Genomics for a healthier British Columbia

Genome BritishColumbia

Leading ▸ Investing ▸ Connecting

2017–2018
Annual Report

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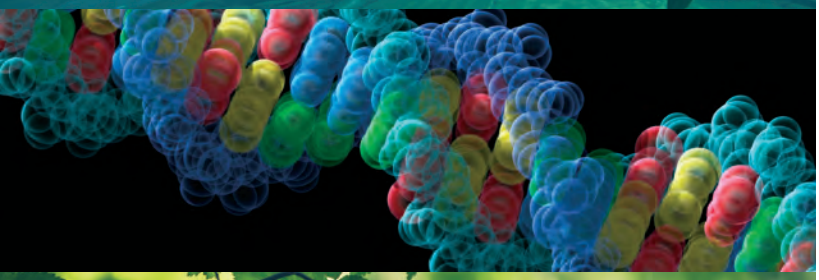
Genomics Now!



The genomics revolution is happening all around us. Scientists are unlocking the code of all living things, (humans, animals, plants, microbes), to improve our understanding of biological systems at a molecular level. Genomics is not science fiction — this transformative technology is changing how we see and interact with the living world in meaningful ways.

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. These new approaches give rise to the need for dialogue regarding societal, economic, and ethical implications as new and powerful genomic solutions are applied to benefit society.

The Legacy of Dr. Michael Smith

It's been a quarter century since Dr. Michael Smith became BC's first Nobel laureate. Smith (with Dr. Kary Mullis), won the Nobel Prize in chemistry for discovering how to make a genetic mutation precisely at any spot in a DNA molecule. This foundational discovery paved the way for new diagnostic tests and treatments for genetic diseases.

Forever a champion of genomics research, the influence and legacy of Michael Smith are still felt today. He pushed for federal funding to establish a new funding council for genomics research, which led to the creation of Genome Canada and regional centres across the nation to administer research contracts. He created Canada's first genomics research centre for cancer research and he was one of the strongest voices for science education – a value Genome BC continues to uphold.

Genomics for a healthier British Columbia

The technologies supporting the Internet may be commonplace today; however, they were borne out of a period of discovery. Concepts had to be developed and proven, technologies refined and applied, spawning commercialization across many fronts. The web has evolved through several innovations to become an interconnected platform where information is democratized, and users are connected. The Internet we use today is the result of transformative technologies that have changed how we connect to the world, forever.

With continued and remarkable advancements in next generation sequencing, a similar story could be told to describe the evolution of genomics. Having moved well beyond a period of pure discovery at the laboratory bench, a new era is moving genomics into the mainstream. The unprecedented pace of technological change and information is leading to incredible opportunities to understand and solve problems.

Genomics is not only driving positive change in health care delivery and outcomes, but this cutting-edge science and related technologies are improving our understanding of the natural world. This is enabling us to adapt to climate change, increase our food safety and security, and develop cleaner energy while driving economic growth.

As a catalyst for building a strong life sciences ecosystem, Genome British Columbia (Genome BC), has helped build the bridge between academia where genomics knowledge is discovered, and the industrial sectors where applications are applied to solve complex biological challenges, helping British Columbia move toward a healthier future — in health, forestry, agrifood, fisheries and aquaculture, energy, mining, and the environment.

2017/18 Year in Review

Highlights

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 $1 billion in more than 360 genomics research projects and science and technology platforms, we've helped to create jobs in Canada while addressing challenges in key sectors such as health, forestry, fisheries and aquaculture, agrifood, energy, mining, and the environment.

Economic Impact

$1.4B* Economic Impact to BC's GDP

21,149* Jobs Created

910 Partnerships

74 Companies Advanced

607 Patent Applications**

$784.5M Direct Co-investment Attracted

$1B Total Investment

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

Academic Results

2,720 Scientific Publications

Projects and Funding

Health	**$491.1** Million
Tech Development and Platforms	**$159.4** Million
Agrifood	**$56.9** Million
Forestry	**$107.7** Million
Environment	**$16.6** Million
Fisheries and Aquaculture	**$66.3** Million
Mining and Energy	**$37.4** Million

All figures are cumulative as of March 31, 2018.

A prescription for clinical health care

Genomics is at the core of precision health. It allows us to understand why some people are more susceptible to certain illnesses, while others are likely to remain healthy. Genomic tools can also predict responsiveness to treatment including whether you are likely to experience an adverse drug reaction or to better predict successful treatment options.

This is in direct contrast to the traditional one-size-fits-all approach, with little or no consideration for the differences between individuals — an important consideration when certain therapies may present other complications, or have extreme costs associated with little or no benefit to the patient.

Genomic applications in precision health are already saving lives in clinical health care settings — improving health outcomes through improved diagnosis, disease management and prognosis for patients affected by cancer, heart disease, autism, epilepsy, rare diseases and other debilitating conditions.

The unique genetic variations between people are an important factor in determining the best and most precise approach to treatment. Precision health care considers not only our genetic profile, but also the environment we live in, our familial history and our lifestyle choices — all of which contribute to our health and well-being.

With a vision to further advance the use and application of genomics in clinical practice, Genome BC has invested over $491 million in 196 health research projects since 2001. Today some of the best health research minds in the world call British Columbia home and, with an emphasis on collaboration between research and clinical expertise, the effort to integrate genomics into clinical settings is paying off. Evidence of this strength was demonstrated in 2017 when BC's clinicians and researchers secured an incredible 38% of the total funds available through the Genome Canada and Canadian Institutes of Health Research (CIHR) competition for research funding in precision health. Combined with funding from Genome BC and other partners, over $58 million is being invested in BC for work on precision health challenges and opportunities, with a strong focus on the clinical application of genomics.

Genome BC looks forward to working with provincial health authorities, the Ministry of Health and these extraordinary research teams to validate and facilitate the uptake of genomic applications in the health care system. As clinical applications of genomics become an integral part of the continuum of care, we will continue to see improvement in disease prevention, diagnosis, and treatment, as well as informing our approaches to wellness, nutrition, and public health.

Dr. Aly Karsan
Photo: BC Cancer

The right drug, to the right patient, at the right time

Pharmacogenomics is the science that studies the role of the genome related to an individual's response to a drug. The science is improving the safety and efficacy of many therapeutic treatments. Notably, pharmacogenomics can help to prevent adverse drug reactions; an unwanted or harmful reaction experienced following the administration of a drug or combination of drugs. Variants in your genetic makeup can also determine whether certain medications or dosages will be effective or not in treating your medical condition.

Genome BC, in cooperation with BC's Ministry of Health, is exploring opportunities to illustrate the effectiveness of pharmacogenomics within BC's public health care system. This three-phase initiative seeks to advance the clinical implementation of pharmacogenomics in British Columbia. Phase I and II will outline the anticipated resources and infrastructure while developing a robust business case and a detailed study design. Phase III would initiate a project focused on evaluating the potential pharmacogenomics has to improve health outcomes for British Columbians and improve cost-effectiveness within the health care system.

Improving precision

Genetic tests on patient material is used to screen for risk of hereditary cancers. This testing enables people to learn what cancers they may develop, how often to have medical follow-ups, what further cancer screening to get, inform their families of potential risk, and whether there are preventive measures that might mitigate risks.

Until recently, patients had to undergo multiple individual tests of their tumor tissue in order to determine whether they would respond to specific therapies. Now the OncoPanel and Myeloid Panel enable clinicians to test for more than a dozen of the most common genetic mutations associated with solid or blood-based cancers, respectively, through a single test.

These multi-gene analysis panels, developed by a team led by Dr. Aly Karsan at BC Cancer's Michael Smith Genome Sciences Centre, have been fully integrated into clinical practice in BC, and as part of standard care in Canada for acquired cancers. Health economic analysis has shown the panels to be a cost-effective way to improve cancer outcomes. Wait times for hereditary cancer screening in BC have gone from several months to a few weeks. BC's expertise is now being sought by other Canadian jurisdictions to alleviate backlogs and speed up testing nationwide.

"The gene mutations included on these panels were designed to help physicians choose between real treatment options that cancer patients can access today. As our knowledge of cancer genetics evolves, we can rapidly add more tests for more mutations with the hope of helping more cancer patients faster."

—Dr. Aly Karsan, Centre for Clinical Genomics, Michael Smith Genome Sciences Centre, BC Cancer

Go-PGx: Preventing chemotherapy side effects in children

Genetic differences in patients can affect the likelihood of developing an adverse drug reaction. Drs. Bruce Carleton and Colin Ross, both of the University of British Columbia, are working to reduce and prevent the incidence of adverse drug reactions among children being treated for cancer. Building upon the success of their ongoing pharmacogenomics research, they are developing genomics-based tests to determine genetic susceptibility to adverse drug reactions and incorporating these tests into clinical practice in pediatric cancer centres across Canada.

Drs. Bruce C. Carleton (right) and Colin J. Ross

Rory

RORY'S STORY:

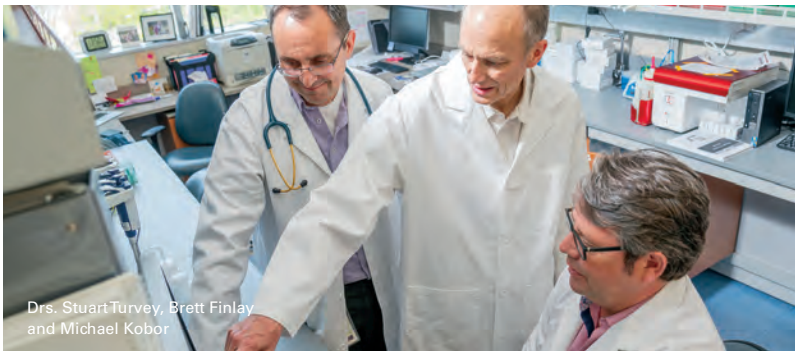
Children should have a future, not cancer

Just before her first birthday, Rory was fighting for her future. As if cancer surgery was not enough for a child to face, the potentially devastating side effects of chemotherapy treatment would also put Rory's future at risk. At the time, her oncologist recommended a pharmacogenetic study which would indicate Rory's risks for side-effects — her results showed a significant risk of hearing loss or deafness. Based on this information, Dr. Bruce Carleton and his team searched for an alternative that would be more likely to preserve hearing. They found a less toxic drug which promised to be as effective to treat Rory's cancer, but had a greater chance of preserving her hearing. It has been three years since Rory finished chemotherapy. Today she is cancer free and her mom proudly reports, "she is able to communicate (sometimes non-stop) and her hearing hasn't been impaired (although it's sometimes selective.)"

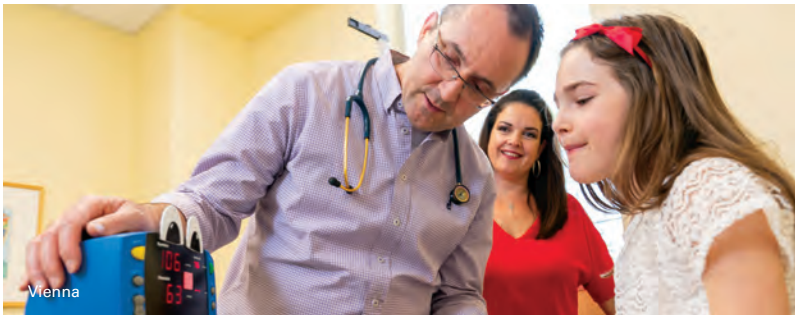
Early diagnosis and prevention of childhood asthma

Asthma is the most common chronic disease of childhood, affecting one in seven Canadian children. Dr. Stuart Turvey of BC Children's Hospital Research Institute, Drs. Michael Kobor and Brett Finlay of the University of British Columbia and Dr. Padmaja Subbarao of The Hospital for Sick Children in Ontario are looking to determine which infants in the CHILD study* are most likely to develop asthma by looking at the absence of key microbes in their stool samples. The team will also look at preventing asthma by developing ways to replace those missing microbes.

**The CHILD Study is a cross Canada initiative where researchers are actively following study participants over time as they grow and develop—from mid-pregnancy into childhood and adolescence.*



Drs. Stuart Turvey, Brett Finlay and Michael Kobor



Vienna

VIENNA'S STORY:

Without subjects, there is no science

Seven-year-old Vienna became part of the CHILD study while her mom, Jennifer, was still six and a half months pregnant. They're one of 3,500 families recruited during pregnancy across Canada to help researchers understand how genes and the environment interact to cause allergies, asthma and other chronic diseases. Thankfully, Vienna doesn't have asthma or any of the other conditions researchers are trying to solve, yet her family's participation is critical. Through home and clinical visits, along with the collection of samples such as umbilical cord blood, breast milk and stool, researchers compare her data to other study participants to gain an in depth understanding of disease. The CHILD study provides a foundational resource to Dr. Stuart Turvey's project: Childhood Asthma and the Microbiome.

CanPREVENT: Reducing the risk of kidney transplant rejection

Transplantation is the optimal treatment for patients with kidney failure, but rejection still causes premature graft loss in as many as 30 per cent of recipients. Drs. Paul Keown and Stirling Bryan of the University of British Columbia, Ruth Sapir-Pichhadze of McGill University and Timothy Caulfield of the University of Alberta aim to cut the rejection rate in half by using genomic technologies to improve the matching of donors and recipients, to monitor the immune response for rejection, and to develop personalized drug treatment regimens for each recipient.

Dr. Paul Keown

ALEISHA'S STORY:

More than anyone should have to endure

Born without parathyroid glands, Aleisha's body was unable to process calcium. Her condition led to several life-threatening conditions including end stage kidney disease. At age 19 a transplant from her mother saved her life, but as is often the case in transplants, the anti-rejection drugs led to several complications, including skin cancer. And still without parathyroid glands, unregulated calcium would eventually lead to another transplant. Before that could happen, Aleisha experienced antibody-mediated rejection. This not only causes premature loss of the transplant, it also makes it more difficult to find another match.

Aleisha spent seven years on dialysis waiting for a second kidney transplant before a rare match was found. Fortunately, she also received a parathyroid gland. Today, her kidney, calcium levels and other vital functions are all within normal range. Dr. Paul Keown and his CanPREVENT team aim to bring a more precise approach to kidney transplant, changing the stories of patients like Aleisha in the future.

Aleisha

Developing genomics-based clinical tests for relapsed lymphoid cancers

Most of the 6,000 annual deaths that result from lymphoid cancers in Canada each year occur when the disease relapses after an initially successful treatment. This makes treating and controlling the symptoms of relapsed disease the most pressing need for these patients. Drs. Christian Steidl, Marco Marra and David Scott of BC Cancer are working to improve the survival rate and quality of life of patients with relapsed lymphoid cancers and reduce treatment costs by developing and implementing genomics-based clinical tests to better guide treatment decisions.

Drs. Marco Marra, David Scott and Christian Steidl

Dr. Richard Hamelin with a hand-held device that runs portable assays designed to perform diagnostics in the field.

Protecting against invasive pests and pathogens

Genome BC invests in genomics research across key economic sectors helping secure healthy markets for BC's industry to thrive. Environmental protection is part and parcel to this effort. For example, researchers are using genomics to investigate how microbes can be used to remediate and reclaim lands from mining operations. Others work to address challenges around aquaculture and fisheries. Genome BC funded initiatives also look to protect BC's agricultural and forest products from invasive pests and pathogens.

In the 3.8 billion years that life has been on the planet Earth, many more species have existed than are alive today. Life is continually evolving, and species are constantly challenged with changing environments. In BC, some of our most economically significant species are struggling to adapt to an influx of invasive pests and pathogens; the result of a changing climate and the increased movement of goods through our global market.

Phytophthora ramorum is a pathogen that can attack hundreds of species of trees and plants, causing diseases such as Sudden Oak Death and Sudden Larch Death. The Asian gypsy moth is an invasive insect that poses a significant threat to Canada's forests, biodiversity and economy. Both have the potential to cause irreversible damage to the environment if they became established and could be responsible for losses of hundreds of millions of dollars to the Canadian economy, impacting agriculture, forestry, urban and natural environments, as well as international trade. Keeping them out is a top priority for the Canadian Food Inspection Agency (CFIA), the regulatory agency in charge of plant protection.

The detection and identification of these harmful intruders are complicated by the fact that they can be hidden and then transmitted within plants or soil, or as eggs that are impossible to identify accurately using traditional detection methods. With the incidence of pest occurrences on the rise, there was a growing need for innovative tools capable of a more rapid, efficient and accurate identification.

Since 2003, *Phytophthora ramorum* has been detected on plants in several retail and wholesale nurseries in the southern coastal area of BC resulting in costly treatment and loss of market. This can be avoided by identifying the pests, and their source, before they are loaded in a container, or on a ship and come in to contact with plants and trees in Canada.

Toward this effort, Genome BC and Genome Canada invested in research led by Dr. Richard Hamelin, a professor and forest pathologist at the University of British Columbia, to develop DNA detection tests targeting unique genome regions that provide a more specific level of identification than was previously possible for these harmful pests. The outcome of this investment is a suite of diagnostic tools that provide accurate, efficient, cost-effective, and on site detection of all life stages of these pests in order to support the CFIA's plant protection mandate. Hamelin and his team have also developed portable assays that can be run on a hand-held device to perform diagnostics directly in the field. This tool could significantly enhance the CFIA's regulatory capacity by enabling rapid, on-the-spot identification of invasive species and pathogens.

Genomic tests are being used to identify pathogens and provide information on the pathogen lineage, which can be used to assess the success of eradication efforts and track the source of the pathogen. In 2017, a total of 1,598 plant samples were processed, out of which 27 samples tested positive for pathogens.

Dr. Lauchlan Fraser

Closing gaps

Mining is a key economic sector in Canada, but also has the potential to create disturbances that can impact terrestrial and aquatic ecosystems. In Canada, environmental assessment (EA) is required to identify social and environmental risks before the approval for a mine operation is given. Genome BC is investing in research to explore opportunities to improve successful ecosystem reclamation following a mine closure. A new research project, led by Drs. Lauchlan Fraser and Jon Van Hamme from Thompson Rivers University (TRU) launched an innovative program of applied research that will work with industry associations, regulators and First Nations to improve efficiency and effectiveness of mine reclamation.

Ensuring safety and increasing speed

Canadian nurseries export young strawberry plants in the amount of $17 million per year. Foreign buyers demand the best varieties of plants. Any substandard product will risk rejection on the export market which has serious knock-on effects to the local economy and puts other markets at risk.

Early detection of viruses in domestic crops is critical. In order to make sure that the plants are healthy, the Canadian Food Inspection Agency (CFIA) tests fruit plants for potentially devastating plant viruses before exportation. Currently, this testing and quarantine process takes an average of three years to complete, significantly hampering the speed of trade.

In an effort to speed this up and accelerate our export market, Genome BC partnered with CFIA and industry groups to demonstrate DNA-based technologies aimed at reducing quarantine testing time by up to two and a half years. The work also looks to develop a way to detect multiple viruses in one single test, dramatically reducing the time and cost to get plants to market.

"Together with provincial partners and industry, our government is making the investments in innovative science that enables agriculture to be a leading growth sector of Canada's economy. Together we can help meet the world's growing demand for high-quality, sustainable food and help grow our middle class."

—**The Honourable Lawrence MacAulay**, Minister of Agriculture and Agrifood

Breathing life into the economy

Through ongoing dialogue and engagement with industry, Genome BC works to identify areas where the application of genomics and other life science technologies can solve specific biological challenges facing key economic sectors. This has brought engineers, clinicians, software programmers, entrepreneurs and other highly skilled people together, working toward common goals.

As a result, there is an increased recognition of the potential for commercialization of genomic technologies and the creation of new products — particularly as technology costs lower and become more accessible to use toward industrial applications. However, the path to commercial success is complex and requires expertise and financial support.

Genome BC's commitment to drive commercialization and translation is evidenced by the effort to bring industry and academia together to enhance innovation in BC. We work to mobilize the province's scientific, technical and engineering talent, and strong entrepreneurial base to create and support critical infrastructure.

As applied and translational research continues to provide useful and beneficial outcomes, Genome BC continues to help realize commercial opportunities by supporting programs such as e@UBC, SFU Innovates and HyperGrowth:Life 2.0, in partnership with the BC Tech Association. These programs help develop a new generation of entrepreneurs through mentorship and advisory support from industry leaders and practicing executives at some of Vancouver's top companies. They provide a critical resource for the acceleration and realization of ideas that produce meaningful social and economic impact in BC, Canada, and the world.

However, an entrepreneurial mindset alone is not enough to bring a great idea to commercial success. Genome BC's Industry Innovation Program (I^2) fills a critical gap in the pipeline to commercialization. This one-of-a-kind program helps companies make financial transitions during the early stages of commercial development — a pivotal time in their evolution. In addition to providing funding, the I^2 Program's rigorous due-diligence process helps developing companies establish a clear pathway to commercialization with near-term milestones. We also help companies tap into a network of expertise, through senior leaders and resources. The result is a stronger foundation for entrepreneurship and economic development in British Columbia.

Genome BC has helped foster collaboration between academia and industry by building networks and attracting co-investment. The effort has helped advance 74 companies to date, supported BC job growth and contributed to international recognition of British Columbia for its genomics and life sciences capabilities.

Companies advanced through early research technology development

BOREAL GENOMICS · MRM Proteomics · AbCellera · PRECISION NANOSYSTEMS · ContextualGenomics

Companies supported through the Industry Innovation program

ANANDIALABS · AbCellera · AugureX · ViewsIQ · Microbiome Insights · CuePath Innovation

Checking the pulse of society

The genomics revolution sparked by the end of the Human Genome Project in 2003, has brought forward exponential advancements in life sciences with far-reaching impacts. Fueled by affordable genome sequencing of any living thing, at increasingly higher speeds, scientists are developing knowledge and opening doors that lead to innovative tools and approaches to tackle major challenges such as: adapting to climate change, ensuring food safety and security, developing clean energy and improving health care, to name a few.

However, the rapid advancement of genomics and its uptake in society will certainly raise genuine questions — how our lives may be impacted, and how to ensure the responsible development and application for society's benefit. The public, and policy makers, wrestle with questions regarding privacy protection and discrimination based on genetic data, the potential implications of gene editing and gene patenting, and understanding genetically-modified foods.

Society has an important stake in how technologies evolve and are utilized, but is challenged to keep pace with the rate of change. Yet, it has never been more important to have an informed public take a participatory role in the progression of science. If genomic solutions are to be responsibly developed and applied to society's challenges, the research and its surrounding dialogue must go beyond the biological science.

The Canadian genomics enterprise (Genome Canada and the six regional centres) continues to strive to ensure societal concerns are thoroughly investigated and society is fully engaged in dialogue to consider the issues. For example, social sciences are fully integrated within large scale 'Genomics' projects to ensure Ethical, Environmental, Economic, Legal and Social aspects (GE^{3}LS) of emerging biotechnologies are investigated and understood. Genome Canada's 2017 competition for Large Scale Applied Research Projects in Precision Health also saw two GE^{3}LS led projects awarded to BC based research teams.

In addition, in 2017, Genome BC piloted its Societal Issues Competition recognizing the need to build capacity in areas that optimize the important contributions that Environmental sciences, Social sciences and Humanities bring to genomics research. The inaugural round of this competition funded four projects within the health sector, that identify and study issues emerging from genomics-based innovations.

Areas of investigation include: understanding public perceptions about the value attached to genomic knowledge and health care outcomes; the ethical challenges associated with the use of whole genome sequencing in surveillance and outbreak investigations; initiating preliminary conversations with individuals of Indigenous ancestries to understand their perspectives, values, and concerns while raising awareness of under-representation in genomics research; and investigating factors influencing decision making for parents considering genome wide sequencing to identify genetic disorders in newborns in the neonatal intensive care unit at BC Women's Hospital + Health Centre.

Environmental sciences, along with Social Sciences and Humanities are critical to the success of genomics research and assist us in the enhancement of public engagement and dialogue. Providing an opportunity to access unbiased, fact-based information and data is essential to develop informed policy and regulation related to genomics.

Drs. Nadine Caron and Laura Arbour

Silent Genomes: Reducing health care disparities for Indigenous children with genetic diseases

First Nations, Inuit and Métis populations, collectively known as the Indigenous Peoples of Canada, face similar health challenges with global Indigenous Peoples. Inequities include access barriers to health care that produce poorer health outcomes compared to non-Indigenous groups.

The 'genomics revolution' has the potential to widen the health inequities gap. Compared to what is becoming routinely available to other Canadians, Indigenous populations often have little or no access to genomic technologies and the research that drives them, hence intensifying the 'genomic divide'.

A key concern in the growing genomic divide is the lack of background genetic variation data for Indigenous populations living in Canada and globally. This prevents accurate findings because of the lack of reference data needed for precise genetic diagnosis. Notably, standard genomics resources are silent with respect to First Nations, Inuit and Métis. The Silent Genomes project will address the genomic divide by reducing access barriers to diagnosis of genetic disease in Indigenous children.

Silent Genomes is a partnership with First Nations, Inuit and Métis Peoples that will:

- establish processes for Indigenous governance of biological samples and genome data,
- lead to policy guidelines and best practice models, bringing equitable genomic testing to Indigenous children in Canada with suspected genetic diagnosis, and
- develop an Indigenous Background Variant Library of genetic variation from a diverse group of First Nations in Canada.

Drs. Laura Arbour and Nadine Caron of the University of British Columbia and Dr. Wyeth Wasserman of BC Children's Hospital Research Institute will work to narrow the gap by creating a system in which Indigenous Peoples can oversee their own genetic data, enhancing equitable access to diagnosis, treatment, and care. This work aims to improve health outcomes related to genetic disease, while assessing cost effectiveness of precision medicine.

Dr. Alison Elliott

GenCOUNSEL: Optimization of genetic counselling for clinical implementation of genome-wide sequencing

Genome-wide sequencing (GWS) is a powerful new genetic test that analyzes a person's entire genetic make-up. While valuable, it can be problematic, by revealing disorders or disease risk factors unrelated to the original reason for testing, or by generating complex findings that are difficult for non-expert health providers to interpret. While not currently routinely available, genome-wide sequencing will soon be in more widespread use for patients who need it – increasing demand for genetic counselling, to which access is already limited in Canada.

Genetic counselors provide education and emotional and decisional support to patients and families, helping them to make informed decisions about genetic testing and its results.

GenCOUNSEL, led by Dr. Alison Elliott of the BC Children's Hospital Research Institute, brings together experts in genetic counselling, genomics, ethics, health services implementation and health economics, in the first project to examine the genetic counselling issues associated with clinical implementation of GWS. The project's aim is to determine the most efficient socio-economic, clinical, legal and economic methods of providing genetic counselling once GWS is available in the clinic. It will create an understanding of current and future needs for genetic counselling, develop best practices for the delivery of genetic counselling, improve access to the counselling, particularly for underserved patient populations, and develop a framework for the legal recognition of genetic counselors. The result will be increased access, patient satisfaction and cost-efficiency while providing genetic counselling to all Canadians who need it.

Catalyzing innovation

A catalyst is defined as an agent that provokes significant change or action. And just as genomics is a disruptive tool, catalyzing discovery and change in the life sciences, Genome BC serves as an agent of change with regard to developing collaborations and catalyzing partnerships between scientists, government, and industry for the purpose of applying genomic applications for the benefit of BC, Canada and the world.

We are equally as passionate about educating and empowering youth as a critical pathway towards a future of innovation. Working in partnership with the Province, Genome BC has worked hard to influence the high school curriculum, reintroducing genetics into the curriculum with a shift in focus from content to competencies.

Additionally, Genome BC's Geneskool program runs throughout the school year supporting teachers across the province with workshops and hands-on activities aligned to the BC curriculum. Geneskool provides turn-key resources that teach students in grades 9 through 12 about this complex topic in new and interesting ways.

We actively work to keep our programs up-to-date, ensuring that skills-based learning is part of our activities. Our forensics workshops, in partnership with Capilano University, focus on experiential learning — putting the student in the position of a scientist working in the field. And all reports say that they love it.

As a founding partner of BC's Science Charter, we share a belief that the future wellbeing of BC depends upon a vibrant culture of scientific discovery and technical innovation across our province. Genome BC actively promotes a strong STEAM (science, technology, engineering, art and mathematics) ecosystem, working with Science Charter partners such as Science World and Triumf, as well as community partners like Let's Talk Science to advance progress for BC's young people.

Genome BC also entered into a multi-year partnership with Science World to support the BodyWorks exhibit, which explores and celebrates the human body. New programming in the gallery was co-developed with Genome BC, to provide a hands-on exploration of DNA, genetics, and the rapidly expanding field of genomics. The Lab Zone is a central hub in the gallery, a place where visitors can engage in storytelling and interactive demonstrations, while learning about cutting-edge research. Since opening less than a year ago the gallery has seen 469,000 visitors.

Genome BC actively seeks opportunities to engage the community throughout the year like participating in events such as Science World's Teen Tuesdays. And working with the Girl Guides of Canada, we participated in SOAR (Spirit of Adventure Rendezvous). While at the Provincial Specialist Association (PSA) SuperConference, we provided hands-on workshops for teachers.

The public talks we host throughout the year are most popular. The Annual Don Rix Distinguished Keynote Address and GeneTalk speaker series provide the public around the province with direct access to world-class scientists, industry leaders, and patients participating in discussion that enhances understanding and opportunities to learn from one another.

"Geneskool has not only enhanced my knowledge in the world of biology but it has also deepened my interest of sciences. I can genuinely say Geneskool has inspired me to pursue a career in this field."

—**Nicole Greig**, Student

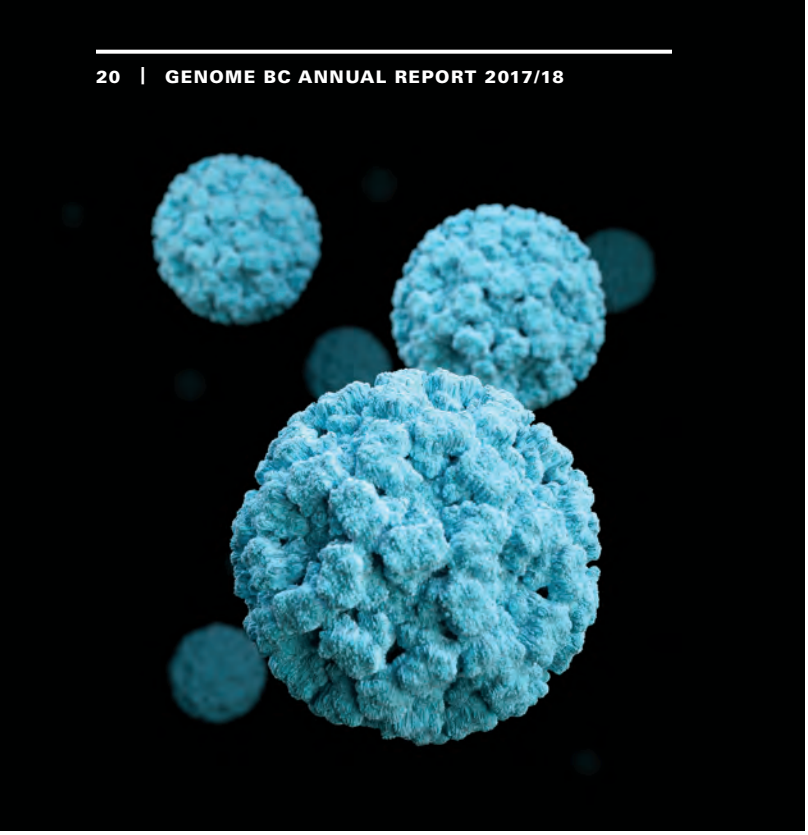
"The activities line up very well with the IB Biology curriculum (biotechnology). I really appreciate the advanced chromatography activity. Without the provided supplies, we couldn't do this in a high school lab. The column chromatography was very interesting and a novel technique for the students to learn."

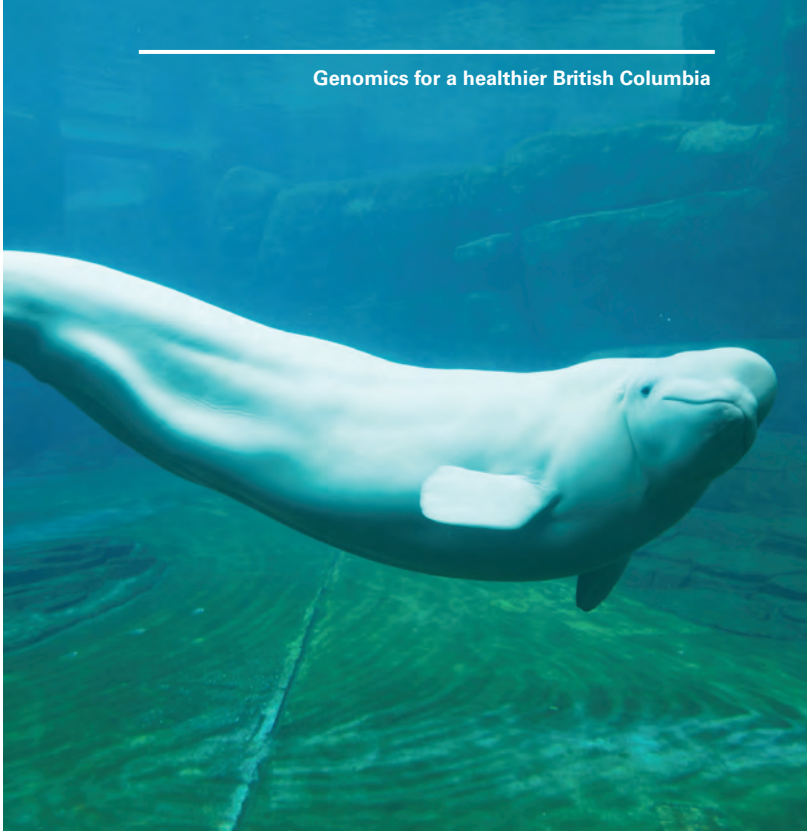
—**Kristy Harris**, Teacher, Semiahmoo Secondary

"Your workshop provides lab work that our small school staff cannot. Thank you, it was much appreciated and needed."

—**Lisa Oike**, Teacher, Boston Bar Elementary-Secondary School

Students perform karyotyping at Genome BC's Geneskool. Karyotyping is a way to see chromosomes inside of cells under a microscope.





Working toward solutions for Norovirus

Genome BC's outreach activities are not limited to public engagement and education. We convene relevant partners in the community to respond to emerging issues and develop action plans. Beginning in November 2016, a series of gastroenteritis cases were reported with links to the consumption of raw oysters. Public health authorities were informed of ~370 cases of foodborne illness from two outbreaks of Norovirus, primarily in BC but extending to Ontario, Alberta and Washington State. As a result, several shellfish areas were closed for harvesting in BC. Public health notices were issued by the British Columbia Centre for Disease Control and the Public Health Agency of Canada, warning of illnesses linked with the consumption of BC raw oysters.

Genome BC hosted a stakeholders' workshop and roundtable discussion on the recent outbreaks. This meeting brought together experts from government, industry, and academia to discuss the challenges presented by Norovirus. The workshop helped to identify gaps in current methodologies and approaches for monitoring for detection of Norovirus in shellfish and concluded a clear need for a rapid and sensitive test to detect norovirus in shellfish. Genomics-derived solutions could potentially play a key role providing an early warning in norovirus surveillance, improving future outbreak investigations. A genomics-based solution could also be developed to provide a low-cost, routine test improving food safety of shellfish products for consumers.

Genome BC's role in bringing together stakeholders to work through emerging issues, like this Norovirus outbreak, is to facilitate the development of a common understanding of the issue within BC and highlight areas where practical solutions could be advanced.

Sequencing the Beluga genome to aid in conservation

When BC suffered a tragic loss with the sudden death of Qila and her daughter, Aurora, the Vancouver Aquarium's beloved beluga whales, many scientific experts stepped forward to offer assistance in finding answers to what caused this heartbreaking loss.

Genome BC reached out to the Aquarium's veterinary team suggesting genomics might help discover what was causing their illness. With funding support from Genome BC, researchers at BC Cancer's Michael Smith Genome Sciences Centre worked with genetic material from the beluga whales who were cared for at Vancouver Aquarium for almost three decades.

The researchers determined neither bacteria nor a virus was responsible. Results of the investigation concluded that the cause of death in both animals was a toxin, although extensive testing was unable to identify the exact substance involved. With the whole beluga genome sequenced, a thorough understanding of beluga genetics may aid conservation efforts for the species, which has been designated at-risk in Canada by the Committee on the Status of Endangered Wildlife in Canada.

2017/18 Societal Engagement

Highlights

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.

Public Engagement/Outreach 2017/18

81
Unique Media Stories

18
Community events

19,821
People reached through events

36
Communities visited through Geneskool

76 Schools visited

7,026 Students engaged

188 Teachers trained

8th Annual Don Rix

8th Annual Don Rix Distinguished Keynote Address, Sharon Terry presented to a sold-out crowd.

12,126
Visits to our booth at the Community Science Celebration

Approximately
469K
visitors to BodyWorks

Genome BC helped shape the Lab Zone – a central hub of the exhibit that explores DNA, genetics and the field of genomics.

Social Media Highlights

- 9,424 Followers
- 1,214 Likes
- 2,785 Followers
- 1.9M Views
- 5,252 Subscribers
- 280 Followers

Message from the President and CEO

Pascal Spothelfer

Genomics is not only a technology of the future; it is a technology of the present.

The relevance of today's genomic applications was on full display in Genome Canada's 2017 Large Scale Applied Research Program competition where investigators were required to work with multidisciplinary partners with a focus on tangible clinical applications including health economists, to ensure benefits to British Columbians and Canadians.

The ability of British Columbia's researchers, clinicians and health economists, to work together, coupled with the expertise of Genome BC's team, led to extraordinary success. Six of the 15 teams funded are from BC — garnering 38% of all competitively available funds. This brings a $58M investment to our province to advance the positive clinical application of genomics for the purpose of improved patient outcomes and system sustainability.

This success showcases the ideal Genome BC stands for: improving the lives of British Columbians. Through the identification and development of strategic programs, Genome BC works toward building a more robust research and innovation ecosystem that will allow for enhanced capacity and impacts here in BC. Our Sector Innovation Program supports genomic research aimed at the long-term potential to address the needs of key sectors in BC's economy and society. And with an emphasis on researchers new to Genome BC, we are continuing to develop and support our future leaders in this space. Our GeneSolve program looks to strengthen ties between academia and end-users by supporting projects that provide solutions to challenges from industry partners across various sectors.

However, the adoption of genomic applications into society would not be possible without a better understanding of public views and societal impacts. We created the Societal Issues Competition to engage the involvement of social, economic and environmental scientists and to support research that identifies and studies the societal issues that emerge from genomics-based innovations. Education and public engagement are extensions of this work and Genome BC continues to provide opportunities for learning, conversation and policy development through internationally recognized programs such as our Geneskool and GeneTalks initiatives.

We are very thankful for the continued confidence the provincial government has shown in Genome BC, investing another $17M in support of our five-year $306M strategic plan. The province has now contributed $71M to this plan adding to investments made by the federal government, industry and other partners. These funds enable us to maximize investments through Genome Canada programs while strategically investing in provincial priorities.

As we develop our strategy beyond 2020, we are defining our path forward, seeking to remove barriers to adoption while expanding activities toward the direct implementation of genomic solutions. We are exploring new opportunities and actively participating in emerging projects arising from the industry-led Canadian Digital Technology Supercluster, particularly in Precision Health.

We recognize our extraordinary partners in academia, industry, government and other key organizations within our ecosystem — regionally, nationally, and internationally. We appreciate these partners, and in particular, Genome Canada and the six regional genome centres across the country, who collectively have enabled Canada to make distinctive contributions in genomics around the world.

The Genome BC team works very hard to deliver excellence. I am most grateful for the engagement and effort from our people and extremely proud of what we achieve together. We strive for exemplary performance both strategically and operationally. In doing so, we benefit from the guidance of our very supportive and engaged Board of Directors, who volunteer their time and talents to make British Columbia a better place as we realize the benefits of genomics.

Pascal Spothelfer

Ida Goodreau and Pascal Spothelfer

Message from the Board Chair

Ida Goodreau

As progress in genomics continues to advance, each new discovery fuels a better understanding of "omics," which in turn drives innovative applications that deepen the relevance of genomics for our future.

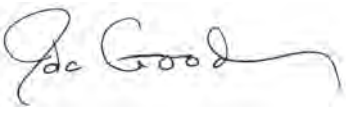
We are fortunate to work in a province that offers a dynamic environment in "omics" research, and can respond quickly and effectively to strategic and translational opportunities to better the lives of all Canadians. For its part, Genome BC has continually worked to deliver value to British Columbia and Canada by monitoring and measuring the impact of its programs and activities. BC-based research teams were extraordinarily successful in this year's Genome Canada competitions — this success reflects both a diverse range of genomic applications to health care challenges and BC's breadth of expertise across many disciplines.

I am continually impressed by the outstanding work and dedication of the Genome BC staff in support of this success and on behalf of the entire board, I applaud their efforts and recognize their success in delivering on a growing number of programs and projects.

As a catalyst for genomics research and innovation, Genome BC's strength is rooted in the ability to connect people and organizations, bringing a practical approach toward finding solutions to challenges that are important to British Columbians. This strength will be a hallmark as Genome BC looks to develop its strategy to take the organization beyond 2020.

We are very thankful to the Government of British Columbia for recognizing the importance of this work and supporting the continued implementation of Genome BC's 2015-2020 strategic plan with an investment of $17M. Continuing support is essential for Genome BC to be well positioned to drive "omics" to even greater heights in the years to come.

After two years as chair I have the pleasure to hand the baton over to my successor John Thompson. I am sure that John will be as delighted as I was to chair this exceptional board of directors. This board serves Genome BC very well and has enriched my personal experience as a director and chair. Genome BC is an amazing asset for British Columbia and it is a privilege for me and my board colleagues to be deeply committed to the organization.



Ida Goodreau

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, 2018, the statements of operations and 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 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 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, 2018, 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.

KPMG LLP

Chartered Professional Accountants
June 8, 2018
Vancouver, Canada

Statement of Financial Position (Expressed in Canadian Dollars)
March 31, 2018, with comparative information for 2017

	2018	2017
Assets		
Current assets:		
Cash	$ **770,851**	$ 1,294,056
Short-term investments (notes 3 and 4)	**84,675,865**	101,216,440
Funding receivable (note 10(a)(ii))	**17,090,624**	137,264
Other receivables (note 5)	**95,476**	71,214
Project advances	**4,234,498**	3,193,307
Prepaid expenses	**145,144**	135,523
	107,012,458	106,047,804
Capital assets (note 6)	**320,689**	383,892
	$ **107,333,147**	$ 106,431,696
Liabilities and Net Assets		
Current liabilities:		
Accounts payable and accrued liabilities (note 7)	$ **6,571,305**	$ 4,828,491
Deferred lease inducement	**117,821**	164,949
Deferred contributions:		
Future expenses (note 8)	**100,323,332**	101,054,364
Capital assets (note 9)	**320,689**	383,892
	$ **107,333,147**	$ 106,431,696

Commitments (note 10)

See accompanying notes to financial statements.

Approved on behalf of the Board:

Ida Goodreau
Director

Joe Garcia
Director

Statement of Operations and Changes in Net Assets (Expressed in Canadian Dollars)
Year ended March 31, 2018, with comparative information for 2017

		2018		2017
Revenues:				
Amortization of deferred contributions related to future expenses (note 8)	$	33,460,603	$	22,455,765
Amortization of deferred contributions related to capital assets (note 9)		143,193		153,521
Investment income		3,014,966		8,912,909
		36,618,762		31,522,195
Expenses:				
Corporate programs and management		7,804,802		7,460,896
Project expenditures		28,670,767		23,907,778
Depreciation		143,193		153,521
		36,618,762		31,522,195
Excess of revenues over expenses, being net assets, beginning and end of year	$	–	$	–

See accompanying notes to financial statements.

Statement of Cash Flows (Expressed in Canadian Dollars)
Year ended March 31, 2018, with comparative information for 2017

		2018		2017
Cash provided by (used in):				
Operations:				
Excess of revenues over expenses	$	–	$	–
Items not involving cash:				
Depreciation		143,193		153,521
Amortization of deferred contributions related to future expenses (note 8)		(33,460,603)		(22,455,765)
Amortization of deferred contributions related to capital assets (note 9)		(143,193)		(153,521)
Unrealized loss (gain) on short-term investments		1,489,515		(2,690,860)
		(31,971,088)		(25,146,625)
Funding (note 8)		32,762,433		33,904,015
Change in operating assets and liabilities:				
Funding receivable		(16,953,360)		100,733
Other receivables		(24,262)		84,069
Project advances		(1,041,191)		(570,029)
Prepaid expenses		(9,621)		44,566
Accounts payable and accrued liabilities		1,742,814		565,055
Loan receivable		–		200,000
		(15,494,275)		9,181,784
Investments:				
Proceeds from sale of short-term investments		19,500,000		17,215,589
Purchase of short-term investments		(4,448,940)		(26,155,796)
Purchase of capital assets		(79,990)		(71,103)
		14,971,070		(9,011,310)
Increase (decrease) in cash		(523,205)		170,474
Cash, beginning of year		1,294,056		1,123,582
Cash, end of year	$	770,851	$	1,294,056

See accompanying notes to financial statements.

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 Corporations 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 in the period in which they arise. Short-term investments are comprised of a portfolio of funds managed by investment professionals.

(c) Project advances:
Project 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. 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.

3. Short-term investments (continued):

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

		2018		2017
Money Market Fund	$	**6,378,321**	$	14,645,408
Canadian Mortgage Fund		**36,080,665**		39,950,181
Fixed Income Fund		**14,559,656**		15,101,453
Canadian and International Equity Fund		**27,390,224**		31,294,681
Other investments		**266,999**		224,717
	$	**84,675,865**	$	101,216,440

The Canadian 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 Fund invests 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.

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

4. Industry Innovation Program:

		2018		2017
Balance, beginning of year	$	**8,950,000**	$	6,800,000
Funding received		**–**		4,000,000
Investments in commercialization projects		**(2,162,500)**		(1,850,000)
Balance, end of year	$	**6,787,500**	$	8,950,000

Year	Number of investments		Amount advanced
2017	3	$	1,850,000
2018	3		2,162,500
	6	$	4,012,500

The program balance consists of deferred contributions which have been invested along with the Corporation's short-term investments (note 3).

Investments in commercialization projects consist 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 Corporation may also receive royalty and other payments contingent upon the success of the investee's commercialization efforts and the balance of the loan outstanding.

During the year the Corporation made an advance to an investee company of $412,500 upon signing an agreement. The Corporation has retained a further $337,500 which will be advanced to the investee company upon certain conditions, as set forth in the loan agreement, being fully met to the satisfaction of the Corporation.

5. Other receivables:

		2018		2017
Sales tax	$	**30,751**	$	27,733
Other accounts receivables		**64,725**		43,481
	$	**95,476**	$	71,214

6. Capital assets:

2018	Cost	Accumulated depreciation	Net book value
Furniture and fixtures	**$ 111,604**	**$ 83,767**	**$ 27,837**
Computers and software	**312,398**	**204,898**	**107,500**
Telecommunications equipment	**7,694**	**5,643**	**2,051**
Leasehold improvements	**545,767**	**362,466**	**183,301**
	$ 977,463	**$ 656,774**	**$ 320,689**

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

During the year ended March 31, 2018, fully amortized capital assets of $4,918 (2017 – $31,813) were removed from the Corporation's accounting records.

7. Accounts payable and accrued liabilities:

	2018	2017
Accounts payable	**$ 130,711**	$ 133,682
Accrued liabilities – projects	**5,116,811**	3,369,139
Accrued liabilities – others	**1,323,783**	1,325,670
	$ 6,571,305	$ 4,828,491

8. 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 10).

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:

	2018	2017
Balance, beginning of year	**$ 101,054,364**	$ 89,630,089
Funding received or receivable during the year:		
Genome Canada	**15,436,746**	12,863,763
Province of British Columbia	**17,000,000**	20,000,000
Western Economic Diversification Canada	**167,259**	275,012
Service Canada	**3,250**	3,135
University of British Columbia	**10,000**	–
Industry Partners	**131,518**	370,424
Other	**13,660**	391,681
	133,816,797	123,534,104
Lease inducement amortization	**47,128**	47,128
	133,863,925	123,581,232
Less:		
Amount amortized to revenue	**(33,460,603)**	(22,455,765)
Amount transferred to fund capital assets purchased during the period (note 9)	**(79,990)**	(71,103)
	(33,540,593)	(22,526,868)
Balance, end of year	**$ 100,323,332**	$ 101,054,364

9. 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:

		2018		2017
Balance, beginning of year	**$**	**383,892**	$	466,310
Allocation of funding for capital asset purchases (note 8)		**79,990**		71,103
		463,882		537,413
Less amount amortized to revenue		**(143,193)**		(153,521)
	$	**320,689**	$	383,892

10. 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, 2018, is as follows:

Funding agreement description		**Support commitment**
2012 Large-Scale Applied Research Project Competition	$	15,916,034
Genomic Applications Partnership Program		5,032,559
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
2017 Genomics Technology Platforms		1,679,473

(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).

A further funding agreement for $17,000,000 to support the Corporation's 2015–2020 strategic plan was entered into on March 29, 2018. These funds were received in April, 2018.

(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.

10. Commitments (continued):

(b) Project commitments (continued):

The total award amount and estimated remaining commitment of the Corporation by program as of March 31, 2018 is as follows:

Approved programs		Total award amount		Estimated remaining Corporation commitment
Current programs:				
2012 Large-Scale Applied Research Project Competition	$	34,036,779	$	18,819
2014 Large-Scale Applied Research Project Competition		41,962,926		2,368,794
2015 Large-Scale Applied Research Project Competition		45,002,369		6,084,886
2015 Bioinformatics and Computational Biology		1,249,994		-
Genomic Applications Partnership Program		12,121,677		618,431
2015 Disruptive Innovation in Genomics Competition		8,007,478		556,858
Genome Canada Pilot Projects		13,653,412		376,810
2015 Technology Development		5,926,633		120,186
2017 Genomics Technology Platforms		36,952,992		1,406,081
Applied Genomics Consortium Program		31,193,623		100,490
Human Epigenome (CIHR)		9,978,992		496,494
Transplantation (CIHR)		4,096,203		816,451
Quantitative Imaging Network (CIHR)		3,900,074		531,739
Centre for Drug Research and Development Fund		4,823,919		308,259
Brain Canada (MIRI 1 & 2)		9,176,572		134,571
Brian Canada (Alzheimer's)		7,042,580		20,650
Brain Canada (PSG)		1,391,750		22,314
Strategic Opportunities Fund		14,305,078		72,546
Strategic Opportunities Fund for Industry		6,745,443		85,302
User Partnership Program		12,775,337		1,148,592
Societal Issues		199,914		64,979
Sector Innovation Program		1,938,074		1,534,093
Genome British Columbia Pilot Programs		45,602,365		3,879,017
Science World British Columbia Outreach Program		200,000		114,284
		352,284,184		20,880,646
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		56,374,386		–
Human Microbiome (CIHR)		4,827,122		–
Entrepreneurship Education in Genomics Program		979,966		–
2012 Bioinformatics and Computational Biology		5,276,029		–
2015-2017 Science and Technology Platform		7,999,946		–
WED – Proof of Concept		10,029,751		–
		500,930,498		–
Total	$	853,214,682	$	20,880,646

10. 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 three fiscal years are as follows:

2019	$	505,038
2020		505,038
2021		252,518
Total	$	1,262,594

11. 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 March 31, 2018 and 2017 and for the years then ended are as follows:

		2018		2017
Cash	**$**	**64,724**	$	100,313
Accounts payable and accrued liabilities		**–**		(19,525)
Deferred contributions		**(64,724)**		(80,788)
Net assets	**$**	**–**	$	–
Revenues	**$**	**16,072**	$	19,525
Expenses		**(16,072)**		(19,525)
	$	**–**	$	–
Cash provided by (used in):				
Operations	**$**	**(35,589)**	$	(26,628)
Funding		**–**		–
Investing		**–**		–
Net change in cash	**$**	**(35,589)**	$	(26,628)

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

12. 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 year ended March 31, 2018.

(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 year ended March 31, 2018.

(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.

There have been no changes to the exposure to market risk during the year ended March 31, 2018.

Corporate Information

Board of Directors

(For fiscal year ended March 31, 2018)

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

Jock Finlayson
Executive Vice President & Chief Policy Officer
Business Council of British Columbia

Joseph Garcia
Partner, Blake, Cassels & Graydon LLP

Margaret (Peggy) Johnston
Senior Program Officer
Bill & Melinda Gates Foundation

Jeffrey Reading
First Nations Health Authority Chair
Heart Health and Wellness at St. Paul's Hospital Cardiology
Professor, Faculty of Health Sciences
Simon Fraser University

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

Gavin Stuart
Professor, Faculty of Medicine
University of British Columbia

Greg Taylor
President, Fish First Consulting

Paul Terry
Chief Technology officer
PHEMI

Board Observers

Heather Davidson
Assistant Deputy Minister
Partnerships and Innovation Division
Ministry of Health, Province of British Columbia

Doug Kinsey
Executive Director (Pacific Region)
Innovation, Science & Economic Development Canada

Marc LePage
President and Chief Executive Officer
Genome Canada

Management

Pascal Spothelfer
President and Chief Executive Officer

Tony Brooks
Chief Financial Officer and Vice President Entrepreneurship & Commercialization

Catalina Lopez-Correa
Chief Scientific Officer and Vice President, Sectors

Suzanne Gill
Executive Director, Corporate Development

Sally Greenwood
Vice President, Communications and Societal Engagement

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.

Genome
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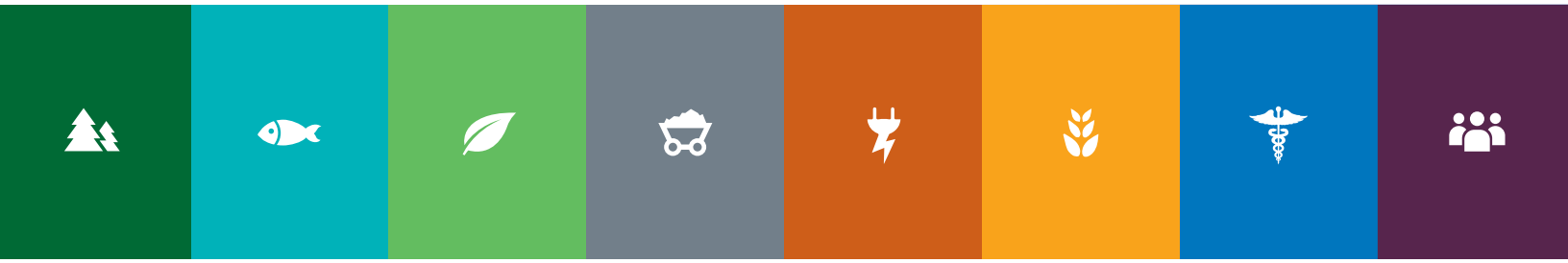
Leading ▸ Investing ▸ Connecting



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