

Program

Ontario Genomics Platform Affiliates
Program Genomics Teaching Prize Summer
Research Fellowship Program Student Network Club
Genome Pre-commercialization Business Development Fund
Geeel! In Genome Tak Mak Canadian Barcode of Life Network

Ontario Genomics Institute Annual Report 2010 Celebrating 10 years of genomics leadership

Abdallah Daar Peter Singer
Aled Edwards Andrew Emili
Andrew Macpherson Anthony Pawson
Arturas Petronis Basil Arif Brenda
Andrews Brent Zanke Cheryl Arrowsmith
Chris Hogue Christian Burks Cynthia
Guidos Daniel Figeys David MacLennan
Gary Bader Quaid Morris Gilles Lajoie
Jack Greenblatt James Woodgett Janet
Rossant Jayne Danska Jeff Wrana John
Coleman John Dick Katherine Siminovitch
Kevin Kain Lap-Chee Tsui Lori Frappier
Mark Henkelman Mehrdad Hajibabaei
Michael Rudnicki Paul Hebert Paul
Piunno Peter Durie Peter Liu Robert
Hegele Scott Tanner Shana
Kelley Shawn Li Stephen
Scherer Ted Sargent Tom
Hudson Turlough Finan Ulrich
Krull Xavier Estivill Database
of Genomic Variants Barcode
of Life Data Systems (BOLD)
Chromosome Rearrangement
Database Chromosome 7
Annotation Project Cystic
Fibrosis Mutation Database
Human Genome Segmental
Duplication Database Non-
Human Segmental Duplication
Database StemBasse Structural
Genomics Consortium Materials
and Methods Toronto Yeast
Interaction Database Toronto
Yeast Pathway Database
DNA Barcoding Cancer stem
cells Copy Number Variants
(CNV) DVS Sciences Protein
Interaction Pathways Autism
Genomics and global health The
Centre for Applied Genomics
(TCAG) Dynactome DyNeMo
Yeast genetics Genomics
Capacity Building Workshops
Technology Days Science
with Industry Workshops
Genomics Technology Seeding

University of Guelph Genome Project The Hospital for Sick Children, Toronto
The Centre for Applied Genomics (TCAG) The Dynactome: Mapping
Spatio-Temporal Dynamic Systems in Humans Samuel
Lunenfeld Research Institute, Genomic Resource Core Facility
Mount Sinai Hospital, Toronto University of Western
Ontario, London Genome- Environment Interactions in
Type I Diabetes McMaster University Identification of
Genetic Pathways that Regulate the Survival and
Development of Cancer and Cancer Stem Cells
Integrative Biology University of Toronto Quantum Dot
Diagnostics: Simultaneous Genomic and Proteomic
Profiling of Multiple Pathogens at Point-of-Care University
Health Network FIO Systems Corporation The Contribution
of Genetic Modulators of Disease Severity in Cystic
Fibrosis to Other Diseases with Similarities of Clinical
Phenotype Strengthening the Role of Genomics and
Global Health Structural and Functional Annotation of the
Human Genome for Disease Study Roberts Research
Institute International Barcode of Life (iBOL)
Structural Genomics Consortium (SGC) – Phase II
International Regulome Consortium (IRC) Ottawa
Health Research Institute Automated Three-dimensional
Phenotyping of Mouse Embryos Environmental
Barcoding through Massively Parallelized Sequencing
Massively Multiparametric Flow Cytometer Analyzer
Multiplexed MicroRNA Detection on an Electronic Chip Proteomic
Technologies for the Study of Rare Cells University of Ottawa
Software Tools to Simplify Gene Function Prediction Technologies
for Methylome Studies Centre for Addiction and Mental Health
Bioproducts and Enzymes from Environmental Metagenomes (BEEM)
Geosyntec Consultants Genomics for Crop Improvement: Agricultural Pest
Management Development of Highly Active Anti-Leukemia Stem Cell
Therapy (HALT) Therapeutic Opportunities to Target Tumor Initiating
Cells in Solid Tumors Canadian Program on Genomics and Global
Health Genetic Determinants of Human Health and Disease
Annotation of Chromosome 7 Proteomics Technology
Core Facility (PTCF) Genetic Determinants of
Human Health and Disease



Ontario **Genomics** Institute

Abdallah Daar
 Peter Singer Aled Edwards
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 Materials and Methods Toronto Yeast Interaction Database Toronto Yeast Pathway Database
 DNA Barcoding Cancer stem cells Copy Number Varients (CNV) DVS Sciences Protein
 Interaction Pathways Genomics and global health The Centre for Applied Genomics (TCAG)
 Dynactome DyNeMo Yeast genetics Pre-commercialization Business Development Fund
 Genomics Capacity Building Workshops Technology Days Science with Industry Workshops
 Genomics Technology Seeding Program Ontario Genomics Platform Affiliates Program
 Genomics Teaching Prize Summer Research Fellowship Program Student Network
 Club Genome Geeel In Genome Tak Mak Canadian Barcode
 of Life Network University of Guelph
 Hospital for Sick Children, Toronto
 The Dynactome: Mapping Spatio-
 Temporal Dynamic Systems in Humans
 Samuel Lunenfeld Research Institute
 Mount Sinai Hospital, Toronto
 University of Western Ontario, London
 Genome-Environment Interactions in
 Type I Diabetes McMaster University
 Identification of Genetic Pathways
 that Regulate the Survival and
 Development of
 Cancer and Cancer
 Stem Cells Integrative
 Biology Quantum
 Dot Diagnostics

OGI'S MISSION

USE WORLD-CLASS RESEARCH TO CREATE STRATEGIC GENOMICS RESOURCES

AND ACCELERATE ONTARIO'S DEVELOPMENT OF A GLOBALLY-COMPETITIVE

LIFE SCIENCES SECTOR.

A DECADE OF GENOMICS DISCOVERY AND INNOVATION IN ONTARIO

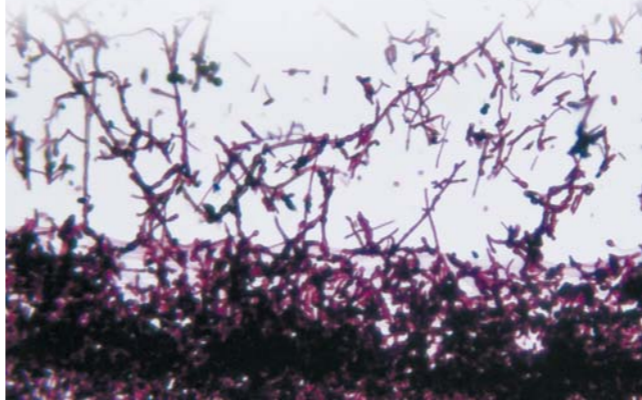
DyNeMo: LEADING TO PERSONALIZED TREATMENT FOR CANCER

In 2009, a team led by Dr. Jeff Wrana, of Mount Sinai's Samuel Lunenfeld Research Institute, unveiled DyNeMo, a new screening tool that supports physicians in developing treatment plans by analyzing the expression levels of genes encoding key proteins found in patients' breast cancer tumours.



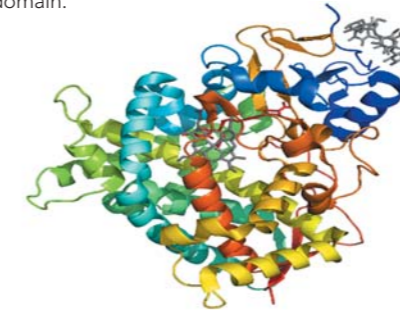
THE COMPREHENSIVE YEAST GENETIC AND PROTEIN INTERACTION NETWORK

Teams led by Drs. Jack Greenblatt, Brenda Andrews and Charles Boone, University of Toronto molecular biologists, mapped the function of genes in yeast genome, an important biomedical model system.



A NEW CATALOGUE FOR PROTEIN 3D STRUCTURES: PROMOTING DRUG DISCOVERY THROUGH COLLABORATION

Drs. Aled Edwards and Cheryl Arrowsmith lead the Structural Genomics Consortium (SCG) to determine the structure and inhibitors of human proteins of therapeutic importance. Over 1000 structures have been deposited in the bank as SCG leads the way in promoting drug discovery for diseases such as malaria, cancer and diabetes by increasing the information available in the public domain.



COMPLETE HUMAN GENOME: CHROMOSOME 7 SEQUENCE AND FUNCTION

Containing many genes crucial to human development, and carrying the cystic fibrosis gene, chromosome 7 is sequenced by Drs. Stephen Scherer and Lap-Chee Tsui as part of the Human Genome Project.



UNDERSTANDING CELL COMMUNICATION LEADS TO IMPROVED TREATMENT FOR CANCER

Dr. Tony Pawson describes the mechanisms of communication inside cells and between them, and how altered signalling can lead to cancer. Using this information, Dr. Pawson and his colleagues have developed tools to allow researchers and eventually clinicians to provide personalized analysis for the cancer patient, ultimately leading to more effective and timely treatment.



FIRST IN CLASS INSTRUMENT COMBINING FLOW CYTOMETRY AND MASS SPECTROMETRY

In 2009, Dr. Scott Tanner and his team unveiled the CyTOF™ Mass Cytometer, being made and marketed by DVS Sciences in Toronto. This new instrument is capable of simultaneous quantitative and independent determination of up to 100 biomarkers in individual cells. In addition to many basic research applications, it has potential for early disease diagnoses and monitoring of treatment efficacy in individual patients through quicker and more effective tissue sample analysis.



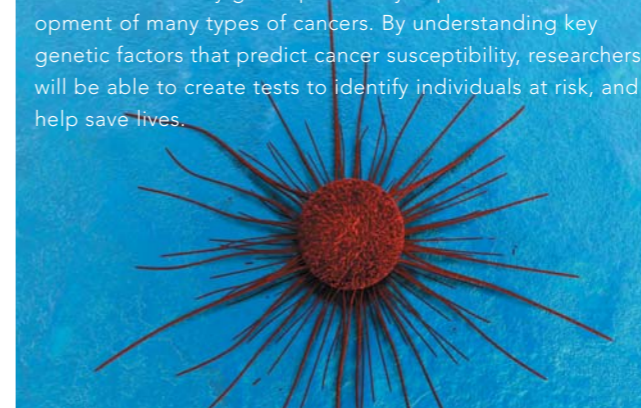
A NEW ALZHEIMER'S GENE

The gene SORL1, associated with many forms of Alzheimer's disease, was isolated by an international team led by renowned Alzheimer's researcher Dr. Peter St. George-Hyslop, Director of the University of Toronto's Centre for Research in Neurodegenerative Diseases, in 2007.



GENETIC VARIATION OF HUMAN TUMOURS PREDICTS SUSCEPTIBILITY TO CANCER

Dr. Tom Hudson and his colleagues at the Ontario Institute for Cancer Research obtained genomic DNA sequences of tumours to identify genes potentially important in the development of many types of cancers. By understanding key genetic factors that predict cancer susceptibility, researchers will be able to create tests to identify individuals at risk, and help save lives.



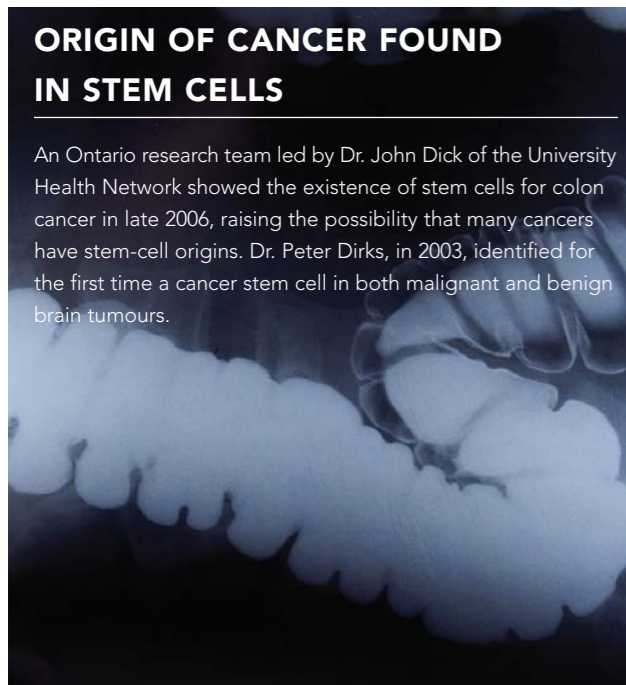
TACKLING GLOBAL HEALTH CHALLENGES THROUGH GENOMICS

Drs. Peter Singer and Abdallah Daar and an international group of researchers work to strengthen genomics research, development, and commercialization in the developing world by examining how emerging world biotechnology companies can meet local health needs and achieve collaboration in genomics innovation. At the same time, they are seeking to encourage advances in pharmacogenomics to address global health challenges and to promote effective use of agricultural genomics to ensure food security in developing countries.



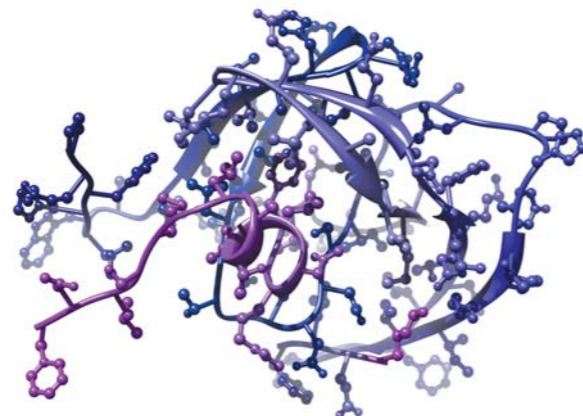
ORIGIN OF CANCER FOUND IN STEM CELLS

An Ontario research team led by Dr. John Dick of the University Health Network showed the existence of stem cells for colon cancer in late 2006, raising the possibility that many cancers have stem-cell origins. Dr. Peter Dirks, in 2003, identified for the first time a cancer stem cell in both malignant and benign brain tumours.



DECODING THE CELL: FORMULATING THE RULES FOR mRNA SPLICING

Drs. Brendan Frey and Ben Blencowe use experimental data from neural tissue along with computational methods to formulate the rules for alternative messenger RNA splicing, a vital pathway in the cell.



COPY NUMBER VARIATION (CNV) OVERTURNS ASSUMPTIONS ABOUT HUMAN VARIATION

Dr. Stephen Scherer of The Centre for Applied Genomics at The Hospital for Sick Children, showed that many individuals possess varied numbers of genes, which can be linked to common ailments, turning traditional genetic theory that individuals had two copies of any given gene, one each from their father and mother, on its head.



THE BREAKTHROUGH OF DNA BARCODING FOR BIODIVERSITY

There are estimated to be between 10M and 100M species of life on our planet, providing a staggering task to classify them using traditional morphological analysis. In 2003, Dr. Paul Hebert (University of Guelph) put forward a proposal that one could greatly increase the speed of species identification by sequencing the same very short region of each species' DNA. He has since validated that hypothesis, built the leading world resource for determining, archiving and analyzing barcoding, is leading the world's biodiversity and taxonomic classification communities, and is creating a broad number of applications in identifying species at borders, in forensic analysis, in industrial fouling, and to monitor biodiversity and ecological complexity.



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OGI SUCCESS STORIES

WE HAVE INTERSPERSED SUCCESS STORIES FROM OGI-FUNDED PROJECTS FROM THE LAST DECADE THROUGHOUT THIS REPORT

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OGI AND ONTARIO: 10 YEARS OF PRODUCTIVE CULTIVATION, FUNDING AND MANAGEMENT OF GENOMICS

CHAIRMAN'S MESSAGE

OGI was incorporated 10 years ago, in 2000, with the overarching aim to develop, establish and deliver a coordinated approach and integrated strategy for Ontario, enabling the province to become a world leader in genomics research by bringing together universities, hospitals, government, industry and other research centres. Our incorporation application also highlighted the objective that researchers have access to necessary equipment and facilities to undertake their research; and the objective to increase public awareness of the need for, as well as uses and implications of, genomics research.

These key elements of our raison d'être – internationally-competitive genomics research programs, development of and access to new technologies, and expanding Ontario's, Canada's and the world's awareness of the exciting role of genomics in the life sciences sector – have been successfully delivered over the past decade, and as seen in this annual report, the past year has been particularly productive.



Our tenth anniversary also marks a decade of strategic collaboration and productive partnership with both Genome Canada and the Ontario government. Both have had a profound impact on genomics research in Canada with the funding they have provided; and both have had a profound impact on OGI in discussing priorities, providing guidance, and maintaining steady enthusiasm and leadership for the promise of genomics approaches in the life sciences sector. We congratulate them both for their significant contributions during this period, and welcome the new Chair of Genome Canada, Dr. Tom Caskey.

The achievements of OGI over the years have been and, moving forward, will be largely based on the OGI staff members whose creative ideas, tireless enthusiasm and hard work have played such a significant role in the success of OGI's programs and its support of genomics researchers in Ontario. I wish to thank them for their efforts and dedication. I also want to thank Christian Burks, President and CEO, for his oversight of the organization's operations as well as for his focus and drive in cementing the organization's position at the centre of genomics in the province.

This year we welcomed four new members to the Board of Directors: Mr. Paul Lucas, President and CEO, GlaxoSmithKline Inc. Canada; Dr. Roderick R. McInnes, Director of Research of the Jewish General Hospital, Lady Davis Institute for Medical Research; Mr. Gregg Szabo, Vice President, Specialty Products at Merck Frosst Canada; and Dr. James Tiedje, Director of the Center for Microbial Ecology at Michigan State University. We also marked the departure of Mr. Mark Lievonen, President of sanofi-pasteur, who has served admirably on the Board since 2002 and provided able leadership as Chair from 2004-2008.

The promise and impact of genomics is celebrated in the media and affects our lives daily. As we enter the next decade, genomics research and the resulting resources for the life sciences sector will have a tremendous positive impact on our approach to medicine, the environment, forestry, agriculture, aquaculture and energy.

Sincerely,

A handwritten signature in black ink, appearing to read 'Mark Poznansky'.

Mark Poznansky
Chair, Board of Directors

Mark Poznansky, Chair, Board of Directors

GENOMICS IN ONTARIO: WORLD-LEADING GENOMICS RESEARCH, RESOURCES AND OUTCOMES

PRESIDENT AND CEO'S MESSAGE

It is with great pleasure that I present OGI's FY 2010 Annual Report, which doubles as a celebration of the 10th anniversary of the initiation of Ontario's significant and strategic entry into genomics research.

Over the past decade, OGI has sourced, developed, and provided funding as well as program management for 47 genomics research projects and platforms funded at a portfolio level of nearly \$700 million.

We are delighted to be celebrating the successes of the past decade; we are enthused and feel privileged to be standing at the portal, looking ahead to what the next 10 years hold for genomics research and discovery, and their impact on our society.

OGI's mission today is to use world-class research to create strategic genomics resources and accelerate Ontario's development of a globally-competitive life sciences sector. The past year has included a number of milestones reflecting this mission, including:

- OGI initiated the flow of \$7.8 million (\$17.3 million with co-funding) to two research teams in Ontario, neither of which had previously been funded by OGI. One project seeks to improve conversion of industrially-processed plant residues and wastes into biofuels and other bioproducts; the other seeks to improve pest control in the vegetable and fruit production industry;
- OGI initiated the flow of \$2.0 million (\$5.5 million with co-funding) for the International Barcode of Life Consortium (iBOL), a multi-country initiative to generate DNA barcodes for five million specimens representing 500,000 species, towards establishing a global biodiversity reference database (BOLD);

- The OGI Pre-commercialization Business Development Fund made two investments: one to support the development of genetic markers to monitor the convergence of a selective breeding program on producing pigs free of boar taint; the other in a prognostic genetic test to improve outcomes of hematopoietic stem cell transplants (bone marrow transplants);
- We launched the Ontario Genomics Platform Affiliates Program – focused on genomics technology service platforms – with six service platforms as inaugural members, and made one Genomics Technology Seeding grant to a participating platform. Our intent is to increase research access to leading-edge technologies by providing support for both vendor-platform and user-platform access and transactions.

I am grateful to our chair, Dr. Mark Poznansky, as well as the other members of our Board of Directors for their time, insight and endeavours on OGI's behalf. I am also pleased to note the most recent addition to OGI's team of Dr. David Schibli (Research Program Manager).

Sincerely,



Christian Burks
President & CEO



A DECADE AT THE FOREFRONT OF GENOMICS RESEARCH

The Ontario Genomics Institute (OGI) was created as a not-for-profit corporation in 2000 following a landmark announcement made by the Canadian Government to support a game-changing science called “genomics.”

Genomics is the application of high throughput, systematic and holistic approaches and technologies to create resources that allow researchers to accelerate their approach to understanding the molecular basis of life. This has spawned a range of applications from prevention and treatment of human and animal disease, to agricultural improvement, environmental remediation, natural resource management, alternative energy development and cataloguing biodiversity on our planet.

Genome Canada was founded to achieve this mandate at the federal level, and OGI – in parallel with genome centres in other regions across Canada – was launched in collaboration with the Ontario government to coordinate genomics programs within Ontario.

Over the next 10 years, OGI would identify, develop, fund and manage 47 projects and technology service platforms worth nearly \$700 million in total funding.

These projects and platforms have found their genesis in a variety of competitions and programs, ranging from basic research to applied technology development, and have occasionally been anticipated, complemented or followed on with a range of OGI programs in research program management, business development and outreach.

Discovery Research

OGI has supported projects that have focused on a number of application areas, including: research in human health and disease; agriculture; biodiversity and conservation; environmental stewardship; and natural resources management. OGI also created a number of its own programs to support and assist collaborations in basic research, including the **Genomics Capacity Building Workshop program** that facilitates international collaborations, and the **Pre-commercialization Business Development Fund** that provides early-stage funding as researchers move towards commercial applications. Many of these research projects have discovered new genes associated with disease; created a wealth of resources for others to use to undertake new research and inform existing research; and some have led to new software and tools.

Technology Development and Genomics Platforms

Technology development and genomics platforms are integral to research, and OGI has supported a number of projects focused on the creation of new technologies such as informatics tools to analyze sequence data, imaging and automated computer analysis programs, software systems, microfluidic technologies, microchips able

to quantify microRNA, and mass cytometer technology that aids early disease diagnoses. These projects have resulted in very promising new technologies that will significantly impact research and front line medical treatment. Already, the mass cytometer cell analyzer has been commercially launched and has achieved solid sales.

OGI also plays a critical role in Ontario’s genomics platforms. Genomics platforms provide services such as DNA sequencing, gene-expression and microarray services, and statistical analysis and biobanking. Ontario’s leading platform is The Centre for Applied Genomics (TCAG), which provides services to over 1300 labs in 28 countries, over 300 academic institutions, 44 companies and 13 government or non-governmental organizations.

Two of OGI’s programs have supported advances in technology development and platforms. **The Ontario Genomics Platform Affiliates program** works to increase the visibility of platform members amongst the research community and currently has six member platforms. **The Genomics Technology Seeding program** provides investment to finance advances in present technologies, as well as ventures into newer leading-edge technologies in genomics. To date, three investments have been made.

Global Consortia

Through the International Consortium Initiative (ICI) program, which began in 2003, OGI has flowed funding to unique international projects that will boost Canadian science:

- **Structural Genomics Consortium (SGC)** works to determine the 3-D structures of proteins of medical significance and put them in the public domain. To date, over 1100 structures have been solved and deposited in the protein database. The UK and Sweden are the major international collaborators on SGC
- **International Regulome Consortium (IRC)** explores regulation of gene function in mammalian cells during development and its implications for stem cell research and regenerative medicine. The potential for stem cell therapeutics and regenerative medicine is huge with an estimated total market in the US alone of \$2–3 billion over the next five years. Many other countries are involved in the IRC including France, the Netherlands, Singapore, UK and USA
- **International Barcode of Life (iBOL)** is developing new genomics approaches to make reliable and rapid species identification possible, helping to combat threats including climate change and invasive species migration, amongst others. 25 countries are involved in iBOL, all working towards building a public resource containing DNA barcodes from five million specimens representing at least 500,000 species over five years. To date, nearly three-quarters of a million DNA barcodes have been sequenced and a global resource containing these DNA barcodes, BOLD, has been created and receives around four million hits per month.

All of the above have resulted in significant outcomes for research in Ontario. Several new resources have emerged including 11 databases and four new software tools.

Some of the successes of the last decade feature in the coming pages. More information on the research, resources, and OGI-run programs mentioned above can be found on our website at: www.OntarioGenomics.ca

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 Scaramuzza Julien St-Pierre
 Sonja Wesholowski Caitlin
 Hammond Matthew Johnson
 Alastair Harris-Cartwright
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 Symington

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www.OntarioGenomics.ca

1 OGI – 10 Years of Cultivating Genomics in Ontario

success stories

OGI has been at the helm of supporting genomics research for the last 10 years, assisting the province's world-renowned researchers in obtaining funding critical to their work and vital to enabling discoveries that bring immense benefits.

In the last 10 years, OGI has flowed nearly \$700 million of federal and provincial funding to 47 research projects in Ontario. OGI has succeeded in placing Ontario on the world map as a centre for excellence in genomics research, and has been successful in bridging the funding gap between federal and provincial funding. It has been OGI's aim to support, promote and foster growth in the life sciences, and during the last decade, it has launched several programs of its own to meet these aims.

OGI Summer Research Fellowship Program – launched 2003 – supports undergraduate students taking part in real-life genomics research. So far, 39 Fellows have benefited.

Pre-commercialization Business Development Fund – launched 2004 – provides investments of \$100,000 in proof-of-principle phase businesses. Eight projects have received funding to date.

OGI Genomics Teaching Prize – launched 2007 – recognizes innovative science teaching in Ontario, helping to train the next generation of genomics and life sciences researchers. Three teachers awarded to date.

Genomics Sector Innovation Network (G-SIN) – launched 2007 with the Ministry of Research and Innovation – provides an online knowledge base and facilitates linkages within Ontario's genomics sector and further afield. www.g-sin.com

Three programs were launched in 2009 – **Genomics Technology Seeding program** – enhancing early access to leading-edge technologies, **Genomics Capacity Building workshops** – encouraging better national and international collaborations, and the **Platform Affiliates Program** – increasing research access to leading-edge technologies.

RESEARCH PROGRAMS

The Research Program team is advancing globally significant research in Ontario by supporting the province's prominent and world-renowned researchers in their quest for solutions to the many challenges facing human and animal health, environmental sustainability, natural resource management, forest health and agriculture.

This year over \$67 million of funding and in-kind contributions flowed to Ontario research institutions and their collaborating institutions outside Ontario, which supported 23 research projects and genomics technology platforms. This year also saw the start of two new projects awarded funding under the Genome Canada competition *Applied Genomics Research in Bioproducts and Crops*.

NEW PROJECTS

APPLIED GENOMICS RESEARCH IN BIOPRODUCTS AND CROPS

BEEM: Bioproducts and Enzymes from Environmental Metagenomes is led by Dr. Elizabeth Edwards (University of Toronto) and Dr. David Major (Geosyntec Consultants, Guelph) with collaborators from Bangor University (Wales), Georgia Institute of Technology, University of Massachusetts, the US Department of Energy Joint Genome Institute (JGI) and Argonne National Laboratory (Illinois). The project aims to examine entire communities of life to screen, identify and analyze novel proteins (enzymes) that have the potential to act as catalysts to transform low-value plant residues and waste products into valuable bioproducts such as fuel.

The BEEM team previously worked with pulp and paper mills to develop microbial processes that reduce harmful byproducts of the industry while also generating energy for their operational requirements.

Genomics in Agricultural Pest Management is led by Dr. Miodrag Grbic (University of Western Ontario, London) with collaborators from Spain (Centro Nacional de Biotecnología, Universidad Politécnica de Madrid and Consejo Superior de Investigaciones Científicas), Belgium (Ghent University and VIB – the Flanders Institute for Biotechnology), France (Centre de Biologie et de Gestion des Populations), and the United States (University of Utah and JGI). The project is focused on the creation of tools and technologies to reduce the damage spider mites cause to the annual \$550 million greenhouse vegetable industry in Ontario, where currently insects and mites destroy 13% of all potential crops.

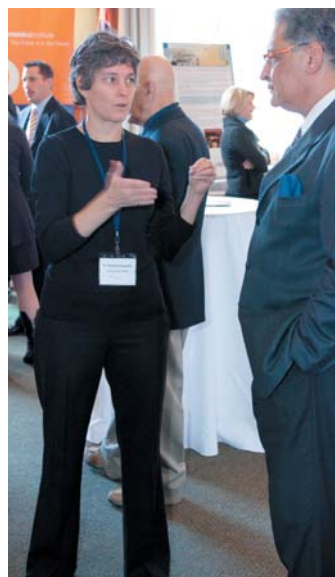
This project is focused on expanding understanding that should lead to the ability to turn off pest-specific genes, opening up a new avenue for biological pest controls by reducing the ability of these pests to reproduce.

The Research Program team at OGI develops and manages Ontario-led, cutting-edge research projects in genomics and associated technology development and access. It works with project teams across Ontario to identify and raise funding that will facilitate their efforts and lead to the creation of genomics resources to accelerate further research and development in the life sciences.



Dr. Scott Tanner shows Minister Milloy around his lab. ←

Dr. Elizabeth Edwards talks to Dr. Kamiel Gabriel, Assistant Deputy Minister of Research and Innovation. →





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2 DNA Barcoding – Understanding Our World

success stories

Dr. Paul Hebert, Biodiversity Institute of Ontario, University of Guelph, is working towards developing a world in which you can identify any living thing on the spot, in an instant, anywhere on the planet. In such a world, improved monitoring of invasive species and pests would be possible, helping to prevent crop and natural resource devastation and lessen its impact on the economy. Also, more rapid detection of infectious disease agents would be possible, aiding the protection of human and animal health, and more robust environmental conservation efforts grounded in a deeper understanding of ecosystem biodiversity would be possible. This is the world that DNA barcoding is helping to build.

DNA barcoding is a taxonomic method that uses a short genetic marker in an organism's DNA to identify it as belonging to a specific species. Invented at the University of Guelph in 2003, this initiative has gathered momentum and international participation from 26 countries in the form of the International Barcode of Life Project (iBOL).

The aim of the project is to build a public resource with DNA barcodes from five million specimens representing at least 500,000 species over five years.

DNA barcoding enables reliable and rapid species identification and promises a significant improvement in the capacity to monitor and manage biodiversity with profound societal and economic impacts.

MORE INFO:

DNA BARCODING:

www.ontariogenomics.ca/research/project/8

iBOL: www.ibolproject.org

National Priorities – Arctic Research

In a visit organized by OGI, Dr. Christian Burks, OGI, Dr. Alan Winter, Genome British Columbia, and Dr. Reno Pontarollo, Genome Prairie, visited Iqaluit, Nunavut, in November 2009 to meet with representatives of Nunavut Tunngavik, Nunavut Research Institute, and the office of Nunavut's Chief Medical Officer of Health: both to discuss genomics research initiatives focused on the people, plants and animals in the arctic; and to better understand their perspective on life science research opportunities, priorities, conduct and impact.



*Dr. Isaac Sabol,
Nunavut's Chief Medical
Officer of Health,
Dr. Christian Burks and
Dr. Reno Pontarollo. →*

PROGRAMS

OGI's Research Program team organizes and sponsors activities and events designed to assist Ontario's researchers with undertaking leading-edge genomics research and make them more competitive in securing new funding to support their work. One such program is the **Genomics Capacity Building (GCB) workshop program**.

OGI funded three GCB workshops over the past 12 months with a grant of \$10,000 each to support researcher-initiated workshops that aim to stimulate collaborations leading to international funding or in-kind contributions in support of large-scale genomics research.

Topics focused on in the past year included: epigenetic research; mapping the human interactome; and genomics of sustainable agriculture; featuring renowned researchers such as Drs. Cheryl Arrowsmith, Tony Pawson, Benoit Coulombe and Miodrag Grbic.

COLLABORATIVE WORKING FIGHTING FOREST THREATS

This year saw the publication of a forest health strategy paper titled *Canadian Forest Health Genomics: Canadian Strengths Address Forestry Challenges*, authored by leading Canadian researchers and building on a workshop (March 2009) and resulting workshop report put together by OGI in collaboration with five other Canadian genome centres.

The strategy paper, published in August 2009, described the opportunities for and potential benefits arising from employing genomics research to better manage forest health, including specific activities like the identification of genes that confer either hardiness in different conditions or resistance to pests; the development of innovative technologies to breed for pest-resistant tree and plant lines; and the ability to accurately identify and monitor pests in the context of integrated pest management. The paper was incorporated into Natural Resources Canada's strategic planning documents, and the February 2010 federal budget allocation for Genome Canada included funding for forestry genomics.



3 Yeast Genomics and Model Organisms – Gaining Insight into Disease

success stories

Drs. Janet Rossant, The Hospital for Sick Children, Brenda Andrews, Jack Greenblatt, Andrew Spence and Cheryl Arrowsmith, University of Toronto, and Tony Pawson, Samuel Lunenfeld Research Institute, worked together on several projects and with numerous colleagues to provide a comprehensive view of protein and genetic interactions in biomedically important model systems – bacteria, mouse, worm and yeast.

Yeast Genomics - While scientists have been interested in the role of individual genes, it is now believed that genes work in groups to perform their functions. Research into baker's yeast, which shares many of the same genes and pathways as humans, has been undertaken to learn more about how gene groups work with each other.

Earlier this year, a paper was published in *Science* on the creation of a *genome-wide genetic interaction map* for the budding yeast *Saccharomyces cerevisiae*. By looking at the connections between genes and functional sub-groups, they were able to get clues about gene function that will inform future studies of yeast and other organisms, helping to produce a better understanding of the basis of genetic disease and lead to new compounds to treat cancer.

Model Organisms - Research on mouse models of human diseases and assessed protein interactions that underlie a variety of illness has been carried out. The Functional Annotation of the Mouse Genome project has moved Canada's mouse genomics to the forefront of this important field. Mouse models for human conditions such as kidney disease and osteoporosis have been generated and new tools to help characterize these mice have been developed. New mouse cell lines that are in high demand from academic and industrial investigators worldwide have also been established.

This research has resulted in major insights into the molecular causes of a range of human diseases and new targets for drug and biomarker development. It also resulted in one provisional patent, one patent filed, two published patents, one commercial licence in place, and four companies formed (Affinium Pharmaceuticals, MDS-Proteomics, Mycota BioSciences, and Virtek Proteomics).

MORE INFO: www.ontariogenomics.ca/research/project/38



PROJECTS

FUNDED IN

FY2010

Canadian Barcode of Life Network

Paul Hebert

University of Guelph
April 2005 – June 2009
\$11.0 million

Autism Genome Project

Stephen Scherer

Hospital for Sick Children, Toronto
January 2006 – March 2011
\$15.6 million

The Centre for Applied Genomics (TCAG)

Ontario Genomics Platform

Stephen Scherer

Hospital for Sick Children, Toronto
January 2006 – March 2011
\$7.4 million

The Dynactome: Mapping Spatio-Temporal Dynamic Systems in Humans

Anthony Pawson, Jeff Wrana

Samuel Lunenfeld Research Institute, Mount Sinai Hospital, Toronto
Shawn S.C Li
University of Western Ontario, London
January 2006 – June 2010
\$27.6 million

Genome-Environment Interactions in Type I Diabetes

Jayne Danska

Hospital for Sick Children, Toronto

Andrew Macpherson

McMaster University, Hamilton
January 2006 – September 2010
\$15.0 million

Identification of Genetic Pathways that Regulate the Survival and Development of Cancer and Cancer Stem Cells

Cynthia Guidos

Hospital for Sick Children, Toronto
January 2006 – September 2010
\$18.8 million

Integrative Biology

Brenda Andrews

University of Toronto
January 2006 – December 2009
\$26.8 million

Quantum Dot Diagnostics: Simultaneous Genomic and Proteomic Profiling of Multiple Pathogens at Point-of-Care

Kevin Kain

University Health Network, Toronto

Michael Greenberg

FIO Systems Corporation, Richmond Hill
January 2006 – September 2010
\$10.2 million

The Contribution of Genetic Modulators of Disease Severity in Cystic Fibrosis to Other Diseases with Similarities of Clinical Phenotype

Peter Durie, Julian Zielenski

Hospital for Sick Children, Toronto
April 2006 – June 2010
\$8.2 million

Strengthening the Role of Genomics and Global Health

Peter Singer, Abdallah Daar

University of Toronto
April 2006 – December 2010
\$10.2 million

Structural and Functional Annotation of the Human Genome for Disease Study

Robert Hegele

Robarts Research Institute, London
October 2006 – June 2011
\$21.5 million

Structural Genomics Consortium (SGC) – Phase II

Aled Edwards

University of Toronto
University of Oxford (UK)
Karolinska Institute, Stockholm (Sweden)
July 2007 – June 2011
\$124.3 million

International Regulome Consortium (IRC)

Michael Rudnicki

Ottawa Health Research Institute
January 2008 – June 2009
\$23.0 million

Automated Three-dimensional Phenotyping of Mouse Embryos

Mark Henkelman

Hospital for Sick Children, Toronto
April 2008 – September 2010
\$1.5 million

Environmental Barcoding through Massively Parallelized Sequencing

Paul Hebert

University of Guelph
April 2008 – June 2010
\$1.8 million

Massively Multiparametric Flow Cytometer Analyzer

Scott Tanner

University of Toronto
April 2008 – March 2010
\$2.8 million

Multiplexed MicroRNA Detection on an Electronic Chip

Shana Kelley, Ted Sargent

University of Toronto
April 2008 – June 2010
\$0.9 million

Proteomic Technologies for the Study of Rare Cells

Daniel Figeys

University of Ottawa
April 2008 – March 2010
\$1.5 million

International Barcode of Life (iBOL)

Paul Hebert

University of Guelph
July 2008 – June 2010
\$5.6 million

Software Tools to Simplify Gene Function Prediction

Gary Bader, Quaid Morris

University of Toronto
April 2008 – June 2010
\$1.9 million

Technologies for Methyome Studies

Arturas Petronis

Centre for Addiction and Mental Health, Toronto
April 2008 – March 2010
\$0.8 million

Bioproducts and Enzymes from Environmental Metagenomes (BEEM)

Elizabeth Edwards

University of Toronto
David Major
Geosyntec Consultants
October 2009 – September 2013
\$10.9 million

Genomics for Crop Improvement: Agricultural Pest Management

Miodrag Grbic

University of Western Ontario
October 2009 – September 2013
\$6.4 million

Dollar amounts are total approved project costs as of March 31, 2010

4 Cancer Stem Cells and New Technology

success stories

There is mounting evidence that many types of cancer tumours are, in fact, generated by a small distinct subset of cells in the tumour mass. Leukemia, skin, colon and brain cancers are all among those with this characteristic. Up to now, these tumour generating cells, often referred to as cancer stem cells, which were discovered in Ontario, have been poorly understood because they are so rare and hard to isolate. Researchers are now developing new tools to identify cancer stem cells. This will lead to new diagnostic tests and provide more timely and effective treatment.

One such new tool is the CyTOF™ Mass Spectrometer that was developed by Dr. Scott Tanner, President and CEO of DVS Sciences Inc. (the makers of CyTOF™) and Associate Professor at the University of Toronto, with funding through OGI. The CyTOF™ instrument is capable of simultaneous quantitative and independent determination of up to 100 biomarkers in individual cells, not possible with existing technologies. In addition to many basic research applications, this has the potential for early disease diagnoses and monitoring of treatment efficacy in individual patients through quicker and more effective tissue sample analysis.

Other leading Ontario cancer stem cell researchers were awarded funding in 2009 through a joint Canada-California collaboration funded in Canada by Genome Canada and the Canadian Institutes of Health Research, and in California by the California Institute for Regenerative Medicine. Drs. John Dick and Jean Wang, University Health Network (UHN), Toronto and Dr. Dennis Carson, University of California, San Diego, will focus their work on the development of novel drugs to treat leukemia. The other Ontario researcher is Dr. Tak Mak, UHN, who with Dr. Dennis Slamon, UCLA, is developing novel drugs targeting cancer-initiating cells in solid tumour cancers. Funds will start to flow to the Ontario researchers in mid-2010, and more information on these projects will be featured in next year's Annual Report.

MORE INFO:

THE CYTOF™ MASS SPECTROMETER:
www.dvsosciences.com

THE CANADA-CALIFORNIA RESEARCH:
www.cancerstemcellconsortium.com



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PREVIOUSLY COMPLETED PROJECTS

Canadian Program on Genomics and Global Health
Peter Singer, Abdallah Daar
University of Toronto
October 2001 – September 2005
\$6.2 million

Genetic Determinants of Human Health and Disease – Annotation of Chromosome 7
Stephen Scherer
Hospital for Sick Children, Toronto
October 2001 – September 2005
\$1.8 million

Proteomics Technology Core Facility (PTCF)
Jack Greenblatt
University of Toronto
Gilles Lajoie
University of Western Ontario, London
October 2001 – December 2005
\$8.6 million

Functional Genomics and Proteomics of Model Organisms
Janet Rossant, Anthony Pawson
Samuel Lunenfeld Research Institute, Toronto
October 2001 – September 2005
Jack Greenblatt, Andrew Spence, Brenda Andrews
University of Toronto
October 2001 – March 2006
\$26.5 million

Genomic Resource Core Facility
Stephen Scherer, Lap-Chee Tsui
Hospital for Sick Children, Toronto
October 2001 – September 2005
\$18.0 million

The Biomolecular Interaction Network Database (BIND)
Christopher Hogue
Samuel Lunenfeld Research Institute, Toronto
April 2002 – December 2005
\$23.1 million

Viral Proteomics
Lori Frappier, Christian Burks
Affinium Pharmaceuticals, Toronto
July 2002 – December 2004
\$6.3 million

Functional Genomics of Arabidopsis
John Coleman
University of Toronto
July 2002 – September 2005
\$1.8 million

Genetic Determinants of Human Health and Disease
Katherine Siminovitch
Samuel Lunenfeld Research Institute, Toronto
January 2003 – June 2006
\$11.0 million

Proteomics and Functional Genomics – An Integrated Approach
Brenda Andrews, Cheryl Arrowsmith
University of Toronto
July 2002 – March 2006
\$15.0 million

The Stem Cell Genomics Project
Michael Rudnicki
Ottawa Health Research Institute
July 2002 – March 2006
\$11.1 million

Development and Applications of Functional Genomics Technologies
James Woodgett
University Health Network, Toronto
October 2002 – December 2005
\$8.8 million

Functional Genomics of Type 1 Diabetes
Jayne Danska
Hospital for Sick Children, Toronto
January 2003 – March 2006
\$8.5 million

Mapping and Isolation of Genes Influencing Severity of Disease in Cystic Fibrosis
Peter Durie, Lap-Chee Tsui
Hospital for Sick Children, Toronto
October 2002 – March 2006
\$6.4 million

Bridging the Emerging Genomics Divide
Peter Singer, Abdallah Daar
University of Toronto
January 2003 – March 2006
\$2.8 million

Fibre Optic Nucleic Acid (FONA) Biosensor Based Gene Profiling: Proof of Principle by Screening for Drug Leads for Orphan Neurodegenerative Disorders and SNP Analysis
Alex MacKenzie
Children's Hospital of Eastern Ontario, Ottawa
Paul Piunno, Ulrich Krull
University of Toronto at Mississauga
July 2003 – June 2005
\$2.8 million

Genomics of the Spruce Budworm and its Viral Pathogens
Arthur Retnakaran, Basil Arif
Great Lakes Forestry Centre – NRC, Sault Ste. Marie
January 2003 – March 2006
\$4.6 million

Genomic Analysis of Soil Microorganisms
Turlough Finan, Brian Golding
McMaster University, Hamilton
January 2003 – March 2006
\$5.9 million

Structural Genomics Consortium (SGC) – Phase I
Aled Edwards
University of Toronto
University of Oxford (UK)
Karolinska Institute, Stockholm (Sweden)
July 2003 – June 2007
\$105.0 million

Segmental Duplications in Neurodevelopmental, Neurological and Behavioural Disorders
Stephen Scherer
Hospital for Sick Children, Toronto
Xavier Estivill
Centro de Regulació Genòmica, Barcelona
April 2004 – September 2007
\$5.2 million

Assessing Risk for Colorectal Tumours in Canada (ARCTIC)
Brent Zanke
Cancer Care Ontario, Toronto
Tom Hudson
McGill University and Génome Québec Innovation Centre
October 2004 – December 2007
\$9.6 million

Protein Expression Profiling Platform for Heart Disease Biomarker Discovery
Peter Liu, Andrew Emili, David MacLennan
University of Toronto
October 2004 – December 2007
\$6.1 million

Mass Spectrometer-based Flow Cytometer, Methods and Applications
John Dick
University Health Network, Toronto
January 2005 – March 2008
\$7.8 million

Dollar amounts are total approved project costs as of March 31, 2010

5 Genomics Platforms – Harnessing Leading Edge Technologies

success stories

Genomics platforms play a critical role in providing infrastructure support for research in genomics, including the characterization of genes and genomes of medical, therapeutic and biological interest.

Platforms provide the entire spectrum of genomics technologies, including DNA sequencing, genotyping, RNA expression, protein identification and quantification (proteomics), metabolomics and the most advanced bioinformatics analyses to manage the vast quantities of complex data produced.

The Centre for Applied Genomics (TCAG) is Ontario's largest platform and has provided services to over 1,300 laboratories: 70% from Ontario and 86% from Canada; 9 Canadian provinces; 28 countries; over 300 academic institutions (universities, teaching hospitals and colleges); 44 companies (33 from Ontario); and 13 government or NGO institutions.

OGI is currently supporting six other platforms through its Platform Affiliates Program. These include: The Advanced Analysis Centre Genomics Facility; Analytical Genetics Technology Centre; Centre for the Analysis of Genome Evolution and function; London Regional Genomics Centre; UHN Microarray Centre; and StemCore Laboratories.

MORE INFO:

TCAG: www.tcag.ca

ON OTHER PLATFORMS: www.ontariogenomics.ca/platform-affiliates

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BUSINESS DEVELOPMENT

The Business Development team at OGI focuses on the impact of genomics research.

OGI also invests in proof-of-principle phase projects through an investment program it runs and helps develop new relationships between academia and industry through events it hosts.

The team is also responsible for managing the Genomics Sector Innovation Network portal – G-SIN (www.g-sin.com) – that highlights and supports the genomics sector in Ontario by providing information on a central portal about genomics research taking place in Ontario, facilitating linkages and building networks for Ontario's genomics sector, which spans academic research, industry and sources of investment capital.

INVESTMENTS

This year OGI closed two proof-of-principle investments through its **Pre-commercialization Business Development Fund (PBDF)**. The PBDF program invests in opportunities – based in genomics, proteomics or associated technologies – that fall in the proof-of-principle (validation) phase of research and that have the short-term potential to secure a significant next step towards the marketplace. Launched in 2004, OGI has invested in eight recipients including Ontario universities, research institutions and companies.

PBDF SUCCESS STORY: OGI made an investment into theranostics company **Amorfix Life Sciences Ltd.** in 2006 for the development of an Alzheimer's diagnostic. Amorfix is now providing a commercial in-house testing service and plans to continue to broaden its customer base throughout the coming year.

Engineering the Future - Synthetic Biology Symposium



Dr. Daniel Gibson from the J. Craig Venter Institute speaking at the synthetic biology workshop. ←



A PROGNOSTIC GENETIC TEST TO IMPROVE STEM CELL TRANSPLANT SUCCESS

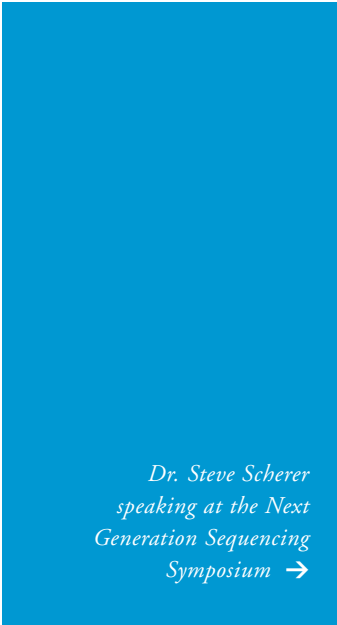
The first PBDF investment this year was in a research project led by Drs. Jayne Danska (The Hospital for Sick Children), John Dick and Jean Wang (both of University Health Network) who are working to improve outcomes for hematopoietic stem cell (HSC) transplants (or bone marrow transplants), of which 20,000 are performed worldwide each year to treat leukemia, lymphoma, solid tumours and certain inherited diseases like thalassemias and anemias. By developing a test based on the genetic make-up of the potential donor and recipient, the outcomes of hematopoietic stem cell transplants can be better predicted, therefore decreasing complications that can occur in transplant patients.

Shortly after the PBDF investment, Trillium Therapeutics Inc., a Canadian biopharmaceutical company developing immune-based biologics, entered into two definitive license agreements with University Health Network and The Hospital for Sick Children to commercialize two immunology programs in the areas of HSC transplantation and cancer.

ELIMINATING BOAR TAIN BY USING GENETIC MARKERS

The second investment this year was in a project led by Drs. Jim Squires and Flavio Schenkel who are developing a set of genetic markers that can be used for a marker-assisted selection breeding program to produce pigs that are free of boar taint, an undesirable odour or taste that is sometimes evident in pork products. Pigs that are tainted have a very low market value, and current practices to prevent boar taint, such as the castration of male pigs, lead to increased fat content in the meat and raise animal welfare concerns. This research has the potential to enable breeding companies to produce more marketable pig lines without the need for sterilization or castration.

This work also received co-investment from industry partner JSR Genetics, a leading pig breeding company in the United Kingdom.



The Next Generation Sequencing Symposium

SCIENCE WITH INDUSTRY WORKSHOPS

Two events were held over the past year, bringing together researchers and the private sector to encourage more productive contact and exchange across industry and academia.

SYNTHETIC BIOLOGY – ENGINEERING THE FUTURE

'Synthetic biology is widely described as the design and construction of new biological parts, devices and systems, and the re-design of existing natural biological systems for useful purposes.' (definition from syntheticbiology.org).

In October 2009, OGI partnered with Integrated DNA Technologies (IDT), a leading supplier of custom nucleic acids based in Iowa and operating in Canada, to host a one-day symposium focused on advancements, opportunities and challenges in the field of synthetic biology. The symposium attracted approximately 120 people from academic research institutions, government and industry from across Ontario, Canada and the US.

Speakers, including representatives from the J. Craig Venter Institute and MIT as well as Canadian institutions, addressed topics including synthetic genomes, promoters and specific genes, cell-free synthetic systems, hybrid genetic pathways and educational initiatives around synthetic biology. A public forum was held in the evening examining potential societal and environmental impacts of synthetic biology, with over 130 members of the public in attendance.

NEXT-GENERATION SEQUENCING SYMPOSIUM

Next-generation sequencing (NGS) technologies are powerful tools for rapidly sequencing genomes and studying functional genomics. In February 2010, OGI in partnership with The Centre for Applied Genomics (TCAG) hosted a one-day symposium titled *SOLiD approaches to ILLUMINATING the FLXible nature of Nucleic Acids*. The symposium explored the field of NGS on all the major platforms, application areas and data analysis. The event attracted over 250 attendees from across Ontario.

NEW PROGRAM – PLATFORM AFFILIATES PROGRAM

OGI launched its Ontario Genomics Platform Affiliates (OGPA) program in September 2009 to increase the visibility of and access to leading edge technologies for genomics technology service platforms across the province; such access is crucial to the rapid pace of genomics research on the global stage.

The program launched with six genomics technology service platforms already on board as inaugural affiliates:

- Advanced Analysis Centre (AAC) Genomics Facility at the University of Guelph
- Analytical Genetics Technology Centre (AGTC) based at University Health Network (UHN)
- Centre for the Analysis of Genome Evolution and Function (CAGEF) based at the University of Toronto
- London Regional Genomics Centre (LRGC) at the University of Western Ontario
- UHN Microarray Centre
- StemCore Laboratories at the Ottawa Hospital Research Institute (affiliated with the University of Ottawa).

Platform affiliate members also benefit from OGI's Genomics Technology Seeding program (GTS), which provides \$10,000 to explore the feasibility of adding new or improved genomics technologies to the offerings of technology service platforms. This year OGI awarded GTS funds to the UHN Microarray Centre to evaluate the potential to extend the applicability of NanoString Technologies' (Seattle) RNA amplification technology to single cell or other applications constrained by small sample size.

OUTREACH

The Outreach team at OGI works with individuals and institutions in research, education, arts and entertainment as well as with the media to increase the visibility and understanding of genomics research and its outcomes, and to facilitate informed public dialogue about genomics and a broader understanding of its impact on society.

ENGAGING STUDENTS AND THEIR TEACHERS

OGI GENOMICS TEACHING PRIZE

Launched in 2007, OGI's Genomics Teaching Prize is awarded annually to the Ontario secondary school educator whose teaching best exemplifies OGI's commitment to preparing Ontario's students for their future roles. An understanding of genomics and proteomics research as well as its outcomes and impact will be advantageous or even critical; certainly for a life sciences researcher or biotech entrepreneur, but also more generally as individuals in any walk of life making decisions about themselves, their families and their businesses.

This year's prize was awarded to Mr. Doug Gajic from Centennial Collegiate Vocational Institute (CVI) in Guelph. He was recognized for his innovative curriculum that exposes his students to current topics, techniques and tools to explore the relationship and impact

of genomics and related fields to the biological sciences. Students also benefit from visits to the Canadian Centre for DNA Barcoding at the University of Guelph's Biodiversity Institute of Ontario, and the opportunity to interact with real-life resources such as the Barcode of Life Data Systems (BOLD).

Mr. Gajic received a \$5,000 cash prize, a budget for up to \$2,000 in new laboratory equipment and expenses to travel to the National Bioscience Educators Conference in Winnipeg to share his award-winning approach to teaching genomics with other life science teachers. His curriculum was also made available on OGI's website for other teachers to download.

OGI SUMMER RESEARCH FELLOWSHIP PROGRAM

This program, launched in 2003, offers undergraduate students an opportunity to engage in real-life research in genomics, proteomics, bioinformatics, or GE³LS (ethical, economic, environmental, legal, and/or social issues relating to genomics and proteomics).

Six students, including the OGI sanofi pasteur Industry Fellow, spent four months over the summer conducting original research in some of Ontario's leading research institutions including the University of Ottawa, St. Michael's Hospital, the University of Toronto and the Ottawa Hospital Research Institute. Fellows also benefited from on-going contact with OGI representatives through peer-to-peer meetings, journal clubs and roundtable discussions. At the end of the program, fellows presented their posters at a session attended by representatives from host research groups and stakeholders from the research community.

This year, OGI established an OGI Summer Research Fellows Alumni Group on Facebook to facilitate interactions between fellows, past and present, and to keep in touch with them as they progress in their academic studies and move into the workplace.



2009 Summer Fellows
left-right
Samuel Ferber,
Belle Song,
Zuhaib Mir,
Alisha Fernandes,
Jared Mudrik,
Andrew Girgis →



Outreach Award Programs

← Dr. Christian Burks with
2009 OGI Teaching Prize
recipient Doug Gajic

8 Understanding Cell Interactions – Signalling Cascades in Cancer

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success stories

Proteins are molecules that are responsible for the structure, function and regulation of cells. Over the past 20 years, Canadian scientists have established that proteins interact with one another, assembling pathways and networks that control cellular behaviour. Drs. Tony Pawson and Jeff Wrana of the Samuel Lunenfeld Research Institute, and Dr. Shawn S.C. Li, University of Western Ontario, and their colleagues, through projects like the Dynactome Project that led to the establishment of Dynemo Biosystems, a company using the Dynemo technology – a proprietary method of assessing changes in protein-interaction networks directly from gene expression data – are mapping protein interactions to determine if diseases such as cancer are the result of changes to individual genes or from changes in the entire network. This is expected to lead to more innovative technologies as well as new therapies for cancer.

This prognostic tool has the potential to provide valuable personalized analysis for cancer patients to help inform treatment decisions. Enhanced predictive accuracy could shrink the financial burden of unnecessary tests or treatments and improve quality of life for thousands of cancer patients.

Dr. Pawson leads the world in understanding protein interaction pathways and was awarded the prestigious Kyoto Prize for his work "Proposing and Proving the Concept of Adapter Molecules in the Signal Transduction" in 2008. In January 2010, Dr. Pawson was named Canada's "Nation Builder of the Decade in Science" by The *Globe and Mail*.

MORE INFO:

DYNACTOME PROJECT: www.ontariogenomics.ca/research/project/43

DYNEMO BIOSYSTEMS: www.dynemobiosystems.com

ENGAGING THE PUBLIC

THE GEEE! IN GENOME

In partnership with The Children's Museum in Kitchener, OGI presented the *The Geee! In Genome*, Canada's first touring exhibition on genomics. This marks the second Ontario hosting of the exhibit, produced by the Canadian Museum of Nature and presented nationally by Genome Canada, with the first hosted in 2008 at the Thunder Bay Art Gallery.

Over 24,000 people visited The Children's Museum between May 23 – September 7, 2009. The exhibit had 2,500 square feet of interactive, bilingual educational content about genomics, its applications and the important contributions made by Canadian scientists.

The exhibit demystifies the science of genomics and encourages visitors to ponder important personal and societal issues arising from genetic testing, gene therapy, human cloning, GMO labelling and safety and DNA databanks.

NATIONAL BIOTECHNOLOGY WEEK

Nearly 500 secondary school students participated in events exploring genomics and biotechnology in Toronto and St. Catharines during National Biotechnology Week 2009. The events were organized by OGI in partnership with Bioscience Education Canada (BEC), Golden Horseshoe Biosciences Network (GHBN) and Brock University, and sponsored in Toronto by MaRS Discovery District and The Biotechnology Initiative (TBI).

The one-day workshops, *Adventures in Genomics and Biotechnology*, brought together leading genomics and life sciences experts to speak to the students about their work and career paths, and featured hands-on exercises and a panel Q&A session on careers in biotechnology. Feedback from participants indicated that the events inspired them to learn more about genomics and opened their eyes to the wide variety of careers available across the many biotechnology disciplines.

ENGAGING PUBLIC SERVANTS AND POLICY MAKERS

GENOMICS IN THE PARK: THE FUTURE IS IN OUR GENES

On November 30, 2009, OGI hosted its second annual Genomics in the Park event at the Ontario legislature at Queen's Park, providing an opportunity for Members of the Ontario Provincial Parliament and Ministry staff to learn about the impacts that genomics research is having in the province. The event brought together ten of the province's leading genomics researchers to showcase their work, much of which received funding from the Ontario government through the Ministry of Research and Innovation (MRI). In excess of 45 MPPs and Ministry staff met researchers and heard about their work. The Honourable John Milloy, Minister of MRI, provided remarks.

AT THE INTERFACE BETWEEN SCIENCE AND ART

In December 2009, OGI teamed up with Washington state mixed-media artist Joseph Rossano, University of Pennsylvania and Costa Rica forest biodiversity ecologist Dr. Daniel Janzen and Ontario biodiversity genomics researcher Dr. Paul Hebert, to present an online educational accompaniment available on the OGI website to a new arts-meets-science exhibition featuring works by Mr. Rossano and Dr. Janzen.

The Barcode of Life: Environment – Evolution – Exuberance debuted at the Bill Lowe Gallery in Atlanta, Georgia, and featured sculptures of butterflies incorporating DNA barcodes. Anticipating Dr. Janzen's visionary concept of a hand-held biodiversity reader, visitors were able to use mobile devices to scan QR codes adjacent to each sculpture that linked them through to the OGI website pages that contained information on the species portrayed, its DNA barcode – provided by the OGI-funded International Barcode of Life (iBOL) project – and DNA barcoding in general, and related conservation efforts that Dr. Janzen spearheads.

*Isolating DNA at National
Biotechnology Week →*



← The Honourable Gary Goodyear, Minister of State for Science and Technology, and David Marskell, CEO, The Children's Museum, visiting the Geee! In Genome exhibition.

9 Global Health with Genomics

success stories

Life expectancy in Canada is 80 years – and rising. In many developing countries, life expectancy is 40 years – and falling. Canada has an opportunity to use genomics to narrow this gap – and to address a whole range of other challenges, from disease and poverty to hunger and environmental degradation.

Genomics approaches to addressing global health concerns were started in 2001 by Drs. Abdallah Daar and Peter Singer with the foundation of what was then the Canadian Program on Genomics and Global Health, which was supported with funding through OGI. This research continues today under a new institutional name – the McLaughlin-Rotman Centre for Global Health (MRC).

Drs. Singer and Daar and their team at MRC continue to ensure that developing countries share the social and economic benefits of the genomics revolution and work towards a world where everyone benefits from new diagnostics, vaccines, drugs and other life science solutions. MRC does this through its programs including 'Grand Challenges' that seeks to remove critical barriers to help solve important health problems, and through the provision of ethical consultants, the development of commercialization models and by conducting research that leads to practical applications.

This world-leading program has influenced domestic and foreign policy decisions, helped Canadian genomics and biotechnology companies to internationalize in emerging and developing markets, and increased public awareness about the uses and misuses of genomics in addressing global health challenges.

MORE INFO:

THE CANADIAN PROGRAM ON GENOMICS AND GLOBAL HEALTH PROJECT:

www.ontariogenomics.ca/research/project/63

MRC: www.mrcglobal.org



GENOMICS: THE NEXT 10 YEARS

DR. FRANCIS COLLINS

DIRECTOR, NATIONAL INSTITUTES OF HEALTH

"Genomics has had an exceptionally powerful enabling role in biomedical advances over the past decade. Only time will tell how deep and how far that power will take us. I am willing to bet that the best is yet to come." (*Nature*, Vol 464, 1 April 2010)

MR. PAUL LUCAS

PRESIDENT AND CEO, GSK CANADA, AND MEMBER OF THE BOARD OF DIRECTORS, OGI

"The Ontario Genomics Institute is at the forefront of developing innovative solutions and world-class research that will ultimately change the health care landscape in this country. Genomics is a highly promising science that will enable the pharmaceutical sector to accelerate our research and development efforts and catalyze the production of more effective and increasingly innovative medicines and vaccines to benefit the health and well-being of all Canadians."

DR. MARK POZNANSKY

CHAIR, BOARD OF DIRECTORS OF OGI, AND FORMER CEO, PRESIDENT AND SCIENTIFIC DIRECTOR OF ROBARTS RESEARCH INSTITUTE

"Genomics will be to the future what broadband has been to communication and what highways have been to transportation."

DR. TODD R. GOLUB

DIRECTOR, CANCER PROGRAM, BROAD INSTITUTE

"Large, unbiased genomic surveys are taking cancer therapeutics in directions that could never have been predicted by traditional molecular biology." (*Nature*, Vol 464, 1 April 2010)

DR. CRAIG VENTER

FOUNDER, CHAIRMAN AND PRESIDENT,
J. CRAIG VENTER INSTITUTE

"Where will genomics be 10 years from now? As sequencing capacity increases globally and the data quality improves, we will move beyond the current goal of one genome per person to sequencing multiple genomes per person.... This will enable us to select healthy cells for reproduction and tissue transplants, or to better understand ageing and tumour development... The genome revolution is only just beginning." (*Nature*, Vol 464, 1 April 2010)

DR. MICHAEL HAYDEN

KILLIAM PROFESSOR, UNIVERSITY OF BRITISH COLUMBIA,
AND DIRECTOR, CENTRE FOR MOLECULAR MEDICINE
AND THERAPEUTICS

"I think we will have technology that will allow doctors to get the sequence of a patient at the bedside and before treating the doctor will be able to say, 'We know you have 10 times the risk of x-side effect if you take this drug based on your genotype and therefore we will modify therapy. 'I think pharmacogenomics will be very much part of all aspects of medicine.'" (*healthzone.ca, Toronto Star*, 8 July 2010)

DR. GEOFFREY DUYK

PARTNER, TPG BIOTECHNOLOGY

"While the genomics community and the popular press have focused their attention on the implications of this rapidly evolving set of technologies, capabilities and associated data on the transformation of individual health care, I would wager that a century from now that this new tool kit and lens on the world will have its major impact on sustainability initiatives as it relates to public health and the health of our planet. Our new found abilities and understandings to monitor and manipulate biology will enable important progress as we attempt to improve global food production in a second sustainable green revolution, develop alternatives to petroleum as a feedstock for chemicals and fuels, address and reverse threats to the environment as well address and manage the impact of climate change."

10 Looking Ahead – Bioproducts and Crop Pests – Using Genomics to Create a Sustainable Future

success stories

The promise of the impact genomics holds on creating a more sustainable environment is immense. That's why one of our success stories is a recent one – to highlight the importance of using genomics research to battle environmental threats and create renewable sources of energy.

Last year, two Ontario research teams received funding to examine new ways of creating sustainable alternatives to fossil fuels and developing new, environmentally sound approaches to reduce crop damage by pests.

Dr. Elizabeth Edwards, University of Toronto, and Dr. David Major, Geosyntec Consultants, Guelph, are focusing on ways to convert industrially processed plant residues and wastes into biofuels and other bioproducts. Their metagenomics approach is based on simultaneously sequencing and analyzing the genomes of many organisms to screen, identify and analyze novel proteins with the potential to act as catalysts to transform low-value plant residues and waste products into valuable bioproducts such as fuel.

Dr. Miodrag Grbic, University of Western Ontario, London, is working to improve pest control in the vegetable production industry. Dr. Grbic and his team are looking to create tools and technologies to reduce the devastating damage spider mites cause to the annual \$500 million greenhouse vegetable industry in Ontario. With increased understanding of the interactions between plant and spider mites, genes that confer pest-resistance can be identified and then could be inserted into some of the 1000 plus plant species on which these pests commonly feed, making them more robust and reliable food producers.

MORE INFO:

DR. EDWARDS' PROJECT:

www.ontariogenomics.ca/research/project/335

DR. GRBIC'S PROJECT:

www.ontariogenomics.ca/research/project/334

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gg  gcccttcg  gccaaatttccgcccagacaactttgtctttggtaatcag
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catg  caagggttccagctgacaaactctctttdaaggaggcaccggct  cccgatt
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THE TEAM

CORPORATE INFORMATION

Office

Ontario Genomics Institute
MaRS Centre, Heritage Building
101 College Street
Suite HL50
Toronto, Ontario, Canada
M5G 1L7

Tel: +1 (416) 977-9582
Fax: +1 (416) 977-8342
www.OntarioGenomics.ca
info@OntarioGenomics.ca

Annual General Meeting

Thursday, October 21, 2010
2:00pm–5:00pm EST
Ogilvy Renault LLP
Royal Bank Plaza
South Tower
200 Bay Street, Suite 3800
Boardroom E
Toronto, Ontario

BOARD OF DIRECTORS (AS OF 31 MARCH 2010)

Directors

Mark J. Poznansky (Chair)
President
G2G Consulting

Christian Burks
President & CEO
Ontario Genomics Institute

Elizabeth Dowdeswell
President & CEO
Council of Canadian
Academies

James D. Friesen
Professor Emeritus
University of Toronto

Jay A. Lefton
Senior Partner
Ogilvy Renault LLP

Paul Lucas
President and CEO
GlaxoSmithKline Inc.
Canada

Roderick R. McInnes
Director of Research
Jewish General Hospital Lady
Davis Institute for Medical
Research

Tim McTiernan
Assistant Vice President
Government, Institutional
and Community Relations
University of Toronto

John P. Molloy
President & CEO
PARTEQ Innovations

Dale Patterson (ex officio)
Interim CEO and Vice
President, External Relations
Genome Canada

George Ross (ex officio)
Deputy Minister
Ontario Ministry of Research
and Innovation

Bonnie Schmidt
President
Let's Talk Science

Louis Siminovitch
Research Director Emeritus
Samuel Lunenfeld Research
Institute

Niclas Stiernholm
President & CEO
Trillium Therapeutics Inc.

Gregg Szabo
Vice-President, Specialty
Products
Merck Frosst Canada

James Tiedje
Director of the Center for
Microbial Ecology
Michigan State University

Brian Underdown
Managing Director
Technology Investing
Lumira Capital

Paul J. Van Damme
Chief Financial Officer
Bradmer Pharmaceuticals

Treasurer

Narinder Dehal
VP, Finance & Operations
Ontario Genomics Institute

Secretary

Keith Pinder
Consultant
Innovation Institute of
Ontario

STAFF (AS OF 31 MARCH 2010)

Christian Burks
President & CEO

Teresa Clarke
Research Program Manager

Narinder Dehal
VP, Finance & Operations

Klaus Fiebig
Chief Scientific Officer & VP
Research Programs

Caitlin Hammond
Research Program Manager

Alastair Harris-Cartwright
Manager, Corporate
Communications

Matthew Johnson
Research Program Manager

Dennis McCormac
Director, Platform
Development

Helen Petropoulos
Manager,
Business Development

Kimberly Riley
Manager, Events and
Outreach

Christine Scaramuzzo
Executive Assistant to the
President & CEO

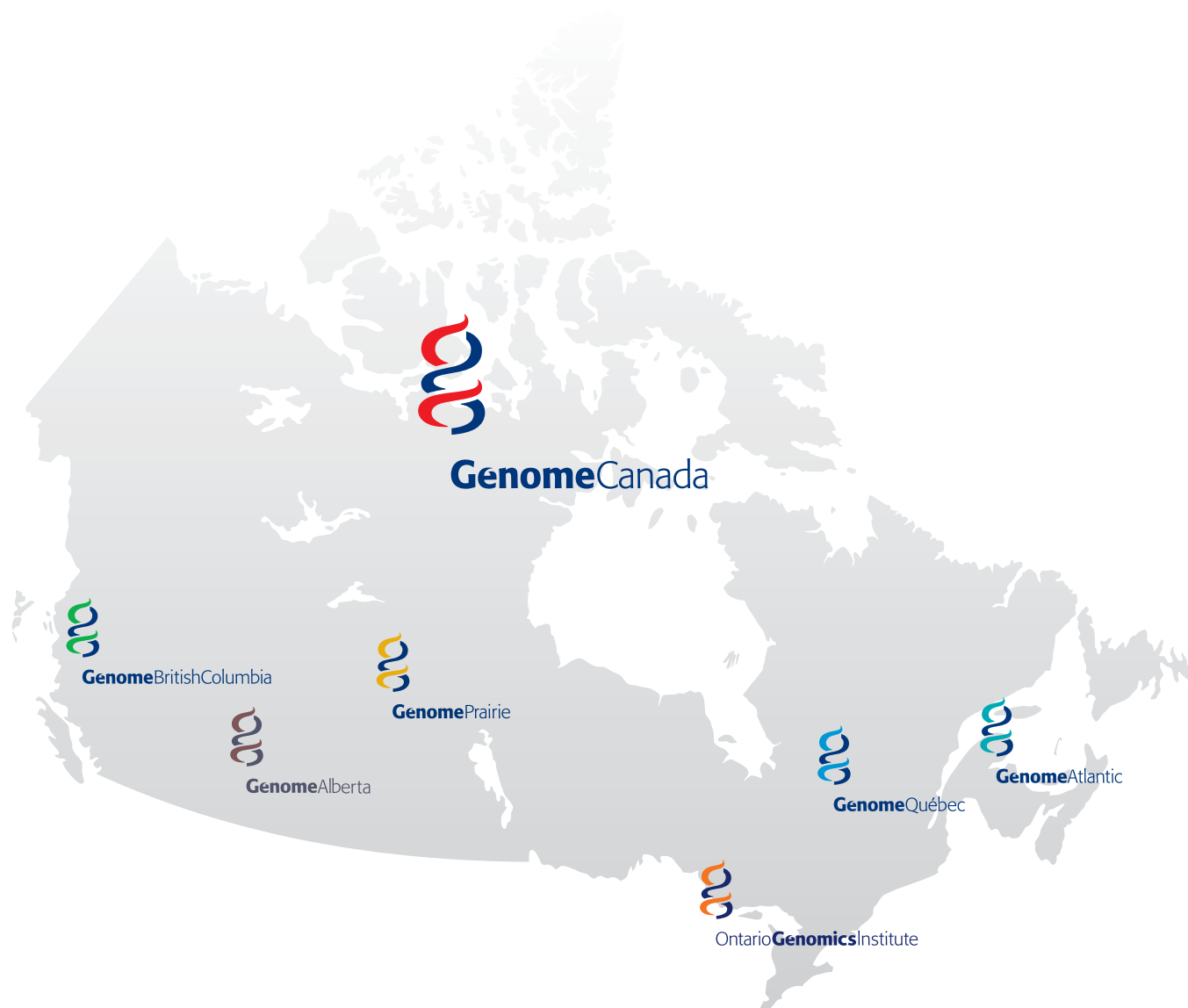
David Schibli
Research Program Manager

Julien St-Pierre
Finance Officer

Rhonda Tannenbaum
Director, Business
Development

Sonja Wesholowski
Web Coordinator

WORKING TOGETHER TO ADVANCE GENOMICS IN CANADA



PARTIAL GENE SEQUENCES DERIVED FROM:

Page 7 **Butterfly** - *Danaus plexippus* pgm Gene

Page 9 **Yeast** - *Saccharomyces cerevisiae* strain S288C ARP4 gene

Page 11 **Cancer Stem Cell** - *Homo sapiens* T-cell acute lymphocytic leukemia 1 (TAL1),

Page 13 **Genomics platform** - TCAG: from the cystic fibrosis mutation database

Page 15 **Autism** - *Homo sapiens* SHANK3 and multiple ankyrin repeat domains

Page 17 **Mosquito** - *Anopheles gambiae* AGAP007345-PA

Page 19 **Protein Interaction Mapping** - *Homo sapiens* breast cancer 2, early onset (BRCA2)

Page 21 **Global Health** - from HIV-1 isolate SE6954 from Uganda

Page 23 **Crop pest** - *Tribolium confusum* β tubulin



Abdallah Daar Peter Singer
 Aled Edwards Andrew Emili
 Andrew Macpherson Anthony Pawson
 Arturas Petronis Basil Arif Brenda
 Andrews Brent Zanke Cheryl Arrowsmith
 Chris Hogue Christian Burks Cynthia
 Guidos Daniel Figeyes David MacLennan
 Gary Bader Quaid Morris Gilles Lajoie
 Jack Greenblatt James Woodgett Janet
 Rossant Jayne Danska Jeff Wrana John
 Coleman John Dick Katherine Siminovitch
 Kevin Kain Lap-Chee Tsui Lori Frappier
 Mark Henkelman Mehrdad Hajibabaei
 Michael Rudnicki Paul Hebert Paul
 Piunno Peter Durie Peter Liu Robert
 Hegele Scott Tanner Shana
 Kelley Shawn Li Stephen
 Scherer Ted Sargent Tom
 Hudson Turlough Finan Ulrich
 Krull Xavier Estivill Database
 of Genomic Variants Barcode
 of Life Data Systems (BOLD)
 Chromosome Rearrangement
 Database Chromosome 7
 Annotation Project Cystic
 Fibrosis Mutation Database
 Human Genome Segmental
 Duplication Database Non-
 Human Segmental Duplication
 Database StemBasse Structural
 Genomics Consortium Materials
 and Methods Toronto Yeast
 Interaction Database Toronto
 Yeast Pathway Database
 DNA Barcoding Cancer stem
 cells Copy Number Variants
 (CNV) DVS Sciences Protein
 Interaction Pathways Autism
 Genomics and global health The
 Centre for Applied Genomics
 (TCAG) Dynactome DyNeMo
 Yeast genetics Genomics
 Capacity Building Workshops
 Technology Days Science
 with Industry Workshops
 Genomics Technology Seeding

Program
 Ontario Genomics Platform Affiliates
 Program Genomics Teaching Prize Summer
 Research Fellowship Program Student Network Club
 Genome Pre-commercialization Business Development Fund
 Geee! In Genome Tak Mak Canadian Barcode of Life Network

Ontario Genomics Institute Annual Report 2010

Celebrating 10 years of genomics leadership

University of Guelph Genome Project The Hospital for Sick Children, Toronto
 The Centre for Applied Genomics (TCAG) The Dynactome: Mapping
 Spatio-Temporal Dynamic Systems in Humans Samuel
 Lunenfeld Research Institute, Genomic Resource Core Facility
 Mount Sinai Hospital, Toronto University of Western
 Ontario, London Genome- Environment Interactions in
 Type I Diabetes McMaster University Identification of
 Genetic Pathways that Regulate the Survival and
 Development of Cancer and Cancer Stem Cells
 Integrative Biology University of Toronto Quantum Dot
 Diagnostics: Simultaneous Genomic and Proteomic
 Profiling of Multiple Pathogens at Point-of-Care University
 Health Network FIO Systems Corporation The Contribution
 of Genetic Modulators of Disease Severity in Cystic
 Fibrosis to Other Diseases with Similarities of Clinical
 Phenotype Strengthening the Role of Genomics and
 Global Health Structural and Functional Annotation of the
 Human Genome for Disease Study Robarts Research
 Institute International Barcode of Life (iBOL)
 Structural Genomics Consortium (SGC) – Phase II
 International Regulome Consortium (IRC) Ottawa
 Health Research Institute Automated Three-dimensional
 Phenotyping of Mouse Embryos Environmental
 Barcoding through Massively Parallelized Sequencing
 Massively Multiparametric Flow Cytometer Analyzer
 Multiplexed MicroRNA Detection on an Electronic Chip Proteomic
 Technologies for the Study of Rare Cells University of Ottawa
 Software Tools to Simplify Gene Function Prediction Technologies
 for Methyome Studies Centre for Addiction and Mental Health
 Bioproducts and Enzymes from Environmental Metagenomes (BEEM)

Consolidated Financial Statements Year Ended March 31, 2010

Geosyntec Consultants Genomics for Crop Improvement: Agricultural
 Pest Management Development of Highly Active Anti-Leukemia
 Stem Cell Therapy (HALT) Therapeutic Opportunities to Target
 Tumor Initiating Cells in Solid Tumors Canadian Program
 on Genomics and Global Health Genetic
 Determinants of Human Health
 and Disease



Ontario**Genomics**Institute

Abdallah Daar
 Peter Singer Aled Edwards
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 Non-Human Segmental Duplication Database StemBasse Structural Genomics Consortium
 Materials and Methods Toronto Yeast Interaction Database Toronto Yeast Pathway Database
 DNA Barcoding Cancer stem cells Copy Number Varients (CNV) DVS Sciences Protein
 Interaction Pathways Genomics and global health The Centre for Applied Genomics (TCAG)
 Dynactome DyNeMo Yeast genetics Pre-commercialization Business Development Fund
 Genomics Capacity Building Workshops Technology Days Science with Industry Workshops
 Genomics Technology Seeding Program Ontario Genomics Platform Affiliates Program
 Genomics Teaching Prize Summer Research Fellowship Program Student Network
 Club Genome Geee! In Genome Tak Mak Canadian Barcode
 of Life Network University of Guelph
 Hospital for Sick Children, Toronto
 The Dynactome: Mapping Spatio-
 Temporal Dynamic Systems in Humans
 Samuel Lunenfeld Research Institute
 Mount Sinai Hospital, Toronto
 University of Western Ontario, London
 Genome-Environment Interactions in
 Type I Diabetes McMaster University
 Identification of Genetic Pathways
 that Regulate the Survival and
 Development of
 Cancer and Cancer
 Stem Cells Integrative
 Biology Quantum
 Dot Diagnostics

OGI'S MISSION

USE WORLD-CLASS RESEARCH TO CREATE STRATEGIC GENOMICS

RESOURCES AND ACCELERATE ONTARIO'S DEVELOPMENT OF A

GLOBALLY-COMPETITIVE LIFE SCIENCES SECTOR.

CONTENTS

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CONSOLIDATED STATEMENT OF FINANCIAL POSITION	2
CONSOLIDATED STATEMENT OF OPERATIONS	3
CONSOLIDATED STATEMENT OF CHANGES IN NET ASSETS	4
CONSOLIDATED STATEMENT OF CASH FLOWS	5
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS	6

AUDITORS'

REPORT

TO THE BOARD OF DIRECTORS OF

ONTARIO GENOMICS INSTITUTE

We have audited the consolidated statement of financial position of the Ontario Genomics Institute as at March 31, 2010 and the consolidated statements of operations, changes in net assets and cash flows for the year then ended. These financial statements are the responsibility of the Corporation's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these consolidated financial statements present fairly, in all material respects, the financial position of the Corporation as at March 31, 2010 and the results of its operations and its cash flows for the year then ended in accordance with Canadian generally accepted accounting principles. As required by the Canada Corporations Act, we report that, in our opinion, these principles have been applied on a basis consistent with that of the preceding year.

A handwritten signature in black ink that reads "KPMG LLP". The signature is written in a cursive, slightly slanted style. Below the signature is a single horizontal line that starts under the 'K' and ends under the 'P'.

Chartered Accountants, Licensed Public Accountants
Toronto, Canada May 28, 2010

CONSOLIDATED STATEMENT OF FINANCIAL POSITION

MARCH 31, 2010, WITH COMPARATIVE FIGURES FOR 2009

2010

2009

Assets

Current assets:

Cash	\$ 6,415,692	\$ 3,058,639
Accounts receivable (note 3)	81,109	75,722
Advances to genomic research projects	57,810	531,568
Deposits and prepaid expenses	101,449	92,601
	6,656,060	3,758,530

Long-term advances and investments (note 4)	403,238	287,095
---	---------	---------

Capital assets (note 5)	79,905	178,968
	\$ 7,139,203	\$ 4,224,593

Liabilities and Net Assets

Current liabilities:

Accounts payable and accrued liabilities (note 6)	\$ 233,230	\$ 328,639
Current portion of lease inducement (notes 5)	13,500	18,000
	246,730	346,639

Deferred contributions (note 7)	5,265,061	2,287,092
---------------------------------	-----------	-----------

Lease inducement (notes 5)	-	13,500
----------------------------	---	--------

Net assets:

Internally restricted (note 9)	66,405	147,468
Unrestricted	1,561,007	1,429,894
	1,627,412	1,577,362

Commitments (note 12)	\$ 7,139,203	\$ 4,224,593
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See accompanying notes to consolidated financial statements.

On behalf of the Board:



Director



Director

CONSOLIDATED STATEMENT OF OPERATIONS

YEAR ENDED MARCH 31, 2010, WITH COMPARATIVE FIGURES FOR 2009	2010	2009
Revenue:		
Amortization of deferred contributions (note 7)	\$27,682,151	\$ 31,243,583
Interest and other revenue	136,215	212,749
	27,818,366	31,456,332
Expenses:		
Genomics research projects	25,137,684	28,699,111
General and administrative	2,019,590	1,992,359
Outreach, communications and GE ³ LS	203,913	337,323
Commercialization	152,893	141,053
Research advisory	143,890	195,234
Amortization of capital assets	100,145	93,970
Loss on disposal of capital assets	1,344	–
	27,759,459	31,459,050
Excess (deficiency) of revenue over expenses	\$ 58,907	\$ (2,718)

See accompanying notes to consolidated financial statements.

CONSOLIDATED STATEMENT OF CHANGES IN NET ASSETS

	YEAR ENDED MARCH 31, 2010, WITH COMPARATIVE FIGURES FOR 2009			2010	2009
	Internally restricted (note 9)	Unrestricted	Total	Total	
Net assets, beginning of year	\$ 147,468	\$ 1,429,894	\$ 1,577,362	\$ 1,592,985	
Excess (deficiency) of revenue over expenses	(83,489)	142,396	58,907	(2,718)	
Unrealized loss on long-term investment (note 4)	–	(8,857)	(8,857)	(12,905)	
Invested in capital assets	2,426	(2,426)	–	–	
Net assets, end of year	\$ 66,405	\$ 1,561,007	\$ 1,627,412	\$ 1,577,362	

See accompanying notes to consolidated financial statements.

CONSOLIDATED STATEMENT OF CASH FLOWS

YEAR ENDED MARCH 31, 2010, WITH COMPARATIVE FIGURES FOR 2009	2010	2009
Cash provided by (used in):		
Operations:		
Excess (deficiency) of revenue over expenses	\$ 58,907	\$ (2,718)
Items not involving cash:		
Amortization of deferred contributions (note 7)	(27,682,151)	(31,243,583)
Amortization of capital assets	100,145	93,970
Loss on disposal of capital assets	1,344	–
Amortization of lease inducement	(18,000)	(18,000)
	(27,539,755)	(31,170,331)
Change in non-cash operating working capital:		
Decrease (increase) in accounts receivable	(5,387)	4,041
Decrease (increase) in advances to genomics research projects	473,758	(531,568)
Decrease in amounts due to genomics research projects	–	(333,131)
Increase in deposits and prepaid expenses	(8,848)	(1,373)
Decrease in accounts payable and accrued liabilities	(95,409)	(135,770)
Increase in deferred contributions	30,660,120	30,907,061
	3,484,479	(1,261,071)
Investments:		
Increase in long-term advances and investments	(125,000)	(100,000)
Additions to capital assets	(2,426)	(36,643)
	(127,426)	(136,643)
Increase (decrease) in cash	3,357,053	(1,397,714)
Cash, beginning of year	3,058,639	4,456,353
Cash, end of year	\$ 6,415,692	\$ 3,058,639

See accompanying notes to consolidated financial statements.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Ontario Genomics Institute (the "Corporation" or "OGI") was incorporated without share capital on October 18, 2000 under the Canada Corporations Act as a not-for-profit organization. OGI's role is to use world-class research to create strategic genomics resources and accelerate Ontario's development of a globally-competitive life sciences sector by concentrating on three strategic areas:

- (a) through Research Program Management, we identify and cultivate emerging Ontario-led, pioneering research projects in genomics and related fields, and work with them to identify, attract, and support funding;
- (b) through Business Development, we catalyze access to and the impact of research outcomes, helping scientists market their discoveries and the resulting products, and also work to ensure that access to leading-edge technologies makes genomics research in Ontario more competitive; and
- (c) through Outreach, we establish initiatives that increase awareness of genomics research and facilitate informed public dialogue about genomics and its impact on society.

1. Significant accounting policies:

(a) Basis of presentation:

These consolidated financial statements include the results of OGI with those of the Corporation's wholly owned subsidiary, Genomics Ontario Inc. All significant intercompany accounts and transactions have been eliminated upon consolidation.

(b) Revenue recognition:

The Corporation follows the deferral method of accounting for contributions, which include funds from Genome Canada and the Government of Ontario's Ministry of Research and Innovation. Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

Externally restricted contributions are recognized as revenue in the year in which the related expenses are incurred. Investment income earned on unspent externally restricted contributions is recognized in the year in which it is earned.

(c) Advances to/amounts due to genomics research projects:

Advances to research projects are comprised of amounts provided by the Corporation to approved research projects which have not been expensed. Amounts due to research projects comprise amounts payable by the Corporation to projects for expenses already incurred and approved.

(d) Financial instruments other than long-term advances and investments:

OGI designates its cash as held-for-trading, which is measured at fair value. Accounts receivable and advances to genomic research projects are classified as receivables, which are measured at amortized cost. Accounts payable and accrued liabilities and amounts due to genomic research projects are classified as other financial liabilities, which are measured at amortized cost.

(d) Financial instruments other than long-term advances and investments (continued):

OGI has adopted The Canadian Institute of Chartered Accountants' ("CICA") Handbook Section 3861, Financial Instruments - Disclosure and Presentation. In accordance with the Accounting Standards Board's decision to exempt not-for-profit organizations from the disclosure requirements with respect to financial instruments contained within Section 3862, Financial Instruments - Disclosures, and Section 3863, Financial Instruments - Presentation, OGI has elected not to adopt these standards in its consolidated financial statements.

The carrying values of cash, accounts receivable, advances to genomic research projects, accounts payable and accrued liabilities and amounts due to genomic research projects approximate fair values due to the relatively short term maturity of these financial instruments.

(e) Long-term advances and investments:

The long-term advances and investments in the entities for which fair value is not readily determinable are accounted for using the cost method.

The long-term advances and investments in entities for which fair value is readily determinable are classified as available-for-sale and stated at fair value. The change in the difference between the fair value and cost of investments at the beginning and end of each year is reflected in the consolidated statement of changes in net assets.

(f) Capital assets:

Capital assets are recorded at cost less accumulated amortization. Leasehold improvements are amortized on a straight-line basis over the lesser of estimated useful life or the term of the lease. Furniture and fixtures are amortized on a straight-line basis over five years. Computer equipment is amortized on a straight-line basis over three years. In the year of acquisition, capital assets are amortized at 50% of the annual rate.

(g) Lease inducement:

Lease inducement represents a tenant improvement allowance provided to the Corporation by its lessor. This amount is being repaid on a straight-line basis over the term of the lease and is recorded as an increase in rent expense. The costs associated with these tenant improvements have been capitalized as leasehold improvements and are being amortized over the lesser of the estimated useful lives and the term of the lease.

(h) Use of estimates:

The preparation of financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the year. Amounts subject to significant estimates and assumptions include the carrying value of capital assets, fair value of long term advances and investments, valuation of accounts receivable and provisions and accruals. Actual results could differ from those estimates.

2. Adoption of new accounting standards:

(a) Amendments to Accounting Standards that apply to Not-For-Profit Organizations:

- (i) Effective April 1, 2009, the Corporation adopted the amendments to the 4400 Sections of the CICA Handbook. These amendments eliminate the requirement to show net assets invested in capital assets as a separate component of net assets, clarify the requirement for revenue and expenses to be presented on a gross basis when the not-for-profit organization is acting as principal and require a statement of cash flow. As a result of adopting these standards, the investment in capital assets has been reclassified as internally restricted. Adoption of these recommendations had no other significant impact on the consolidated financial statements for the year ended March 31, 2010.
- (ii) Effective April 1, 2009, the Corporation adopted CICA Handbook Section 4470, Disclosure of Allocated Expenses by Not-for-Profit Organizations, which establishes disclosure standards for entities that choose to classify their expenses by function and allocate expenses from one function to another. The adoption of this standard did not have an impact on the consolidated financial statements for the year ended March 31, 2010.

(b) Amendments to Section 1000, Financial Statement Concepts ("Section 1000"):

Effective April 1, 2009, the Corporation adopted the amendments to Section 1000 of the CICA Handbook. These amendments clarify the criteria for recognition of an asset or liability, removing the ability to recognize assets or liabilities solely on the basis of matching of revenue and expense items. Adoption of these recommendations had no effect on the consolidated financial statements for the year ended March 31, 2010.

3. Accounts receivable:

	2010	2009
Grants receivable: Genome Canada	\$ -	\$ 31,327
Goods and services taxes ("GST")	19,062	27,323
Interest and other	62,047	17,072
	\$ 81,109	\$ 75,722

4. Long-term advances and investments:

Pursuant to the commercialization policy of the Corporation, the Corporation invests in genomics-related research where traditional sources of financing are unavailable and the Corporation believes the technology may be of commercial interest in the future. Additional investments of \$125,000 (2009 - \$100,000) were made during the year. Investments for which fair value is not determinable are recorded at cost as at March 31, 2010, as the Corporation does not have significant influence over the entities. The investment in a publicly-traded company has a fair value of \$78,238 (2009 - \$87,095) and cost of \$100,000 (2009 - \$100,000). It is recorded at fair value.

5. Capital assets:

			2010	2009
	Cost	Accumulated amortization	Net book value	Net book value
Leasehold improvements	\$ 305,465	\$ 268,030	\$ 37,435	\$ 112,306
Furniture and fixtures	64,957	41,822	23,135	36,126
Computer equipment	37,053	17,718	19,335	30,536
	\$ 407,475	\$ 327,570	\$ 79,905	\$ 178,968

Pursuant to its move into new premises in 2006, the Corporation made expenditures of \$202,132 on leasehold improvements. The related lease inducement loan of \$90,000 has been recorded as a deferred inducement and is being repaid over the lease term. As at March 31, 2010, the remaining obligation is \$13,500.

6. Accounts payable and accrued liabilities:

	2010	2009
Accrued liabilities	\$ 165,181	\$ 142,509
Accounts payable	25,918	131,403
Vacation accrual	42,131	54,727
	\$ 233,230	\$ 328,639

7. Deferred contributions:

The Corporation receives funding from Genome Canada and other parties to be administrated and distributed in accordance with the related funding agreements.

Deferred contributions related to expenses of future periods represent unspent externally restricted funding, to be used for the purposes of providing funds to eligible recipients and the payment of operating and capital expenditures in future periods.

The changes in the deferred contributions balances are as follows:

	2010	2009
Opening balance	\$217,176,119	\$186,269,058
Contributions received or receivable during the year:		
Genome Canada - Research	20,739,317	23,153,977
Genome Canada - Operations	1,000,000	1,500,470
Genome Canada - Structural Genomics Consortium	3,820,803	6,252,614
Government of Ontario - MRI	5,000,000	-
Other	100,000	-
	247,836,239	217,176,119
Amount amortized to revenue	(242,571,178)	(214,889,027)
	\$ 5,265,061	\$ 2,287,092

8. Related party transactions and balances:

In October 2003, the Corporation acquired the common shares of Genomics Ontario Inc., a for-profit entity which provides an investment vehicle for certain commercialization activities. During the year, an intercompany loan for \$2,970 (2009 - \$3,000) was provided to Genomics Ontario Inc. to fund operations. The loan is non-interest bearing, unsecured and payable on demand. This transaction has been eliminated upon consolidation.

9. Internally restricted net assets:

Internally restricted net assets represent net assets invested in capital assets.

10. Financial instruments:

(a) Interest rate risk:

Interest rate risk arises from interest income on the cash balance. The effect on revenue of an increase or decrease in interest rates is not significant.

(b) Market risk:

Market risk arises from the long-term investment in a publicly-traded company. The exposure is limited to the carrying value of this investment.

It is management's opinion that OGI is not exposed to significant interest rate, market, credit or currency risk arising from financial instruments.

11. Capital disclosures:

The Corporation's current objectives when managing capital are to safeguard the assets and maintain liquidity. The Corporation maintains its liquidity by monitoring actual and projected cash commitments to ensure that it has sufficient liquidity through funding received for operations.

12. Commitments:

(a) Funding:

The Corporation has committed to the following:

	Commitments	Less amount paid for:		Residual commitments
		Expenses incurred	Advances (due to)	
			(000's)	
Competition III	\$ 83,450	\$ 74,751	\$ (578)	\$ 9,277
International Consortium Initiatives	32,890	27,343	–	5,547
Science and Technology Platforms	3,838	1,983	26	1,829
Technology Development Competition	5,783	4,853	265	665
Applied Genomics Research in Bioproducts or Crops Competition	8,210	697	345	7,168
	\$ 134,171	\$ 109,627	\$ 58	\$ 24,486

In accordance with an agreement with Genome Canada with regard to financial commitments totalling \$83,450,000 for Competition III, \$5,784,000 for Technology Development Competition and \$8,210,000 for Applied Genomics Research in Bioproducts or Crops Competition, the Corporation had agreed, among other things, to obtain equivalent financial support from other parties.

Genome Canada has entered into an agreement with the Corporation under which Genome Canada agreed to provide the Corporation with financial contributions up to \$28,453,200 for disbursement to the Structural Genomics Consortium ("SGC"), \$2,127,380 for the International Regulome Consortium ("IRC") and \$2,110,000 for the International Barcode of Life project ("iBOL"), collectively referred to as the International Consortium Initiatives ("ICI"). Under the agreement, the Corporation disburses funds to the project but expenditures are reported directly to Genome Canada; therefore, the Corporation treats these funds as unrestricted and expenses when they are disbursed.

In fiscal 2010, OGI received \$5,000,000 in funding from the Government of Ontario's Ministry of Research and Innovation.

(b) Operating lease:

The Corporation is committed under a five year operating lease expiring December 31, 2010, for premises as follows:

2011	\$ 153,316
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(c) Support services:

In September 2009, OGI entered into a one-year agreement with an external provider of transactional accounting services at a cost of \$30,000 (plus GST). The agreement was renewed for a one-year period, at a cost of \$30,000 (plus GST).

