GENOMEBC

2011–12 / ANNUAL REPORT

is the New Big

We're working with partners to use the world's smallest molecules to solve the world's biggest problems.

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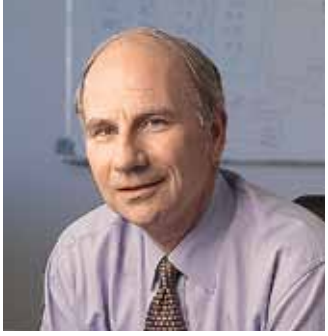
Small is the New Big

When is something small actually big? That's when genomics-based solutions tackle the very largest needs in our clinics and marketplaces. Genome BC's translational research programs connect researchers and end-users to help answer big, real-world questions. **Who benefits?**

All of us.

DR. ALAN PELMAN
Chair, Board of Directors



DR. ALAN E. WINTER
President and CEO

Message from the Board Chair and President

A genome's mass can be measured in 'picograms' – or trillionths of a gram. But the impact of researching something so small is potentially enormous.

That's why this year's annual report theme is "Small is the New Big". The genome and its components are tiny, but understanding the genome and how it functions is starting to pay big dividends – in new clinical solutions, more precise resource management decisions, improved bioenergy production methods, more effective environmental remediation and many more useful applications.

Genome BC itself is a relatively small organization but as the single largest funder of genomics research in BC, we are making a big impact.

We've significantly leveraged our investments through co-funding. Working with some of the brightest minds in BC, our staff of 28 has secured over $550M for genomics research in the province.

This substantial investment has funded more than 140 cutting-edge research projects and technology platforms, which have directly created over 2,100 highly skilled full-time jobs in the province.

British Columbia has only 13% of Canada's population, yet Genome BC-funded researchers have garnered 32% of competitive Genome Canada funds since 2006, including 44% of the available funds in technology platform competitions.

Collectively, our funded research teams have contributed to over 300 international collaborations, influenced 11 issued patents, published over 650 peer reviewed journal articles and helped to advance five companies.

But how do you measure Genome BC's impact? By looking at how we're translating research discoveries into new applications in key provincial economic sectors including agriculture, bioenergy, environment, fisheries, forestry, health and mining. Ultimately, we are enabling user-driven research to meet sector needs and benefit the citizens of British Columbia.

As an organization, we've also leveraged our skills and experience by creating high-impact partnerships. These partners include our major funders – the Province of BC and the federal government through Genome Canada and Western Economic Diversification Canada – and our many co-funders. They also include our board members, both past and present, our staff and the exemplary researchers we fund.

They are the reason that our small organization is having such a big impact in BC.

Dr. Alan Pelman
Chair, Board of Directors

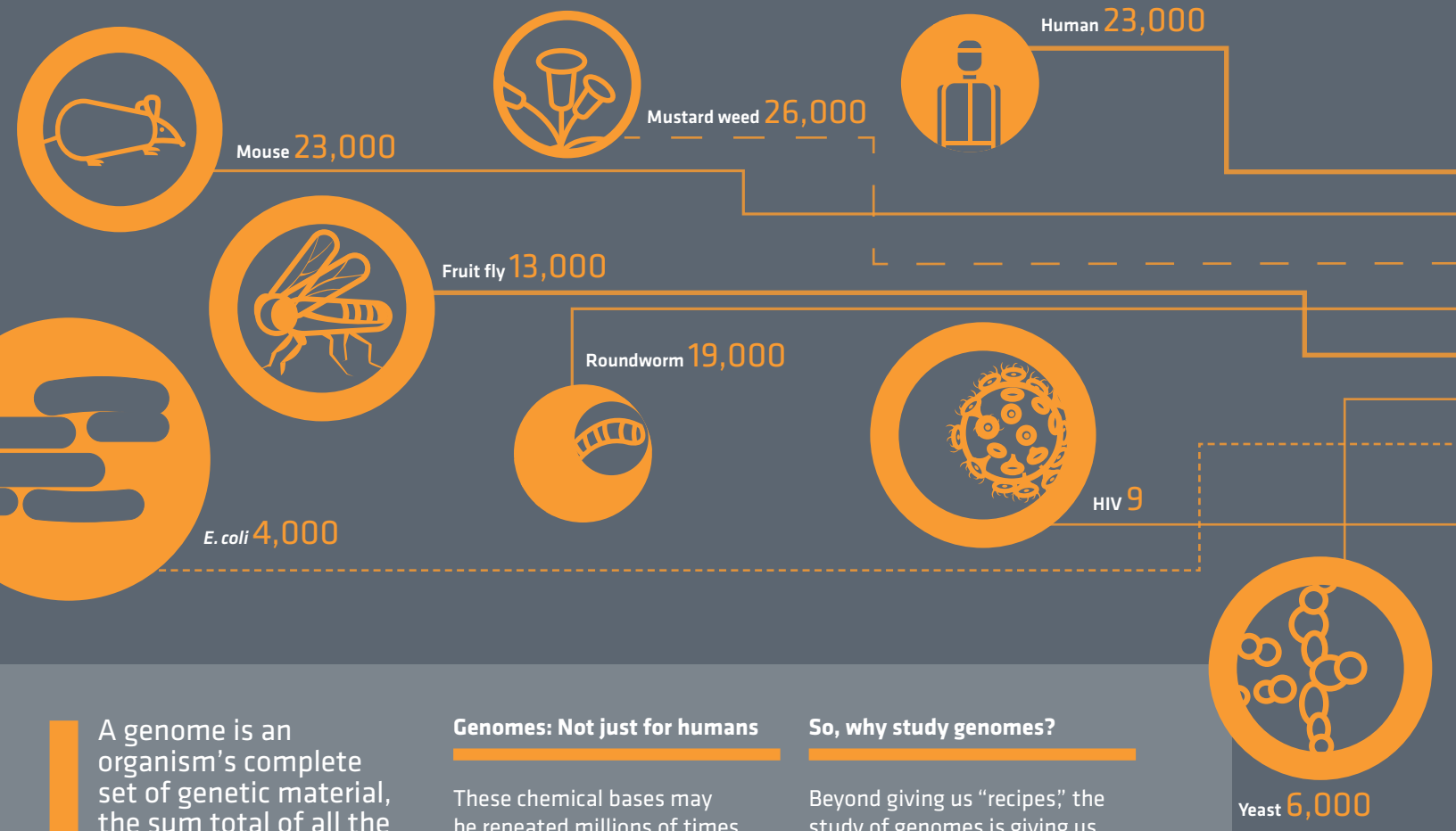
Dr. Alan E. Winter
President and CEO

What is:

“genomics”?

In simple terms, genomics is a discipline that studies the structure, function and inheritance of the genome. Genomics enables the examination of molecular mechanisms and the interplay of genetic and environmental factors in health and disease. The knowledge and innovations emerging from the field of genomics are finding solutions to complex biological challenges many of which are also raising questions of societal and economic importance.

Which raises the question: What is a genome?



A genome is an organism's complete set of genetic material, the sum total of all the genetic instructions required to make a living thing. Like a recipe, which is a set of cooking instructions to make a dish, a genome contains all the instructions for making that organism.

To take the analogy a step further, recipes and genomes both have discrete components. A recipe's instructions are made up of discrete units – sentences – and each sentence is made up of words, which are created from a set of letters from A to Z. A genome is made up of discrete units – chromosomes – and each chromosome contains genes, which are made up of sets of chemical bases represented as the letters A, T, C and G.

Genomes: Not just for humans

These chemical bases may be repeated millions of times throughout a genome. The human genome, for example, has 3.2 billion pairs of bases. The size, content and complexity of a genome ultimately determines if the genome "recipe" is for a human, a cat, a mushroom, a fish or a tuberculosis bacterium.

Although the human genome gets a lot of attention, all living things have a genome: animals, plants and even fungi. Viruses such as HIV also have genomes.

The development of technologies to sequence the DNA of whole genomes on a routine basis – essentially to 'read' an organism's blueprint – has enabled thousands of genome sequencing projects in labs around the world. Along with the human genome sequence, we now have "recipes" containing instructions for all kinds of organisms, such as soil microbes, trees, bees and salmon.

So, why study genomes?

Beyond giving us "recipes," the study of genomes is giving us a fundamental understanding of how organisms function at a molecular level. This knowledge is changing the way we think about biology and driving new ways to tackle society's most pressing problems.

Many of our challenges involve complex biological systems: adapting to a changing climate; ensuring a clean water supply; feeding our growing population; and reducing our dependence on fossil fuels.

With whole-genome sequencing and other sophisticated genomics tools and technologies, researchers are approaching these problems more systematically and on a much broader scale than before.

The human genome has just 23,000 genes – far fewer than expected by researchers who sequenced the first human genome – about the same as a mouse … and mustard weed. However, the human genome is estimated to be about 3.2 billion base pairs long, which presents a colossal amount of complex data.

Organism	Genome Size (base pairs)	Estimated Genes
Human *(Homo sapiens)*	3.2 billion	23,000
Laboratory mouse *(M. musculus)*	2.6 billion	23,000
Mustard weed *(A. thaliana)*	100 million	26,000
Roundworm *(C. elegans)*	97 million	19,000
Fruit fly *(D. melanogaster)*	137 million	13,000
Yeast *(S. cerevisiae)*	12.1 million	6,000
Bacterium *(E. coli)*	4.6 million	4,000
Human immunodeficiency virus *(HIV)*	9,700	9

Far-ranging applications

The understanding of the genomes of humans, animals, plants and microorganisms is fuelling a wave of innovation not only in human health, but in many other economically important sectors – environment, forestry, fisheries, agriculture, mining and bioenergy.

Genomics provides a wealth of knowledge to allow us to better understand the underlying mechanisms of disease and improve diagnosis and treatment. Cancer tumours are being sequenced to identify the most effective treatments. Infectious bacteria are being sequenced to track disease outbreaks. And drug treatments are being tailored to a person's genetic information to improve efficacy and to prevent adverse reactions.

Genomics is improving how we monitor waterways for contaminants, remediate decommissioned mine sites and create more sustainable biofuels from biomass. Researchers are also identifying trees' natural pest resistance and adaptability to climate change, promoting the sustainable development of Canada's forests.

These applications only scratch the surface. Genomics is a vast field of study, with numerous applications across all sectors of the economy.

Who knows what tomorrow will bring?

The Different 'Omics'

Genomics has related sub-disciplines or different 'omics'. Here are but a few of the 'omics' being studied by scientists today:

Proteomics

is the study of the structure, function, and interactions of proteins produced by genes, which direct the activities of cells and functions of the body.

Metabolomics

is the study of the chemicals that play a role in metabolic activities.

Transcriptomics

looks at how some of the genes are expressed at any given time, to help figure out how a genome behaves under certain circumstances.

Epigenomics

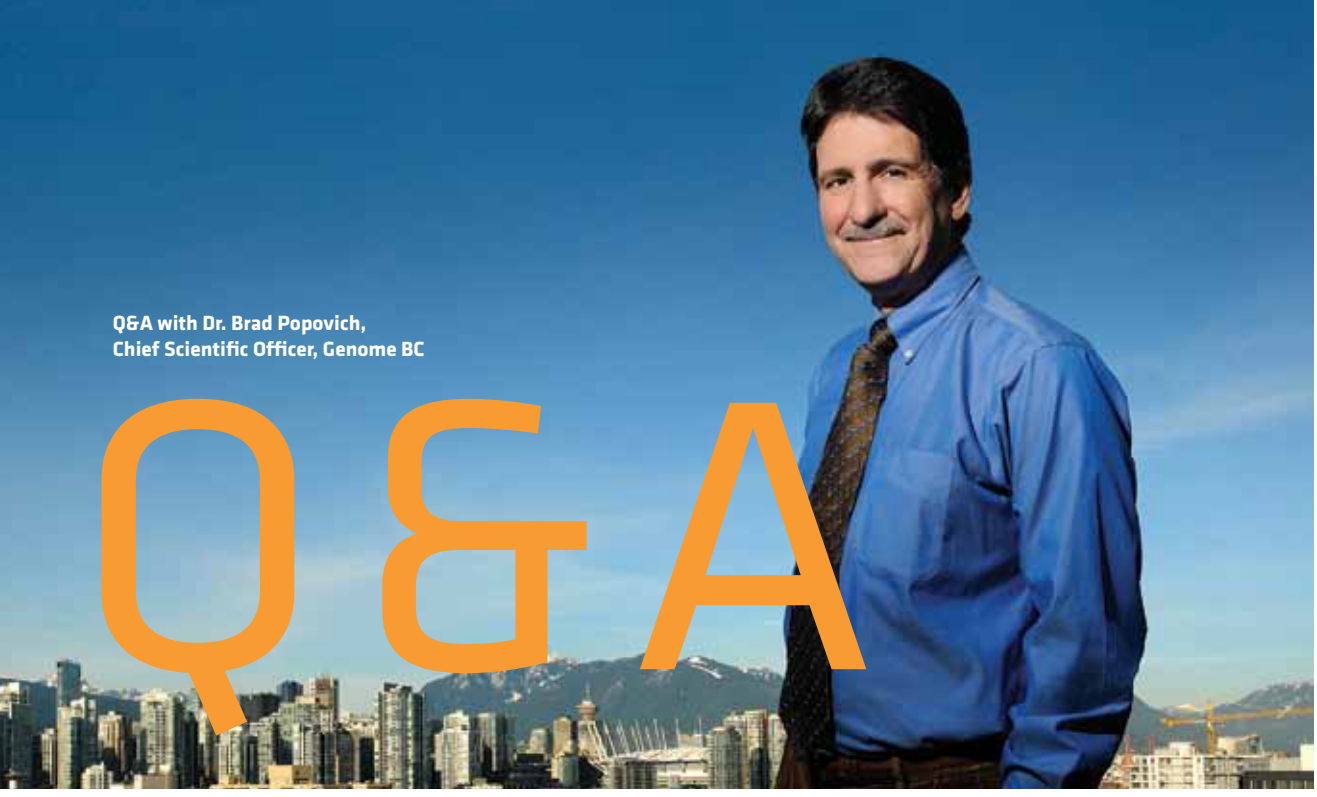
is the study of DNA modifications that affect the on/off switch of underlying genes.

Metagenomics

studies all the genetic material found in an environmental sample.

Pharmacogenomics

deals with the influence of genomic variation on drug response in patients.



Q&A with Dr. Brad Popovich,
Chief Scientific Officer, Genome BC

Q&A

Q Why does Genome BC fund genomics research "strategically"?

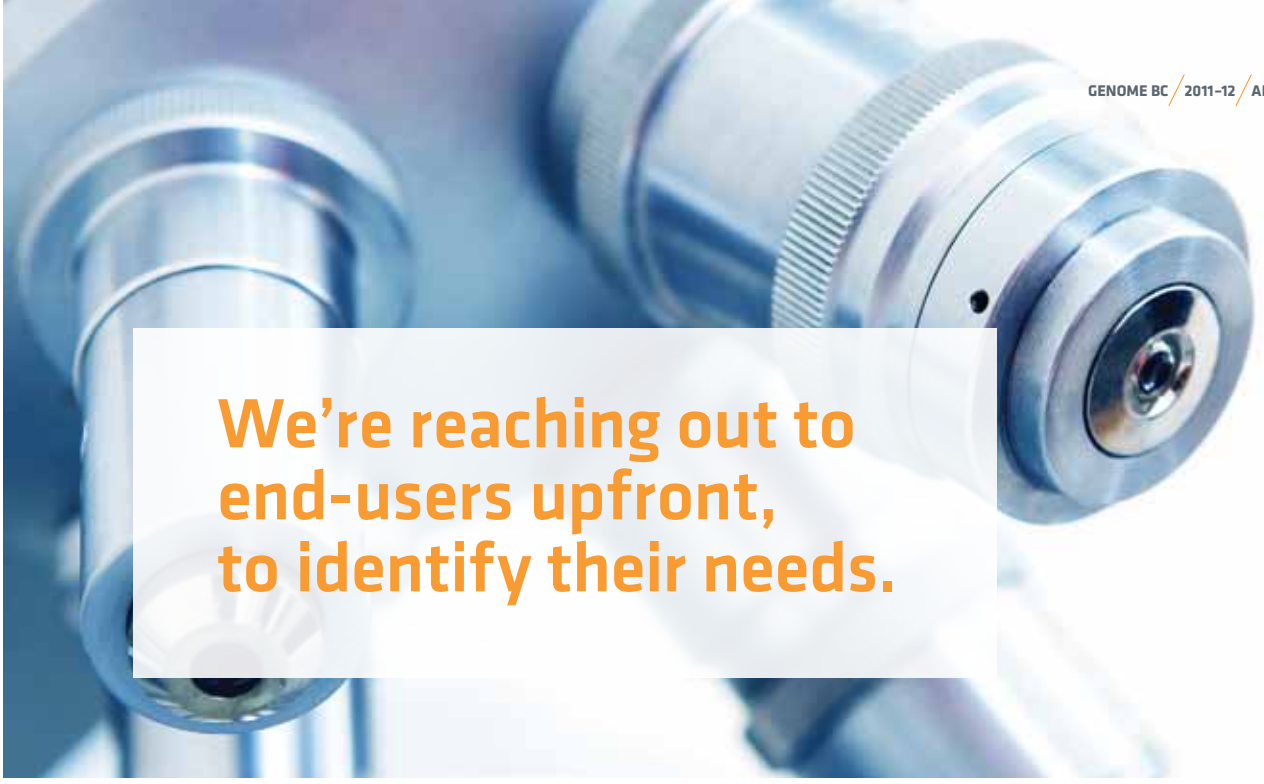
A Traditionally, funders have not typically required academic researchers to think very much about the potential 'receptors' and ultimate end-users of their research. We're deliberately taking a very different approach. We're reaching out to end-users upfront, to identify their needs. We want to know what challenges industries and sectors are facing today and over the next 10 to 20 years. Only then can we think about how genomics research might have an impact in these areas.

Q How do you build those industry and end-user partnerships?

A We are reaching out to all the important players in a given sector. Some of them are partners who play an advisory role to help us identify sector challenges and focus our research priorities. Some of the key players are potential receptors of the translational research we fund. Once a project is completed, our partners can incorporate the application or technology into their sector or field. So it's important to get them to the table early on. Our strategy is to get some of these players more involved in co-funding. If they can see that the research will provide key resources they can put into play – hopefully they won't just give us a love letter, they'll participate and co-fund the required work.

Q Why has there been a gap between academics and end-users?

A Industry is set up to translate research into the marketplace and they do a good job. Genome BC doesn't want to occupy that space; we create a bridge between academia and industry. We play a role in helping academics move their research toward application or commercialization which most are very keen to see happen. I know personally, as a former academic who ran a business, that it took me a long time to learn business skills. I didn't learn them in grad school.



We're reaching out to end-users upfront, to identify their needs.

Q What is fuelling the move towards more 'translational' research?

A We are being responsive to our main funders – the province of BC and the federal government – and also to the citizens of BC. Citizens are taking notice that a lot of money is being spent on scientific research and they want to see the benefit. So increasingly the focus is on securing tangible and meaningful benefits from research. If you can't secure benefits for citizens, why do it?

Q What are the main challenges involved in translating research carried out in universities into applications for users in industry?

A They are monumental. At times it feels insurmountable like we are trying to force a square peg into a round hole. Our research groups are receptive to translation, but they don't always recognize the complexity of commercialization, or understand the marketplace, systems uptake, or the need for receptor capacity which often requires taking a more international perspective. They have to be very business savvy. But we're making progress. We're here to bring business and networking skills into the process. We're helping these groups as aggressively as our resources allow.

Q Can you give some examples of Genome BC funded research that have successfully been translated into application?

A There are lots of examples. In health, Bruce Carleton and Michael Hayden have been funded through a number of our programs, most recently our Personalized Medicine Program. They're developing tests to identify patients who are likely to have adverse reactions to certain drugs; serious adverse reactions like deafness and heart failure. They're working on moving these tests into the clinical setting and in response the US Food and Drug Administration has already required label changes on two affected products.

The PROOF group – Bruce McManus, Robert McMaster, Paul Keown and their team – are in the process of developing tools, blood tests, to detect transplant rejection without having to resort to highly invasive and risky biopsies. Their work is presently at the validation stage of clinical development.

There are other examples across all sectors – in forestry, fisheries, agriculture – where we've been working closely with stakeholders and have a good sense of what these sectors need. We'll be seeing practical outcomes emerge from some of these applied research projects in the near-term.

What is Personalized Medicine?

'Personalized medicine' means different things to different people. For some, it describes a traditional healthcare model, where general practitioners know each of their patients personally and treat them as individuals. Others see it as the ability to diagnose or predict susceptibility to a myriad of diseases with a single drop of blood – like something out of a sci-fi movie. However you see it, one thing is certain: it has the potential to have a...

Big Impact.

In reality, personalized medicine falls somewhere in between. It's an implementation of molecular medicine methods and genomics which give us an understanding of variations in genes and gene expression, proteins and metabolites.

These variations are the reason why some patients respond well to a medical treatment and why some experience devasting side-effects.

Personalized medicine is a game-changer in disease treatment.

Ultimately, this understanding is moving us away from a one-size-fits-all approach to medical treatment. 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 tailor the treatment plan.

Such 'therapeutic stratification' is already being used in cancer treatment. Scientists are using genomics to sequence certain cancer tumours to identify the most effective treatment. If a tumour is found to be resistant to an existing therapy, a patient and their physician can avoid the ineffective treatment and the accompanying side-effects, and focus on other more effective therapies.

Personalized medicine is also being harnessed to identify patients' underlying genetic susceptibility to adverse drug reactions. Tests are being developed to predict if a patient will experience known adverse effects, such as deafness and heart failure, enabling clinicians to tailor an individual's drug therapy. If drug response can be predicted ahead of time, incidents of adverse reactions can be lessened, lives can be saved and our healthcare system can realize economic savings.

This exciting area of medicine is still in its infancy. We may never be able to diagnose all disease conditions or determine disease susceptibility with a single drop of blood, but personalized medicine does have the potential to optimize each individual's medical outcomes and contribute to a more sustainable and cost-effective healthcare system.

The Right Treatment for the Right Patient

Choosing the right treatment for acute myeloid leukemia (AML), an incurable and highly individualized disease, is extremely difficult. For patients with the disease, a stem cell transplant offers the best chance for a long-term remission – if the treatment works.

Although some AML patients experience few problems with a transplant, many others endure serious complications, including graft-versus-host disease, stem cell failure, organ damage, secondary cancers and even death. But what if you could find out in advance that a transplant was likely to work in your particular case? It might be worth all the risks. Conversely, if you knew in advance that such a risky procedure was unlikely to work, you could focus on other available treatment options.

The BC Cancer Foundation has teamed up with Genome BC to co-fund an innovative genomics research project that is identifying genetic markers associated with AML. This knowledge will help clinicians choose the best treatment options for their patients.

This project could pave the way for new molecular diagnostics that are expected to personalize treatments for AML and provide a proof-of-concept to treat other cancers.

Dr. Aly Karsan, Medical Director of the Cancer Genetics Laboratory at the BC Cancer Agency and Dr. Marco Marra, Director of the Michael Smith Genome Sciences Centre, are leading the project.

"Our donors expect us to invest their donations in areas with the greatest promise and priority. We believe genomics research offers the greatest hope to cancer patients," says Doug Nelson, President and CEO of the Foundation. "The clinical use of genomic data is dramatically improving the therapeutic stratification of patients, thus giving doctors a practical tool for making treatment decisions. This particular research project will give oncologists better tools to treat AML patients and AML patients better options."

"There's also a very practical benefit," says Nelson. "If clinicians know that certain treatments are ineffective in a high number of patients, it will focus research efforts on those areas and guide the development of new, targeted therapeutics."

"It's an opportunity for the Foundation to leverage our donations," adds Nelson. "Co-funding creates a multiplying effect that takes our donors' dollars much further. Working together with Genome BC, we are helping to make personalized diagnoses and treatment of AML a reality."

DOUG NELSON
President and CEO, BC Cancer Foundation

BENDING THE HEALTH "COST CURVE"

Genome BC is working closely with healthcare end-users, like the Provincial Health Services Authority (PHSA), to demonstrate that genomics-based research can be translated into the healthcare system cost-effectively.

The PHSA operates many specialized provincial agencies, including the BC Cancer Agency, Child and Family Research Institute and BC Centre for Disease Control, all large research-based organizations. Genome BC included the PHSA in the development of its "Genomics and Health: Personalized Medicine Program" competition.

"Through these discussions, Genome BC developed an understanding of the pressures and constraints facing the healthcare system and what is needed to translate genomics discoveries to the clinic," explains Ellen Chesney, PHSA's Chief Administrative Officer, Research.

"The Personalized Medicine competition broke new ground," adds Chesney. "By focusing on projects that can be applied in the short term and requiring economic analysis and the meaningful involvement of health system decision-makers, Genome BC is helping to advance the practical translation of genomics to improve patient outcomes in a way that bends the health cost curve."

Ellen Chesney
Chief Administrative Officer, Research, Provincial Health Services Authority

Tailoring Taylor's Treatment

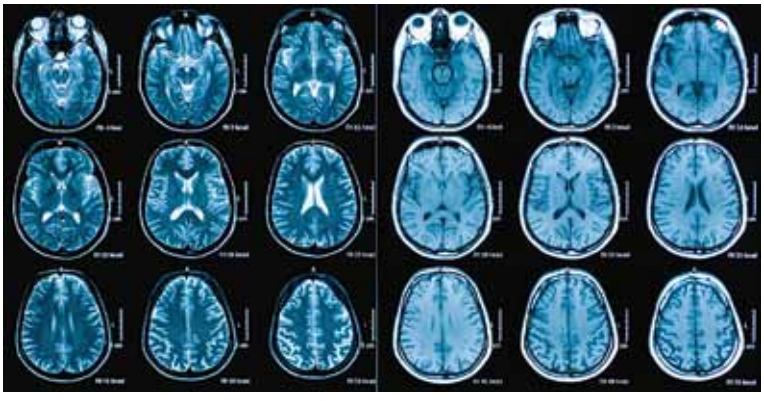
Taylor Date's recovery from a childhood brain tumour is not only a story of heroic parenting, it's a story of personalized medicine 'in action'.

When Taylor Date was diagnosed with medulloblastoma, a malignant cancer tumour in the brain, at just nine months old, the standard treatment was effectively like trading one disease for another.

Growing in the cerebellum at the back of the head, medulloblastomas are typically diagnosed and treated uniformly. Standard treatment includes radiation of the entire brain and spine. Sadly, while sometimes life-saving, the radiation almost always severely stunts physical and mental growth in the child, effectively trading one devastating disease for a host of other life-altering effects, such as severe mental impairment, hormonal deficiencies and increased rate of stroke.

Faced with a dilemma that would alter Taylor's life forever, her parents, Peggy Flynn and Jeff Date, crossed their fingers, followed their gut and took a chance.

They opted to forego radiation and focus exclusively on chemotherapy to treat their baby daughter. It was an agonizing choice, but their decision to spare Taylor a severely impaired quality of life paid off. Taylor fully recovered from her disease. Now 19, Taylor is a happy, healthy university student.



Taylor's parents were lucky. What they couldn't have known all those years ago was that their daughter's particular type of tumour had a high survival rate with just chemotherapy. Science just hadn't figured that out yet.

Now, a multi-disciplinary team of clinicians and genomics scientists in BC and Ontario are working hard to stratify medulloblastomas by sequencing 1,000 different tumour tissue samples. Data is showing that all medulloblastomas are not created equal. In fact, there may actually be four sub-types, each with a different prognosis and each requiring a specific treatment.

With more than $9.8 million in funding from Genome BC and other partners, the team aims to develop laboratory tests to more accurately classify patients' tumours for treatment. This more personalized approach will increase survival rates and improve quality of life of children with brain cancer.

As a way of giving back, Taylor Date is participating in this study in the hopes that other children and families might be spared her ordeal.

"The amount of stress and pain that my parents had to endure while looking after me and praying for my health was unbearable," she says. "I hope that one day, with help from Genome BC and the amazing doctors and nurses at Sick Kids, cancer will be cured."

"We have to start somewhere in finding new genetic targets for the development of new, less toxic and more precise drugs, and this project has the potential to hit home runs for children with brain tumors in future years. We will also learn important lessons that can be applied to other types of cancer."

Dr. David Malkin, project co-lead and a pediatric oncologist at Sick Kids Hospital in Toronto.

The Social Network Meets Genome Sequencing

A Genome BC-funded project brought social network analysis and genomics together – and changed the way epidemiologists track the spread of infectious diseases.

When there's a tuberculosis (TB) disease outbreak in a community, public health officials want to 'solve' it as quickly as possible.

"The protocol is to find the key individuals spreading the disease, the 'super-spreaders', treat them quickly, and then try and find out who they may have infected," says Dr. Jenn Gardy, head of the Genome Research Laboratory at the BC Centre for Disease Control (BCCDC).

To track down these super-spreaders, TB epidemiologists use a technique called 'social network analysis'. This involves interviewing TB patients to find out about their daily contacts and activities and drawing the data as a web of connections between people and places. The idea is to detect patterns – common relationships, common behaviours, common locations – anything that connects individuals in time and space, so a disease pattern can emerge.

At the same time, molecular lab techniques, such as DNA fingerprinting, are used to compare disease strains to get a snapshot of the pathogen.

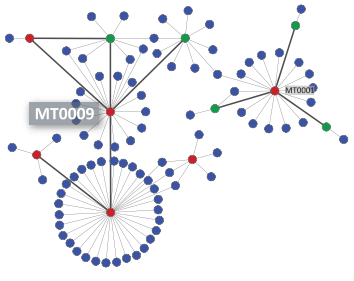
"With DNA fingerprinting, you can compare patients' germs to each other to find out whether you have a true outbreak, but you can't identify sub-clusters of an outbreak or confirm who the super-spreaders are. It's pretty crude."

For the first time, a Genome BC-funded research team applied whole-genome sequencing to the epidemiology toolbox to track a TB outbreak in a small community in BC. The collaboration between scientists and clinicians at the BCCDC, Michael Smith Genome Sciences Centre and SFU yielded some surprising results.

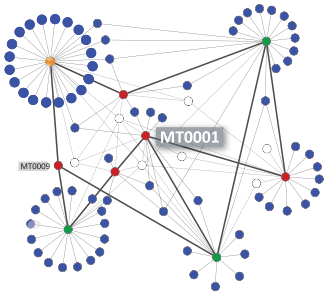
"With the detail provided by whole-genome sequencing, we found out that there were actually two mini-outbreaks, each caused by its own unique strain of TB. This was not at all obvious from interviews and DNA fingerprinting."

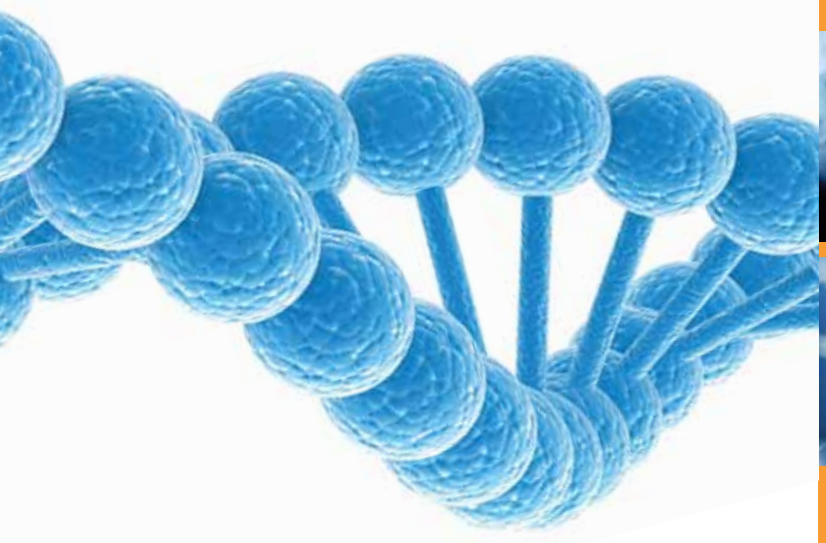
"Our findings are already starting to influence how we investigate other TB outbreaks and how we're screening people who might be at risk for developing TB," says Gardy. "We've been able to take our study's findings and put them into practice right away."

Contact Tracing



Social Network Questionnaire





These new methods are now being applied to other disease outbreaks, such as measles, in communities around the world.

The team published their research findings in the prestigious *New England Journal of Medicine* and have leveraged their results to secure funding for two new projects – using genome sequencing to track another, larger TB outbreak and building a provincial 'map' of TB that incorporates outbreaks from the past 15 years.

By using genomics to study more TB outbreaks, the team is hoping to amass a "huge knowledge base" on how TB behaves in different situations, which will ultimately help them to design better TB prevention and control strategies.

Stopping the "Super-Spreaders"

For the first time ever, whole-genome sequencing of a TB bacterium has been combined with traditional public health research methods, creating a powerful tool for tracking and stopping the transmission of disease outbreaks.

"The application of whole-genome sequencing for population health issues provides us with another tool in the fight against emerging and existing pathogens," explains Chief Provincial Health Officer Dr. Perry Kendall. "To see genomics combined with social networking analysis in the tracing of TB outbreaks and allowing us to better understand the complexity of not only TB but other communicable diseases is profound. This kind of responsive research – research that allows us to delve into real time emerging health issues is so valuable and yet, so rare. Having an organization like Genome BC willing and able to provide resources in a timely fashion and work in collaboration with the BC Centre for Disease Control and the regional public health services illustrates beautifully the application of genomics research made possible through community partnerships."

Dr. Perry Kendall
Chief Provincial Health Officer

What is Translational Research?

Translational research is directed at solving a specific problem in a specific area, but often the results can have a far-reaching impact. Research to improve the safety of our drinking water supply, for example, is not only essential to the health of our communities, but is an issue of global importance.

A new project aimed at developing more effective drinking water testing shows the kind of impact that translational research can have. Funded by Genome BC, Genome Canada and other partners, this research will enable faster testing at the watershed level to help protect drinking water supplies around the world.

Current testing methods
Today, drinking water is tested by collecting samples from the tap, rather than at the source watershed. Testing for bacteria contaminants such as *E. coli*, often takes more than two days to complete.

The healthcare burden
Culture-based bacterial testing takes too long: if a water supply has been contaminated, by the time the testing has been completed, the water would already have reached some homes, making people sick.

Faster results
The new simplified process will apply metagenomics to test water at the source. This will reduce testing from days to hours and identify remnants of all microbes present in the water, rather than just *E. coli* bacteria.

Global impact
Clean drinking water is not only vital to the health of our communities, it is a global issue. There's more than just human lives at stake: entire ecosystems rely on healthy water supplies.

Crossing the 'Valley Of Death'

In high-tech and venture capital circles, it's called the 'Valley of Death' – a term referring to the chasm between early-stage research and the development of applications with commercial value.

Many useful ideas, discoveries and inventions never see the light of day because they aren't able to navigate the difficult crossing from discovery to translation to marketplace.

Genome BC has been working hard to develop unique funding and partnering programs to help promising genomics-based applications cross the divide.

In practical terms, this includes supporting strategic programs for translational research and business development. Genome BC will continue to support excellent, large-scale fundamental research as the applied genomics and innovation programs continue to grow.

Genome BC has developed robust business development programs that span the translation and commercialization continuum: from applied research, proof-of-concept and company formation, right through to the early stages of product development. Currently, there are three business development programs in place.

Through the *Partnership Program*, commercialization opportunities are leveraged by partnering with Centres of Excellence for Commercialization and Research in BC, including the Centre for Drug Research and Development (CDRD); Prevention of Organ Failure (PROOF); the Prostate Centre's Translational Research Initiative for Accelerated Discovery and Development (PC-TRIADD); and the Pan-Provincial Vaccine Enterprise (PREVENT).

The *Proof-of-Concept Program* is supporting projects that have demonstrated proof-of-concept, but require additional funding for development before they are ready to be spun-out or licensed.

The *Strategic Opportunities Fund for Industry (SOFi) Program* provides funding to support genomics-derived innovations at BC companies engaged in research and development.

The *Western Genomics Networks Program* finished this past fiscal year. It was a partnership with Western Economic Diversification Canada, Genome BC, Genome Alberta and Genome Prairie designed to foster regional linkages between these western Genome Centres and end-users in various sectors.

Twelve new research networks across sectors such as agriculture, forestry, health and environment were created and realized $116 million in new funding for the region, including $15 million of industry funding.

Genome BC recognizes that converting cutting edge genomics-based discoveries into useful, clinic-ready and market-ready applications is challenging. These translational and business development programs have great potential to stimulate the creation of new, innovative genomics-based solutions, which will in turn secure benefits for the people of BC, Canada and beyond.

Disappearing Act

FOR MORE THAN TWO DECADES, SOME OF BC'S WILD SALMON RUNS HAVE BEEN IN STEADY DECLINE. COULD A MYSTERIOUS VIRUS BE PARTIALLY TO BLAME?

What exactly is putting one of the world's largest salmon runs in jeopardy? Competing hypotheses range from physiological predisposition, environmental conditions, contaminants, pathogens and predators. However, the true cause remains a mystery.

Dr. Kristi Miller, head of molecular genetics in the Salmon and Freshwater Ecosystems Division at the Department of Fisheries and Ocean's Science Branch, was deeply puzzled by the disappearing fish.

"We knew mortality rates were high, but we didn't have a good understanding of what was causing the problem. It was an unpredictable and volatile situation," Miller explains.

"So we turned to genomics to ask 'what are the stressors that might be undermining salmon performance?' We started by capturing the natural changes salmon undergo over the course of migration and then focussed in on genomic variance among individuals."

The team identified biomarkers for growth and feeding, high water temperature stress, response to low oxygen and numerous signatures that contained differential immune stimulation. These signatures reflected conditional differences among migrating salmon.

To more directly link salmon condition to survival, Miller and her team decided to combine radio tracking and biosampling with genomics – the first time this approach had ever been used to investigate the cause of diminishing returns. They applied functional genomics studies to biopsied gill tissue from wild adults tagged and tracked through ocean and river environments.

DR. KRISTI MILLER
Head of molecular genetics, Pacific Biological Station, Fisheries and Oceans Canada

"The same genomic signature kept coming out, regardless of whether fish were tagged in marine or freshwater environments. It was highly predictive of whether the salmon would make it to spawning grounds or not. Fish carrying this signature before entering freshwater had greater than 10 times lower probability to make it to spawning grounds."

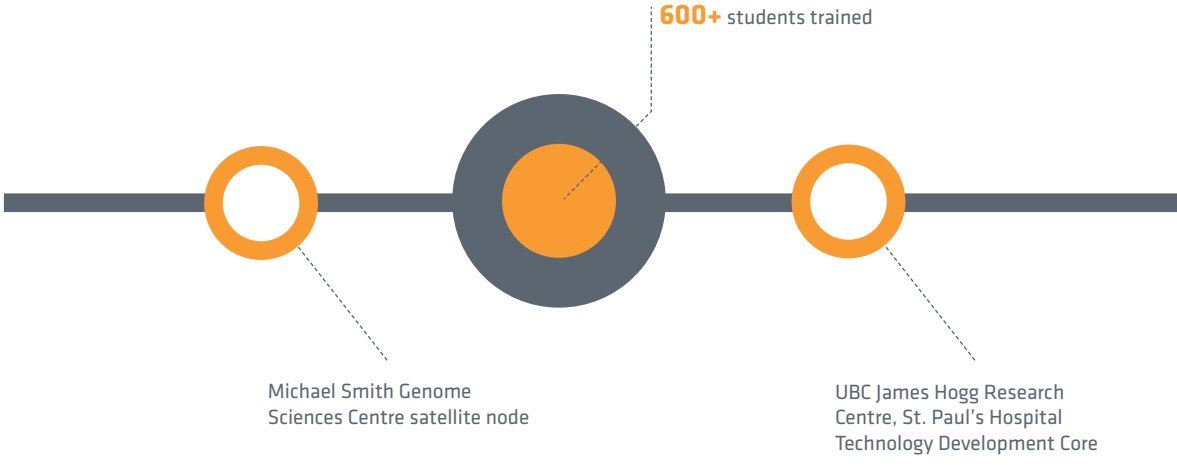
The pattern of immune stimulation led the researchers to hypothesize that a large proportion of salmon dying prematurely were responding to a viral infection. The breakthrough findings, which for the first time showed that salmon were compromised before entering the river, were published in *Science* and garnered significant attention from the scientific world and the media.

As a result, Miller was asked to give testimony about her findings at the federal Commission of Inquiry into the Decline of Sockeye Salmon, known as "The Cohen Commission". The Commission will submit its final report in September 2012.

"Genomics is adding significant depth to our fisheries research," says Miller. "In the short term, we are developing genomic tools and knowledge to enable fisheries managers to more precisely predict run sizes. This is a first step. In the longer term, our ongoing research aims to understand the cause-effect relationship between specific genomic signatures, novel pathogens and salmon mortality. We will use this knowledge to predict and, if possible, mitigate the causes of diminishing runs. This is our ultimate goal."

Necessity is the Mother of Entrepreneurship

Technology Development Platform Achievements



Genome BC's Technology Development Platform has spawned eight satellite engineering groups across BC which continue to drive the invention of ingenious research instrumentation and biomedical devices.

It was the most advanced instrument on the market for size selection in high-throughput library construction, one of the fundamental steps in next-generation genome sequencing. But the team led by Drs. Andre Marziali and Robin Coope at the Technology Development Platform knew the 4-channel instrument wouldn't do the trick.

So they built their own – a 96-channel instrument that's easier to automate. Named the "Barracuda," it has been in production since 2010, with three more units recently commissioned by the Michael Smith Genome Sciences Centre.

The innovation represented another slam dunk for engineers at the Technology Development Platform – or "Tech Dev", as it's affectionately called.

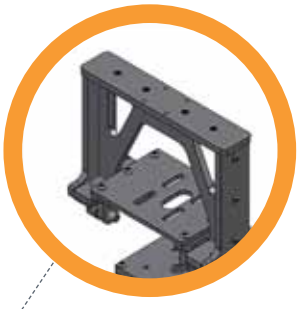
With inaugural funding in 2002 from Genome BC, the platform was created to provide engineering support to the local life sciences research community along with world-class prototyping facilities and resources for advancing innovative biomedical devices towards commercialization.

"One thing that's sometimes overlooked is how critical technical engineering support was to the sequencing of the first human genome," explains Marziali, co-director of the platform. "Because the life sciences field moves so rapidly, there is a huge need for in-house technical development to support research and clinical needs. These highly specialized instruments and devices are simply not available on the market."

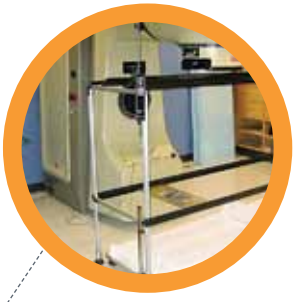
What started as a two-engineer operation in Marziali's Applied Biophysics Lab at UBC, mainly to support Genome Canada and Genome BC-funded projects, Tech Dev has grown to eight distinct satellite engineering groups at institutions across BC, including UBC (Vancouver and Okanagan campuses), the BC Cancer Agency, St. Paul's Hospital and the University of Victoria.

In 2007, with support from Western Economic Diversification Canada, Genome BC secured $1.25 million for advanced prototyping facilities and training centres in BC. The funding established new facilities at the UVic-Genome BC Proteomics Centre and the British Columbia Institute of Technology. It also launched the Joint Engineering Centre, a state-of-the-art prototyping centre at the BC Cancer Agency.

"The Barracuda"



Lateral Spine Loader



Gamma Ray Couch

24 major projects,
with 9 clinical, 6 academic and 4 industrial collaborators

University of Victoria
Genome BC Proteomics Centre

British Columbia
Institute of Technology

Joint Engineering Centre
at the BC Cancer Agency

The close proximity of the teams' engineers and trainees to researchers and clinicians in the local research community is one of the secrets to the platform's success. By networking, they've been able to spot opportunities to solve problems, improve efficiencies and invent new devices.

The program has trained more than 600 students in prototyping techniques and spearheaded 24 major projects with nine clinical, six academic and four industrial collaborators.

Platform members have generated dozens of technologies including devices for high-throughput genome analysis with the Michael Smith Genome Sciences Centre, the design of radiotherapy apparatus and clinical genetics devices for the BC Cancer Agency, anesthesiology devices for Vancouver General Hospital and work flow improvements for the BC Centre for Disease Control, among many other innovative projects.

Many of these successes are currently being commercialized, including the development of a platelet quality monitor prototype for Canadian Blood Services, leading to commercialization of the ThromboLUX™ device by LightIntegra Technology and the development of prototypes and applications for the commercialization of a nucleic acids purification technology, licensed to Boreal Genomics.

SPIN-OFF ENABLING NON-INVASIVE CANCER MONITORING (SCODA)

One of the major successes of Genome BC's Technology Development Platform is Boreal Genomics, a spin-off company founded in 2007 by Dr. Andre Marziali and colleagues.

In 2004, as part of a Tech Dev project, Marziali co-invented a patented technology to purify nucleic acids. The "SCODA" technology formed the basis of Boreal Genomics to further commercialize high-performance instruments for DNA and RNA purification.

The company's newest product, the Boreal OnTarget™ system, allows researchers to detect and sequence both known and unknown rare somatic mutations, enabling non-invasive monitoring of cancer and improving the effectiveness of personalized treatments.

All Busy on the Western Front

Provincial challenges don't conveniently end at provincial borders.

The mountain pine beetle is a case in point as the devastating forest pest has crossed from BC into Alberta and threatens to keep moving.

Canada's western provinces share common challenges in key economic sectors such as human health, agriculture, forestry and mining. The need to solve these challenges drove the development of a novel funding program to support the application of genomics to these sectors in Western Canada.

Funded by Western Economic Diversification Canada (WD) from 2007 to 2011, the Western Genomics Networks were created to provide a platform for the western genome centres – Genome BC, Genome Alberta and Genome Prairie – to collaborate with companies on market-driven research and the commercialization of new technologies.

The Networks brought together stakeholders from across Western Canada, including industry, provincial governments, universities, and federal laboratories and agencies. They fostered inter-regional cooperation, allowing the Genome Centres to benefit from overlapping economic sector activities, links between research institutes and complementary funding opportunities.

The investment of $800,000 from WD created 12 multi-stakeholder networks. In BC, four pan-western genomics networks were developed and led by Genome BC: forestry, cancer, mining/environment and fisheries/aquaculture.

The BC program exceeded all target goals. Several industry–research partnerships were formed to further develop and apply genomics innovations in areas such as understanding sea lice infestations, sablefish production, natural pest control, mine remediation, biofuel development, adverse drug reactions and salmon aquaculture.

Industry investment in these research projects totaled $15.3 million, exceeding a target goal of $3 million.

The initiative succeeded in attracting engagement and investment from both western Canadian-based companies and several multinationals: an enzyme producer, a pharmaceutical company and an aquaculture group.

A majority of the research groups developed and launched under the program successfully applied for follow-on funding to further develop and apply their genomic innovations. The total amount of incremental funding to date is $116 million, exceeding the target goal of $15 million.

Western Genomics Networks: BC Highlights

In BC, four pan-western genomics networks were developed and led by Genome BC in forestry, cancer, mining/environment and fisheries/aquaculture. These networks generated numerous industry–research partnerships to develop and apply genomics innovations in key areas.

FORESTRY

- Forest health, bioenergy and forest management
- Mountain pine beetle project with Genome Alberta
- Significant BC Ministry of Forests and Range involvement

CANCER

- Four new projects in cancer genomics
- Joint development fund with the Centre for Drug Research and Development aimed at later-stage genomics commercialization opportunities: seven projects funded to date
- New medulloblastoma (childhood brain cancer) project funded jointly with Genome Canada and Terry Fox Research Institute
- New personalized medicine project at BC Cancer Agency to streamline cancer diagnosis through genomic testing

MINING/ENVIRONMENT

- Mine bioremediation project
- Sentinel species to monitor water quality project
- Watershed quality monitoring project
- Significant Environment Canada involvement

FISHERIES/AQUACULTURE

- International Cooperation to Sequence the Atlantic Salmon Genome initiative
- Research projects on sea lice, sablefish, fisheries management and shellfish
- Projects in natural fishery ecosystems

Successful Industry–Academic Partnership Draws Top Researcher to BC

It was a coup for the province. Dr. Matthew Farrer, one of the world's leading lights in the genetic aspects of Parkinson's disease and molecular neuroscience, left sunny Florida to make his new home in Vancouver. Farrer now holds a UBC appointment, the Dr. Donald Rix BC Leadership Chair in Genetic Medicine and a Canada Excellence Research Chair in Neurogenetics and Translational Neuroscience.

Drawing such a luminary to the province didn't happen overnight. Farrer's appointment was the culmination of Genome BC's catalyzing efforts which led to a funding partnership between LifeLabs, the Province of BC, Genome BC and UBC.

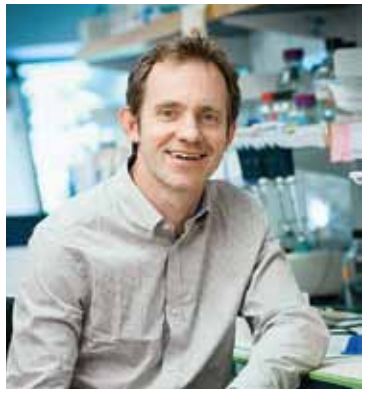
To fund the chair – named for the late Dr. Don Rix, physician, philanthropist, founder of LifeLabs, as well as long-time board chair of Genome BC – LifeLabs contributed $2 million, the Genome BC Foundation invested $250,000 and the Province provided $2.25 million through its Leading Edge Endowment Fund (LEEF).

The shareholder of LifeLabs, Borealis Infrastructure, has a long term plan for its lab business and viewed an investment in research to accelerate innovations in genomics-based diagnostic testing as both a sound business decision and a fitting tribute to the life work of Dr. Rix.

"More than 80% of medical decisions are made on the basis of a laboratory test," notes Mark Murphy, Vice President of Borealis Infrastructure, which owns LifeLabs. "Our view is that genomics is one of the fields with the greatest potential to improve medical diagnostics and have an enormous impact on healthcare in Canada. The ability to identify an individual's genetic markers and target drug interactions and other treatment options may well create opportunities to develop more personalized therapies."

"Genome BC has been fantastic to partner with. Their knowledge of the research space and key players such as UBC and the Centre for Molecular Medicine and Therapeutics helped make this partnership possible. We are pleased to be part of this alignment of the public and private sectors which provided enough funding to support a world-class genomics researcher."

MARK MURPHY
Vice President, Borealis Infrastructure



Dr. Matt Farrer

A world expert in the genetic aspects of Parkinson's disease and molecular neuroscience, Dr. Matt Farrer and his team have helped identify five genes and many mutations involved in Parkinson's by analyzing DNA from populations and families. Their collaborations span more than 26 countries on six continents and include neurologists who work directly with patients as well as neuroscientists who use genetic tools and mechanistic insights for novel therapeutic development.

One of Farrer's discoveries published in the *American Journal of Human Genetics* in July 2011, is the identification of a genetic mutation that causes late-onset Parkinson's disease, using DNA samples of a Swiss family where 11 relatives have developed the disease. This is the first genetic mutation discovery related to Parkinson's led by a Canadian-based team and employed the latest in next-generation sequencing technologies. Farrer and his team are now developing new therapies based on their findings.

Outreach

Getting Kids "Hooked on Science"

It's no surprise Bryan Tisdall gets excited when he sees young visitors' eyes light up as they interact with the hands-on exhibits at Science World's TELUS World of Science. After all, he is the science centre's Chief "Excitement" Officer.

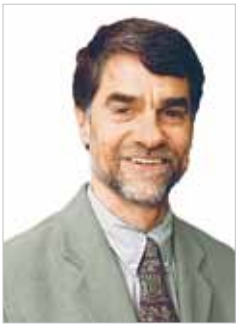
But, for Tisdall, it's about much more than putting smiles on the faces of young children and their families.

"Our real goal is to get kids from all over BC hooked on science. It's not only great for them, it's absolutely vital for the province. Science and technology education are key to our future prosperity."

To bridge the science gap, Science World connects with like-minded partners who share aspirations for promoting science and technology across the province. For almost a decade, Genome BC and Science World have partnered to engage the community about genomics – not only the next generation of scientists, but all those who will be touched by genomics in their everyday lives.

"We need to spark an interest in science early on," explains Tisdall. "Then we need to keep those kids involved at the secondary level so more of them will pursue science careers. But Science World can't do it alone. We need fellow travelers, like Genome BC, who share this vision."

The two organizations worked closely to present GEEE! in Genome, a popular interactive exhibit on genomics that's enjoyed two runs at TELUS World of Science. Genome BC also provides hands-on activities and volunteers to Science World's long-running Community Science Celebrations, held in different BC communities every year. With topics ranging from the mountain pine beetle to disappearing bees and biofuels, the interactive exhibits focus on how genomics tools and technologies can help solve challenges in many of BC's communities.

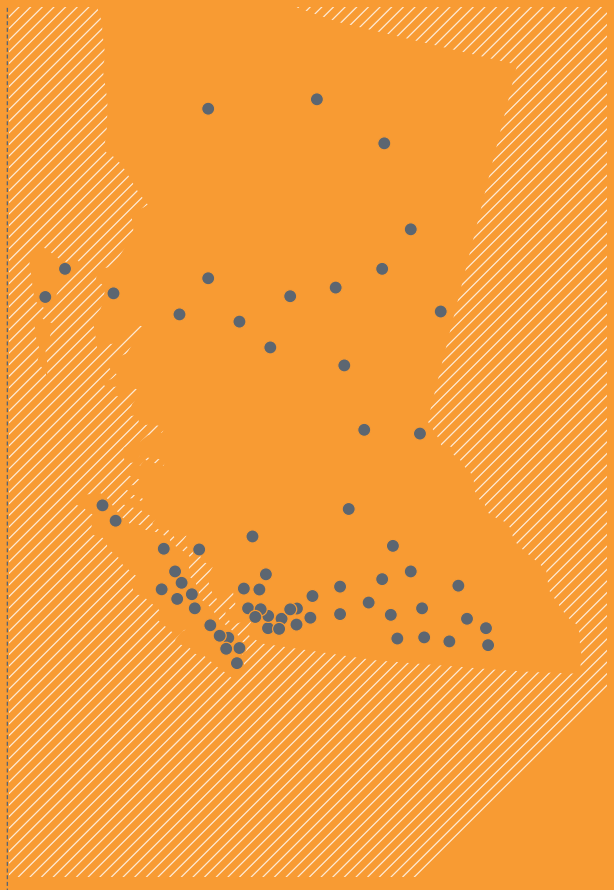


BRYAN TISDALL
President and CEO, Science World

When Tisdall read a recent OECD report that scored BC students' rate of participation in science education as "very low", it only served to reinforce the importance of his organization's strategic outreach efforts.

"Genome BC helps us open doors to high school students, one of our key target audiences and the province's future scientists. And who knows? The young scientist in Haida Gwaii who pulls DNA from a kiwi might be the next Michael Smith."

Geneskool on the Road



100 Mile House
Abbotsford
Agassiz
Aldergrove
Alexis Creek
Burnaby
Burns Lake
Campbell River
Castlegar
Chemainus
Chetwynd
Chilliwack
Clearwater
Clinton
Comox
Coquitlam
Cortes Island
Courtenay
Crawford Bay
Dawson Creek
Dease Lake
Duncan
Fort Nelson
Fort St. James
Fort St. John
Fort Ware
Fraser Lake
Galiano Island
Gold River
Invermere
Kamloops
Kaslo
Kelowna
Ladysmith
Langley
Logan Lake
Mackenzie
Maple Ridge
Masset
McBride
Mill Bay
Naksup
Nanaimo
Nelson
New Wesminster
North Vancouver
Parksville
Port Alberni
Port Hardy
Port McNeill
Port Moody
Prince George
Prince Rupert
Queen Charlotte City
Quesnel
Richmond
Salmo
Sidney
Smithers
South Slocan
Squamish
Surrey
Terrace
Vancouver
Vernon
Victoria
West Vancouver
Williams Lake

Geneskool Investigations with Vinci Au

It's a gruesome crime scene. An unidentified male is found dead in the washroom of a plane bound from Vancouver to New York. Blood is spattered on the handle of the knife in his chest. In the tiny room, there are clear signs of a struggle.

No, it's not an episode of *CSI*, or even a real crime scene. It's a murder mystery from "GSI: Geneskool Investigation," one of several Geneskool on the Road traveling workshops designed by Genome BC to give high school students the chance to explore genomics and practice real-world molecular biology lab techniques.

"In this forensics activity, the real fun starts when the students have to practice lifting fingerprints from the tiles," explains Vinci Au, a Geneskool workshop and camp leader since 2008. "The hands-on approach encourages them to participate in active learning," adds Au, who has also been instrumental in keeping the program up-to-date with high school students in mind.

A self-described "science geek," Au graduated with a BSc from UBC and now has full-time job in a genomics lab at her alma mater. So it's hard to believe that, back in high school, Au thought genomics was really dry. She remembers the exact moment her enthusiasm was ignited, thanks to an amazing high school science teacher who regularly invited guest speakers to the class.

"I was sitting in science class expecting to be bored. Instead, I was blown away by some of the amazing applications – like the concept of 'gene therapy', where you can potentially use viral vectors to treat a serious disease," recalls Au.

To learn more about genomics, she began attending Genome BC public forums. In her senior year of high school, Au competed in the Genome Canada-sponsored Sanofi-Aventis Biotalent Challenge, which gave her the opportunity to work with UBC's Dr. Julian Davies.

With Geneskool, the student has become the teacher. Au's most satisfying moments happen when she witnesses a "light turn on" in one of her young Geneskool participants.

"Especially in students who weren't so keen on genomics in the first place. To see them become really interested and engaged in the topic, that's when I feel like I've made a difference."

VINCI AU
Geneskool Leader

Year in Review Highlights

APRIL 2011 At the LifeSciences BC Awards Gala, the Genome BC Award for Scientific Excellence was 01 ***awarded to Dr. Michael Hayden***. Genome BC's 02 Geneskool volunteers took part in the "Year of Science; Science and the World Around Us Expo"in Prince George. **MAY 2011** Genome BC and the Peter Wall Institute presented the WALL Exchange Public Forum: "The Construction of the First Synthetic Cell and Global Ocean Sampling Expedition" featuring J. Craig Venter. **JUNE 2011** Genome BC welcomed new board members Dr. Janet Halliwell and Dr. Victor Ling. **AUGUST 2011** 03 ***Dr. Matthew Farrer*** was appointed to the Dr. Donald Rix BC Leadership Chair in Genetic Medicine. **SEPTEMBER 2011** "18 Things You Should Know About Genetics," by ***David Murawsky***, won first place for the best short film at 04 ***Gene Screen BC 2011***. **OCTOBER 2011** A unique new project "Genomics Research Entrepreneurship to Accelerate Translation (GREAT)" was funded through Genome Canada's Entrepreneurship Education in Genomics (EEG) pilot program. **NOVEMBER 2011** 05 ***Dr. Leroy Hood***, ***President and co-founder of the Institute for Systems Biology*** in Seattle, delivered the 2nd Annual Dr. Don Rix Distinguished Keynote to more than 250 people.

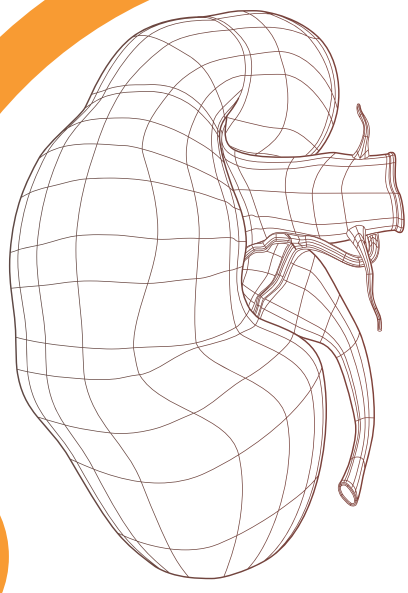
06

07

DECEMBER 2011 Five new projects were successful in the fourth round of funding in Genome BC's Strategic Opportunities Fund. 06 ***Investments were made in five major forestry projects*** over the fiscal year. These projects aim to increase our understanding of the genomics of trees – how they control growth, adaptability, and much more. **JANUARY 2012** Genome BC, along with other Canadian Genome Centres, co-hosted a networking reception at the Plant and Animal Genome Conference in San Diego. 07 ***An important new project targeting childhood brain cancer*** was announced with support from former cancer patient Taylor Date. **FEBRUARY 2012** Genome BC took the centre stage at the 08 ***Family Science Days*** during the American Association for the Advancement of Science (AAAS) meeting held in Vancouver. The second round of funding through Genome BC's Proof-of-Concept program was announced. Investments were made in three new projects: targeting a therapeutic vaccine for HPV; a novel vaccine against Salmonella enterica in poultry; and 09 ***a study of functional genomics in the liver and kidney***. **MARCH 2012** On World Water Day, Genome BC announced a new research project: "Applied Metagenomics of the Watershed Microbiome;" which aims to develop a better way to identify the presence of the fecal pollution in watersheds and provide new tools to track sources of water contamination.

09

08



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, 2012, the statements of operations and changes in net assets and statement of 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 generally accepted accounting principles, 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 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, 2012, and its results of operations and its cash flows for the year then ended in accordance with Canadian generally accepted accounting principles.

KPMG LLP

Chartered Accountants
June 1, 2012
Vancouver, Canada

Statement of Financial Position *(Expressed In Canadian Dollars)*

March 31, 2012, with comparative figures for 2011	**2012**	2011
Assets		
Current assets:		
Cash	**$ 1,975,812**	$ 5,849,533
Short-term investments (note 3)	**104,472,221**	106,169,138
Funding receivable	**917,996**	429,948
Other receivables (note 4)	**130,657**	76,825
Project advances	**2,270,787**	1,053,606
Prepaid expenses	**155,566**	129,246
	109,923,039	113,708,296
Loan receivable (note 5)	**155,465**	200,000
Capital assets (note 6)	**490,801**	993,958
Other long-term asset (note 7)	**184,152**	175,818
	$ 110,753,457	$ 115,078,072
Liabilities and Net Assets		
Current liabilities:		
Accounts payable and accrued liabilities (note 8)	**$ 5,394,858**	$ 3,193,564
Deferred lease inducement	**37,944**	–
Deferred contributions:		
Future expenses (note 9)	**104,829,854**	110,890,550
Capital assets (note 10)	**490,801**	993,958
	$ 110,753,457	$ 115,078,072

Commitments (note 12)
See accompanying notes to financial statements.
Approved on behalf of the Board:

Dr. Alan Pelman
Chair

Mr. Ken Galbraith
Director

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

Year ended March 31 2012, with comparative figures for 2011	2012	2011
Revenues:		
Amortization of deferred contributions related to future expenses (note 9)	$ **31,934,677**	$ 25,800,081
Amortization of deferred contributions related to capital assets (note 10)	**605,830**	1,228,585
Investment income	**2,856,674**	2,181,954
	35,397,181	29,210,620
Expenses:		
Corporate programs and management	**5,489,033**	5,066,386
Project expenditures	**29,302,318**	22,915,649
Depreciation	**605,830**	1,228,585
	35,397,181	29,210,620
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, 2012, with comparative figures for 2011	2012	2011
Cash provided by (used in)		
Operations:		
Excess of revenues over expenses	$ **–**	$ –
Items not involving cash:		
Depreciation	**605,830**	1,228,585
Amortization of deferred contributions related to future expenses (note 9)	**(31,934,677)**	(25,800,081)
Amortization of deferred contributions related to capital assets (note 10)	**(605,830)**	(1,228,585)
Amortization of deferred lease inducement	**6,478**	–
Accretion of loan receivable	**44,535**	(13,084)
Unrealized (gain) loss on short-term investments	**(212,498)**	239,393
	(32,096,162)	(25,573,772)
Funding (note 9)	**25,961,842**	39,458,784
Change in assets and liabilities:		
Funding receivable	**(488,048)**	(80,870)
Other receivables	**(53,832)**	(45,506)
Project advances	**(1,217,181)**	2,025,868
Prepaid expenses	**(26,320)**	(3,160)
Accounts payable and accrued liabilities	**2,201,294**	254,344
Deferred lease inducement	**37,944**	(18,075)
	(5,680,463)	16,017,613
Investments:		
Proceeds from sale of short-term investments	**14,500,000**	14,000,000
Purchase of short-term investments	**(12,590,585)**	(25,580,727)
Purchase of capital assets	**(102,673)**	(58,933)
	1,806,742	(11,639,660)
Increase (decrease) in cash	**3,873,721**	4,377,953
Cash, beginning of year	**5,849,533**	1,471,580
Cash, end of year	$ **1,975,812**	$ 5,849,533

Supplemental cash flow information (note 11)
See accompanying notes to financial statements.

Notes to Financial Statements

(Expressed In Canadian Dollars) Year ended March 31, 2012, with comparative figures for 2011

1. Operations:

Genome British Columbia (the Corporation) was incorporated on July 31, 2000 under the Canada 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. Short-term investments:

Short-term investments which are held for trading 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.

b. Project advances:

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

c. 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

d. 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 to 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.

e. Use of estimates:

The preparation of financial statements in conformity with generally accepted accounting principles 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, the fair value of short-term investments, accruals for project expenditures and the determination of the fair value of the other long-term asset. Accordingly, actual results could differ from these estimates.

f. Measurement and fair value of financial instruments:

Cash is designated as held for trading and is recorded at fair market value. Funding receivable, other receivables, and loan receivable are designated as loans and receivables and are recorded at amortized cost. Accounts payable and accrued liabilities are designated as other financial liabilities and are recorded at amortized cost.

Carrying amounts of certain of the Corporation's financial instruments, including funding and other receivables, accounts payable and accrued liabilities, approximate their fair value due to their short maturities.

2. Significant accounting policies (continued):

g. Long-term asset:

The Corporation's long-term asset is available for sale and is recorded at cost which represents the determined fair market value at the date the instrument is issued. Subsequent declines in fair value will be recorded in the period that they occur.

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:

The Corporation has elected to defer applying the Canadian Institute of Chartered Accountants (CICA) Handbook Sections 3862, ***Financial Instruments – Disclosure*** and 3863, ***Financial Instruments – Presentation***. Section 3862 and 3863 place increased emphasis on disclosures about the nature and extent of risks arising from financial instruments and how an entity manages those risks. The Corporation has elected to continue to apply the financial instruments disclosure and presentation standards in accordance with Section 3861.

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.

m. Revisions to Not-for-Profit accounting standards:

Effective April 1, 2012, the Corporation's current accounting framework will no longer exist. In December 2010 the CICA in conjunction with the Accounting Standards Board (AcSB) issued Part III – Accounting Standards for Not-for-Profit Organizations (Part III) of the CICA Handbook. Part III is effective for fiscal years commencing on or after January 1, 2012 and provides Canadian private sector not-for-profit organizations with a new financial reporting framework. The Corporation has the option to apply International Financial Reporting Standards (IFRS) or the newly approved accounting standards for not-for-profit organizations.

The Corporation has elected to adopt the new accounting standards for not-for-profit organizations effective April 1, 2012.

The Corporation is evaluating the impact of adopting the new accounting standards for not-for-profit organizations; differences on adoption are expected to be minimal.

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 Corporation's short-term investments are comprised of a portfolio of funds. The portfolio consists of investments in a Canadian money market fund and a bank guaranteed Canadian mortgage fund. The portfolio is managed by independent investment professionals in accordance with the Corporation's investment policy. All short-term investments are classified as held for trading and 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 the portfolio manager to change the level of investment in either fund 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 a high-credit quality financial institution.

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

		2012		2011
Canadian Money Market Fund	**$**	**40,611,890**	$	26,851,374
Canadian Mortgage Fund		**63,860,331**		56,317,260
Term deposit		**–**		23,000,504
	$	**104,472,221**	$	106,169,138

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.

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

4. Other receivables:

	2012	2011
Sales tax	$ 60,545	$ 74,099
Other accounts receivables	70,112	2,726
	$ 130,657	$ 76,825

5. Loan receivable:

The Corporation made a loan to a British Columbian academic institution to assist in attracting a senior scientific researcher. The loan is in the amount of $200,000, bears no interest, and has 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 and change in net assets as a discount and the loan receivable balance is accreted over the term of the loan using the effective interest rate method.

6. Capital assets:

March 31, 2012	Cost	Accumulated depreciation	Net book value
Furniture and fixtures	$ 79,656	$ 55,622	$ 24,034
Computers and software	361,409	307,653	53,756
Telecommunications equipment	27,696	25,140	2,556
Project equipment	7,090,281	6,728,897	361,384
Leasehold improvements	351,212	302,141	49,071
	$ 7,910,254	$ 7,419,453	$ 490,801

March 31, 2011	Cost	Accumulated depreciation	Net book value
Furniture and fixtures	$ 54,977	$ 50,076	$ 4,901
Computers and software	340,124	274,760	65,364
Telecommunications equipment	27,696	20,104	7,592
Project equipment	7,596,680	6,681,863	914,817
Leasehold improvements	294,503	293,219	1,284
	$ 8,313,980	$ 7,320,022	$ 993,958

7. Other long-term asset:

Other long-term asset includes subscription rights and common shares in an early stage biotechnology company (Investee) issued pursuant to a continuing collaborative research agreement. Each subscription right entitles the Corporation to one common share for no additional consideration and convert to common shares of the Investee upon certain triggering events or three years from issuance. At March 31, 2012, the Corporation held 67,414 (March 31, 2011 – 68,950) subscription rights and 209,796 (March 31, 2011 – 200,014) common shares of the Investee.

	Number	Cost
Balance at March 31, 2011	268,964	$ 175,818
Additions	8,246	8,334
Balance at March 31, 2012	277,210	$ 184,152

8. Accounts payable and accrued liabilities:

	2012	2011
Accounts payable	$ 135,222	$ 130,637
Accrued liabilities	5,259,636	3,062,927
	$ 5,394,858	$ 3,193,564

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 Genome British Columbia and other parties (note 12).

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:

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

		2012		2011
Balance, beginning of year	$	**110,890,550**	$	97,277,769
Funding received or receivable during the period:				
Genome Canada		**14,867,560**		10,892,448
Province of British Columbia		**10,001,600**		25,014,400
Western Economic Diversification Canada		**782,682**		342,264
International collaboration		**–**		2,991,784
BC Clinical Research Infrastructure Network partners		**306,500**		150,000
Service Canada		**3,500**		4,288
Sponsorships		**–**		48,500
Other		**–**		15,100
		136,852,392		136,736,553
Lease inducement amortization		**6,478**		–
Other long-term asset		**8,334**		13,011
		136,867,204		136,749,564
Less:				
Amount amortized to revenue		**(31,934,677)**		(25,800,081)
Amount transferred to fund capital assets purchased during the year (note 10)		**(102,673)**		(58,933)
		(32,037,350)		(25,859,014)
Balance, end of year	$	**104,829,854**	$	110,890,550

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:

		2012		2011
Balance, beginning of year	$	**993,958**	$	2,163,610
Allocation of funding for capital asset purchases (note 9)		**102,673**		58,933
		1,096,631		2,222,543
Less: amount amortized to revenue		**(605,830)**		(1,228,585)
Balance, end of year	$	**490,801**	$	993,958

11. Supplemental cash flow information:

		2012		2011
Cash received for:				
Interest	$	**2,408,074**	$	2,238,181
Non-cash transactions:				
Change in other long-term asset		**8,334**		13,011

12. Commitments:

a. Funding:

(i) 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 an agreement entered into with Genome Canada with regard to a financial support commitment of up to $11,431,003 related to Applied Genomics Research in Bioproducts or Crops Competition, 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.

In accordance with an agreement entered into with Genome Canada with regard to a financial support commitment of up to $23,043,282 related to Large-Scale Applied Research Project Competition, 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.

12. Commitments (continued):

In accordance with an agreement entered into with Genome Canada with regard to a financial support commitment of up to $571,178 related to Entrepreneurship Education in Genomics Program, 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.

(ii) In accordance with an agreement with the Centre for Drug Research and Development (CDRD), the Corporation has agreed to contribute up to $1,000,000 to jointly fund research and development projects in commercialization of genomics-related drug discoveries at CDRD. At March 31, 2012, the Corporation has contributed $192,283.

(iii) In accordance with an International Cooperation Project Agreement entered into with four international funding partners, the Corporation has agreed to contribute up to $2,000,000 to fund research in the Sequencing of the Atlantic Salmon Genome. At March 31, 2012, the Corporation has contributed $2,000,000.

b. 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 August, 2015. Minimum payments for the next four fiscal years are as follows:

2013	$	454,697
2014		411,265
2015		416,456
2016		173,523
Total	$	1,455,941

13. Related party transactions:

In the normal course of business, the Corporation enters into Collaborative Research Agreements to fund genomics or proteomics related research projects. During the year ended March 31, 2012, and in accordance with one such agreement, the Corporation paid $128,932 (2011 – $nil) to a company that has a director and shareholder who is also an officer of the Corporation.

14. 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 CICA 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 for the years ended March 31, 2012 and 2011 are as follows:

		2012		2011
Cash and term deposits	**$**	**1,255,606**	$	1,717,190
Deferred contributions		**(1,255,606)**		(1,717,190)
Net assets	**$**	**–**	$	–
Revenues	**$**	**497,250**	$	513,000
Expenses		**(497,250)**		(513,000)
Excess of revenue over expenses	**$**	**–**	$	–
Cash provided by (used in):				
Operations	**$**	**(461,584)**	$	(460,188)
Investing		**203,936**		636,826
Net change in cash	**$**	**(257,648)**	$	176,638

There are no significant differences in accounting policies between the Foundation and the Corporation. The majority of the assets of the Foundation are restricted by the terms of a memorandum of understanding relating to the funding of a research chair at a British Columbian academic institution.

15. Capital management:

The Corporation considers its total assets to be its capital. A significant portion of its capital is comprised of short-term investments. How the Corporation manages its short-term investments is set out in note 3. 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 9). The Corporation uses these funds to achieve its objectives (note 1). The Corporation is not subject to debt covenants or any other capital requirements with respect to operating funding. Funding received for designated purposes must be used for the purpose outlined in the funding agreements. The Corporation has complied with the external restrictions on the funding provided.

16. Comparative figures:

Certain prior year figures have been reclassified to conform to the current year's presentation.

Board Appointments

JANET HALLIWELL

Principal, J.E. Halliwell Associates Inc

Janet is the Principal of J.E. Halliwell Associates Inc, a company established to offer value-added services in policy and management consultancy relating to post-secondary education and science and technology, particularly publicly-funded R&D. In April 2007, Janet retired from many years of public service – serving in her final years as Executive Vice-President of the Social Sciences and Humanities Research Council (SSHRC).

Janet currently serves on the Board of Directors of the Fields Institute for Mathematics and the Advisory Council of the Cluster on Population Change and Lifecourse. She is Chair of CASRAI (Consortia Advancing Standards in Research Administration) and the International Oversight Committee for the Canadian Longitudinal Study on Aging on behalf of the Canadian Institutes for Health Research (CIHR). Janet was also Chair of the Nova Scotia Council on Higher Education, Chair of the Science Council of Canada and an officer of the Natural Sciences and Engineering Research Council of Canada.

VICTOR LING

President and Scientific Director, Terry Fox Research Institute

Victor is President and Scientific Director of the Canada-wide Terry Fox Research Institute. He is a distinguished scientist at the BC Cancer Agency (BCCA) and Professor of Pathology and Laboratory Medicine at the University of British Columbia (UBC). He is also Director of the Interdisciplinary Oncology graduate training program, a partnership between BCCA and UBC.

Dr. Ling is best known for his discovery of P-glycoprotein (MDR), a major mechanism of resistance to anticancer drugs. He has been honoured by the General Motors Kettering Prize, the Dr. Josef Steiner Cancer Research Award, the Gairdner Foundation International Award, a Michael Smith Foundation Distinguished Scholar Award and many others. He has received honorary degrees from four Canadian universities, the Order of British Columbia, the Order of Canada and is a fellow of the Royal Society of Canada.

Corporate Information

Board of Directors

(for fiscal year ended March 31, 2012)

CHAIR: ALAN PELMAN
Former Vice President, Technology, Weyerhaeuser Canada

VICE-CHAIR: IAN DE LA ROCHE
Adjunct Professor, University of BC

ALAN WINTER
President & CEO, Genome BC

DON ENNS
President, LifeSciences BC

KEN GALBRAITH
General Partner, Ventures West Capital Ltd.

IDA GOODREAU
Adjunct Professor, Sauder School of Business, and Director, Strategy, Centre for Healthcare Management, University of British Columbia

JANET HALLIWELL
Principal, J.E. Halliwell Associates Inc

VICTOR LING
President & Scientific Director, Terry Fox Research Institute

PETER J. O'CALLAGHAN
Senior Partner, Blake, Cassels & Graydon LLP

ROSEMARY OMMER
Director, Institute for Coastal Oceans Research, University of Victoria

EDWARD SAFARIK
Past President & CEO, Ocean Fisheries Ltd.

MICHAEL STEVENSON
Past President & Vice-Chancellor, Simon Fraser University

Management

ALAN WINTER
President & CEO

TONY BROOKS
Chief Financial Officer & Corporate Secretary

SUZANNE GILL
Director, Corporate Development

SALLY GREENWOOD
Vice President, Communications & Education

GABE KALMAR
Vice President, Operations

BRAD POPOVICH
Chief Scientific Officer

Auditors

KPMG LLP
Vancouver, BC

Legal Counsel

RICHARDS BUELL SUTTON LLP
Vancouver, BC

Thanks to Our Funders

Genome BC would like to acknowledge and thank its corporate funding partners including:
Genome Canada
The Province of British Columbia
Western Economic Diversification Canada

Acknowledgements

We would like to thank the following groups and individuals who assisted with this annual report: the management and staff at Genome BC, Genome BC-funded researchers, writer Elizabeth Morse and the Signals Design Group team.

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