc.

Next generation immune profiling technology based on microfluidic single cell analysis

Carl Hansen, *University of British Columbia*

\$3M in funding through Genome Canada, Genome BC and AbCellera.

Automated Tumour Pathology

Marco Marra, Robin Coope, *BC Cancer Agency*

\$410K in funding through Genome Canada, Genome BC, and the Canadian Foundation for Innovation (CFI).

BC researchers show strength in developing bioinformatics

Through the Bioinformatics and Computational Biology Competition, Genome Canada in partnership with the Canadian Institutes of Health Research, invested a total of \$4 million into next-generation tools and methodologies to deal with the influx of large amounts of data produced by modern genomics technologies.

Out of 16 approved project applications, Genome BC-supported scientists were successful in six projects, receiving 36.8% of all available funds. Work on these important projects commenced in October 2016.



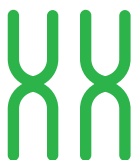
"These projects will strengthen the development of new tools to help provide maximum value from research investments in genomics and related fields that produce a massive influx of data. This substantial federal investment into BC's bioinformatics capabilities is a testament to the research excellence in our province and will help to increase capacity and expertise in this sector."

— Dr. Pascal Spothelfer, President and CEO, Genome BC

New bioinformatics for new sequencing technologies: Genome characterization and variation detection using long reads

Inanc Birol, *BC Cancer Agency*

\$250K



Genomic Epidemiology Application Ontology (GenEpiO)

William Hsiao, *University of British Columbia*;
Andrew McArthur, *McMaster University*;
Fiona Brinkman, *Simon Fraser University*

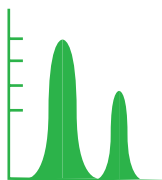
\$250K



Automated analysis of big flow cytometry data

Ryan Brinkman, *BC Cancer Agency*
Cedric Chauve, *Simon Fraser University*
Sara Mostafavi, *University of British Columbia*

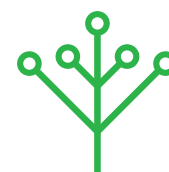
\$250K



Kamphir: a versatile framework to fit models to phylogenetic tree shapes

Art Poon, *formerly University of British Columbia*
now University of Western Ontario

\$205K



PathOGiST: Calibrated multi-criterion genomic analysis for public health microbiology

Leonid Chindelevitch, *Simon Fraser University*
William Hsiao, *University of British Columbia*
Cedric Chauve, *Simon Fraser University*

\$250K



OnTarget: Big Data Informed Software for the Design of cis-Regulatory Regions Controlling Human Gene Expression

Wyeth Wasserman, *University of British Columbia*

\$250K





PHOTO CREDIT: Paul Terefenko/The Lavin Agency

"If we want genomics to be routinely used in public health microbiology, we need to make genomic test results accessible and interpretable by primary care providers."

— Dr. Jennifer Gardy

Working with partners in the UK to accelerate diagnosis and treatment of tuberculosis

The BC Centre for Disease Control (BCCDC), Oxford University and Public Health England (PHE) are collaborating to build data-sharing capacity to accelerate the use of genomics as a tool for the diagnosis, treatment and tracking of tuberculosis.

Funded in part by Genome BC, this pioneering work will support PHE and BCCDC's efforts to validate the use of a genomic platform in a clinical setting through developing user-friendly reports to assist doctors in faster and more effective diagnosis and treatment.

Led by Dr. Jennifer Gardy at BCCDC and Dr. Derrick Crook, University of Oxford and PHE, this research

is exploring how to communicate the complex data from a genomics-based test in a simple and effective laboratory report. This will allow clinicians, many of whom have not worked with genomic data before, to quickly and easily find the information and get the interpretation they need to ensure a direct benefit for patients.

This partnership is a product of the Memorandum of Understanding signed by Genome British Columbia and Genomics England to improve diagnostic capability and outcomes for patients with cancer, rare diseases and infectious diseases. Valued at \$168,000, the Sharing Mycobacterial Analytic Capacity project reflects the mutual desire to share and co-develop information and tools, and a mechanism for the international exchange of knowledge, data and materials in the field of genomics.



Message from the President and CEO

PASCAL SPOTHELFER

Genome BC is an extraordinary organization with an outstanding team. My predecessor leaves the organization with a sound strategy, an excellent reputation, and very strong relationships with stakeholders and funders. It has been my privilege to succeed Dr. Alan Winter in the role of President and CEO.

I would like to congratulate the BC researchers who had success in Genome Canada's 2015 Large Scale Applied Research Program Competition. In total, BC received 35% of available federal funds toward research focused on Natural Resources and the Environment—a reflection of BC's world-class competitive genomics capacity. British Columbia's success continued in two other competitions focused on technology, receiving 37% and 26% of available federal funds.

In the health sector, many of Genome BC's activities have a direct connection with the Ministry of Health and the newly created Diagnostics and Clinical Services Division. Our strategy towards precision health progressed with a number of highlights such as the establishment of Genome BC's Health Sector Advisory Council and working in partnership with the ministry to draft a framework for implementing genomics into clinical practice.

Progress in our entrepreneurship and commercialization stream remains on track with formal relationships established with entrepreneurship@UBC and the British Columbia Technology Industry Association. In addition, we invested in three companies through the Industry Innovation Program. We've seen growth in the number of companies advanced (now at 40), and increased investment into applied research and translation.

In anticipation of an evolving world of sector specific applications, transformative genomic implementations in health care and growing opportunities for commercialization, we have combined our research program management and sector development functions to allow for agile sector oriented strategies and activities without losing tactical focus in the future. The combination of excellence in operations, creative thinking, and strategic foresight for the long term is key to our success.

We are grateful for the ongoing support from the Government of British Columbia, the Government of Canada, through Genome Canada and Western Economic Diversification Canada. We are very fortunate to be supported by an outstanding Board of Directors that not only provides sound governance, but also diverse views to our discussions that enrich our thought processes. Our volunteer Board members are very engaged and work hard. They deserve not only the gratitude from us at Genome BC, but also from the public, whose interest they ultimately serve. I would also like to thank my team for making the transition in my exciting new role easy, and to all our partners and stakeholders for their ongoing support of Genome BC.



Message from the Board Chair

IDA GOODREAU

In genomics, we talk about disruptive innovation. A powerful way of thinking about challenging the ideas of the status quo, while introducing new ways of “thinking” and “doing” that change the world around us.

Genome BC began the year with a transition in leadership, offering a new voice for innovation. A catalyst for new opportunities that can bring us to new milestones—with each marker along the way building on the successes that have helped us deliver sustainable social and economic benefits to BC, Canada and beyond.

Our new CEO, Pascal Spothelfer, has brought new perspectives to Genome BC’s 2015–2020 Strategic Plan; he is working with the team to identify new approaches to bring together the necessary partnerships, funding, and operational models that will see genomics remain at the heart of a world class life sciences cluster in BC.

As Board Chair, I wish to thank the Province of British Columbia for its continued support of Genome BC and the recent \$20 million funding towards our current five year strategic plan. The trust imbued upon us by this public commitment strengthens our resolve to ensure we continue to provide excellent value to the people of BC.

In closing, I wish to thank my fellow Directors who sit on the board and provide oversight and guidance to Genome BC. I would also like to thank the staff and management team whose commitment and professionalism are unparalleled. It is their dedication that puts genomics into action and why we continue to see progress. It is clear our organization will continue as a beacon of innovation in British Columbia.

A handwritten signature in black ink that reads "Ida Goodreau". The signature is fluid and cursive, with the first name "Ida" and last name "Goodreau" clearly distinguishable.

Independent Auditors' Report

To the Board of Directors of Genome British Columbia

We have audited the accompanying financial statements of Genome British Columbia, which comprise the statement of financial position as at March 31, 2017, the statements of operations, changes in net assets and cash flows for the year then ended, and notes, comprising a summary of significant accounting policies and other explanatory information.

Management's Responsibility 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.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on our judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the entity's preparation and fair presentation of the financial statements 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. An audit also includes

evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

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

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of Genome British Columbia as at March 31, 2017, and its results of operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.



Chartered Professional Accountants
June 2, 2017
Vancouver, Canada

Statement of Financial Position (Expressed in Canadian Dollars)


March 31, 2017, with comparative information for 2016

	2017	2016
Assets		
Current assets:		
Cash	\$ 1,294,056	\$ 1,123,582
Short-term investments (notes 3 and 4)	101,216,440	89,585,373
Funding receivable	137,264	237,997
Other receivables (note 5)	71,214	155,283
Project advances	3,193,307	2,623,278
Prepaid expenses	135,523	180,089
Current portion of loans receivable (note 6)	–	200,000
	106,047,804	94,105,602
Capital assets (note 7)	383,892	466,310
	\$ 106,431,696	\$ 94,571,912
Liabilities and Net Assets		
Current liabilities:		
Accounts payable and accrued liabilities (note 8)	\$ 4,828,491	\$ 4,263,436
Deferred lease inducement	164,949	212,077
Deferred contributions:		
Future expenses (note 9)	101,054,364	89,630,089
Capital assets (note 10)	383,892	466,310
	\$ 106,431,696	\$ 94,571,912

Commitments (note 11)

See accompanying notes to financial statements.

Approved on behalf of the Board:


Ida Goodreau
Director


Mr. Joe Garcia
Director

Statement of Operations and Changes in Net Assets (Expressed in Canadian Dollars)

Year ended March 31, 2017, with comparative information for 2016

	2017	2016
Revenues:		
Amortization of deferred contributions related to future expenses (note 9)	\$ 22,455,765	\$ 22,579,995
Amortization of deferred contributions related to capital assets (note 10)	153,521	146,460
Investment income	8,912,909	1,247,718
	31,522,195	23,974,173
Expenses:		
Corporate programs and management	7,460,896	7,345,249
Project expenditures	23,907,778	16,482,464
Depreciation	153,521	146,460
	31,522,195	23,974,173
Excess of revenues over expenses, being net assets, end of year	\$ –	\$ –

See accompanying notes to financial statements.

Statement of Cash Flows (Expressed in Canadian Dollars)

Year ended March 31, 2017, with comparative information for 2016

	2017	2016
Cash provided by (used in):		
Operations:		
Excess of revenues over expenses	\$ –	\$ –
Items not involving cash:		
Depreciation	153,521	146,460
Amortization of deferred contributions related to future expenses (note 9)	(22,455,765)	(22,579,995)
Amortization of deferred contributions related to capital assets (note 10)	(153,521)	(146,460)
Accretion of loan receivable	–	(12,207)
Unrealized (gain) loss on short-term investments	(2,690,860)	3,693,606
	(25,146,625)	(18,898,596)
Funding (note 9)	33,904,015	10,740,393
Transfer of funds related to BC Clinical Research Infrastructure Network (BCCRIN) upon inception (note 9)	–	(199,003)
Change in operating assets and liabilities:		
Funding receivable	100,733	(162,262)
Other receivables	84,069	(98,880)
Project advances	(570,029)	(75,887)
Prepaid expenses	44,566	6,893
Accounts payable and accrued liabilities	565,055	126,753
Loan receivable	200,000	–
	9,181,784	(8,560,589)
Investments:		
Proceeds from sale of short-term investments	17,215,589	13,034,479
Purchase of short-term investments	(26,155,796)	(38,884,876)
Purchase of capital assets	(71,103)	(55,876)
	(9,011,310)	(25,906,273)
Increase (decrease) in cash	170,474	(34,466,862)
Cash, beginning of year	1,123,582	35,590,444
Cash, end of year	\$ 1,294,056	\$ 1,123,582

See accompanying notes to financial statements.

Notes to Financial Statements

(Expressed in Canadian Dollars) Year ended March 31, 2017

1. Operations:

Genome British Columbia (the Corporation) was incorporated on July 31, 2000 under the Canada Corporations Act and continued under the Canada Not-For-Profit Act as a not-for-profit organization and is exempt from income and capital taxes. The Corporation has the following objectives:

- (a) develop and establish a coordinated approach and integrated strategy in British Columbia to enable British Columbia to become a world leader in selected areas of genomic and proteomic research, including agriculture, aquaculture, environment, forestry and human health, among others, by bringing together universities, research hospitals, other research centres and industry, as well as government and private agencies for the benefit of British Columbia;
- (b) participate in national approaches and strategies to strengthen genomics research capabilities in Canada for the benefit of all Canadians;
- (c) create a genome centre in British Columbia to ensure that researchers can undertake research and development projects offering significant socio-economic benefits to British Columbia and Canada, to provide access to necessary equipment and facilities, and to provide opportunities for training of scientists and technologies;
- (d) establish a contractual relationship with Genome Canada, and contractual and collaborative relationships with others (including private and voluntary sectors and federal and provincial governments) in order to provide financial and personnel resources for the Corporation;
- (e) address public concerns about genomics research through the organization of intellectual resources regarding ethical, environmental, legal and societal issues related to genomics; and
- (f) increase public awareness of the need for genomics research and of the uses and implications of the results of such research, thereby helping Canadians understand the relative risks and rewards of genomics.

2. Significant accounting policies:

(a) Basis of presentation:

These financial statements have been prepared in accordance with Canadian Accounting Standards for Not-for-Profit Organizations (Accounting Standards for NPO's).

(b) Short-term investments:

Short-term investments are recorded at fair value with gains and losses recorded in the statement of operations and changes in net assets in the period in which they arise. Short-term investments are comprised of a portfolio of funds managed by investment professionals.

(c) Project advances:

The advances are comprised of amounts provided by the Corporation to approved research projects and platforms which have not yet been spent.

(d) Capital assets:

Capital assets are recorded at cost. Depreciation is provided using the straight-line method as follows:

Asset	Years
Furniture and fixtures	5
Computers and software	3
Telecommunications equipment	5
Project equipment	3 – 4
Leasehold improvements	remaining lease term

(e) Revenue recognition:

The Corporation follows the deferral method of accounting for contributions.

Externally restricted contributions:

Deferred contributions related to expenses of future periods represent unspent externally restricted funding and related investment income, which are for the purposes of providing funding to eligible recipients and the payment of operating and capital expenditures in future periods. Externally restricted contributions for expenses of a future period and related investment income are deferred and recognized as revenue in the year in which the related expenses are incurred. Deferred contributions related to capital assets represent the unamortized amount of contributions received for the purpose of purchasing capital assets. The amortization of such contributions is recorded as revenue in the statement of operations and changes in net assets. Restricted contributions related to the purchase of capital assets are deferred and recognized as revenue using the same methods and amortization rates of the related capital assets.

Unrestricted contributions:

Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

2. Significant accounting policies (continued):

(f) Commercialization projects:

The Corporation seeks to drive commercialization through partnerships with early stage companies. The Industry Innovation Program (the "Program") was established for the purpose of investing in companies involved in early stage research and development, where technologies have not yet reached commercialization. The value of any underlying security on these investments is limited. The Corporation expenses all amounts invested in these projects as advanced. Recovery of amounts invested are recorded as revenue when the funds are received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured. The Program balance consists of deferred contributions for investment, interest and royalties earned, gains less losses on investments, recoveries from investments less new investment.

(g) Use of estimates:

The preparation of financial statements requires the use of estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities and the reported amounts of revenues and expenses. Significant areas requiring the use of management's estimates relate to the determination of the useful life of capital assets, accruals for project expenditures and the recoverable amounts of loans receivable. Accordingly, actual results could differ from these estimates.

(h) Valuation of long-lived assets:

If management determines that a capital asset no longer has any long-term service potential to the Corporation, such assets and related deferred contribution balances are written down to their fair values.

(i) Deferred lease inducement:

Tenant inducement received associated with leased premises is deferred and amortized on a straight-line basis over the term of the lease.

(j) Related foundation:

The financial information of Genome British Columbia Foundation, a not-for-profit entity that is commonly controlled by the Corporation, is not consolidated but disclosed in these financial statements.

(k) Financial instruments:

Financial instruments are recorded at fair value on initial recognition. All financial instruments are subsequently measured at cost or amortized cost, unless management has elected to carry the instruments at fair value. The Corporation has elected to carry its short-term investments at fair value.

At period-end, the Corporation assesses whether there are any indications that a financial asset measured at cost or amortized cost may be impaired. Financial assets measured at cost include funding receivable, other receivables and loan receivable. If there is an indicator of impairment, the Corporation determines if there is a significant adverse change in the expected amount or timing of future cash flows from the financial asset. If there is a significant adverse change in the expected cash flows, the carrying value of the financial asset is reduced to the highest of the present value of the expected cash flows, the amount that could be realized from selling the financial asset or the amount the Corporation expects to realize by exercising its right to any collateral. If events and circumstances reverse in a future period, an impairment loss will be reversed to the extent of the improvement, not exceeding the initial impairment charge.

(l) Foreign exchange:

The Corporation's monetary assets and liabilities denominated in foreign currencies are translated into Canadian dollars using exchange rates in effect at the balance sheet date. Revenue and expense items are translated at the rate of exchange prevailing on the date of the transaction. Foreign exchange gains and losses are included in the statement of operations and changes in net assets.

3. Short-term investments:

The Board of Directors has overall responsibility for the establishment and oversight of the Corporation's short-term investments. The Board has established an Investment Committee, which is responsible for developing and monitoring the Corporation's investment policy. The overall objectives of the Corporation's investment policy are to achieve security of principal that ensures a return of the capital invested, to maintain the liquidity necessary to meet the cash flow requirements of the Corporation and to maximize the rate of return without affecting liquidity or incurring undue risk. The policy was updated in December 2015 to expand investment categories to include equities that are publicly traded and listed on major stock exchanges.

The Corporation's short-term investments are comprised of a portfolio of funds and other investments. The portfolio consists of investments in a Canadian money market fund, a bank guaranteed Canadian mortgage fund, a fixed income fund and a Canadian and international equity funds. The portfolio is managed by independent investment professionals in accordance with the Corporation's investment policy. Other investments consist of common shares. All short-term investments are measured at fair value. The Corporation's short-term investments are subject to interest rate, market and liquidity risks.

Both the risk of significant changes in interest rates and the risk of significant changes in market prices are mitigated by the Corporation's policy that permits its portfolio managers to change the level of investment in the funds at short notice and the fact that interest earned on the portfolio is reinvested monthly at prevailing rates. The Corporation limits exposure to liquid asset credit risk through maintaining its short-term investments with high-credit quality financial institutions.

Notes to Financial Statements (continued)

(Expressed in Canadian Dollars) Year ended March 31, 2017

3. Short-term investments (continued):

The Corporation's short-term investments are as follows:

	2017	2016
Money Market Funds	\$ 14,645,408	\$ 5,289,470
Canadian Mortgage Fund	39,950,181	38,591,247
Fixed Income Fund	15,101,453	13,695,233
Canadian and International Equity Fund	31,294,681	31,431,188
Other investments	224,717	578,235
	\$ 101,216,440	\$ 89,585,373

The Money Market Fund invests in a mixture of Treasury Bills, Bankers' Acceptances, Commercial Paper (minimum R-1 low rating) and bonds (minimum BBB rating) with maturities averaging 60–120 days and a minimum Government of Canada, Provincial or cash holding of 25%.

The Canadian Mortgage Fund invests in first mortgages on Canadian residential real property with loan value ratios of 65% or less. The mortgages are purchased by the fund from a Canadian Chartered Bank and in the event that a mortgage is in default for more than 90 days the bank guarantees both the interest and the principal of the mortgage.

The Fixed Income Fund invests in a mixture of bonds and debentures with a minimum average credit rating of BBB.

The Canadian and International Equity Funds invest in a mixture of Canadian, U.S. and international equities.

Other investments are common shares, converted from subscription rights, in a biotechnology company issued pursuant to a collaborative research agreement in the early development stage. Each subscription right entitled the Corporation to one common share for no additional consideration and was convertible into common shares of the Investee upon certain triggering events or three years from issuance. The subscription rights were converted into common shares in connection with the commencement of trading of the shares of the Investee in an active quoted market in November, 2014. The investment was carried at a discounted fair market value as the Corporation was subject to a lock-up agreement until May 15, 2015.

Fair values of the Corporation's portfolio investments are based on quoted bid price at the reporting date.

4. Industry Innovation Program:

	2017	2016
Balance, beginning of year	\$ 6,800,000	\$ 6,800,000
Funding received	4,000,000	–
Investments in commercialization projects	(1,850,000)	–
Balance, end of year	\$ 8,950,000	\$ 6,800,000

The program balance consists of deferred contributions for investment and is included with the Corporation's other short-term investments (note 3).

The investments in commercialization projects consists of loans which are secured by a general security interest in all assets of the companies. Interest accrues on the outstanding balances at prime plus 3% compounded annually. Repayment of principal and accrued interest over a two year period commences after the earlier of a) an agreed annual gross revenue threshold, b) a change of control of the company; or c) a date that is four years from the date of the loan was advanced. The Company may also receive royalty and other payments contingent upon the success of the investee's commercialization efforts and the balance of the loan outstanding.

5. Other receivables:

	2017	2016
Sales tax	\$ 27,733	\$ 73,642
Other accounts receivables	43,481	81,641
	\$ 71,214	\$ 155,283

6. Loans receivable:

The Corporation made a loan to a British Columbian academic institution to assist in attracting a senior scientific researcher. The loan was in the amount of \$200,000, bore no interest, and had a term of five years, expiring on May 9, 2016. The loan was measured at fair value on initial recognition, which was estimated using a net present value calculation with a discount rate of 6.50% per annum. The difference between the initial fair value and the principal amount was recorded in the statement of operations as a discount and the loan receivable balance has been accreted over the term of the loan using the effective interest rate method. The loan was repaid in full in June 2016.

7. Capital assets:

2017	Cost	Accumulated depreciation	Net book value
Furniture and fixtures	\$ 102,080	\$ 65,757	\$ 36,323
Computers and software	246,850	158,663	88,187
Telecommunications equipment	7,694	4,934	2,760
Leasehold improvements	545,767	289,145	256,622
	\$ 902,391	\$ 518,499	\$ 383,892
2016	Cost	Accumulated depreciation	Net book value
Furniture and fixtures	\$ 93,667	\$ 47,256	\$ 46,411
Computers and software	217,468	129,362	88,106
Telecommunications equipment	6,199	4,348	1,851
Leasehold improvements	545,767	215,825	329,942
	\$ 863,101	\$ 396,791	\$ 466,310

During the year ended March 31, 2017, fully amortized capital assets of \$31,813 (2016 – \$62,992) were removed from the Corporation's accounting records.

8. Accounts payable and accrued liabilities:

	2017	2016
Accounts payable	\$ 133,682	\$ 256,108
Accrued liabilities	4,694,809	4,007,328
	\$ 4,828,491	\$ 4,263,436

9. Deferred contributions related to future expenses:

The Corporation receives funding from Genome Canada, the Province of British Columbia, Western Economic Diversification Canada and from other sources to be held, administered and distributed in accordance with the related funding agreements between the Corporation and other parties (note 11).

Deferred contributions related to expenses of future periods represent these unspent externally restricted funding, which are for the purposes of providing funding to eligible recipients and the payment of operating and capital expenditures in future periods. The changes in the deferred contributions balance for the year are as follows:

	2017	2016
Balance, beginning of year	\$ 89,630,089	\$ 101,677,442
Funding received or receivable during the year:		
Genome Canada	12,863,763	10,360,369
Province of British Columbia	20,000,000	–
Western Economic Diversification Canada	275,012	235,333
Service Canada	3,135	4,305
University of British Columbia	–	33,000
Industry Partners	370,424	–
Other	391,681	107,386
	123,534,104	112,417,835
Lease inducement amortization	47,128	47,128
	123,581,232	112,464,963
Less:		
Amount amortized to revenue	(22,455,765)	(22,579,995)
Amount transferred to fund capital assets purchased during the year (note 10)	(71,103)	(55,876)
Amount transferred to BCCRIN upon incorporation	–	(199,003)
	(22,526,868)	(22,834,874)
Balance, end of year	\$ 101,054,364	\$ 89,630,089

Notes to Financial Statements (continued)

(Expressed in Canadian Dollars) Year ended March 31, 2017

9. Deferred contributions related to future expenses (continued):

In the year ended March 31, 2016 BC Clinical Research Infrastructure Network (BCCRIN), which was previously included as a functional unit of the Corporation, was incorporated. In previous years, the funds related to BCCRIN were reported by the Corporation as part of its operations. At the time of incorporation the Corporation transferred \$199,003, representing the surplus of funds received and unspent related to BCCRIN's operations, to the new entity (BCCRIN). The Corporation has no ownership or voting rights in the new entity.

10. Deferred contributions related to capital assets:

Deferred contributions related to capital assets represent the unamortized amount of contributions received for the purchase of capital assets. The amortization of such contributions is recorded as revenue in the statement of operations and changes in net assets.

The changes in the deferred contributions related to capital assets balance for the year are as follows:

	2017	2016
Balance, beginning of year	\$ 466,310	\$ 556,894
Allocation of funding for capital asset purchases (note 9)	71,103	55,876
	537,413	612,770
Less amount amortized to revenue	(153,521)	(146,460)
	\$ 383,892	\$ 466,310

11. Commitments:

(a) Funding:

(i) Genome Canada:

The Corporation enters into funding agreements with Genome Canada (the agreements). In accordance with these agreements the Corporation agrees to secure on an on-going basis cash or cash equivalent commitments from other parties representing at least 50% of the total costs of the projects covered by the agreements. In addition, Genome Canada agrees to disburse an amount only up to the amount of the formal commitments from other parties. However, Genome Canada may provide funding notwithstanding the fact that formal commitments from other parties have not yet been secured. Genome Canada has also agreed that funds, provided in good faith, where commitments from other parties have not yet been secured, shall not be reimbursable to Genome Canada.

In accordance with each respective agreement, the Corporation has agreed, among other things, to provide Genome Canada with a co-funding plan for each project. A co-funding plan for each project has been provided to and accepted by Genome Canada.

The list of active research funding agreements with Genome Canada by program, and the supporting commitments from other parties for the active research projects covered by these agreements, as at March 31, 2017 is as follows:

Funding agreement description	Support commitment
Entrepreneurship Education in Genomics Program	\$ 571,178
2012 Large-Scale Applied Research Project Competition	15,916,034
2012 Bioinformatics and Computational Genomics	2,563,577
Genomic Applications Partnership Program	5,859,827
2014 Large-Scale Applied Research Project Competition	15,296,041
2015 Disruptive Innovation in Genomics Competition	5,071,275
2015 Large-Scale Applied Research Project Competition	20,700,133
2015 Technology Development for the Genomics Innovation Networks	2,070,575

(ii) Province of British Columbia

In accordance with an agreement for funding received, dated March 30, 2015, and updated on March 24, 2017, the Corporation received funding of \$54,000,000 to support its 2015 – 2020 strategic plan: Powering British Columbia's Bioeconomy. In accordance with the agreement, the Corporation completed and submitted to the funder an accountability framework that included robust and detailed performance metrics on November 27, 2015. The Corporation launched its Industry Innovation Program in October 2015 as part of its commercialization strategy. Included as part of that strategy, and contingent upon the success thereof, is the intent to repay the Province \$10,800,000 over the next decade (note 4).

(b) Project commitments:

In the normal course of business, the Corporation enters into Collaborative Research Agreements for the completion of milestone-based research projects. Detailed below is the estimated remaining commitment of the Corporation's funds relating to active research programs. The Corporation typically provides co-funding to research projects, whereby its funds are combined with funds from other sources to provide the total project award amount. Funds provided directly to the research institution by third parties are included in the total award amount shown in the table below.

11. Commitments (continued):

(b) Project commitments (continued):

The total award amount and estimated remaining commitment of the Corporation by program as of March 31, 2017 is as follows:

	Total award amount	Estimated remaining Corporation commitment
Approved programs		
Current programs:		
2012 Large-Scale Applied Research Project Competition (LSARP)	\$ 34,036,779	\$ 1,558,447
2014 Large-Scale Applied Research Project Competition (LSARP)	41,962,926	4,524,500
2015 Large-Scale Applied Research Project Competition (LSARP)	45,002,369	7,557,600
Entrepreneurship Education in Genomics Program	979,966	3,045
2012 Bioinformatics and Computational Biology	5,276,029	34,375
2015 Bioinformatics and Computational Biology	1,249,994	–
Genomic Applications Partnership Program (GAPP)	9,161,261	570,573
2015 Disruptive Innovation in Genomics Competition	7,792,478	941,198
Genome Canada Pilot Projects	13,474,072	623,086
Technology Development 2015	5,926,633	410,077
2015-2017 Science and Technology Platform	7,999,946	–
Applied Genomics Consortium Program	31,193,623	94,648
Human Epigenome (CIHR)	9,978,992	890,083
Transplantation (CIHR)	4,096,203	928,448
Quantitative Imaging Network (CIHR)	3,900,074	605,426
Centre for Drug Research and Development Fund	4,309,919	147,136
Brain Canada (MIRI 1 & 2)	9,176,572	300,717
Brain Canada (Alzheimer's)	7,042,580	233,672
Brain Canada (PSG)	1,391,750	126,330
Strategic Opportunities Fund	14,305,078	209,582
Strategic Opportunities Fund for Industry	6,745,443	196,475
WED – Proof of Concept	10,029,751	24,375
User Partnership Program	12,775,337	2,860,629
Societal Issues	50,000	–
Genome British Columbia Pilot Programs	29,714,634	3,620,414
Science World British Columbia Outreach Program	200,000	142,855
	317,772,409	26,603,691
Closed programs:		
Competition I	42,707,207	–
Competition II	43,502,482	–
Competition III	100,153,663	–
Competition in Applied Genomics Research in Bio-products or Crops	24,346,330	–
International Competition	12,881,913	–
Applied Genomics and Proteomics in Human Health	44,099,840	–
Applied Genomics Innovation Program	24,437,610	–
Translational Program for Applied Health	17,891,275	–
New Technology Development Projects	5,509,566	–
WED Programs	10,713,337	–
Science and Technology Platforms	71,061,922	–
Technology Development Initiatives Fund	706,536	–
Other Pilot Programs	3,561,133	–
Advancing Technology Innovation through Discovery	5,702,315	–
Personalized Medicine Program	8,168,169	–
2010 Large-Scale Applied Research Project Competition (LSARP)	56,374,386	–
Human Microbiome (CIHR)	4,827,122	–
	476,644,806	–
Total	\$ 794,417,215	\$ 26,603,691

Notes to Financial Statements (continued)

(Expressed in Canadian Dollars) Year ended March 31, 2017

11. Commitments (continued):

(c) Operating lease and management agreements:

The Corporation has entered into operating lease agreements for office premises and management contracts which expire at various dates until September 30, 2020. Minimum payments for the next five fiscal years are as follows:

2018	\$	505,038
2019		505,038
2020		505,038
2021		252,518
Total	\$	1,767,632

12. Genome British Columbia Foundation:

Genome British Columbia Foundation (the Foundation) is a registered charity established to promote and foster life sciences research for the public benefit by coordinating, sponsoring and carrying educational conferences, seminars, workshops and symposiums. The Foundation is exempt from income and capital taxes.

The majority of the Foundation's Board of Directors are also members of the Corporation, and as such, the Corporation is presumed to control the Foundation. In accordance with the CPA Canada Handbook Section 4450, the Corporation has chosen not to consolidate the Foundation but has followed the disclosure requirements. The Corporation has no economic interest in the Foundation.

Financial information of the Foundation as at year ended March 31, 2017 and 2016 and for the years then ended are as follows:

	2017		2016	
Cash, term deposits and receivables	\$	100,313	\$	126,941
Accounts payable and accrued liabilities		(19,525)		(26,639)
Deferred contributions		(80,788)		(100,302)
Net assets	\$	–	\$	–
Revenues	\$	19,525	\$	25,453
Expenses		(19,525)		(25,453)
	\$	–	\$	–
Cash provided by (used in):				
Operations	\$	(26,628)	\$	(21,150)
Funding		–		–
Investing		–		–
Net change in cash	\$	(26,628)	\$	(21,150)

There are no significant differences in accounting policies between the Foundation and the Corporation.

13. Financial risks:

(a) Liquidity risk:

Liquidity risk is the risk that the Corporation will be unable to fulfill its obligations on a timely basis or at a reasonable cost. The Corporation manages its liquidity risk by monitoring its operating requirements. The Corporation prepares budget and cash forecasts to ensure it has sufficient funds to fulfill its obligations. There has been no change to the risk exposures during the period ended March 31, 2017.

(b) Credit risk:

Credit risk refers to the risk that a counterparty may default on its contractual obligations resulting in a financial loss. The Corporation deals with creditworthy counterparties to mitigate the risk of financial loss from defaults. There has been no change to the risk exposures during the period ended March 31, 2017.

(c) Market risk:

Market risk is the risk that changes in market prices, as a result of changes in foreign exchange rates, interest rates and equity prices, will affect the Corporation's income or the value of its holdings of financial instruments. The objective of market risk management is to manage and control market risk exposures within acceptable parameters, while maximizing the return.

(i) Currency risk:

Investments in foreign securities are exposed to currency risk due to fluctuations in foreign exchange rates. The Corporation is exposed to currency risk on its foreign currencies held within its cash accounts and through its investments in the International Equity Fund.

(ii) Interest rate risk:

Interest rate risk is the risk that the fair value of the Corporation's investments will fluctuate due to changes in market interest rates.

(iii) Other price risk:

Other price risk relates to the possibility that the fair value of future cash flows from financial instruments will change due to market fluctuations (other than due to currency or interest rate movements). The diversification across various asset classes is designed to decrease the volatility of portfolio returns.

Corporate Information

Board of Directors

(For fiscal year ended March 31, 2017)

Ida Goodreau

Chair
Former CEO, Vancouver Coastal Health

John F.H. Thompson

Vice Chair
Consultant, PetraScience Consultants Inc.
and Professor, Cornell University

Pascal Spothelfer

President and Chief Executive Officer
Genome BC

Lenard F. Boggio

Retired Partner
PricewaterhouseCoopers LLP

Neena L. Chappell

Professor Emeritus
Institute on Aging & Lifelong Health and
Department of Sociology
University of Victoria

Ian de la Roche

Past President, FP Innovations
Adjunct Professor – Forest Resources
Management
University of British Columbia

Jock Finlayson

Executive Vice President and Chief Policy Officer
Business Council of British Columbia

Joseph Garcia

Partner
Blake, Cassels & Graydon LLP

Janet Halliwell

Principal
J.E. Halliwell Associates Inc.

Victor Ling

President and Scientific Director
Terry Fox Research Institute

Edward Safarik

Former President and CEO
Ocean Fisheries Ltd.

John Shepherd

Past Director, Leukemia/Bone Marrow Transplant
Program of BC
University of British Columbia

Paul Terry

President and CEO
PHEMI

Management

Pascal Spothelfer

President and Chief Executive Officer

Tony Brooks

Chief Financial Officer and Vice President,
Research Programs

Catalina Lopez-Correa

Chief Scientific Officer and Vice President,
Sectors

Suzanne Gill

Executive Director, Corporate Development

Sally Greenwood

Vice President, Communications and Education

Auditors

KPMG LLP
Vancouver, BC

Legal Counsel

Richards Buell Sutton LLP
Vancouver, BC

Thanks to our Funders

Genome BC thanks its funding partners including the Province of British Columbia, the Government of Canada through Genome Canada and Western Economic Diversification Canada, and project co-funders.

Acknowledgements

We would like to thank all those who assisted in developing this annual report, including the management and staff at Genome BC, Genome BC funded researchers, and the Carter Hales Design Lab team.



Western Economic
Diversification Canada

Diversification de l'économie
de l'Ouest Canada

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