



DRIVING INNOVATION,  
CREATING IMPACT

ANNUAL REPORT 2016-2017



**GenomeAtlantic**

Life Sciences. Life Solutions.

## HARNESSING THE POWER OF GENOMICS

Genomics encompasses a suite of game-changing technologies that are driving the growth of the bioeconomy and transforming health. Genome Atlantic works with public sector and private sector partners and academic researchers to develop genomics solutions that are helping Atlantic Canadian companies to be more productive, sustainable and globally-competitive. We work in seven sectors - aquaculture and fisheries, agriculture, energy, the environment, human health, forestry, and mining – facilitating more than \$90 million in applied, end-user-driven genomics R&D to date.

Three years ago, Genome Atlantic embarked on an ambitious three-year plan to meet the increasing needs of Atlantic Canadian businesses for genomics solutions. This plan aimed to achieve a more robust approach to business development, new industry-academic partnerships, a focus on strategic industry sectors, and more private-sector investments in genomics R&D.

The 2016-2017 reporting year marks the third and final year of this plan during which Genome Atlantic has not only achieved but surpassed our goals.

Genome Atlantic gratefully acknowledges the generous assistance of the Government of Canada through Genome Canada, the Atlantic Canada Opportunities Agency, the National Research Council of Canada (Industrial Research Assistance Program), and the Government of Newfoundland and Labrador in supporting this work and helping us to contribute to Atlantic Canada's health, growth and prosperity.

**Genome Atlantic** is a not-for-profit corporation with a mission to help Atlantic Canada reap the economic and social benefits of genomics and other 'Omics technologies. Working with a broad range of partners, Genome Atlantic is part of a national network of genome centres that are enabling innovative, genomics-driven solutions in agriculture, aquaculture and fisheries, energy, the environment, forestry, human health and mining.

## DE-RISKING INVESTMENT THROUGH GENOMICS R&D

According to the Conference Board of Canada's Innovation Scorecard, Canada's relatively low ranking in innovation is due to two key factors: there is not enough business investment in R&D and not enough research at post-secondary institutions is end-user-driven.

Genome Atlantic is part of the solution, employing a comprehensive approach that de-risks business investment while ensuring that funded projects deliver the maximum benefit for business and public sector clients.

In partnership with many organizations throughout the region and beyond, Genome

Atlantic has helped enable more than \$90 million in R&D to date, encompassing an ever-increasing investment from the private sector; the Business Expenditure on R&D (BERD) fraction of our portfolio reached 30% in Fiscal 2016-2017.

In 2016-2017, Genome Atlantic achieved unprecedented success in attracting significant new genomics R&D and business investment to the region. These results cap a three-year plan whose goals we not only achieved but surpassed by a considerable margin.

### GOALS SET 2014-2015 TO 2016-2017

### RESULTS ACHIEVED

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Enable \$17 million of new genomics R&D investment in Atlantic Canada

\$33 million new R&D (including \$22 million in Atlantic Canada)

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Enable 130 person years of employment

297 person years of employment, of which 184 are in Atlantic Canada

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Enable \$4.7 in Business Expenditure on R&D (BERD)

\$7.1 million, including \$3.7 million invested by Atlantic Canadian companies (BERD)

## A TRUSTED PARTNER WITH A PROVEN STRATEGY

Genome Atlantic is the only organization in Atlantic Canada that is solely focused on helping companies and public-sector organizations access customized, DNA-related solutions to their challenges. We are a turnkey solution partner offering services at every stage of the opportunity development continuum – from the development of proposal strategy to partnership facilitation, identifying academic expertise, comprehensive proposal development support, raising the required funding, and ultimately managing those projects awarded funding.

In 2016-2017, Genome Atlantic was engaged with approximately 30 companies across seven sectors to develop innovative, genomics-driven solutions.

### 2016-2017 OPPORTUNITY DEVELOPMENT BY THE NUMBERS:

**4** **GENOMICS OPPORTUNITY REVIEW PROGRAM (GORP)**– Approved 4 applications for GORP which provides up to \$15,000 for initiatives to help companies or select government

agencies evaluate the ROI of a potential genomics-based solution.

**18** **SECTOR ENGAGEMENT** – Participated in 18 industry events and arranged for 6 genomics experts to present to industry on their use of genomics to solve private sector problems.

**7** **PARTNERSHIP FACILITATION** – Supported 7 initiatives designed to foster collaboration between academic researchers, companies and other stakeholders. Many of these engagements have led to follow-on initiatives, such as the development of proposals or further exploration.

**13** **PROPOSAL SUPPORT** – Supported the development of 13 proposals with total budgets exceeding \$56 million. Proposals encompassed 10 companies and public-sector organizations and four provinces.

## ACTIVE PROJECTS

Genome Atlantic has helped to enable 21 active, funded R&D projects in Atlantic Canada, with a total value of more than \$40 million. These projects are supported by Genome Atlantic and by a variety of private sector companies, as well as federal and provincial governments and public-sector organizations.

Current projects span six sectors, and include:

- 3 in agriculture
- 7 in aquaculture
- 2 in energy
- 3 in the environment
- 1 in forestry
- 5 in health

## GENOMICS AT WORK IN ATLANTIC CANADA

In partnership with other genome centres across Canada and with many public- and private-sector partners, Genome Atlantic is helping to enable many high-impact projects.

**De-risking offshore oil and gas exploration** – \$4.9 million project that mixes genomics and geology to further de-risk exploration in Nova Scotia's offshore, and potentially attract billions of dollars in additional petroleum investments to the province. Project Partners: Genome Atlantic, Genome Canada, Genome Alberta, NS Department of Energy, the Offshore Energy Research Association, Natural Resources Canada's Geologic Survey of Canada, the University of Calgary, and Mitacs.

**Reducing co-infection in farmed Atlantic salmon** – \$4.5 million project to develop therapeutic feeds that reduce the risk of co-infection in farmed Atlantic salmon, potentially cutting fish losses by as much as 20% overall and up to 50% for some diseases, and reducing the need for additional treatments to keep fish healthy. Project Partners: Genome Atlantic, Genome Canada, EWOS/ Cargill, Research & Development Corporation of Newfoundland and Labrador (now InnovateNL), Mitacs, University of Prince Edward Island, Memorial University.

**Understanding how microbes eat pipelines** – \$7.8 million project to study microbiologically-induced corrosion (MIC), a poorly understood phenomenon that accounts for 20% of steel infrastructure corrosion of oil and gas pipelines. Project Partners: Genome Atlantic, Genome Canada, Genome Alberta, University of Calgary, University of



Riley Brandt, University of Calgary

**Dr. Lisa Gieg, University of Calgary, is co-leading a Genome Canada and Genome Alberta project to understand how microbes eat pipelines.**

Alberta, Memorial University, Dalhousie University, Husky Energy, Suncor Energy, Petroleum Research Newfoundland and Labrador, Research and Development Corporation of Newfoundland and Labrador (now InnovateNL), and Mitacs.

**Using chips to create better salmon** – \$3.8 million project employing genomics tools known as SNP chips to select for salmon with better flesh quality and with more resistance to parasites and disease – an improvement that could translate into increased annual revenue of approximately \$18 million and the creation of at least 40 new processing jobs for Kelly Cove Salmon and its parent company Cooke

Aquaculture. Project Partners: Genome Atlantic, Ontario Genomics, Genome Canada, University of Guelph, Cooke Aquaculture, and the National Research Council of Canada-IRAP.

**Reducing the impact of rising ocean temperatures on farmed Atlantic salmon** – \$4.6 million project uses genetic sequencing and selective breeding techniques to adapt existing salmon stock to increasing sea temperatures, while developing more robust salmon that can better withstand lower oxygen levels and higher risks of parasites and disease. Lead Funder: Atlantic Canada Opportunities Agency (Atlantic Innovation Fund) Project Partners: Genome Atlantic, Ontario Genomics, University of Waterloo, University of Prince Edward Island, Memorial University, Elanco (Novartis), Cooke Aquaculture, Somru BioScience, and Research Development Corporation Newfoundland and Labrador (now InnovateNL), Innovation PEI.

**Bioremediation of petroleum-contaminated sites in Labrador** – Two projects totaling \$82,000 are employing genomics-enabled remediation to



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aid in the cleanup of petroleum contamination at an abandoned mineral exploration site and in one of Canada's largest ex-military bases. Genomics technologies are being used in these applications to identify superior alternatives in near-polar climates where traditional remediation methods aren't effective. Project Partners: Genome Atlantic, Memorial University, Altius Minerals, Nordlys Environmental LP, NSERC (Engage) (CRD), Research Development Corporation Newfoundland and Labrador (now InnovateNL).

**Controlling wireworm infestations in potatoes** – Wireworm is an emerging global agricultural pest that is devastating potato and other root vegetable crops. Current pesticides are either being delisted or have minimal efficiency. This \$90,000 pilot project is developing an RNAi rotational crop strategy to control wireworm infestations. Project Partners: Genome Atlantic, Cavendish Farms, Prince Edward Island Potato Board, Prince Edward Island Horticulture Board, Dalhousie Faculty of Agriculture, and Agriculture and Agri-Food Canada.

**Using environmental DNA technology to monitor marine pollution on marine species** – Conventional environmental effects monitoring of marine environments is labour intensive, expensive and slow to obtain results. This \$113,000

project uses DNA barcoding – a potential game changer for the environmental services industry and regulators – to create a marine microbial environmental baseline for measuring the impact of marine pollution on marine species. Project Partners: Genome Atlantic, University of Calgary, Stantec, Nova Scotia Department of Energy, Marine Environmental Observation Prediction and Response Network (MEOPAR).

**Developing new software and database tools to combat antibiotic resistance** – ‘Superbug’ bacteria are evolving to be resistant to conventional antibiotics. Using metagenomics, which allows the genetic profiling of microbes as a community, this \$250,000 project aims to develop new software and database tools that will help to analyze antibiotic resistance in bacteria by profiling the DNA of entire communities of microbes. Project Partners: Genome Atlantic, Dalhousie University, Simon Fraser University, McMaster University, and Genome Canada.

## EDUCATION AND OUTREACH

Through education and outreach programs, Genome Atlantic promotes the application of genomics to real-world business problems and creates networking opportunities that facilitate R&D partnerships.

## EDUCATION AND OUTREACH HIGHLIGHTS FOR 2016-2017

- **Monthly Health Seminar Series** - In partnership with the IWK Health Centre and the Centre for Genomics Enhanced Medicine (CGEM), Genome Atlantic hosted 10 presentations by Canadian

and international genomics health leaders to promote knowledge translation and research collaborations.

- **Genomics Toolkit** – Our broad array of print, digital and video tools expanded to include a new e-bulletin and an ongoing series of web-based profiles of genomics leaders.
- **Media Relations** - A Genome Atlantic press release on the Integrated Pathogen Management of Co-Infection in Atlantic Salmon project received extensive coverage in provincial media and aquaculture publications in Canada, the United States and internationally; two op-eds by Genome Atlantic President & CEO Steve Armstrong were published in the Halifax Chamber of Commerce *Business Voice* and *The Guardian* (Charlottetown), focusing on how genomics is addressing industry challenges while driving the growth of the biosciences in Atlantic Canada.



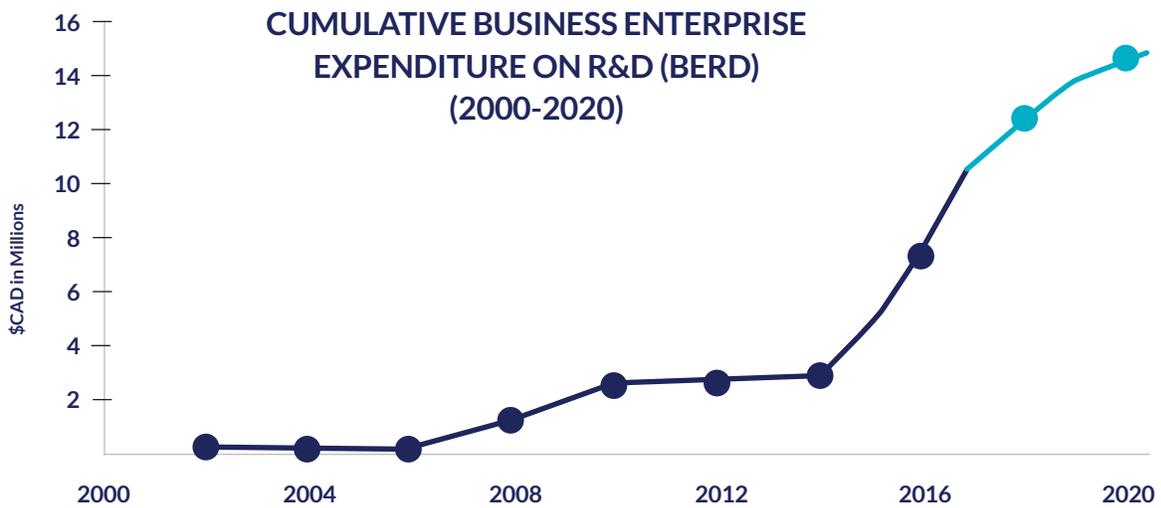
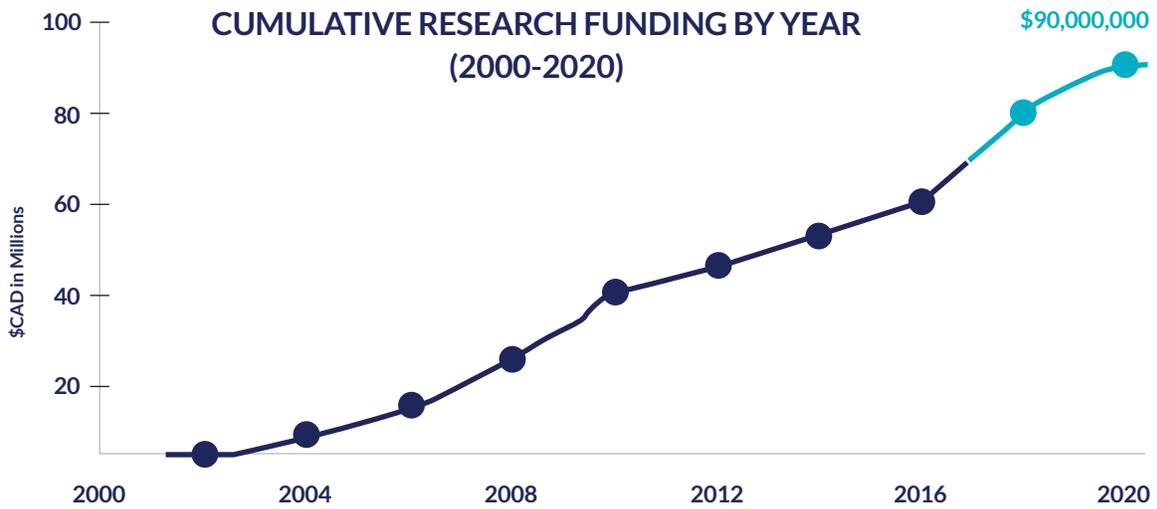
Drs. Matthew Rise (Memorial University), Richard Taylor (EWOS/Cargill) and Mark Fast (UPEI) are leading the Integrated Pathogen Management of Co-Infection in Atlantic Salmon project

Chris Hammond, Memorial University.

# IMPACT TO DATE

- Actual Research Spending
- Secured Research Funding (To Date)

**1,559**  
Person Years  
of Employment  
Enabled

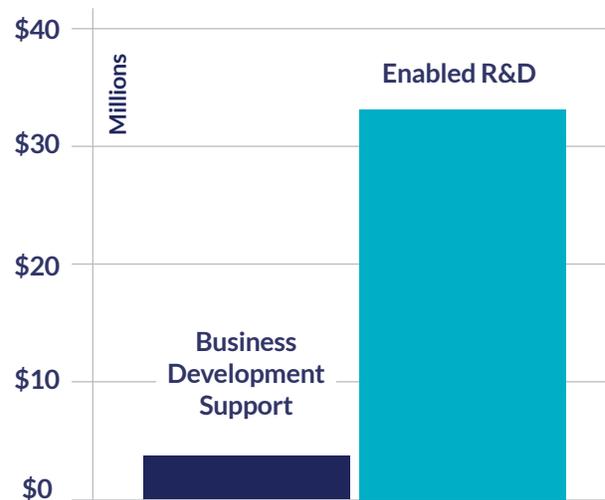


## GENOMICS ROI AND PRIVATE SECTOR INVESTMENT

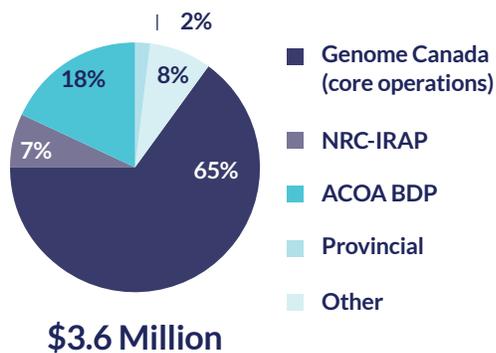
Operational and Business Development investments in Genome Atlantic for the three-year period spanning fiscal years 2014-2015 to 2016-2017, totaled \$3.6 million and enabled \$33 million of new genomics R&D. This ten-fold return on investment speaks to Genome Atlantic's strong track record as an effective agent for economic growth and to our well-established reputation as Atlantic Canada's go-to organization for DNA-related business solutions.

Private sector investment (BERD) in Genome Atlantic projects has continued to increase since the company's inception in 2000 and averaged

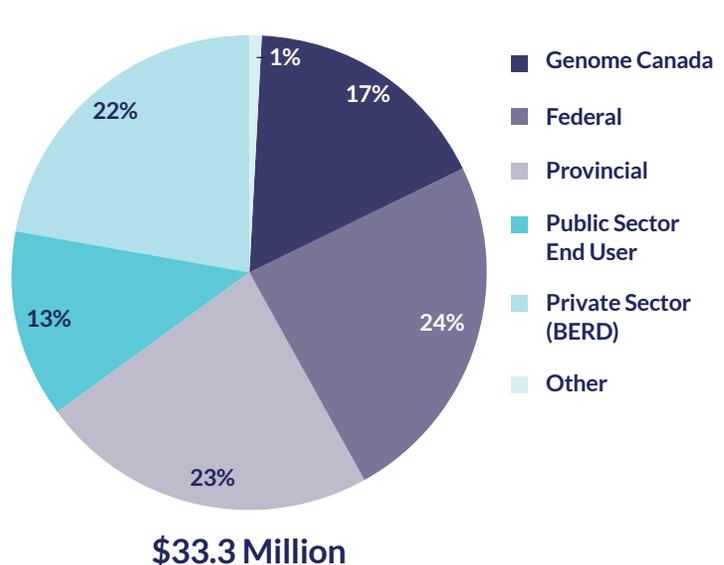
22% of overall investment between April 2014 and March 2017. This is a testament to the growing uptake by Atlantic Canadian businesses in genomics R&D.



### BUSINESS DEVELOPMENT SUPPORT (INPUT)



### BUSINESS DEVELOPMENT ENABLED R&D (OUTPUT)



## MEETING OUR CLIENTS' NEEDS

In January 2016, as part of our strategic planning process, Genome Atlantic engaged The Evidence Network (TEN) to determine our impact on two main client groups - companies and academic researchers. The findings below are based on responses from a representative sample of 19 industry clients and 19 researchers, most of whom have been engaged with Genome Atlantic since 2012 or earlier:

### MAJOR FINDINGS:

- **100%** of both companies and researchers reported being satisfied or very satisfied with Genome Atlantic's proposal development services.
- **85%** of companies said they were satisfied or very satisfied with Genome Atlantic's business opportunities services, and 89% of companies said they were satisfied or very satisfied with Genome Atlantic's networking and linkages services.
- **88%** of companies said Genome Atlantic increased their awareness of the positive impact of 'Omics technologies and of funding sources for 'Omics research.
- **81%** of companies and 100% of researchers said Genome Atlantic helped them to increase the competitiveness of their funding and research proposals.
- **71%** of companies that increased employment and revenues since their first



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engagement with Genome Atlantic attributed these increases to having incorporated 'Omics technologies into their operations.

- **95%** of researchers said Genome Atlantic had a positive impact on their ability to secure funding.
- **74%** of companies and **95%** of researchers said they would have difficulty to access similar support services to those offered by Genome Atlantic.

The findings show that Genome Atlantic's unique services, when coupled with high satisfaction ratings, are meeting the needs of companies and researchers in Atlantic Canada.

## OUR PEOPLE

### BOARD

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President/CEO

**NIL D'ENTREMONT**

Chief Financial Officer

**CHARMAINE GAUDET**

Director, External Relations

**ANDY STONE**

Director, Business Development

[Financial Statements available on our website](#)

Documents available in French upon request.

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