



**GenomeCanada**

# **CORPORATE PLAN 2015–16**

Published by Genome Canada

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**Genome**Canada

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# SECTION I

## About Genome Canada

Established in February 2000, Genome Canada is a not-for-profit organization that acts as a catalyst for developing and applying genomics<sup>1</sup> and genomic-based technologies to create economic and social benefits for Canadians. Genome Canada connects ideas and people across public and private sectors to find new uses for genomics, invests in large-scale science and technology to fuel innovation, and translates discoveries into applications, new technologies, and societal impacts across key sectors of national importance, including health, agriculture, forestry, fisheries, energy, mining, and the environment.

The first 10 years of the organization's existence were focused on capability- and capacity-building, both in terms of highly qualified personnel and technology platforms to equip increasingly sophisticated genomics research teams with the most advanced tools needed to do their work. With investments in large-scale genomics science projects across multiple sectors, Canada has made its mark on the world stage in this specialized field of research with its research teams making significant contributions to international consortia, in areas as diverse as wheat, salmon, conifer trees, autism, rare diseases and cancer.

At the core of a solid foundation for success made by sustained strategic federal investments, is a "made-in-Canada" funding model that features national leadership through Genome Canada, and regional mobilization through six Genome Centres located across Canada. As independent entities receiving operational support from Genome Canada and provincial governments, the Genome Centres play a critical role securing partners to co-invest in genomics projects that cross provincial and national borders both in terms of their research work and its impacts. Since 2000, in partnership with the Genome Centres, Genome Canada expects to leverage \$1.2 billion received in federal funding to secure an additional \$1.3 billion in co-funding.

These investments have led to major breakthroughs. For example,

- The sequencing of the Atlantic salmon genome – the results of which are being transferred to the Canadian aquaculture industry;
- The sequencing of the white spruce and Norway spruce genomes—the results of which are being used by tree breeders in silviculture;
- The draft sequencing of the wheat genome has been published and will lead to opportunities to create new varieties of wheat adapted for the Canadian agri-producers;
- Canadian researchers have discovered the root causes for 150 rare childhood diseases;
- There have been major recent breakthroughs in the discovery of a pre-leukemic stem cell, a sharpshooter cancer drug and a formula for predicting autism.

<sup>1</sup> The term genomics is defined as the comprehensive study, using high throughput technologies, of the genetic information of a cell or organism, including the function of specific genes, their interactions with each other and the activation and suppression of genes. In light of Genome Canada's mandate, related disciplines include bioinformatics, epigenomics, metabolomics, metagenomics, nutrigenomics, pharmacogenomics, proteomics and transcriptomics.

### *Strategic Plan 2012–2017*

#### *Vision*

Harness the transformative power of genomics to deliver benefits to Canadians

#### *Mission*

To lead the Canadian Genomics Enterprise by:

- Connecting ideas and people across public and private sectors to find new uses and applications for genomics;
- Investing in large-scale science and technology to fuel innovation; and
- Translating discoveries into applications to maximize impact across all sectors.

#### *Objectives*

- Respond to societal needs by generating genomics discoveries and accelerating their translation into applications.
- Attract greater investment in genomics research from a broad range of stakeholders, in particular the private sector.
- Enhance the impact of genomics by transforming knowledge of the ethical, environmental, economic, legal and social challenges and opportunities into sound policies and practices.
- Enhance the recognition of the value of genomics by increasing stakeholder appreciation of genome science, its applications and implications.



# Genome Centres and S&T Innovation Centres

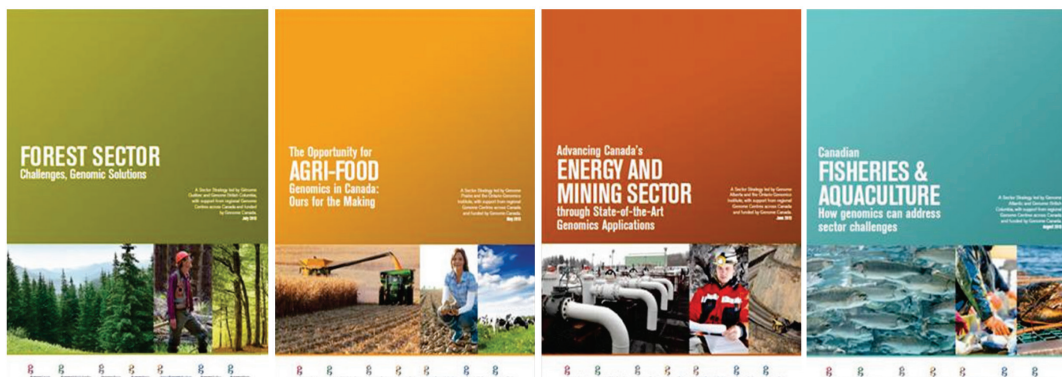


In 2012, following extensive consultations, Genome Canada developed and released its Strategic Plan<sup>2</sup> 2012–2017. Bolstered with a new Vision, Mission, and Objectives, this plan builds upon progress made, and reflects the opportunities and challenges associated with a transformative technology that can be a key enabler for driving the bio-economy of Canada. The Plan recognized the need to include two additional sectors of strategic and economic importance to Canada—energy and mining. The Plan recognized the need to place a greater emphasis on translating discoveries into new applications that can lead to economic and social benefits in strategic sectors; and, engage users (e.g., industry, government, non-profits, policy makers, regulators) to identify the challenges and opportunities in each sector. The Plan also recognized that in order to prime this “pipeline” of innovation, Genome Canada must continue to fund discovery research and support cutting-edge technology. All of the above is achieved through a seamless portfolio of programs developed with partners to support the end-to-end integration of research and its application.

## Strategic Priorities

In 2013, Genome Canada and the Genome Centres undertook broad consultations with industry representatives and others working in Canada’s energy & mining, agri-food, fisheries & aquaculture and forestry sectors. A wide range of challenges facing these sectors were explored and examined to determine where genomics could play a role in addressing some of the most pressing issues hampering productivity, effectiveness and global competitiveness of each respective sector. Out of these discussions came a series of strategies outlining a plan for integrating genomics into these sectors for Canada’s advantage.

<sup>2</sup> The strategic plan can be viewed on Genome Canada’s website ([www.genomecanada.ca](http://www.genomecanada.ca)).



Direct outputs of these consultations include the development of two Large-Scale Applied Research Project (LSARP) competitions:

- The *Genomics and Feeding the Future* LSARP competition was launched in 2014 and focuses on using genomic approaches within the agri-food and fisheries/aquaculture sectors to address challenges and opportunities related to global food safety, security and sustainable production thereby contributing to the Canadian bio-economy and well-being of Canadians; and,
- An LSARP competition with the theme of Natural Resources and the Environment to be launched in 2015.

The strategic prioritization approach is also evident in the international arena; whereby Genome Canada participates in international genomics research consortia when it is deemed that Canada can significantly contribute expertise and leadership or that Canada will derive substantial benefits from Canadian participation. Thus, Genome Canada has funding commitments as part of several major international projects, including the International Rare Disease Research Consortium (IRDiRC), the Cancer Stem Cell Consortium (CSCC), the Structural Genomics Consortium (SGC), the International Wheat Genome Sequencing Consortium, the International Barcode of Life Project (iBOL), the International Cancer Genome Consortium (ICGC), and the International Mouse Phenotyping Consortium (IMPC).

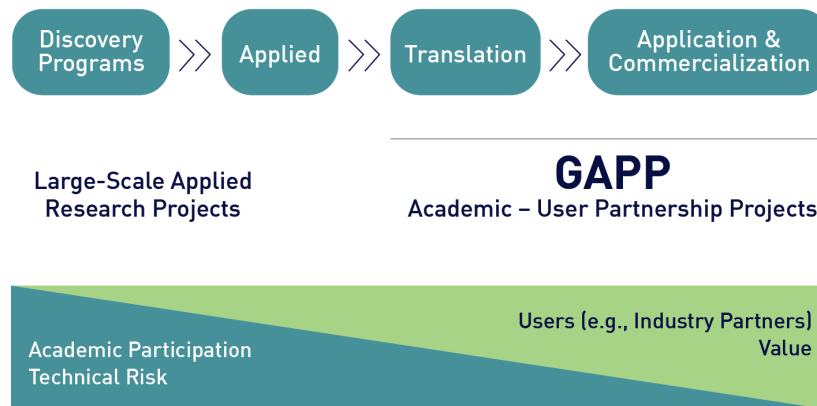
### Translational Programs

In 2013, Genome Canada launched its Genomic Applications Partnership Program (GAPP). This user-driven program is aimed at progressing technologies from academia into the realm of 'real world' applications based on pulling from challenges faced by industry or the public sector. It funds later stage R&D projects, mature enough to envision short-term application and commercial development. Each project receives a third of its funding from Genome Canada, a third from the "user" partner and the remaining third from other co-funding sources including the province in which the project takes place. The program has generated considerable interest and uptake across multiple sectors.

Examples of successes include a Quebec-based cheese producer that is integrating genomics into its manufacturing process to ensure batch-to-batch consistency of their product, a young Ontario-based biotech start-up developing a new genotype-specific diagnostic for infectious disease, and a major Atlantic aquaculture company integrating genomics into its broodstock programs to improve farmed salmon stocks.

Not only is the GAPP program bridging the academic-industry divide, but through a new partnership with Mitacs—a national, not-for-profit research organization that manages and funds research and training programs for undergraduate and graduate students, and postdoctoral fellows—students and fellows will gain an entrepreneurial experience in the translation of genomics based academic innovations.

## GENOME CANADA'S FUNDING CONTINUUM: POSITIONING OF GAPP



### Leading Edge Technology

The research community has been well-served by the ongoing investments Genome Canada has made to establish and maintain cutting-edge technology platforms and advanced expertise at five Science and Technology Innovation Centres located across Canada. This model has been retooled to create a Genomics Innovation Network (GIN), comprised of ten genomic technology innovation centres across the country. The GIN model will stress collaboration among these centres and harness their collective power for the advancement of genomics research in Canada.

Genome Canada's investments in new technology development to encourage truly transformative, "made-in-Canada" innovation in this fast-moving field has led to successful outcomes. For example, an interdisciplinary collaboration in 2001, funded by Genome Canada, between Toronto chemist Dr. Scott Tanner and biologist Dr. John Dick and a follow on investment through a technology development competition led to the invention of a game-changing laboratory tool: a protein analysis system that provided the first detailed picture of what's going on with single, often rare cells at the molecular level. This discovery resulted in a small spin-off company (DVS Sciences), which employs 60+ full-time staff at its research and development and instrument-manufacturing facility in Ontario. This technology is now in use around the globe.

Complex questions arise out of the massive and growing influx of "big data" resulting from technological advances applied to genomics, not least of which is how to analyze and make sense of the body of information so that it can be used for the benefit of society. Genome Canada is tackling these problems by making bioinformatics and computational biology priority areas of research.

To this point, Genome Canada, in partnership with the Canadian Institutes of Health Research, are co-leading the development of a National Bioinformatics/Computational Biology (B/CB) Strategy which acknowledges the strengths and challenges of the B/CB community in Canada and addresses their needs in order to provide a sustainable legacy for the community.

Genome Canada is also supporting a number of initiatives that address how best to manage the flow of data and the advantages of shared data across institutions and national boundaries, while safeguarding citizens' privacy rights. This includes a program to support Canada's participation and leadership in the Global Alliance for Genomics and Health which has a mandate to enable responsible sharing of genomic and clinical data.



## Genomics in Society

Just as technology underpins the genomics scientific endeavor, so do understanding what advancements in the science and technology mean for our society, how public interest plays into the effective development of genomics applications in Canada and how public policy can adapt accordingly.

A key innovation of the genomics research landscape has been the requirement of Genome Canada for active consideration of the contributions of GE<sup>3</sup>LS (genomics and its ethical, environmental, economic, legal and social aspects) research to achieve the social and/or economic benefits of genomics research for Canadians. Genome Canada funded GE<sup>3</sup>LS research is providing stakeholders the insights needed to anticipate impacts of scientific advances in genomics, avoid pitfalls, cultivate success, and, ultimately, contribute to Canada's leadership in the 21<sup>st</sup> global bio-economy.

In 2013, Genome Canada, in partnership with the Canadian Institutes of Health Research, announced funding for 17 large-scale personalized health projects. The projects—spanning a number of disease areas—were selected based on their high potential to deliver social and economic benefits for Canadians. Such benefits include, for instance, the adoption of new technology, a change in clinical practice guidelines, new uses for an existing drug or a reduction in adverse drug reactions. Genome Canada is establishing a collaborative structure to assist the GE<sup>3</sup>LS research undertaken by the 17 projects generate synergies and efficiencies, share expertise and further advance common goals. The objective is to provide insights that can inform the 17 projects and aid the implementation of the deliverables from these projects into the health care system.

## The Genomics Enterprise

Genome Canada and the Genome Centres have built a robust genomics research community in Canada, transforming both the quality and quantity of such research. This community exists as a virtual enterprise representing a highly complex, informal yet collaborative network of individuals and organizations consisting of those who fund research, those who conduct it, those equipped to translate discoveries into applications, and those who will use them to deliver or derive economic and social benefits for Canadians.

Genome Canada, in collaboration with the six Genome Centres, expects to raise over \$1.3 billion in co-funding commitments to supplement the \$1.2 billion committed by the Government of Canada over the past 14 years. Co-funding partners include provincial government and agencies, international organizations and research institutes, industry, universities, and research hospitals. This collaborative effort has resulted in funding commitments to support over 200 large-scale research projects and S&T Innovation Centres, and six regional Genome Centres.

For example, in 2014–15, Genome Canada:

- initiated the development of a partnership with the Social Sciences and Humanities Research Council (SSHRC) for the purpose of extending Genome Canada's support of GE<sup>3</sup>LS research to a community of social sciences and humanities researchers who may not be familiar with Genome Canada programs, including GE<sup>3</sup>LS research; and,
- partnered with the European Commission through its Horizon 2020 program in which funding has been allocated for a targeted ERA-NET Co-Fund proposal to coordinate rare disease research funding through transnational calls designed to implement IRDIRC objectives and priorities;

## Genome Canada Portfolio – 2000 to 2014

Numbers of Projects/Innovation Centres by Sector and Region as at October 2014

SECTOR	GENOME BRITISH COLUMBIA	GENOME ALBERTA	GENOME PRAIRIE	ONTARIO GENOMICS INSTITUTE	GENOME QUEBEC	GENOME ATLANTIC	TOTAL
Agriculture	3	6	6	5	3	2	25
Energy	2	1	1				4
Environment	4			5	3	1	13
Fisheries	2					3	5
Forestry	5			1	3	1	10
Health	33	4	2	39	32	3	113
GE <sup>3</sup> LS	2	2	2	3	3		12
Technology Development	3	1	2	10	2		18
Innovation Centres	4	2		2	1	1	10
<b>Total</b>	<b>58</b>	<b>16</b>	<b>13</b>	<b>65</b>	<b>47</b>	<b>11</b>	<b>210</b>

GE<sup>3</sup>LS = Ethical, Economic, Environmental, Legal and Social aspects of Genomics research

### Commitment to Accountability

In the delivery of its mandate, Genome Canada is committed to applying the highest standards of accountability and transparency to its operations, informing Canadians about the exciting opportunities and promise that genomics holds, and reporting on achievement of results. Mechanisms and instruments such as corporate plans and annual reports, independent performance audit and evaluation studies, peer review and research oversight committee processes, annual attest audits, continuous risk management assessment and effective oversight by the Board of Directors, provide a high level of assurance. Genome Canada rigorously monitors its expenditures in order to manage operations in a fiscally prudent manner.

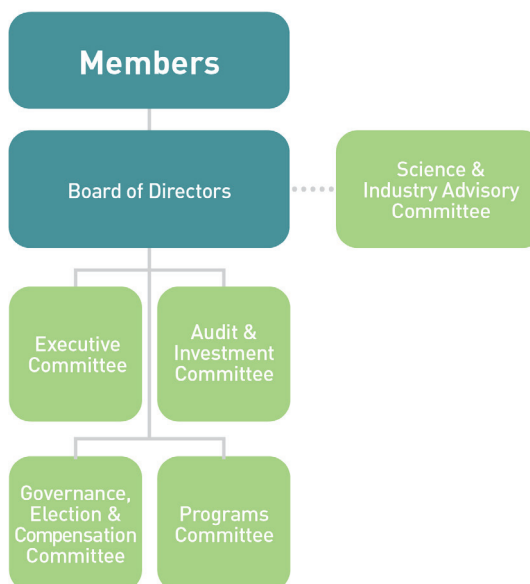
### Governance

Genome Canada was established in February 2000 under the *Canada Corporations Act*, and in 2012, was issued new Articles of Continuance under the *Canada Not-for-Profit Corporations Act*.

Genome Canada is governed by a Board of Directors comprising up to 16 individuals drawn from the academic, private and public sectors. These individuals bring unique skills and experiences as well as strong interests and insights to successfully fulfill Genome Canada's strategic plan. Furthermore, the presidents of five federal research funding agencies—the Canada Foundation for Innovation (CFI), the Canadian Institutes of Health Research (CIHR), the National Research Council (NRC), the Natural Sciences and Engineering Research Council (NSERC), and the Social Sciences and Humanities Research Council (SSHRC), are non-voting, ex-officio advisors to the Board of Directors.

The Board of Directors has overall responsibility for the stewardship of the business and affairs of Genome Canada. To help with the discharge of these duties, the Board has in place four standing committees: an Executive Committee, an Audit and Investment Committee, a Governance, Election and Compensation Committee, and a Programs Committee. As well, the Board of Directors has established a Science and Industry Advisory Committee which provides strategic advice and approaches and directions that contribute to the corporation's achievement of its objectives.

## Governance Structure



### About this Document

Genome Canada's Corporate Plan 2015–16 reports on activities and performance for the fiscal year 2014–15 and outlines anticipated activities for fiscal year 2015–16.

The reporting of activities and performance is organized around the three activities stated in Genome Canada's mission statement, and is aligned to the organization's logic model with respect to stated outputs and outcomes.

# SECTION II

## Performance for 2014–15

### 1 – STRATEGY AND PARTNERSHIPS

Connecting ideas and people across public and private sectors to find new uses and applications for genomics

#### OUTPUTS

##### *1—Research/investment strategies in various sectors of the Canadian bio-economy*

**Sector Strategies**—In 2013–14, road maps or strategies were developed through extensive workshop consultations with key stakeholders for each of the following sectors: Agri-Food; Energy and Mining; Forestry; Fisheries and Aquaculture. The sector strategies were used as engagement tools with key stakeholders and serve as roadmaps for Genome Canada’s investments in each of these sectors. Key stakeholders include federal, provincial and regional governments, industry, sector-based regulators and policy-makers, and researchers. The sector strategies were promoted extensively through communications tools and activities designed to connect and communicate these sector strategies to the stakeholder communities.

As well, plans are to conduct an economic analysis of the impact of genomics in each of the sectors. Over the course of 2014, the first economic analysis of the impact of genomics on the forestry sector was initiated with results to be reviewed in the first quarter of 2015.

##### *2—Relationships and partnerships with the national and international genomics community in areas of strategic interest to Canada*

**International Barcode of Life**—The International Barcode of Life (iBOL) project is the largest biodiversity genomics initiative ever undertaken with the objective to construct a DNA barcode reference library that will have practical applications in multiple areas. In the first phase of this project (2009–2015), the iBOL collaborators plan to barcode five million specimens representing 500,000 species.

In August 2014, the iBOL Research Oversight Committee (ROC) met with the iBOL Project Team in Guelph, Ontario to assess the progress being made and to provide advice and guidance to the project team. Overall, the ROC determined that the iBOL project was on target to meet its funded goals.

In October 2014, the International Scientific Collaboration Committee (20 researchers from 14 nations) met in Munich to discuss ongoing collaborations and the future of iBOL.

Genome Canada has allocated \$5 million of the \$165 million received in Budget 2013 to support two years of iBOL operational expenditures: \$2.5 million in 2015–16 and \$2.5 million in 2016–17.

#### OUTCOMES

##### *1—Funded genomics research projects are relevant to sectors of the Canadian bio-economy*

As a result of the sector strategy development, the Board of Directors agreed to the development of RFAs for two Large-Scale Applied Research Project (LSARP) competitions—one focused on Genomics and Feeding the Future which was launched in June 2014; and one focused on Genomics of Natural Resources and the Environment, which will be launched in 2015. Both Competitions will be informed by sector and user needs, as identified through the sector strategy process, ensuring key economic drivers are targeted and focus is placed on areas with a high potential for translation into practical applications.

##### *2—New opportunities arise for research collaboration in strategic areas of interest to Canada, within Canada and at the international level*

As of mid-November 2014, the project has generated more than 4.5 million barcodes representing more than 420,000 species; thus, on track to meet its targets for building an extensive DNA barcode reference library. Significant outcomes included:

- iBOL research was used in a new bio-surveillance program activated in the summer of 2014 in 55 Ontario provincial parks.
- With support from the Canadian Department of Foreign Affairs, Trade and Development, iBOL is undertaking work in Peru on developing barcoding capacity to support biodiversity conservation, sustainable harvesting and trade.
- iBOL staff are providing barcode training to researchers in developing countries
- “Lifescanner: An iPhone app developed in collaboration with SAP to crowdsource the collection and analysis of samples was released in July 2014 with 1000 beta kits (for sending samples) distributed. With Lifescanner, anyone can use an iPhone to collect a tissue sample or whole organism, send it off for analysis and get the species identified based on DNA barcodes.

Connecting ideas and people across public and private sectors to find new uses and applications for genomics

OUTPUTS	OUTCOMES
<p><b>Structural Genomics Consortium</b>—The Structural Genomics Consortium (SGC) is an international public-private partnership of public and private organizations, including pharmaceutical companies from Canada and the United Kingdom. Its core mandate is to determine the three dimensional structures of proteins of therapeutic importance and to place them in the public domain without restriction on their use.</p> <p>Genome Canada has allocated \$5 million of the \$165 million received in Budget 2013 to support two years of SGC operational expenditures: \$2.5 million in 2015–16 and \$2.5 million in 2016–17.</p> <p>Outputs to date include:</p> <ul style="list-style-type: none"> <li>▪ ~2 peer-reviewed publications/week (&gt;97 papers to date in 2014)</li> <li>▪ solved and deposited &gt;1500 novel human structures (~15% of the yearly and overall global output)</li> <li>▪ solved and deposited structures of 4 human integral membrane proteins in the last 24 months</li> <li>▪ Phase III deliverables against targets are on track: 220/200 novel structures; 240/200 recombinant antibodies; 26/30 chemical probes</li> <li>▪ more than 250 active collaborations worldwide</li> </ul>	<ul style="list-style-type: none"> <li>▪ Catalyzed by Genome Canada investment in iBOL, new major barcoding investments were made by Germany, Austria, Norway and New Zealand, increasing the extent of international research collaboration.</li> </ul> <p>With support from Genome Canada, the SGC has developed mechanisms by which disease foundations such as the Huntington Foundation can gain dedicated access to the chemical probes that have potential therapeutic relevance as they emerge from the SGC research pipeline. A pilot partnership initiated with the Huntington Foundation in June 2014 serves as a template for building business model partnerships with other disease foundations.</p>
<p><b>International Rare Disease Research Consortium</b>—Due to investments by Genome Canada and the Canadian Institutes of Health Research in rare disease initiatives such as FORGE, Care for Rare and IGNITE, Canada is a member of an international initiative on rare diseases—the International Rare Disease Research Consortium (IRDiRC). Canada is a key player in IRDiRC, chairing the Executive Committee and having leadership roles in both the Diagnostic and interdisciplinary Working Groups.</p> <p>IRDiRC has laid out a roadmap which would deliver the understanding of the mechanisms underlying most rare diseases by 2020 and develop a plan for the clinical translation of whole genome sequencing for patients with rare diseases.</p> <p>To-date, IRDiRC members have developed 64 new therapies, towards their goal of 200 by 2020.</p>	<p>In 2014, Genome Canada was accepted in E-Rare-3, a consortium of international funders (E-Rare) that has obtained renewal under the European Commission’s <i>ERA-NET Co-Fund Call Program</i> to coordinate rare disease research funding through transnational calls designed to implement the objectives and priorities of the IRDiRC.</p> <p>The rare disease field has also been embraced by the Global Alliance for Genomics and Health as one that could demonstrate the value of being able to openly share genomic and clinical data across jurisdictions.</p>



Connecting ideas and people across public and private sectors to find new uses and applications for genomics

OUTPUTS	OUTCOMES
<p><b>International Mouse Phenotyping Consortium</b>—The International Mouse Phenotyping (IMPC) aims to develop an internationally coordinated approach for phenotyping the mouse mutants being developed.</p> <p>The IMPC's agreed goal is to undertake the phenotyping of 20,000 mouse mutants over a ten year period, providing the first functional annotation of a mammalian genome. The consortium's Phase I (2012–16) goal is to generate and analyze approximately 4,000 mouse mutants produced as part of the International Knockout Mouse Consortium.</p>	<p>Genome Canada membership on the IMPC Steering Committee is as a result of a GC funded project "NorCOMM2 – <i>In vivo</i> models for human disease &amp; drug discovery" (2010 Large-Scale Applied Research Project Competition), which is a member of the IMPC. Increased international coordination of mouse phenotyping research will lead to a better understanding of human diseases.</p>
<p><b>Cancer Stem Cell Consortium</b>—The Cancer Stem Cell Consortium (CSCC), a consortium of Canadian funders including Genome Canada, aims to coordinate an international strategy for cancer stem cell (CSC) research. Through a partnership with the California Institute for Regenerative Medicine (CIRM), two projects have been funded, co-led by Canadian and Californian researchers. One project (Principal Investigators are Drs Dick and Carson) focused on the development of novel agents to treat leukemia and the other project (Principal Investigators are Drs Mak and Slamon) focused on the development of novel small molecule therapeutics targeting cancer-initiating cells in solid tumour cancers.</p> <p>Additional partnerships were established through the 2012 Genomics and Personalized Health Large-Scale Applied Research Project Competition, as well as with the Terry Fox Research Institute to support cancer stem cell research projects and the development of cancer treatments.</p> <p>In March 2014, Genome Canada's Board of Directors approved the parameters for a competition to support a Canadian Cancer Stem Cell Consortium that will build a pan-Canadian, integrated and cohesive cancer stem cell research program with the goal to improve the outcomes of hard-to-treat cancers.</p> <p>In 2014–15, significant efforts were made to secure additional funding to support the Consortium; such as, partnering with Stand up to Cancer (SU2C) — an initiative created to accelerate innovative cancer research to get new therapies to patients quickly; and working with industry partners (particularly pharmaceuticals) to focus on directed research programs with the potential to advance their proprietary internal programs.</p> <p>The SU2C-Canada CSC Dream Team Research Funding opportunity was launched on October 14. Webinars, in English and French, were held on October 30 to inform the research and stakeholder community and to answer questions on the funding opportunity and guidelines. The Canadian Scientific Advisory Committee (CSAC) and the CSC subcommittee have been finalized. Letters of intent were received in December 2014 with final decisions anticipated in July 2015.</p>	<p>Two important advances were made in 2014</p> <ul style="list-style-type: none"> <li>▪ In the February 2014 edition of Nature, the Dick/Carson team reported that it had identified pre-leukemic hematopoietic stem cells in acute myeloid leukemia (AML). Detection and treatment of these pre-leukemia cells may help address therapeutic resistance in AML.</li> <li>▪ A PLK4 inhibitor (CFI-400945) was developed by the Mak/Slamon project and has been approved for clinical evaluation in the US and Canada. This inhibitor has been shown to have significant anticancer activity.</li> </ul>

Connecting ideas and people across public and private sectors to find new uses and applications for genomics

OUTPUTS	OUTCOMES
<p><b>International Cancer Genome Consortium—</b> The International Cancer Genome Consortium (ICGC) aims to coordinate large-scale cancer genome studies in tumours from 50 different cancer types and/or subtypes that are of clinical and societal importance across the globe. Systematic studies of more than 25,000 cancer genomes at the genomic, epigenomic and transcriptomic levels will reveal the repertoire of oncogenic mutations, uncover traces of the mutagenic influences, define clinically relevant subtypes for prognosis and therapeutic management, and enable the development of new cancer therapies.</p> <p>The 10<sup>th</sup> Scientific Workshop of the ICGC will be held in February 2015 in Verona, Italy. Discussions will be focused on refreshing ICGC's strategy.</p>	<p>Genome Canada's membership on the ICGC Steering Committee is as a result of a GC funded project "Stratifying and Targeting Pediatric Medulloblastoma through Genomics" (2010 Large-Scale Applied Research Project Competition), which represents part of the Canadian contribution to the ICGC.</p>
<p><b>CIHR Research Catalyst Network-Rare Diseases—</b> The Research Catalyst Network has an overarching goal to establish a national consortium that will expedite collaboration between basic and clinician scientists in functional studies of novel rare disease genes. CIHR is the key driver of this initiative and will support a single national network for a period of five years. Genome Canada as a partner has contributed \$200,000 of the total \$2.3 million budget.</p> <p>The network will identify instances where Canadian model organism expertise is relevant to a newly discovered disease gene, and when such instances are found, a research project would be initiated to explore the functional characterization of the gene.</p> <p>In 2014–15, one proposal for the establishment of a national consortium on rare diseases was submitted and subsequently approved.</p> <p>The "Rare Diseases: Models and Mechanisms" (RDMM) consortium, will mobilize the entire Canadian biomedical community of laboratory scientists and clinicians to communicate and connect; integrate and share their resources and expertise; and, work together to provide functional insights into newly discovered rare disease genes.</p>	<p>Building on an international reputation for being a leader in rare disease gene identification, this program will help extend Canada's leadership into treatment and therapeutics for rare diseases.</p> <p>The network will provide catalyst grants over 3 years to pro-actively link the most relevant scientists with clinicians identifying disease genes to support immediate experiments. The work of the RDMM will lead to improved understanding of how specific gene mutations cause rare diseases, which will ultimately generate therapeutic leads and experimental approaches for further development.</p>

Connecting ideas and people across public and private sectors to find new uses and applications for genomics

OUTPUTS	OUTCOMES
<p><b>Canadian Institute for Advanced Research</b>—The Canadian Institute for Advanced Research (CIFAR) is a private, not-for-profit institute of advanced study that brings together unique individuals to focus on important questions with the potential to improve human health and the environment, transform technology, build strong societies, understand human culture and even chart the universe.</p> <p>In April 2013, CIFAR launched its <i>Global Call for Ideas</i>— a call for proposals to create one or more new research networks that will address a complex question of importance to humanity.</p> <p>CIFAR's Board of Directors approved four Network proposals to move into a start-up phase, with an anticipated launch in 2015, with the two Networks of interest to Genome Canada receiving Board of Directors approval for a commitment of \$1.25 million:</p> <ul style="list-style-type: none"> <li>▪ Microbes and Humans: Role of the Microbiota in Human Development and Evolution Network</li> <li>▪ Biology, Energy, Technology: The Case for Convergence Network</li> </ul>	<p>In partnership, Genome Canada has an opportunity to advance knowledge in the selected genomics areas and provide additional opportunities for a research community to think beyond their current frameworks.</p>
<p><b>Global Alliance for Genomics and Health</b>—Over 70 leading health care, research, and disease advocacy organizations involving colleagues in over 40 countries have taken initial steps to form an international alliance dedicated to encouraging widespread access to genomic and clinical data by developing a common framework of international technical, operational and ethical standards needed to ensure the interoperability of genomic research platforms in a secure and responsible manner.</p> <p>In June 2013, the GC Board of Directors approved an allocation of up to \$1 million as a signal of GC's support of this initiative, and to allow Canada to take a leadership role in this initiative.</p> <p>On November 25, 2014 Genome Canada and CIHR launched the "Sharing Big Data for Health Care Innovation: Advancing the Objectives of the Global Alliance for Genomics and Health" competition. This competition will provide \$1.5 million to support a single pan-Canadian program to develop a comprehensive strategy that will enable the sharing of genomic and clinical datasets across Canada and around the globe in a responsible, secure and effective manner, thereby accelerating progress in health research and improving patient care.</p> <p>It is expected that the program will leverage existing provincial and national genomic and clinical data sharing efforts and be aligned with international initiatives.</p>	<p>Participation in a global alliance that develops a technology platform with open standards will create new opportunities to gain insight into disease, improve prevention and early detection, define diagnostic categories, streamline clinical trials, and match patient to therapy. The impact can be rapid (e.g., targeted therapy based on genomic characterization) and longer term (discovering molecular targets, leading to new and more effective therapies).</p>

Connecting ideas and people across public and private sectors to find new uses and applications for genomics

**OUTPUTS**

*3–Requirements for supported projects to leverage co-funding from various sources, especially the private sector*

Through its most recent Contribution Agreement with Industry Canada, GC is committed to increasing its 1:1 co-funding ratio that has been traditionally required for all past agreements. The \$165 million Agreement stipulates that as a condition of funding, GC must raise an additional \$280 million in co-funding from other organizations including the private sector. This aligns directly with the strategic plan.

In 2014–15, GC has aggressively pursued partnerships with other organizations on initiatives that pursue similar innovation goals as GC, as noted in the above sections, as well as launching the Genomic Applications Partnership Program (GAPP) specifically targeted at attracting private sector investments.

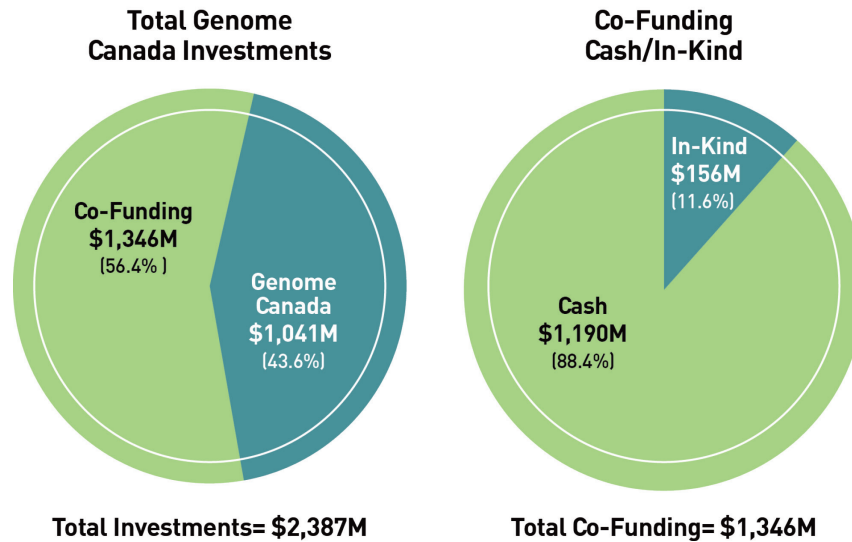
**OUTCOMES**

*3–Increased level of investment by other partners, in particular industry*

As a result of GC's initiatives, co-funding ratios continue to steadily rise. As of December 2014, GC's cumulative investments for all programs since inception comprises of 56% in co-funding and 44% in GC funding (see schematic below).

The successful partnership with CIHR in the \$150 million Personalized Health Competition of 2012 resulted in a co-funding/GC ratio of 2:1, while Genome Canada's emphasis on attracting industry funding through initiatives such as the Genomic Applications Partnership Program has begun to pay dividends in attracting a user and private sector co-funding/GC ratio of 2.7:1.

**Total Genome Canada Investments  
(as of December 2014)**



Investing in large-scale science and technology to fuel innovation

OUTPUTS	OUTCOMES
<p><i>1–Support for large-scale genomics research projects in Canadian research institutions, including GE<sup>3</sup>LS</i></p> <p><b>Applied Genomics Research in Bio-products or Crops Competition</b>—This strategic competition on applied genomics research in the areas of crops, bio-energy, and bio-products (launched in April 2008) resulted in 12 projects receiving a total of \$53 million in Genome Canada funding support.</p> <p>The majority of the projects were to be completed by September 2013. However, 11 of the 12 projects applied for one-time no-cost extensions for up to one year in order to allow more time to complete the approved objectives and research activities.</p> <p>All 12 projects had submitted their final reports in September 2014. Information from the final reports will be used for the evaluation of the program.</p>	<p><i>1–Enhanced knowledge and HQP capacity in Canada in genomics research including GE<sup>3</sup>LS</i></p> <p>The expected outcomes from these projects will have significant impact in the fields of agriculture, bio-products and bio-energy. Some examples of early outcomes include:</p> <ul style="list-style-type: none"> <li>▪ the complete sequence and annotation of the spider mite genome which can eventually allow for development of non-pesticide tools to make agriculture more sustainable.</li> <li>▪ Identification of genes in fungi and identification of novel bacteria that will allow for the development of innovative technologies to convert waste into energy and fuels.</li> <li>▪ Innovative approaches to shape public policy and streamline regulation in order to move innovation from the laboratory towards practical applications.</li> </ul>
<p><b>2010 Large-Scale Applied Research Project Competition</b>—This strategic competition for large-scale research projects (launched in May 2010) focused on the application of genomics research. A total of \$29.1 million of Genome Canada funding was allocated to 9 projects in the areas of forestry and/or the environment and 7 projects in the areas of fisheries, human health and agriculture. Interim review took place over the summer and early fall of 2013.</p> <p>Since interim review, Genome Canada and the Genome Centres have overseen the implementation of the Review Committees' recommendations to ensure the objectives of each project are achieved. All of the projects will be submitting their final reports by June 2015.</p>	<p>In the forestry sector, the projects are exploring the many ways to make Canada's forests more sustainable, including identifying common tree diseases; using genomics to develop short-rotation, fast-growing trees for use in biofuel production; and to study the genes involved in adaptation to local climate conditions</p> <p>In the environment sector, researchers are exploring how genomic technology can be used to serve as an early warning system for problems in natural environments and watersheds; and, studying the use of phytoremediation, a process that uses plants to clean up pollutants.</p> <p>In the agriculture sector, the research will lead to improvements in the health of our livestock and crops, including conducting research into cattle and pig populations as well as creating the next generation of wheat.</p> <p>Within the health sector, the studies are looking for potential new treatments for cancer and rare diseases, while one project is part of an ambitious international partnership that is working to understand the function of each one of the 20,000 genes found in the mouse genome.</p>



Investing in large-scale science and technology to fuel innovation

OUTPUTS	OUTCOMES
<p><b>Large-Scale Applied Research Project Competition 2012 (Genomics and Personalized Health)</b>—This strategic competition for applied genomics research in the area of personalized health (launched January 2012) was undertaken in partnership with the Canadian Institutes of Health Research (CIHR), and the Cancer Stem Cell Consortium (CSCC). A total of \$45 million of Genome Canada funding was allocated to 17 projects.</p> <p>In 2014–15, a National Forum on Genomics and Personalized Health was held in April 2014 in Montreal and brought together the 17 projects in order to explore ways to help coordinate and enhance key components of the translational aspects of the projects. A report from the National Forum is being finalized and will be distributed to appropriate stakeholders.</p>	<p>This competition is focused on projects with a potential to contribute to a more evidence-based approach to health and potential to improve not only the cost-effectiveness of the health-care system, but also to ensure that discoveries are translated into patient and population benefits. The projects will focus on the application of genomics to tailor patient treatments and therapies in fields as diverse as epilepsy, autism, HIV/AIDS, cancer, cardiovascular disease, rare neurological diseases, and stroke, among others.</p>
<p><b>2014 Large-Scale Applied Research Project Competition on Genomics and Feeding the Future</b>—After extensive consultation with end-users, this strategic competition, in partnership with Western Grains Research Foundation, was launched in June 2014. The competition will focus on using genomic approaches within the agri-food and fisheries/aquaculture sectors. A total of 78 registrations were received in August 2014, with 54 of these being submitted as pre-applications in November 2014. After peer review, 27 of these were invited to submit full applications.</p> <p>A total of \$30 million of the \$165 million received in Budget 2013 in Genome Canada funding support is available for this competition.</p>	<p>The outcomes of these projects are anticipated to address challenges and opportunities related to global food safety, security and sustainable production; and thereby, contribute to the Canadian bio-economy and well-being of Canadians.</p>
<p><b>GE<sup>3</sup>LS Third Modality</b>—The 2012 LSARP (Personalized Health) competition introduced a new GE<sup>3</sup>LS research modality. In addition to existing “Integrated GE<sup>3</sup>LS” research components that are conducted within genomics projects and large-scale, stand-alone GE<sup>3</sup>LS research projects, Genome Canada has introduced a model of concurrent research that synthesizes and leverages the efforts of research projects within competitions.</p> <p>In June 2014, the Board of Directors approved an allocation of \$2 million of the \$165 million received in Budget 2013, to support a proposal which involved the establishment of a Genomics and Personalized Health GE<sup>3</sup>LS Network with the inaugural meeting planned for April 2015 as well as the development of a Genomics and Personalized Health Impact Research Initiative.</p>	<p>The expected outcomes of the GE<sup>3</sup>LS Third Modality are to promote networking amongst funded GE<sup>3</sup>LS projects; identify and address overarching research questions; optimize synthesis of all the GE<sup>3</sup>LS research efforts to facilitate the translation into practices and/or policies; and, identify and address the gaps in GE<sup>3</sup>LS efforts that may require additional research attention.</p>

Investing in large-scale science and technology to fuel innovation

OUTPUTS	OUTCOMES
<p><i>2—Support for the operations, research equipment, technology development, and networking of the Genomics Innovation Network (GIN), formerly called Science and Technology Innovation Centres (STICS)</i></p> <p><i>3—Support for the development of technologies that enable genomics research</i></p> <p><b>Science and Technology Innovation Centres Operations Support</b>—Genome Canada provides state-of-the-art technologies, expertise and infrastructure to Genome Canada-funded researchers as well as other researchers from academia and industry through its financial support of the five Science and Technology Innovation Centres (STICs) across Canada. These Centres provide a wide spectrum of genomics technologies, including DNA sequencing, genotyping, RNA expression analysis, protein identification and quantification, metabolomics and the most advanced bioinformatics analyses to manage the vast quantities of complex data produced. The Centres have three main areas of activity: engaging in collaborative research projects, developing technologies and methods, and providing services to Canadian and international researchers.</p> <p>In 2013–14, the Board of Directors approved a funding investment of \$29 million in the renewal of the five existing STICs as well as an additional \$1 million for networking projects amongst the Innovation Centres. This funding supports the Innovation Centres until March 2015.</p> <p>Each of the Innovation Centres is overseen by an Oversight Committee (OC), which provides the required oversight by monitoring progress and advising on future directions. In 2014–15, each of the five Innovation Centres held their first OC meetings with positive progress noted for all.</p>	<p><i>2—Canadian genomics research is enabled through the provision of leading-edge technologies</i></p> <p>The funding for the five STICs reflects the desire to meet the needs and ensure the continued success of projects funded by Genome Canada and other organizations and to further promote technology development and innovation at the STICs.</p> <p><b>McGill University and Genome Quebec Innovation Centre:</b> A world-class research facility for genomics, this Centre has renowned expertise in complex genetic disorders such as cardiac disease, asthma and Type 2 diabetes. It provides a comprehensive suite of services, including complete DNA and RNA analysis, large-scale genomics, as well as genotyping and bioinformatics.</p> <p><b>The Centre for Applied Genomics:</b> Affiliated with the world-renowned SickKids Hospital in Toronto, The Centre for Applied Genomics conducts groundbreaking research in genomics including service and training support for academic, government, and private sector scientists worldwide. It provides a wide variety of services including biobanking (a facility that stores biological samples (usually human) for use in research), informatics, microarray analysis (analyzing many genes in a single experiment quickly and efficiently) and DNA sequencing.</p> <p><b>Genomics Innovation Centre at the B.C. Cancer Agency Genome Sciences Centre:</b> This leading international Centre for genomics and bioinformatics research supports scientists in BC and around the world in addressing critical questions in the life sciences, with a focus on human cancers. As one of the largest capacity genomics centres of its type in Canada, the Centre specializes in high-throughput, large-scale genome research activities including cancer genetics, bioinformatics, DNA sequencing, data analysis, gene expression profiling, and technology development. The Centre also provides training in bioinformatics for health researchers.</p> <p><b>The Metabolomics Innovation Centre:</b> This unique Centre, located in Edmonton, Alberta, and Victoria, British Columbia offers a wide range of cutting-edge metabolomic services for clinical trials research, biomedical studies, bio-products studies, nutrient profiling and environmental testing. The Centre is capable of identifying and quantifying up to 2,000 different chemicals from certain biological samples—about five times more than any other service currently available.</p> <p><b>University of Victoria-Genome BC Proteomics Centre:</b> This Centre provides world-class services and support in identifying and characterizing proteins. It also specializes in quantitative proteomics (identifying differences between samples), enabling researchers to pinpoint differences between healthy and diseased</p>

Investing in large-scale science and technology to fuel innovation

OUTPUTS	OUTCOMES
<p><b>Genomics Innovation Network</b>—In March 2014, Genome Canada’s Board of Directors approved the recommendations of a <i>Working Group on the Future of the STICs</i> on a future model for Innovation Centres beyond March 2015. Individual innovation centres that are successful in receiving Core Operating Support funds through this competition will become founding members (Nodes) of the GIN.</p> <p>In May 2014, the RFA for an open competition for membership to the GIN and receipt of Core Operations Support funds was launched. A total of 36 registrations were received in August 2014 and subsequently 30 full applications were received in October 2014. In November 2014, an international peer review committee met to review the applications. The recommendations of the committee to support 10 GIN Nodes were approved by the Board of Directors at its December 2014 meeting.</p> <p>A total of \$16 million of the \$165 million received in Budget 2013 in Genome Canada funding support was available for this competition.</p>	<p>patients. Research at the Centre is focused on developing new technologies in structural proteomics, clinical proteomics, and protein imaging with the ultimate goal of applying these technologies to customer research projects.</p> <p>The GIN will establish a network of genomic technology innovation centres across Canada that will facilitate an environment that stimulates innovation, enhances collaboration and harnesses the collective power of these Centres for the advancement of genomics research in Canada.</p>
<p><b>2012 Bioinformatics/Computational Biology Competition</b>—This bioinformatics and computational biology competition was launched in June 2012 in partnership with the Canadian Institutes of Health Research. The objective is to support the development of next generation bioinformatics and computational biology tools and methodologies that will be required by the research community to deal with the influx of large amounts of data produced by modern genomics technologies and provide broad access of these new tools to the research community. The competition resulted in 17 projects (8 large-scale applied projects and 9 small-scale innovative projects) receiving a total of \$5 million in Genome Canada funding.</p> <p>In 2014–15, Genome Canada will receive the required annual reports from the 8 large-scale applied projects, which were funded for three years. Final reports from the small-scale innovation projects (SIPs) are also expected.</p>	<p>The outcomes of the projects funded through the Bioinformatics/Computational Biology Competition will not only help support the development of next generation bioinformatics and computational biology tools and methodologies that will be required by the research community to deal with the influx of large amounts of data produced by modern genomics technologies, but also provide broad access to these tools and methodologies.</p>
<p><b>Advancing Big Data Science in Genomics Research</b>—Genome Canada partnered with the Natural Sciences and Engineering Research Council (NSERC), the Canadian Institutes of Health Research (CIHR) and the Canada Foundation for Innovation (CFI) in NSERC’s 2013 Discovery Frontiers Program call for proposals (launched in February 2013) on the exploration and exploitation of genomics data. NSERC, Genome</p>	<p>The competition is designed to further advance this area by supporting the establishment of a single national initiative with strong international linkages and the mandate to develop tools and methodologies for integrating multiple ‘omics’ datasets generated from other disciplines of biological sciences, as well as phenotypic data collected for different organisms of study.</p>

## Investing in large-scale science and technology to fuel innovation

OUTPUTS	OUTCOMES
<p>Canada, CIHR and CFI planned to award one grant through this call, at a total funding level of up to \$1.55 million per year for four years, of which Genome Canada's contribution was to be \$2 million over four years.</p> <p>In April 2014, NSERC announced the successful project was <i>The Cancer Genome Collaboratory</i>, led by Dr. Lincoln Stein from the University of Toronto.</p>	<p>The project funded will develop powerful new computing tools so that researchers can analyze genetic data from thousands of cancers to learn more about how cancers develop and which treatments work best. The powerful new data-mining tools are expected to be available in 2015 for beta testing by selected cancer genomics and privacy researchers. The facility is planned to be opened to the broader research community in 2016.</p>
<p><b>National Bioinformatics and Computational Biology (B/CB) Strategy</b>—Genome Canada and CIHR are co-leading efforts to develop a National Bioinformatics and Computational Biology Strategy. A Steering Committee comprising the Presidents of the three granting councils, CFI, Genome Canada and NRC is overseeing the development of the Strategy. An Advisory Committee was established to lead the development of the Strategy.</p> <p>In June 2014, a strategic planning meeting of the Committee, partners, stakeholders and other members of the B/CB community was held in Toronto. The outputs of this meeting included the establishment of an Advisory Committee which produced a 2-page Executive Summary of the strategy.</p> <p>Further consultations with the broader community over the Winter of 2014 will result in the development of a national B/CB strategy to be presented to Genome Canada's Board of Directors in spring 2015.</p>	<p>The collaborative and consultative efforts of key players with direct or special interest in the field of bioinformatics and computational biology, will result in the development of a multi-year roadmap which details the current state and future opportunities in bioinformatics and computational biology. This strategy will ensure Canada's competitive position in B/CB is coordinated, strengthened and sustained. It will allow Canadians to benefit from the approximately \$11 billion invested in life sciences research over the past decade.</p>
<p><b>Disruptive Innovation in Genomics</b>—The Disruptive Innovation initiative has its genesis with Genome Canada's Science and Industry Advisory Committee which offered authoritative advice to the Board of Directors on Genome Canada's future role in the area of disruptive technologies.</p> <p>The Board of Directors at its June 2014 meeting approved the launch of a competition on Disruptive Innovation in Genomics. The major objective of the RFA is to support the develop of disruptive innovation in the field of genomics, defined as a new genomics-based technology or the application of an existing technology that is transformative in that it has the potential to either displace an existing technology, disrupt an existing market or create a new market.</p> <p>The RFA will be launched in the Spring of 2015. A total of \$15 million from the \$165 million received in the Budget 2013 for Genome Canada funding support has been allocated to this competition.</p>	<p>It is anticipated the disruptive innovations will enable the rapid acceleration of genomics research and will mark a significant leap forward for the genetic revolution; for example, enabling the field of predictive and personalized medicine. New disruptive innovations may decrease the cost of research and/or increase the efficiency and quality of laboratory work. Furthermore, they will provide opportunities for commercialization, which will ensure that Canada takes its rightful place in world bio-economy of the future.</p>

Translating discoveries into applications to maximize impact across all Sectors

OUTPUTS	OUTCOMES
<p><i>1–Support for entrepreneurial education in genomics</i></p> <p><b>Entrepreneurship Education in Genomics (EEG) Program</b>—The Entrepreneurship Education in Genomics (EEG) Program was launched as a pilot in February 2011. Two projects were funded—Genomics Research Entrepreneurship to Accelerate Translation (GREAT) and Boosting Entrepreneurial Skills and Training: BEST in Genomics.</p> <p>The BEST project ended in September 2014 and a final report will be submitted to Genome Canada by the end of 2014. Information from the final report will be used for evaluation purposes.</p> <p>The GREAT project was granted a no-cost extension and the project will end in December 2015.</p> <p>Going forward, the EEG program will focus its mandate on a partnership with Mitacs. Mitacs will be involved in funding internships as part of the Genomic Applications Partnership Program.</p> <p>No funds are required for this Mitacs partnership and the \$2.5 million allocated to EEG will be repurposed and used to fund additional GAPP projects.</p>	<p><i>1–Genomics researchers' entrepreneurial skills are enhanced</i></p> <p>The BEST project has had success with their on-site laboratory presentations:</p> <ul style="list-style-type: none"> <li>▪ 21 on-site presentations to educate on entrepreneurship;</li> <li>▪ 12 projects were coached (GenoRem, SMarTForests); and,</li> <li>▪ 6 projects have gone to work on business plans and company launch for commercialization.</li> </ul> <p>One of the projects coached (Labrie/Agropur) was funded through the GAPP. Finally, the BEST team is thinking of ways to continue their model through external funding.</p> <p>The GREAT project has had success with their Lean Launch Pad project. 15 teams have participated with 10 moving toward commercialization. The program is being expanded to other sectors, such as genomics. The program has resulted in Metamixis, a spin-out to focus on biomass conversion. The company was recently awarded a BC Bio-energy network prize for \$20K. Finally, the GREAT project will be merged with Entrepreneurship@UBC and Genome BC is planning to fund a life science stream for entrepreneurship.</p>



Translating discoveries into applications to maximize impact across all Sectors

OUTPUTS	OUTCOMES
<p><i>2–Support for partnerships between academia and potential users to advance a product, tool or process closer to market or address a significant unmet need</i></p> <p><b>Genomic Applications Partnership Program (GAPP)</b>—The Genomic Applications Partnership Program was launched in June 2013 as a key element in Genome Canada’s strategic plan towards funding downstream research and development projects that are driven by challenges and opportunities facing Users (industry, government, not-for-profits) of genomics based technologies. The GAPP is designed to increase collaboration between genomics scientists and users of genomics research, as well as to stimulate investment from private and public partners to fund projects that address real world challenges and opportunities in the field of genomics.</p> <p>GAPP has completed three funding rounds with another two funding rounds anticipated in 2015. To date, over 70 Expressions of Interest (EOIs) have been reviewed and this has resulted in 17 projects awarded funding. Genome Canada has committed to \$21 million of funding leveraged by \$52 million in co-funding for \$73 million of total funding. The 12 projects from the first two rounds were announced by Hon. Ed Holder, Minister of Science &amp; Technology, in October 2014, which resulted in significant national media coverage.</p> <p>The projects being funded are being monitored quarterly and some are well underway. A couple of the projects are ahead of schedule in meeting their milestones.</p> <p>The review process has been adjusted based on feedback internally and also from the Genome Centres and Applicants. The Core Evaluation Team (CET) feels that the new streamlined process is working well, is more efficient, and resulting in only the highest quality proposals being presented to the CET.</p>	<p><i>2–Increased research partnerships between academia and users</i></p> <p>The anticipated outcomes of the GAPP include:</p> <ul style="list-style-type: none"> <li>▪ Increased engagement of user partners</li> <li>▪ Increase in research partnerships between academia and the private sector to stimulate Canadian innovation</li> <li>▪ Increase in socio-economic value of genomics research by promoting application of research results</li> <li>▪ Increase in level of investment by others, in particular industry</li> <li>▪ Increase in prototypes or early stage products, tools or processes developed and moved closer to the market or application</li> <li>▪ Increase in the level of recognition by sector leaders of the importance of genomics to their sector</li> <li>▪ Increased number of new receptors/ end users involved</li> <li>▪ Increased uptake of genomics research into policy and practice</li> </ul>
<p><i>3–Support for increasing awareness of the value of genomics in society</i></p> <p>In 2014–15, Genome Canada continues to build presence and profile among key target audiences of the value of genomics in society through a variety of approaches (media relations and social media engagement, advertising, publications, events and sponsorships):</p> <p><b>MEDIA AND SOCIAL MEDIA ENGAGEMENT</b></p> <p>Genome Canada engaged in ongoing media relations and social media activities in 2014–15. A significant media opportunity involved the national announcement of the projects selected for funding under Rounds 1 and 2 of the Genomic Applications Partnership Program. The Minister of State for Science and Technology played a key role in this announcement along with other Members of Parliament.</p>	<p><i>3–Stakeholders are informed of genomics investments and recognize their social and economic value</i></p> <p>Genome Canada’s media relations, social media and advertising activities have served to build our corporate profile and convey key messages about the relevance and socio-economic benefits of genomics to Canadians and the targeted stakeholders.</p> <p>Genome Canada received positive international, national and regional media coverage, in particular related to the Genomic Applications Partnership Program funding announcement (more than 50 news items resulted). Media coverage was prominent in both French- and English-language media outlets, particularly within business reports, which contributed to building awareness among the business community that genomics is relevant to industry sectors and there are opportunities for academic-industry partnerships.</p>

Translating discoveries into applications to maximize impact across all Sectors

OUTPUTS	OUTCOMES
<p>Throughout the year, Genome Canada contributed numerous articles and opinion pieces to leading publications targeting policymakers, business leaders and the general Canadian population.</p> <p>Emphasis was also placed on enhancing social media engagement. Genome Canada facilitated dynamic discussion on social media on salient genomics-related topics, most notably during the Genomics: The Power and the Promise international conference.</p> <p><b>PUBLICATIONS AND COLLATERAL MATERIALS</b></p> <p>Genome Canada produced various publications that have served as effective marketing and communications tools for the organization. These include Annual Report 2013–14, sector strategy fact sheets, and a post-conference magazine following Genomics: The Power and the Promise conference. The latter was produced as part of a media partnership with iPolitics. A partnership was also formed with Canadian Science Publishing/NRC Research Press to deliver relevant content to the international genomics research community.</p> <p><b>ADVERTISING</b></p> <p>Genome Canada placed targeted advertising in key publications including The Hill Times, Policy Magazine, Re\$earch Money and iPolitics. A storytelling campaign ‘Genomics Transforming Lives’, highlighting a range of research impacts across multiple Canadian sectors, was delivered over the course of several months in the form of ‘sponsored content’ and promoted via iPolitics’ digital news products.</p> <p><b>PUBLIC OUTREACH</b></p> <p>Genome Canada once again collaborated with the regional Genome Centres to support DNA Day, an annual initiative led by Let’s Talk Science to support high school genomics learning across Canada. This is a full-day bilingual event involving online text-based chats between high school students, teachers and members of the public with genomics experts across Canada. In addition to sponsorship dollars, Genome Canada produced new bilingual videos of its President welcoming students to the event and providing information about genomics and the relevance of DNA Day. An estimated 8,000+ participants took part in the initiative.</p> <p><b>SPONSORSHIPS</b></p> <p>Genome Canada maintains a sponsorship program which provides financial support to a select number of scientific meetings, conferences, seminars, education programs, and other events that relate to genomics research including its GE<sup>3</sup>LS aspects, and that support Genome Canada’s mission.</p>	<p>Media interviews and opinion piece contributions to prominent mainstream news outlets (e.g. Globe and Mail, Ottawa Citizen, SRC Radio) on topics including genomics and the environment, gene patenting and the role of genomics in Canada’s bio-economy helped position Genome Canada as a thought-leader on these issues. Articles and op eds contributed to Policy Magazine, the Hill Times and other sources further raised the profile of the important role of genomics in society to federal policymakers and business leaders.</p> <p>Social media engagement resulted in substantial growth of ‘followers’ on Twitter and increased interaction with the online community interested in genomics. There were a total of 2,188 tweets during the Genomics: The Power and The Promise conference using the #powerofgenomics hashtag, resulting in more than 3 million social media impressions for the content discussed.</p> <p>These sponsorship opportunities provide a platform to showcase Canadian genomics science to selected audiences around the world, as well as increase Genome Canada’s profile and raise awareness of genomics research.</p>

Translating discoveries into applications to maximize impact across all Sectors

OUTPUTS	OUTCOMES
<p>In 2014–15, funding commitments by Genome Canada to sponsorship opportunities, included:</p> <ul style="list-style-type: none"> <li>▪ 13<sup>th</sup> Annual Research Money Conference (April 22–23 – Ottawa, ON)</li> <li>▪ Canadian Bioethics Society Annual Meeting (May 28–30, Vancouver, BC)</li> <li>▪ Canadian Science Writers' Association (June 5–8, Toronto, ON)</li> <li>▪ 2014 Biotechnology Industry Organization International Conference (June 23–26 – San Diego, CA)</li> <li>▪ 2014 Henry Friesen International Prize in Health Research (Sept 16–19 – Ottawa, ON)</li> <li>▪ 8<sup>th</sup> International Cancer Genome Consortium (Sept. 30 – Oct. 2 – Toronto)</li> <li>▪ 2014 Agricultural Bioscience International Conference (October 5–8 – Saskatoon, SK)</li> <li>▪ Biorefining Conversions Network (October 21–23, Banff, AB)</li> </ul>	
<p><b>CORPORATE EVENTS</b></p> <p>On an annual basis, Genome Canada, often in collaboration with the Genome Centres, is engaged in the organization of select corporate events of national or international import.</p> <p>In 2014–15, Genome Canada was actively engaged in the following corporate events:</p> <ul style="list-style-type: none"> <li>▪ Congress 2014 of the Humanities and Social Sciences (May 24–30 – St. Catharines, ON)</li> <li>▪ 2014 Biotechnology Industry Organization International Conference (June 23–26 – San Diego, CA)</li> <li>▪ Canadian Science Policy Conference (October 15–17 – Halifax, NS)</li> <li>▪ Genomics: The Power and the Promise (November 24–26 – Ottawa, ON)</li> </ul>	<p>Genome Canada corporate events are marketing and communication tools that are key to strategically position the corporation as a catalyst for showcasing the potential of genomics research and its potential impact on the economic and social wellbeing of Canadians.</p> <p>In particular, Genome Canada's signature event — Genomics: The Power and the Promise, hosted in partnership with the Gairdner Foundation, successfully brought together stakeholders across many government departments, not-for-profits, academic institutions, media, students and industry representatives to exchange information and dialogue about the cutting-edge advances in the field of genomics. Over 350 participants attended and sponsorship targets to offset costs of the event were met.</p>
<p><b>GENOMICS IN SOCIETY ENGAGEMENT ACTIVITIES</b></p> <p>One of the objectives of the strategic plan is to: <i>Enhance the impact of genomics by transforming knowledge of the ethical, environmental, economic, legal and social challenges and opportunities into sound policies and practices.</i> This objective builds on the GE<sup>3</sup>LS research capacity that has been developed over the years, and extends into more directed efforts to inform science, technology and innovation undertakings related to genomics and its responsible application. Accordingly, the term "Genomics in Society" is being used to refer to GE<sup>3</sup>LS research and other related activities.</p>	

Translating discoveries into applications to maximize impact across all Sectors

OUTPUTS	OUTCOMES
<p>In 2014–15, the following key Genomics in Society engagement activities occurred:</p> <p><b>Genomics, Public Policy and Society (GPS) series</b>—The GPS series is intended to: broker a dialogue between federal policy-makers and researchers on issues that arise at the interface of genomics and society; help foster evidence-based public policy; and identify timely and socially-relevant research priorities.</p> <p>A GPS event was held in conjunction with the annual Congress of the Humanities and Social Sciences, held May 2014 in St. Catharines, ON. A draft policy brief entitled: “Feeding the Future: Can Scientist, Regulators and Activities Agree?” was presented. Invited commentators represented the perspectives of regulatory oversight from Health Canada, a small/medium business enterprise involved in horticulture R&amp;D, and an academic with policy expertise.</p> <p><b>Congress 2014 of the Humanities and Social Sciences</b>—The annual Congress is organized by the Canadian Federation for the Humanities and Social Sciences and brings together academics, researchers, policy-makers, and practitioners to share findings, refine ideas, and build partnerships. More than 70 scholarly associations participate, attracting close to 5,000 participants.</p> <p>In addition to organizing a GPS event at this Congress, Genome Canada also held a session describing GE<sup>3</sup>LS research and how it is funded, as part of “Career Corner”.</p> <p><b>Partnership with Social Sciences and Humanities Research Council (SSHRC)</b>—At its September 2014 Board meeting, Genome Canada’s Board of Directors agreed to establish a partnership with SSHRC and provide up to \$1 million in funding support to appropriate SSHRC programs in order to solicit applications related to GE<sup>3</sup>LS topics, beginning with research that addresses disruptive genomic-based innovation, and subsequently genomics more broadly. Discussions are currently underway.</p>	<p>Provided evidence-informed policy options that can help advance the uptake of genomic-based innovations by Canadian companies and other users, and improve policy-making related to genomic-based technologies in various sectors.</p> <p>Enhanced stakeholder understanding of the cross-sectoral application of genomics.</p> <p>The partnership will help to reach a community of stakeholders in social science and the humanities who may be unfamiliar with the GE<sup>3</sup>LS research program, or whose areas of expertise had not yet extended to genomic science and technologies and related societal considerations, thereby helping to support an expanded array of disciplinary approaches, and develop greater capacity.</p>

## SECTION III

# Grant Management for 2014–15

The federal government, through Industry Canada, has committed a total of \$1.2 billion in funding for Genome Canada since 2000–01. All funding is provided through funding agreements between Genome Canada and Industry Canada. Genome Canada also raises additional co-funding from others, including other levels of the public sector, the voluntary sector and the private sector.

### INVESTMENT AND MANAGEMENT OF FUNDS

The Audit and Investment Committee supports the Board of Directors of Genome Canada in fulfilling its fiduciary responsibilities with respect to the management of funds. It meets quarterly and reports to the Board on the outcome of their deliberations.

The Committee is responsible for:

- overseeing the investment and management of funds received from the Government of Canada according to a Board-approved investment policy that outlines guidelines, standards and procedures for the prudent investment and management of funds; and,
- overseeing Genome Canada’s policies, processes and activities in the areas of accounting and internal controls, risk management, auditing and financial reporting.

The Programs Committee brings further oversight to the management of funds by ensuring research funding and activities are aligned to Genome Canada’s strategic priorities. The Committee provides advice to the Board of Directors on research programs and projects, research partnerships and collaborations, competitions, and program evaluation.

### SOURCE AND USE OF FUNDS

Genome Canada currently manages funds arising from the following 5 funding agreements:

#### Genome Canada Funding Agreements with Industry Canada

FUNDING AGREEMENT	COMPETITIONS AND PROJECTS FUNDED
<b>2008</b> (\$140 million)	<ul style="list-style-type: none"> <li>▪ Competition in Applied Genomics in Bio-products and Crops.</li> <li>▪ Two research projects through the Cancer Stem Cell Consortium, the International Barcode of Life project.</li> <li>▪ Support for the S&amp;T Innovation Centres, the operations of six regional Genome Centres, as well as the operations of Genome Canada through to 2012–13.</li> </ul>
<b>2010</b> (\$75 million)	<ul style="list-style-type: none"> <li>▪ Competition in forestry and the environment.</li> <li>▪ Multi-sector Competition.</li> <li>▪ Competition for Science and Technology Innovation Centre Operations Support.</li> </ul>

**2012**

(\$65 million)

- Competition in applied genomics research in personalized health.
- Funding of Phase III of the Structural Genomics Consortium, and the International Barcode of Life project.
- Funding for the Public Population Project in Genomics.
- Competition in the area of bioinformatics and computational biology.
- Contribute to the operations of six regional Genome Centre and Genome Canada through to 2013–14.

**2013**

(\$60 million)

- Funding for Genomic Applications Partnership Program (GAPP).
- Funding for renewal of STICs for two years.
- Funding of the Structural Genomics Consortium, and the International Barcode of Life project.

**2014**

(\$165 million)

- Two competitions in large-scale applied genomics research.
- Funding for the Genomics Innovation Network operations in 2015–16 and 2016–17 as well as related technology development and collaborative projects.
- Funding for national and international partnerships.
- Contribute to the operations of six regional Genome Centres and Genome Canada through to 2016–17.

**CASH MANAGEMENT**

Genome Canada disburses funds on a quarterly basis through the six regional Genome Centres for approved research projects and S&T Innovation Centres. On a quarterly basis, each Genome Centre is required to review the expenditures to date and estimate cash requirements for Centre operations and for each project and innovation centre that it manages. It then submits a “draw request” to Genome Canada indicating the cash needs of the Centre for the subsequent quarter. The Genome Centres assess the project/innovation centre needs against the approved budget, actual expenditures, scientific progress to date and co-funding received from other sources. Genome Canada then conducts its own thorough review of the draw request submission before releasing funds.



## Summary of Receipts and Disbursements

<b>DETAILS</b> (IN MILLIONS OF DOLLARS)	<b>PROJECTS FUNDED</b>	<b>ACTUALS</b> 2000-01 TO 2013-14	<b>FORECAST</b> 2014-15	<b>FORECAST CUMULATIVE</b> TO 2014-15
<b>RECEIPTS</b>				
Government of Canada		945.5	69.8	1,015.3
Investment Income		88.8	0.4	89.2
		1,034.3	70.2	1,104.5
<b>PROGRAM AND OPERATING DISBURSEMENTS</b>				
Research Projects				
Projects and Programs Completed in Previous Years	120	537.1		537.1
Applied Genomics in Bio-products and Crops	12	52.1	2.9	55.0
2010 LSARP: Multi-Sector*	7	22.7	8.3	31.0
2010 LSARP: Forestry and Environment	9	23.5	5.5	29.0
Entrepreneurship Education in Genomics	2	0.6	0.6	1.2
2012 LSARP: Genomics and Personalized Health	17	12.6	9.7	22.3
Bioinformatics/Computational Biology	17	1.3	1.8	3.1
Genomic Applications Partnership Program (GAPP)	12		3.0	3.0
Advancing Big Data Science	1		0.5	0.5
Detection and Surveillance of <i>Listeria</i> , and <i>E. coli</i>	3	0.3	0.2	0.5
Structural Genomics Consortium	1	37.3	3.8	41.1
International Barcode of Life	1	11.2	4.4	15.6
Cancer Stem Cells Consortium	3	10.1	4.2	14.3
	<b>205</b>	<b>708.8</b>	<b>44.9</b>	<b>753.7</b>
Science & Technology Innovation Centres	5	139.4	15.4	154.8
Genome Centres Operations		73.0	4.8	77.8
<b>GENOME CANADA OPERATING EXPENDITURES</b>		<b>88.2</b>	<b>6.6</b>	<b>94.8</b>
<b>Total Disbursements</b>	<b>210</b>	<b>1,009.4</b>	<b>71.7</b>	<b>1,081.1</b>
<b>Excess (Deficiency) of Receipts over Disbursements</b>		<b>24.9</b>	<b>-1.5</b>	<b>23.4</b>
<b>Opening Cash Balance</b>			<b>24.9</b>	
<b>Closing Cash Balance</b>		<b>24.9</b>	<b>23.4</b>	

\*LSARP = Large-Scale Applied Research Projects

# SECTION IV

## Plans for 2015–16

### 2015–16 PROJECT AND PROGRAM PLANNING

For the 2015–16 fiscal year, Genome Canada is developing and putting into place programs and initiatives funded by the \$165 million contribution announced by the Government of Canada in its 2013 federal budget. In June 2013, Genome Canada’s Board of Directors approved initial allocations of this Government of Canada contribution as follows:

(IN MILLIONS OF \$)	
<b>LARGE-SCALE SCIENCE</b>	
<b>Applied Research Competitions:</b>	
▪ Genomics in Society <sup>3</sup> Initiative	2.0
▪ Large-Scale Applied Research Project Competition	28.0
▪ Large-Scale Applied Research Project Competition	28.0
<b>Strategic Partnership Programs:</b>	
▪ Structural Genomics Consortium	5.0
▪ International Barcode of Life Project	5.0
▪ New Strategic Initiatives	10.0
<b>ACCESS TO LEADING-EDGE TECHNOLOGY</b>	
▪ STIC Competition (operations)	30.0
▪ Technology Development Competition (Disruptive Innovations)	15.0
<b>TRANSLATION</b>	
▪ Entrepreneurial Program	.0
▪ Genomics Applications Partnerships Program (GAPP)	7.8
<b>OPERATIONS SUPPORT</b>	
▪ Genome Canada	19.8
▪ Genome Centres	14.4
<b>Total</b>	<b>165.0</b>

**Large-Scale Science**—A minimum of \$50 million in funding is allocated to the design and launch of two Large-Scale Applied Research Project (LSARP) Competitions. The first LSARP – Genomics and Feeding the Future - was launched in June 2014. Full applications will be received in the early part of 2015–16 with an expectation that \$30 M in Genome Canada funding will begin to flow to the successful applicants in the latter part of the fiscal year. The parameters, principles and request for application guidelines for the second LSARP – Natural Resources and the Environment will be developed over the remainder of the 2014–15 fiscal year and will be launched in the early part of the 2015–16 fiscal year.

A total of up to \$2 million in funding is allocated to a Genomics in Society initiative – the GE<sup>3</sup>LS Third Modality, which aims to ensure that GE<sup>3</sup>LS research funded through the 2012 LSARP competition on personalized health can be coordinated or complemented to best

<sup>3</sup> Genomics in Society includes GE<sup>3</sup>LS Research (ethical, environmental, economic, legal and social aspects of genomics research) and related activities that inform science, technology and innovation undertakings related to genomics and its responsible application, and facilitate the translation of genomics and GE<sup>3</sup>LS knowledge into sound policies and practices.

meet the goals stipulated in each project. Two initiatives are planned: the establishment of a Genomics and Personalized Health GE<sup>3</sup>LS Network -the inaugural meeting is to take place in Spring 2015 - as well as the development of a Genomics and Personalized Health Impact Research Initiative.

A total of up to \$10 million (\$5 million to each consortium) in funding is allocated to the iBOL and SGC consortia for two years of operational funding support.

A total of up to \$10 million of funding has been set aside for other strategic research priorities determined by the Genome Canada Board of Directors in 2014–15. To-date, the following funding has been committed:

- European Research Areas (E-Rare-3) – \$1 million
- SSHRC Partnership Initiative – \$1 million
- Research Catalyst Network – Rare Diseases – \$200,000
- Canadian Institute for Advanced Research – \$1.25 million

**Access to Leading-Edge Technology** — A total of up to \$45 million in funding is allocated to support leading-edge technologies that enable Canadian genomics research, including support for the genomic technology innovation centres until fiscal year 2016–17 and a competition in Disruptive Innovation.

In March 2014, the Board of Directors approved the recommendations of a *Working Group on the Future of the STICs* on a future model for Innovation Centres beyond March 2015. In May 2014, the RFA for an open competition for membership to the Genomics Innovation Network (GIN) and receipt of Core Operations Support funds was launched and ten GIN Nodes were approved by the Board of Directors in December 2014.

**Translation** — Up to \$2.5 million in funding initially allocated to entrepreneurial programs has been repurposed to GAPP, in order to give more opportunities for Mitacs internships; and, up to \$5.3 million in funding is to be allocated to the Genomics Applications Partnerships Program in addition to the \$30 M the program previously allocated from Budget 2012.

**Operations Support** — A total of \$19.8 million in funding is allocated to support the operations of Genome Canada and \$14.4 million to support the operations of the 6 Genome Centres until fiscal year 2016–17.

**On-going Projects and Programs**—Along with the initiatives mentioned above which will be either initiated or on-going in 2015–16, Genome Canada will continue the necessary fostering of partnerships, administrative oversight, and/or monitoring of the following major initiatives which were launched in previous fiscal years:

- 2012 Large-scale Applied Research Project Competition
- 2010 Large-Scale Applied Research Project Competition
- Applied Genomics in Bio-products or Crops Competition
- Bioinformatics/Computational Biology Competition
- Emerging Issue on *Listeria*
- Emerging Issue on *E. coli*
- Emerging issue on Porcine Epidemic Diarrhea virus
- Emerging issue on the Mount Polley Mine Tailings Dam Breach
- International Rare Disease Research Consortium

- International Mouse Phenotyping Consortium
- Cancer Stem Cell Consortium
- International Cancer Genome Consortium
- CIHR Research Catalyst Network
- Canadian Institute for Advanced Research Partnership
- Global Alliance for Genomics and Health
- Advancing Big Data Science in Genomics Research
- National Bioinformatics Strategy

### **Five Year Evaluation (March 2014): Implementation of Recommendations**

As per the funding agreements with Industry Canada, Genome Canada is required to submit an independent third-party evaluation of its activities and projects every five years. The last evaluation was completed in March 2014. The Five Year Evaluation assessed Genome Canada's relevance and past performance over the period from 2009–10 to 2013–14. Its findings helped inform management and other stakeholders on progress and provided the opportunity to reflect on how Genome Canada is executing its Strategic Plan (2012–2017) and how to best implement the organization's strategic direction going forward.

Six recommendations arose from the evaluation that were considered by the Management and Board of Directors of Genome Canada in a formal management response. These recommendations are listed below and will be implemented in 2015–16 and beyond:

- Genome Canada, working with the Genome Centres, should seek out and/or create joint initiatives with a broader range of public and private organizations aiming to achieve similar objectives (e.g., R&D funding programs, partnership programs, business innovation, etc.).
- Genome Canada should coordinate with the Genome Centres to develop a communications and engagement plan that identifies strategies for specific audiences/sectors and facilitates the sharing of communications tools and resources.
- Genome Canada should address current information gaps on the effectiveness and weaknesses of integrated GE<sup>3</sup>LS to confirm its value in facilitating translation of genomics research and to develop criteria and guidelines to help adjust practices for the integration of GE<sup>3</sup>LS.
- Genome Canada should further improve working relationships with Genome Centres and collaboratively develop focused and customized funding programs that address the needs of specific sectors, including both large-and small-scale projects, as appropriate.
- Genome Canada should encourage the five Science and Technology Innovation Centres (STICs) to build on their unique strengths (e.g., providing analytical expertise, developing training programs and providing leading-edge technologies at an affordable cost) and to develop clearer policies and guidelines regarding data sharing and intellectual property, with a view to promote more open access to data.
- Genome Canada should continue to improve its performance measurement and reporting structures, as well as seek to better integrate its different databases.

## PLANNED RECEIPTS AND DISBURSEMENTS 2015–16 AND SUBSEQUENT YEARS

The following table provides a preliminary estimate of the receipts and disbursements for 2015–16 and subsequent fiscal years as of December 2014. The Operating Budget for fiscal year 2015–16 will be presented to the Genome Canada Board of Directors for approval in March 2015.

### Planned Revenues and Expenditures 2015–16 and Subsequent Years

DETAILS (IN MILLIONS OF DOLLARS)	GENOME CANADA				ESTIMATED CO-FUNDING FOR THOSE YEARS	TOTAL GENOME CANADA AND CO-FUNDING	%
	FORECAST CUMULATIVE 2000–01 TO 2014–15	PLANNED 2015–16	PLANNED SUBSEQUENT YEARS	FORECAST TOTAL			
<b>RECEIPTS</b>							
<b>Government of Canada</b>							
Government of Canada Previous Agreements	700.0			700.0		700.0	23.5%
Government of Canada March 2008 Agreement	126.4	7.4	6.2	140.0		140.0	4.7%
Government of Canada March 2010 Agreement	75.0			75.0		75.0	2.5%
Government of Canada January 2012 Agreement	43.6	13.5	7.9	65.0		65.0	2.2%
Government of Canada January 2013 Agreement	47.5	7.5	5.0	60.0		60.0	2.0%
Government of Canada January 2014 Agreement	22.8	39.0	103.2	165.0		165.0	5.5%
<b>Investment Income</b>	89.2	0.3	0.3	89.8		89.8	3.0%
<b>Co-Funding</b>					1,686.0	1,686.0	56.6%
	<b>1,104.5</b>	<b>67.7</b>	<b>122.6</b>	<b>1,294.8</b>	<b>1,686.0</b>	<b>2,980.8</b>	<b>100.0%</b>
<b>PROGRAM DISBURSEMENTS</b>							
<b>Research Projects</b>							
Projects and Programs Completed in Previous Years	537.1			537.1	635.1	1,172.2	39.4%
2010 LSARP: Multi-Sector*	31.0			31.0	33.8	64.8	2.2%
2010 LSARP: Forestry and Environment	29.0			29.0	30.3	59.3	2.0%
Applied Genomics in Bio-products and Crops	55.0			55.0	62.6	117.6	4.0%
Bioinformatics/Computational Biology	3.1	1.3	0.6	5.0	4.0	9.0	0.3%
Genomic Applications Partnership Program (GAPP)	3.0	7.0	25.3	35.3	70.6	105.9	3.6%
2012 LSARP: Genomics and Personalized Health	22.3	12.7	11.9	46.9	98.4	145.3	4.9%
LSARP 2014 and 2015		5.3	50.7	56.0	112.0	168.0	5.6%
GE <sup>3</sup> LS Third Modality		1.0	1.0	2.0	4.0	6.0	0.2%
Advancing Big Data Science	0.5	0.5	1.0	2.0	5.5	7.5	0.3%
Detection and Surveillance of <i>Listeria</i> and <i>E. coli</i>	0.5			0.5	0.5	1.0	0.0%
Entrepreneurship Education in Genomics	1.2	1.0	1.0	3.2	6.4	9.6	0.3%
Structural Genomics Consortium	41.1	1.2		42.3	274.8	317.1	10.7%

International Barcode of Life	15.6	0.6		16.2	36.6	52.8	1.8%
Cancer Stem Cell Consortium	14.3	3.4	5.3	23.0	60.8	83.8	2.8%
Other Initiatives (including Global Alliance)		2.5	8.5	11.0	31.0	42.0	1.4%
	<b>753.7</b>	<b>36.5</b>	<b>105.3</b>	<b>895.5</b>	<b>1,466.4</b>	<b>2,361.9</b>	<b>79.3%</b>
<b>Access to Leading Edge Technologies</b>							
Science and Technology Innovation Centres	154.8	15.0	15.0	184.8	77.1	261.9	8.8%
Disruptive Innovation		4.2	10.8	15.0	30.0	45.0	1.5%
	<b>154.8</b>	<b>19.2</b>	<b>25.8</b>	<b>199.8</b>	<b>107.1</b>	<b>306.9</b>	<b>10.3%</b>
<b>Genome Centres Operations</b>	<b>77.8</b>	<b>4.8</b>	<b>4.8</b>	<b>87.4</b>	<b>112.5</b>	<b>199.9</b>	<b>6.7%</b>
<b>GENOME CANADA OPERATING EXPENDITURES</b>	<b>94.8</b>	<b>6.6</b>	<b>6.6</b>	<b>108.0</b>		<b>108.0</b>	<b>3.6%</b>
<b>Total Disbursements</b>	<b>1,081.1</b>	<b>67.1</b>	<b>142.5</b>	<b>1,290.7</b>	<b>1,686.0</b>	<b>2,976.7</b>	<b>100.0%</b>
<b>Excess Receipts over Disbursements</b>	<b>23.4</b>	<b>0.6</b>	<b>-19.9</b>	<b>4.1</b>			
<b>Opening Cash Balance</b>		<b>23.4</b>	<b>24.0</b>				
<b>Closing Cash Balance</b>	<b>23.4</b>	<b>24.0</b>	<b>4.1</b>	<b>4.1</b>			

\* LSARP = Large-Scale Applied Research Project



## **SECTION V**

# Performance, Audit and Evaluation

Genome Canada has a wide array of policies, systems and processes that have been developed over time to address issues of performance, audit and evaluation. In 2013–2014, the Board of Directors approved an updated performance, audit and evaluation strategy (PAES) to ensure that a comprehensive and integrated approach to these functions was established and maintained.

### **ANNUAL AUDIT**

The annual audit of the financial statements of Genome Canada is conducted within 45 days of each fiscal year-end in accordance with generally accepted Canadian auditing standards. The objective is to express an opinion on whether Genome Canada's financial statements present fairly, in all material respects, the financial position, results of operations, and cash flow of the corporation. Upon completion of the audit, the financial statements and a summary of audit findings are presented to the Audit and Investment Committee and then to the Board of Directors for approval.

### **RECIPIENT AUDIT**

Genome Canada has developed and implemented a recipient audit framework in consultation with the Genome Centres. As part of this exercise, a risk assessment tool was developed to enable the Centres to identify projects and Science and Technology Innovation Centres that would undergo a detailed compliance audit. This framework was introduced to bring a common approach to recipient audits across Canada and to improve the management control framework within which genomics research is administered.

### **COMPLIANCE AUDIT**

In fiscal year 2011–12 Industry Canada, as a routine practice, initiated a compliance audit of Genome Canada conducted by an independent accounting firm. The stated objective of the audit was to assess Genome Canada's compliance with the requirements of the funding agreement that was in effect in fiscal year 2010–11. The resulting audit report concluded that *"...we are of the opinion that GC did comply with the requirements of its funding agreement with Industry Canada"*.

### **EVALUATION**

The terms and conditions of Genome Canada's funding agreements with Industry Canada specify that every five years it shall carry out an independent third-party evaluation of its grants to eligible projects, including its own activities and projects. It further states that the evaluation will measure overall performance in achieving the objectives identified in the funding agreement. In 2008–09, Genome Canada underwent a full third-party summative evaluation to determine to what extent it had achieved its objectives and mandate. The evaluation concluded that overall, the rationale for Genome Canada remains strong and important and that there has been a "transformative" impact of Genome Canada on Canadian genomics research.

The second, five-year evaluation of Genome Canada was completed in March 2014. The Five Year Evaluation assessed Genome Canada's relevance and past performance over the period from 2009–10 to 2013–14. Its findings helped inform management and other stakeholders on progress and how to best implement the organization's strategic direction going forward.

The evaluation demonstrated Genome Canada's value and alignment to Canada's Science and Technology Strategy and made it clear that Genome Canada is progressing in the right direction for achieving its own strategic plan. A number of strengths were highlighted in the report particularly around the quality of the research that is undertaken. The report noted that Genome Canada has directly contributed to enhancing support and capacity for genomics research through its funding programs, and through the development and implementation of a coordinated national strategy. Genome Canada has made a positive contribution to enhancing Canada's international profile and visibility in genomics, and to attracting additional investments to support genomic research. The output of peer-reviewed papers produced by principal investigators increased significantly with Genome Canada funding, furthermore, so did the scientific impact (i.e., paper citations, proportion of papers in the 10% most cited category). These positive indictments of the scientific research speak to the rigour of the peer review process that ensures that Genome Canada funds at the highest standard of research.

Notwithstanding the positive advancements made by Genome Canada between 2009 and 2014, there were areas highlighted in the report that warranted further consideration as we forge ahead with delivering on our strategic plan.

Six recommendations arose from the evaluation that were considered by the Management and Board of Directors of Genome Canada in terms of contextual considerations, strategic implications and action items to be addressed. The implementation plan for these action items that arose from these discussions has been incorporated into this annual corporate planning cycle (as noted previously in section IV). While some can be easily achieved with distinct projects and short timeframes others are more long term initiatives embedded into ways of working.

Anticipated research and evaluation activities for 2015–16 include:

- Further development of the national database to collect and report on performance indicators arising from Genome Canada funded projects and internal performance measurement.
- A series of in-house and funded research projects that tackle a number of priority national evaluation issues.
- Dissemination and knowledge translation of the findings and recommendations arising from the Five Year Evaluation.
- The development and /or participation in evaluative communities of practice with other Science and Technology organizations.

# SECTION VI

## Risks and Challenges

### RISK MANAGEMENT

Risk management is integrated into all operational, managerial and governance activities of Genome Canada. Strategic risks arising from the external operating environment as well as the internal operational environment are assessed on an ongoing basis:

- At the project selection level, risk is managed and mitigated through a process that restricts funding to only those projects judged to have the greatest probability of success from both a scientific and managerial point of view. The viability of each project's success is further mitigated through ongoing monitoring and interim review.
- At the operational level, officers of Genome Canada identify risks and propose strategies for mitigating and reporting (e.g. due diligence routines for review of draw requests and for interim reviews of funded projects).
- At the managerial level, policies, systems, processes and procedures (administrative, financial, human resource management) are developed, implemented and monitored.
- At the governance level, the Board of Directors and its committees are aware of their risk management responsibilities and exercise modern governance practices with respect to policy approval and oversight.
- The Audit and Investment Committee is responsible for the monitoring of risk and mitigation strategies, and regularly reviews the organization's corporate risk profile.
- The Genome Canada internal working environment culture is one that values honesty, integrity and ethical conduct.

### CHALLENGES

#### Co-Funding

To fully implement its five-year strategic plan, Genome Canada proposed a multi-year funding approach as a means of demonstrating to external stakeholders, including the private sector, the federal government's commitment and resolve in supporting genomics and its contribution to Canada's bio-economy. Under a multi-year funding model, Genome Canada proposed, in 2012, to work toward increasing the leverage ratio from 1:1 to 1:2. Over the past two years, Genome Canada has been able to achieve this ambitious ratio as a result of its greater orientation towards research application. However, to ensure continuing this momentum of securing co-funding at a ratio of approximately 1:2 on a more permanent basis, Genome Canada would require a longer-term federal investment over the next five years.

#### Multi-year Funding

Year-to-year funding inhibits strategic investment planning, and the leveraging of complementary actions on the part of our regional partners. A multi-year federal funding commitment from the federal government at a level substantial enough to allow for the full implementation of the Strategic Plan would position Genome Canada as a stable and credible partner with industry and with the provinces. These co-funding partners require a multi-year planning horizon for the kind of large-scale investments that genomics research generally entails.

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### **Government of Canada**

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