



2009-2010  
Activity Report

INSTITUTE FOR RESEARCH  
IN IMMUNOLOGY  
AND CANCER



Université   
de Montréal

Cancer is the leading cause of death in Canada. The Canadian Cancer Society estimates that 173,800 new cases will be diagnosed and 76,200 people will die from cancer in 2010.

Close to 40% of Canadian women and 45% of Canadian men will develop some form of cancer in their lifetime. Despite considerable efforts and spectacular scientific advances in combating this disease, effective treatments are lacking for most types of cancer.

An ultra-modern research hub and training centre located at the heart of Université de Montréal, the Institute for Research in Immunology and Cancer (IRIC) was created in 2003 to shed light on the mechanisms of cancer and discover new, more effective therapies to counter this plague.

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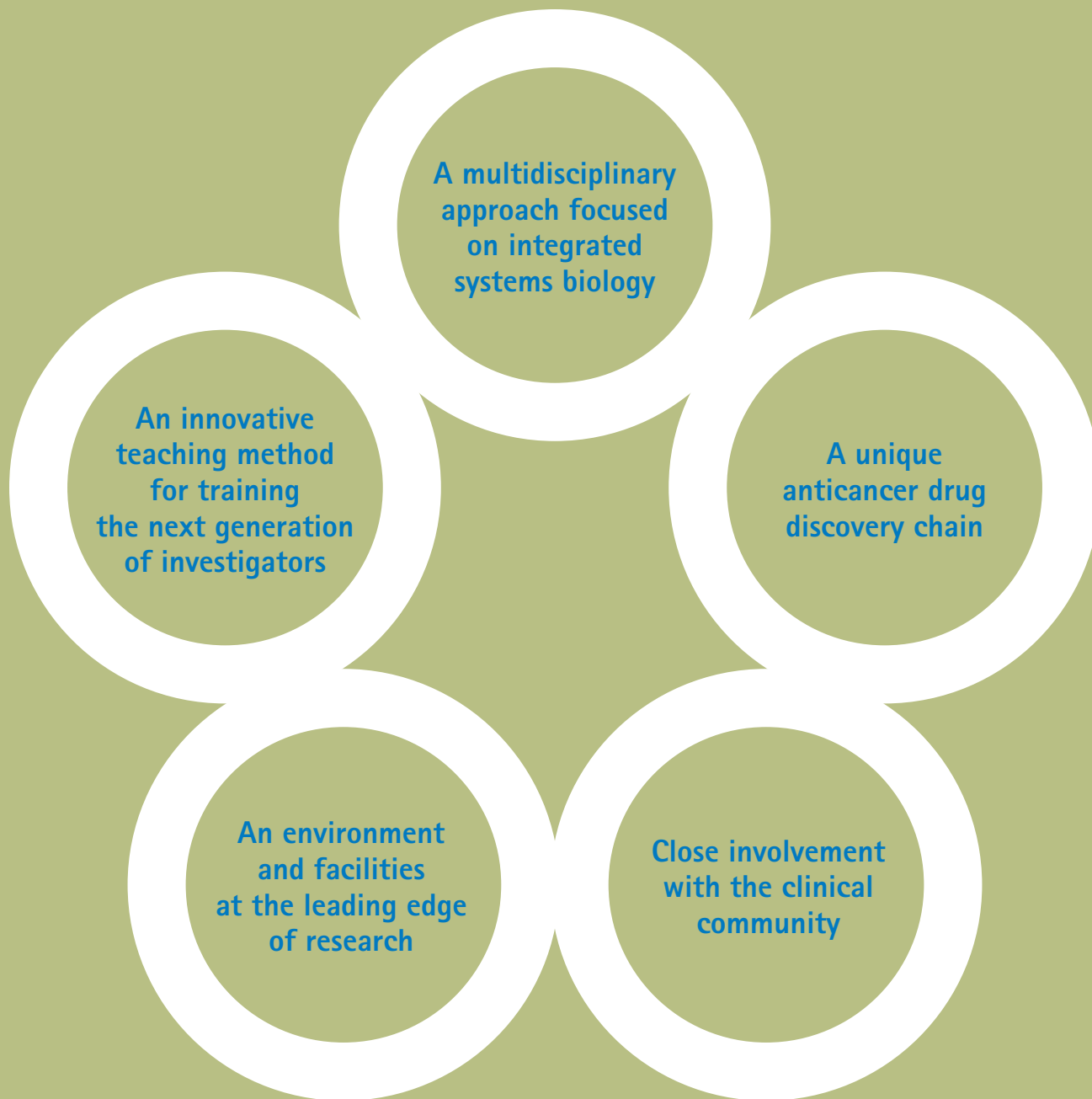
Financial Profile

Front cover: An IRIC multidisciplinary work team. Front row, students Danielle de Verteuil and Étienne Caron flanking Dr. Claude Perreault, investigator, Immunobiology. Back row, Dr. Pierre Thibault, investigator, Proteomics and Bioanalytical Mass Spectrometry, Wafaa Yahyaoui, postdoctoral fellow, Dr. Éric Bonneil, head of the Proteomics core facility and Dr. Sébastien Lemieux, investigator, Functional and Structural Bioinformatics.

# IRIC's Profile



IRIC operates according to a model that is unique in Canada. Its innovative approach to research has already led to discoveries that will, over the coming years, have a significant impact on the fight against cancer.



IN ONLY SEVEN YEARS OF ACTIVITY, IRIC HAS BUILT A REPUTATION FOR EXCELLENCE WITHIN THE CANADIAN AND INTERNATIONAL SCIENTIFIC COMMUNITY. ITS TEAM HAS CLOSE TO 400 DEDICATED MEMBERS, EACH ONE CONVINCED OF THE SOUNDNESS OF THE INSTITUTE'S APPROACH: COMPLEMENTARY EXPERTISE, COLLABORATION AND COMMUNITY, COMBINED WITH CREATIVITY AND INNOVATION, MAKE UP ITS WINNING FORMULA FOR BEATING CANCER.

# A Distinctive Results-focused Research Model

## A multidisciplinary approach focused on integrated systems biology

Around ten years ago, the simultaneous emergence of highly sophisticated technologies and new scientific disciplines—genomics, proteomics and bioinformatics—spurred a remarkable acceleration in research work and led to the birth of integrated systems biology. This novel approach, which has a multidisciplinary focus, attempts to study all components of a biological process at the same time, and no longer just one component in isolation. IRIC was one of the first research centres in Canada to use this model.

## A unique anticancer drug discovery chain

The Institute set up the first Canadian anticancer drug discovery chain in an academic setting. Therapeutic targets are initially validated by conducting a broad range of tests to identify the active compounds. Next, the Institute's Medicinal Chemistry core facility optimizes their properties. Lastly, IRICoR, an IRIC subsidiary

created in 2008, establishes partnerships with biopharmaceutical companies with the aim of marketing the discoveries.

## Close involvement with the clinical community

IRIC investigators maintain close ties with hospitals; this enables them to increase the pace of their research and have it validated in clinical trials. The collaborating partners include Maisonneuve-Rosemont Hospital, CHUM, Montréal's Jewish General Hospital and McMaster University Medical Centre (Hamilton). In addition, Institute investigators are active in local, national and international networks dedicated to the advancement of science and public health.

## An environment and facilities at the leading edge of research

IRIC is located in the Marcelle-Coutu Pavilion at Université de Montréal, a building specifically designed to meet the needs of collaborative and multidisciplinary research. Every investigator has access to 11 cutting-edge technological core

facilities, rare research tools in an academic setting. These core facilities also meet the needs of the scientific community at Université de Montréal, in Canada and elsewhere.

## An innovative teaching method for training the next generation of investigators

The next generation of investigators trained at IRIC must not only become experts in their own field, they must also integrate multidisciplinary and collaboration into their practice. To do so, the Institute was the first in Canada to set up a graduate study program in systems biology, adapted to both the job market and academic research. This program has had unprecedented success and attracts students from around the world.

**2** mandates

Accelerate the discovery of new therapies and train the scientists of tomorrow

**25**  
research units

**1**  
mission  
Have a significant impact on the treatment of cancer

A dedicated team of  
**400**  
members

**AMBITIOUS MEANS**

**25** principal investigators  
**152** research employees  
**74** postdoctoral fellows  
**124** Master's and Ph.D. students  
**23** professional and administrative employees  
**11** leading-edge technological core facilities  
**1** integrated anticancer drug discovery chain  
**1** postgraduate study program in systems biology  
**Over \$120 million** in investments

**ALREADY CONCLUSIVE RESULTS**

Over **360** publications in scientific journals  
**11** patents issued and **25** patent applications filed by its investigators  
Over **550** lectures given by its investigators and guest investigators  
**279** students and postdoctoral fellows trained  
**15** Canada Research Chairs and **2** private chairs  
**Close to \$15 million** in research funding in the past year



Université  
de Montréal

INSTITUT DE RECHERCHE  
EN GÉNÉTIQUE ET  
GÉOLOGIE

# Words from the Executive Management

- A word from the rector of Université de Montréal
- A word from the chairman of IRIC's Board of Directors
- A word from IRIC's chief executive officer and scientific director



## One of the university's flagships

Cancer never ceases to gain ground globally, and it is more important than ever to find a way to reverse this trend.

At the start of the millennium, Rector Robert Lacroix sought to position Université de Montréal as one of the world leaders in cancer research. He was right to do so. Today, the Institute for Research in Immunology and Cancer (IRIC) has risen to the challenge and stands out, particularly for its implementation of the first real anticancer drug discovery chain in an academic setting in Canada.

Through innovation, bold thinking and the expertise of its investigators, IRIC makes an extraordinary contribution to our prestige as an institution and stands as one of our flagships.



## A crazy dream

The creation of IRIC in 2003 was the most daring project undertaken during my time as rector of Université de Montréal. Even in my wildest dreams, I never imagined that the Institute would acquire such a degree of excellence in so short a time. This excellence was acquired, first and foremost, thanks to its exceptional team as well as the support of Université de Montréal and the many people who signed on to the project.

This bridging of the academic and business worlds carries over to IRIC's Board of Directors. Its members, who are all convinced of the Institute's key importance, are not content just to spread the good news of its developments and discoveries: they also help keep it on track, by regularly reviewing its strategic plan and by helping to secure the funding that will support it. In this regard, IRIC's first fundraising campaign, which I co-chaired with Marcel Dutil, chairman of the Board and CEO of the Canam Group, can be termed historic: since the start of the campaign, we have

On the eve of a new large fundraising campaign at Université de Montréal, there is no doubt that its development and renown remain among our top priorities. And we hope that IRIC will garner all the financial support it needs to effectively carry out its mission.

Lastly, I would like to use the publication of this first activity report to thank Dr. Guy Sauvageau and IRIC's investigators, staff and students as well as the members of its Board of Directors for their devoted work.

**Guy Breton, M.D., F.R.C.P.(c)**  
Rector, Université de Montréal

collected a little over \$14 million. A true achievement for such a young research centre and one that is still relatively unknown to the general public! On this point, I would particularly like to thank the Marcelle and Jean Coutu Foundation for giving the campaign an initial boost with an exceptional donation to IRIC of \$5 million.

IRIC has been one of the finest achievements in which I have played a role in my career. And each time a major development occurs or a discovery is made here, I view it as a gift, a very personal reward. I even dare to imagine that one day, one of the Institute's investigators will receive the ultimate award: a Nobel prize. A crazy dream? Perhaps not as crazy as one may think.

**Robert Lacroix, Ph.D., CM, OQ, MSRC (FRSC)**  
Chairman of IRIC's Board of Directors

## 2009–2010: A year preparing for the future

IRIC's mission is to have a tangible impact on the battle against cancer by developing effective new therapies. From this standpoint, 2009-2010 was a pivotal year. Previously, the Institute was a young research centre in full development: we were putting together the pieces of the puzzle—multidisciplinarity, collaboration, leading-edge technological core facilities, partnerships—and making them work together. Now they work, and they are producing ever more promising results! Take the example of ribavirin: Dr. Katherine Borden's team discovered that this antiviral was effective in treating certain patients with acute leukemia.

The year 2009-2010 was also one in which major strategic projects were launched, mainly thanks to the support of generous philanthropists who understand the importance of investing in an institute such as ours. Daily, these donors provide crucial support for funding high-risk research projects whose potential impact for treating cancer is enormous.

To achieve these objectives, IRIC is also fortunate to work with several partners, including Maisonneuve-Rosemont Hospital, pharmaceutical companies and several high-tech equipment suppliers.

Thanks to its numerous partnerships—and thanks also to its distinctive model, which makes the Institute a one-of-a-kind research centre—IRIC is one of Québec's main hubs in the fight against cancer. This first activity report, which sheds light on IRIC's ambitions and the means to achieve them, reflects this concern for excellence.



**Guy Sauvageau, M.D., Ph.D., F.R.C.P.(c)**

Chief executive officer and scientific director

IRIC



## Some Key IRIC Dates

**June  
2003**

Robert Lacroix, rector at Université de Montréal, announces the creation of the Institute for Research in Immunology and Cancer (IRIC).

IRIC takes up residence in the new Marcelle-Coutu Pavilion, an ultra-modern building specifically designed to meet the technical and collaborative needs of investigators and students.

The Institute then enters a period of growth marked by the installation of 11 leading-edge technological core facilities and an animal facility, the annual hiring of three new principal investigators and the continually increasing recruitment of students and postdoctoral fellows.

**Winter  
2003-04**

The new chief executive officer, Pierre Chartrand, and the first four recruits, principal investigators Trang Hoang, Sylvain Meloche, Guy Sauvageau (scientific director) and Marc Therrien, take up temporary residence in the Roger-Gaudry Pavilion.

**January  
2005**

**May  
2006**

Launch of the new graduate program in molecular biology, systems biology option.

**June  
2007**

Appointment of Guy Sauvageau to the position of chief executive officer and renewal of his mandate as scientific director.

**February  
2008**

Implementation, at the Institute, of the first Canadian anticancer drug discovery chain in a university setting, thanks to cooperation between IRIC, the Groupe de recherche universitaire sur le médicament and Maisonneuve-Rosemont Hospital. In the same year, IRIC creates its subsidiary IRICoR, whose objective is to develop and market new anticancer therapies.

**June  
2009**

Kick-off of IRIC's first large-scale fundraising campaign, which receives a \$5 million donation from the Marcelle and Jean Coutu Foundation.



# Scientific Activities

IRIC already has 25 research units—  
with a capacity for 9 more—  
headed by scientists  
of international calibre,  
supported by outstanding teams.

- Three Research Axes
- Research Facilities
- Strategic Projects
- The Impacts of our Research

## Three Research Axes

Research at IRIC revolves around three axes, each with its own head. This structure, established in 2009, promotes cooperation among the 25 research units.

HOW DOES A NORMAL CELL TURN INTO A CANCER CELL? TO UNDERSTAND THE PROCESS, THE INVESTIGATORS IN THIS AXIS ARE DIVIDED INTO TWO GROUPS, EACH OF WHICH STUDIES CERTAIN BASIC ASPECTS OF CELL BIOLOGY. THE FIRST GROUP WORKS ON THE RESPONSE MECHANISMS TO EXTRA-CELLULAR SIGNALS AND THE FACTORS CONTROLLING GENE EXPRESSION. THE INVESTIGATORS IN THE SECOND GROUP FOCUS THEIR EFFORTS ON VARIOUS ASPECTS OF CELL DIVISION.

# Axis 1: Biology of Cancer

RESEARCH UNITS	PRINCIPAL INVESTIGATORS
<b>Signalling/Transcription Group:</b>	
Cell Signalling and Proteomics	Philippe P. Roux
Chromosome Biogenesis	Alain Verreault, axis head
Intracellular Signalling	Marc Therrien
Molecular Targeting for Breast Cancer Treatment	Sylvie Mader
Proteomics and Bioanalytical Mass Spectrometry	Pierre Thibault
Signalling and Cell Growth	Sylvain Meloche
<b>Regulation and Cell Division Mechanics Group:</b>	
Cell Cycle Mechanisms in <i>Drosophila</i>	Vincent Archambault
Cell Cycle Regulation and Chromosome Structure	Damien D'Amours
Cell Division and Differentiation	Jean-Claude Labbé
Cellular Biology of Mitosis	Sébastien Carréno
Chemical Biology of Cell Division	Benjamin Kwok
Cytoskeletal Dynamics and Cell Division	Amy Shaub Maddox
Mitotic Mechanisms and Chromosome Dynamics	Paul S. Maddox
Vesicular Trafficking and Cell Signalling	Gregory Emery

Page 11: Dr. Vincent Archambault (standing), principal investigator, accompanied by Wang Peng, Zeina Salloum and Karine Normandin who are taking a close look at *Drosophila*.

**Associate investigators:** Mike Tyers (The University of Edinburgh, Scotland), Lea Harrington (The University of Edinburgh, Scotland), André Robidoux (CHUM–Université de Montréal)

## It happened this year!

**Dr. Marc Therrien** had his **Canada Research Chair in Intracellular Signalling Tier 2** renewed for five years. With his team, he studies various aspects of the RAS/MAPK intracellular signalling pathway, which is activated abnormally in many cancers. The studies aim to understand how different proteins in this signalling pathway interact and to identify new components.

**Dr. Vincent Archambault** was recipient of the **2009 Maud Menten New Principal Investigator Prize in the Biomedical Research** field and a grant of \$30,000 awarded by the Institute of Genetics of the Canadian Institutes of Health Research.

**Dr. Pierre Thibault** chaired the **"Proteomics and systems biology"** conference at the 78th Congress of the Association francophone pour le savoir (Acfas), in May 2010, at Université de Montréal. Many aspects of proteomics were explored during the conference, specifically molecular imaging by laser ablation, cell fractionation, protein-protein interactions and the use of bioanalytical techniques, such as liquid chromatography and mass spectrometry.



Principal Investigator Marc Therrien and postdoctoral fellow Caroline Baril at the Bio-imaging core facility.



Principal Investigator Vincent Archambault holding his 2009 Maud Menten Award.

### In 2009–2010

14 research units

42 students

23 postdoctoral fellows

28 publications

\$5,001,274 in funding

## Showcase discoveries

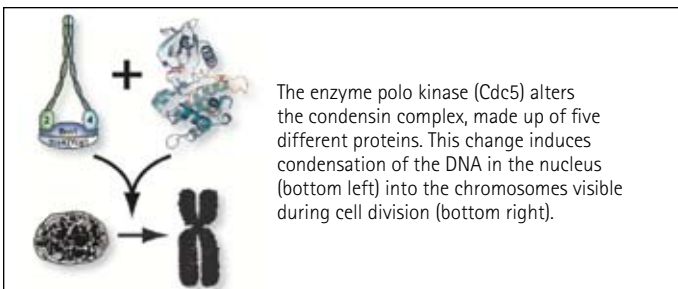
### Better understanding the action of an enzyme in treating certain cancers

Chromosome condensation is a normal and essential aspect of cell division. But the process goes off track in the case of certain cancerous cells: the chromosomes become unstable, which causes mutations that accelerate cell multiplication.

**Dr. Damien D'Amours'** team was the first in the world to demonstrate the role of an enzyme, polo kinase (Cdc5), in this process. The enzyme acts directly on some of the five proteins of the complex called condensin, which triggers the condensation of chromosomes. The team therefore discovered a crucial element for controlling cell division and, potentially, the appearance of certain cancers.

"Understanding the mechanism of action of this enzyme should enable us to control it and could prove to be a key element in the development of effective therapies for certain cancers," remarks Dr. D'Amours.

**Study cited:** Julie St-Pierre, Mélanie Douziech, Franck Bazile, Mirela Pascariu, Éric Bonneil, Véronique Sauvé, Hery Ratsima, Damien D'Amours. "Polo kinase regulates mitotic chromosome condensation by hyperactivation of condensin DNA supercoiling activity". *Molecular Cell*. 34: 416-426, 2009.

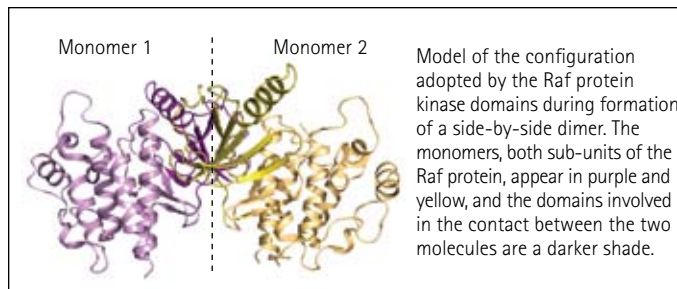


### Preventing the multiplication of cancerous cells

**Dr. Marc Therrien's** team has for many years been studying a signalling pathway activated in numerous cancers. The team is interested in the interactions among several proteins in this pathway and, in particular, the manner in which one of them, Raf, acts. With its collaborators at the Samuel Lunenfeld Research Institute in Toronto, the team has shown how Raf attaches to other proteins to form complexes, called dimers, which are essential to cell proliferation, whether cancerous or not.

This is a major discovery, since it opens the door to the development of new anticancer drugs: by blocking the Raf dimerization process, cancerous cells would be prevented from multiplying. "These new therapies would enable us to target cancer cells with unequalled precision while reducing the harmful side effects for patients," concludes Dr. Therrien.

**Study cited:** Thanashan Rajakulendran, Malha Sahmi, Martin Lefrançois, Frank Sicheri, Marc Therrien. "A dimerization-dependent mechanism drives RAF catalytic activation." *Nature*. 461: 542-546, 2009.



ALTHOUGH RELATIVELY RARE, LEUKEMIA IS STILL ONE OF THE CANCERS THAT CAUSES THE MOST DEATHS, AND RELAPSES REMAIN A MAJOR CONCERN. THE INVESTIGATORS IN THIS AXIS EXPLORE THE MECHANISMS GOVERNING GENE EXPRESSION IN CANCEROUS CELLS AND THE BIOLOGY OF NORMAL AND LEUKEMIC STEM CELLS. THEY ALSO STUDY THE MOLECULAR MECHANISMS OF IMMUNITY, IMPORTANT FOR BONE MARROW TRANSPLANTS AND THE DEVELOPMENT OF ANTICANCER VACCINES. THE CLINICAL TRIAL IN PROGRESS FOCUSES ON DEVELOPING A NOVEL RIBAVIRIN TREATMENT FOR PATIENTS WITH ACUTE MYELOID LEUKEMIA.

## Axis 2: Leukemia and Stem Cell Biology

RESEARCH UNITS	PRINCIPAL INVESTIGATORS
Chromatin Structure and Stem Cell Biology	Julie Lessard
Hematopoiesis and Leukemia	Trang Hoang
Immunobiology	Claude Perreault, axis head
Molecular Genetics of Stem Cells	Guy Sauvageau
Structure and Function of the Cell Nucleus	Katherine L. B. Borden

**Associate investigators:** Frédéric Barabé (Université Laval), Josée Hébert (Maisonneuve-Rosemont Hospital), Georg A. Holländer (Basel University, Switzerland), Éric Milot (Maisonneuve-Rosemont Hospital), Denis-Claude Roy (Maisonneuve-Rosemont Hospital)

### In 2009–2010

5 research units  
28 students  
26 postdoctoral fellows  
13 publications  
\$3,409,695 in funding



Éric Deneault, Ph.D. student and Dr. Guy Sauvageau.

## It happened this year!

**US\$400,000 for a Canada-wide clinical study.**

**Dr. Katherine Borden's** team and her collaborators at the Segal Cancer Centre at Montréal's Jewish General Hospital, McMaster University/Hamilton Health Sciences and Maisonneuve-Rosemont Hospital received a major grant from the Leukemia and Lymphoma Society (USA) to test the efficacy of the antiviral ribavirin, combined with other medications in the treatment of certain cancers.

**Dr. Guy Sauvageau**, international expert in stem cells and blood cancer. With his team, he was the first to identify genes that make it possible to produce a large number of stem cells in a laboratory setting. Recipient of the **Canadian Till and McCulloch Award** from the Stem Cell Network, he was also appointed **Chairman of the Scientific Committee on Stem Cells** by the American Society of Hematology for 2010

and a member of the advisory group for the **Québec research and innovation strategy** of the Québec Ministère du Développement économique, de l'Innovation et de l'Exportation.

**Dr. Claude Perreault** acknowledged for his work on **bone marrow transplants in the treatment of leukemia**. He was awarded the **2009 Murray Margarit Memorial Award** by the Leukemia and Lymphoma Society of Canada and received \$120,000 to continue his work.

## Showcase discoveries

### Multiplying stem cells in the laboratory to overcome the shortage of bone marrow donors

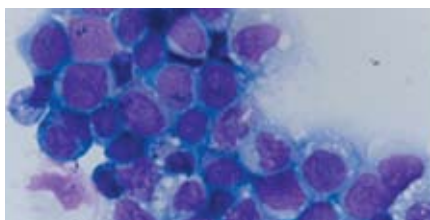
Bone marrow contains hematopoietic stem cells (HSCs) which are crucial to the production of blood cells. However, every year in North America, many patients with leukemia wait in vain for a bone marrow transplant. Why? Because of a shortage of compatible donors.

Thanks to experiments conducted on mice, **Dr. Guy Sauvageau's** team has identified a dozen proteins that accelerate the reconstitution of blood cells.

"The next step is to verify whether these proteins produce the same effect on humans," explains Dr. Sauvageau. The clinical trials for this revolutionary treatment will take place at Maisonneuve-Rosemont Hospital in Montréal, one of the largest Canadian centres for the transplantation of stem cells. Dr. Sauvageau also works there as a physician-clinician. If the results are conclusive, these proteins could, over the long term, be used to multiply, in culture, the number of stem cells available for transplants and reduce graft rejection. In other words, this approach would do nothing less than revolutionize the treatment of leukemia and other diseases!

This important discovery by IRIC was highlighted during the **MONTRÉAL FIRST** campaign of the Board of Trade of Metropolitan Montréal aimed at acknowledging innovative and creative Montréal talent.

**Study cited:** Éric Deneault, Sonia Cellot, Amélie Faubert, Jean-Philippe Laverdure, Mélanie Fréchette, Jalila Chagraoui, Nadine Mayotte, Martin Sauvageau, Stephen B. Ting, Guy Sauvageau. "A functional screen to identify novel effectors of hematopoietic stem cell activity." *Cell*. 137: 369-379, 2009.



Mouse hematopoietic stem cells (HSCs) whose *ex vivo* proliferation has been stimulated by the forced expression of the protein NA10HD. The activity of this factor was demonstrated by a new genome screening strategy perfected by Dr. Sauvageau's team.

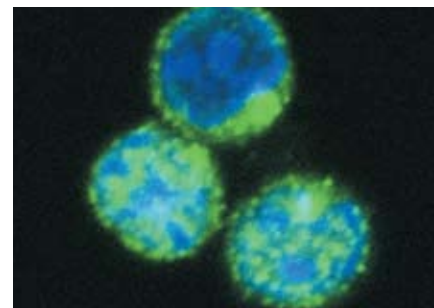
### Understanding genes to combat the most common leukemia in children

Acute lymphoblastic leukemia (ALL) is the most common cancer in children. The disease develops when a single immature white blood cell mutates, then proliferates uncontrollably.

**Dr. Trang Hoang's** team has shown how the synergy among three mutated genes causes leukemia: mutant forms of the SCL and LMO genes expand the pool of immature lymphocytes, which then proliferate intensively. Combined, these two events then foster the emergence of cells carrying a mutation in a third gene, Notch1, which plays a role in most cases of T-cell lymphocytic leukemia.

"Although chemotherapy cures up to 80% of cases of ALL in children, we hope to minimize the side effects by developing less invasive therapies that will specifically target the genes triggering the disease," concludes Dr. Hoang.

**Study cited:** Mathieu Tremblay, Cédric S. Tremblay, Sabine Herblot, Peter D. Aplan, Josée Hébert, Claude Perreault, Trang Hoang. "Modeling T-cell acute lymphoblastic leukemia induced by the SCL and LMO1 oncogenes." *Genes and Development*. 24: 1093-1105, 2010.



A high level of expression of the Notch1 protein is detected in leukemic mouse cells using a specific antibody (green fluorescence). The DNA in the nucleus is detected by the addition of the DAPI stain (blue fluorescence).

THE INVESTIGATORS IN THIS AXIS FOCUS ON IMMUNOTHERAPY, WAYS TO OVERCOME THE RESISTANCE TO CERTAIN DRUGS AND THE DEVELOPMENT OF DIAGNOSTIC TOOLS FOR BREAST AND PROSTATE CANCER. THEY ALSO STRIVE TO IMPLEMENT TOOLS FOR TRACKING CHANGES IN MOLECULES DURING TREATMENT, INCLUDING BIOINFORMATICS APPROACHES. THE STUDY OF SPECIFIC INTERACTIONS BETWEEN THERAPEUTIC MOLECULES AND CERTAIN CELL RECEPTORS, AND THE ENGINEERING AND USE OF THERAPEUTIC RIBONUCLEIC ACIDS (RNAs) ARE ALSO OF INTEREST.

# Axis 3: Molecular Diagnostics and Targeted Therapies

## In 2009-2010

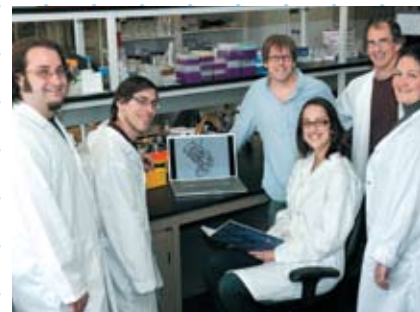
6 research units  
26 students  
12 postdoctoral fellows  
27 publications  
\$4,618,632 in funding

RESEARCH UNITS	PRINCIPAL INVESTIGATORS
Functional and Structural Bioinformatics	Sébastien Lemieux
Histology and Molecular Pathology	Louis Gaboury, axis head
Molecular Immunovirology	Daniël Lamarre
Molecular Pharmacology	Michel Bouvier
RNA Engineering	François Major
Yeast Molecular Biology	Martine Raymond

**Associate investigators:** Jacques Archambault (Institut de recherches cliniques de Montréal), Olivier Lichtarge (Baylor College of Medicine, Houston, USA), Anne Marinier (IRIC)



Dr. Louis Gaboury, principal investigator (centre), flanked by Micheline Fortin, Romain Sabina and Melina Narlis.



Dr. François Major, principal investigator (centre) with members of his new RNA Engineering research unit.

## It happened this year!

The new RNA Engineering research unit was inaugurated in April 2010. A first-of-its-kind in Canada and one of the very few in the world, its goal is to understand and control the behaviour of ribonucleic acids (RNAs) at the heart of cell programming, which is deregulated in case of cancer. This unit is headed by **Dr. François Major**, principal investigator of bioinformatics and a pioneer in his field, with the collaboration of Dr. Gerardo Ferbeyre, investigator in biochemistry at the Faculty of Medicine, Université de Montréal.

The Québec Consortium for Drug Discovery awarded a grant of \$1.8 million to the project headed by **Dr. Michel Bouvier**.

He is developing molecular and cellular tools to predict the efficacy of new drugs. The project involves a group of scientists from Université de Montréal, McGill University, Université de Sherbrooke and the PerkinElmer Group.

**Dr. Louis Gaboury**, who has headed the Histology research unit and core facility since 2005, was appointed principal investigator and head of the Molecular Diagnostics and Targeted Therapies research axis in 2009. President of the Association des pathologistes du Québec, he also manages the Oncology and Molecular Pathology laboratory at Hôtel-Dieu de Montréal and the Molecular Pathology research unit at the Centre hospitalier de l'Université de Montréal Research Centre.

## Showcase discovery

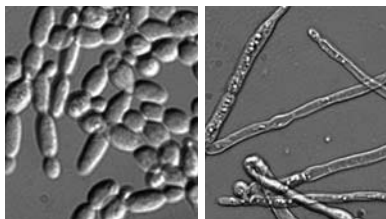
### A component of vitamin B3 leads to a giant step in the treatment of candidiasis

This study is an excellent example of how the work of various IRIC researchers converges.

**Dr. Alain Verreault** and his team have for many years been investigating the role of histones, cell nucleus proteins essential for DNA packaging and the maintenance of its integrity, especially during cell division. For her part, **Dr. Martine Raymond** is a leading specialist in the yeast *Candida albicans*. The infections it causes—candidiases—are very serious complications for immunosuppressed individuals, such as patients undergoing chemotherapy or those who have undergone an organ or bone marrow transplant. The appearance of resistant strains of *Candida* has made the development of new therapeutic approaches all the more urgent.

By combining their efforts, these two investigators, with their IRIC colleague **Dr. Pierre Thibault** and Dr. Alaka Mullick from the National Research Council of Canada's Biotechnology Research Institute, discovered that nicotinamide, a molecule of vitamin B3, caused the cell death of *Candida albicans* by interfering with the modification of histones. Even more significant, tests on infected mice have clearly confirmed the beneficial effects of nicotinamide in the treatment of candidiases.

**Study cited:** Hugo Wurtele, Sarah Tsao, Guylaine Lépine, Alaka Mullick, Jessy Tremblay, Paul Drogaris, Eun-Hye Lee, Pierre Thibault, Alain Verreault and Martine Raymond. "Modulation of histone H3 lysine 56 acetylation as an antifungal therapeutic strategy." *Nature Medicine*. 16: 774–780, 2010.



*C. albicans* yeast grows normally (left). Using nicotinamide to interfere with histone modification leads to an abnormal "V" formation of filaments and DNA fragmentation (right), which in turn leads to cell death.

IRIC HAS 11 LEADING-EDGE TECHNOLOGY CORE FACILITIES AND ONE OF THE LARGEST ANIMAL FACILITIES IN THE COUNTRY. THESE INFRASTRUCTURES ARE MADE AVAILABLE TO THE INSTITUTE'S RESEARCH UNITS, WHICH ARE ITS MAIN USERS, AS WELL AS THE SCIENTIFIC COMMUNITY AT UNIVERSITÉ DE MONTRÉAL, IN CANADA AND ELSEWHERE. THIS TYPE OF SHARING MAKES IT POSSIBLE TO OPTIMIZE THE CONSIDERABLE INVESTMENT NECESSARY FOR THE PURCHASE, OPERATION AND MAINTENANCE OF THIS SPECIALIZED EQUIPMENT. THANKS TO TECHNOLOGICAL PARTNERSHIPS WITH SEVERAL MANUFACTURERS, IRIC AND ITS CLIENTS HAVE ACCESS TO THE VERY LATEST EQUIPMENT.

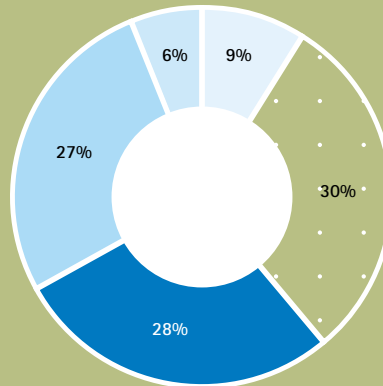
# Research Facilities



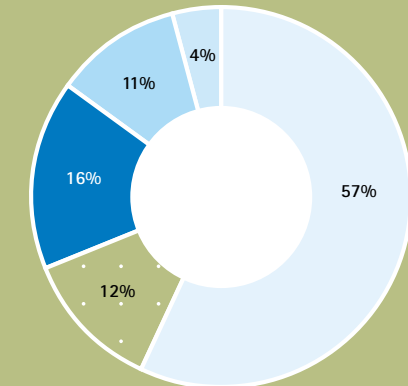
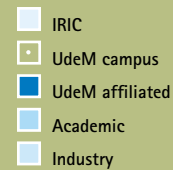
Proteomics, Genomics and Transgenesis core facilities.

In 2009–2010, IRIC core facilities and the animal facility served a total of 278 research groups.

Source of research groups using the IRIC core facilities



Use of IRIC core facilities by research groups



Since the creation of IRIC, the implementation of these core facilities and the animal facility—in addition to the Medicinal Chemistry core facility—has required an investment of \$62.2 million, obtained through national competitions held by the Canada Foundation for Innovation.

### Bio-imaging

Microscopic image acquisition and analysis

### Bioinformatics

Development of novel tools to analyze, integrate and view biological databases

### Biophysics

Characterization of molecule structure in solution, nuclear magnetic resonance and study of protein interactions with other molecules or drugs

### Flow Cytometry

Analysis and isolation of cells present in heterogeneous samples, according to their physical or functional properties

### Genomics

DNA sequencing, genotyping and gene expression quantification

### High-Throughput Screening

Identification and validation of new molecular targets and small molecules with therapeutic potential

### Histology

Study and analysis of the morphological and functional changes of tissues

### Medicinal Chemistry

Synthesis of new molecules with biological activity and optimization of their therapeutic properties

### Proteomics

Characterization of complex protein samples

### Recombinant Proteins and Antibodies

Large-scale production of proteins and specific antibodies

### Transgenesis

Production of genetically modified mice

In addition to these infrastructures, IRIC jointly supports, with Maisonneuve-Rosemont Hospital, the operation of the Cytogenetic core facility of the Québec Leukemia Cell Bank.



Dr. Anne Marinier, associate investigator, flanked by her colleagues, Dan Deon and Edward Ruediger.

### It happened this year!

**The creation of the new Medicinal Chemistry core facility**, made possible by a partnership with the pharmaceutical company Bristol-Myers Squibb, enabled IRIC to obtain a \$8.72 million grant from the Ministère du Développement économique, de l'Innovation et de l'Exportation (MDEIE) and Industry Canada. This budget was used to set up the core facility, directed by **Dr. Anne Marinier**, who was recently named an associate investigator. The unit already has 19 biologists and medicinal chemists, who design new molecules and optimize their therapeutic properties.

# Strategic Projects

IRIC's objective is to develop new therapies in the fight against cancer. The Institute takes an innovative approach by initiating projects that are high risk but that hold significant potential for the discovery of new drugs. Unfortunately, it is difficult to secure funding for this type of research from granting agencies.

In 2009, IRIC introduced an innovative solution: the Strategic Projects Committee (SPC). The SPC identifies projects that seem particularly promising, in order to allocate funds to principal investigators that originate from sources other than the regular funding organizations. Annually, the Committee targets up to a dozen high-potential projects. Their selection is based mainly on two criteria: scientific merit and originality.

Also favoured are projects that are consistent with IRIC's strategic research plan in terms of validating the technologies used and contributing to the program of several research teams. A project's medium- or long-term clinical or commercial impact is also considered.

Convinced of the soundness of this original initiative, IRICoR and private IRIC donors fund projects selected by the Committee, mainly by way of the B2Discovery program (see p. 36).

"The funding facilitated by the SPC can be seen as a spark plug: once the research process is launched and the guarantees of success are obtained, we have the leverage to obtain the funding traditionally granted by government agencies."

– Dr. Paul Maddox, principal investigator.

# Leucégène Project: Revolutionizing our Understanding of Cancer

One of the major difficulties in the fight against cancer stems from the fact that apparently similar cancers have different genetic and molecular causes. Identifying the range of genetic anomalies associated with a specific type of cancer is the challenge that a multidisciplinary IRIC team headed by **Drs. Guy Sauvageau and Josée Hébert** agreed to take on in 2009, by creating the Leucégène project.

This project is a perfect example of the innovative approach to research at IRIC: the intertwining of systems biology, clinical research and partnerships forges a winning alliance against cancer. Leucégène also illustrates what our investigators can do with the financial support granted on the recommendation of the Strategic Projects Committee.

Using a very high-throughput sequencing approach developed by **Dr. Pierre Chagnon** at the Genomics core facility, the Leucégène team is trying to obtain a detailed description of the transcriptome, i.e., the set of genes expressed in the cancerous cells of many patients with acute myeloid leukemia (AML). The analysis of these results is made possible thanks to the contribution of **Patrick Gendron** and **Dr. Sébastien Lemieux** of the Bioinformatics core facility. "It is the technology used that

makes the project truly revolutionary," explains **Brian Wilhelm**, postdoctoral fellow. "Still today, a physician has no way of precisely knowing which genes are at the source of the disease. The Leucégène project in fact aims to precisely identify the defective genes to be able, over the long term, to develop a drug that targets them specifically."

"The Leucégène project is extremely promising," concludes Brian Wilhelm. "We know very little about the genetic causes of leukemia. But thanks to IRIC's Genomics and Bioinformatics core facilities, we are now able to detect the set of genetic mutations associated with this type of cancer."

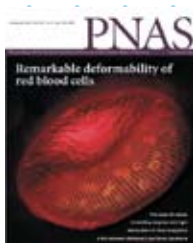
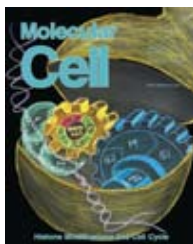
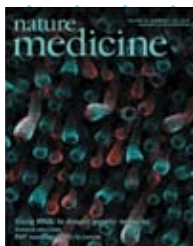


The Leucégène project team: Brian Wilhelm, Josée Hébert, Pierre Chagnon, Patrick Gendron, Sébastien Lemieux and Guy Sauvageau.



A high-throughput sequencing apparatus in the Genomics core facility.

# The Impacts of Our Research



## Outstanding discoveries and publications

IRIC discoveries have spurred major advances in understanding the development of cancer and opened the way to the creation of new, more targeted therapeutic solutions. Its publications are a reflection of these accomplishments. They also demonstrate the Institute's drive and productivity. Since the creation of IRIC, the number of papers written by its investigators and published in peer-reviewed journals has steadily increased every year. In 2009-2010, its investigators published 68 papers, including a dozen in high-impact, prestigious scientific journals, such as *Nature*, *Nature Medicine*, *Cell*, *Molecular Cell*, *Genes and Development* and *PNAS*.

Furthermore, the collegial atmosphere that characterizes IRIC is conducive to collaboration, both between investigators in different axes and those in the same axes. In the past few years, over half of the principal investigators at IRIC have published collaborative papers.

The list of publications can be consulted on IRIC's website at [www.irc.ca](http://www.irc.ca).

## New inventions and patents

IRIC's principal investigators hold 11 invention patents and have over 25 patent applications pending. These patents cover the development of instruments, processes, molecules, diagnostic tools and therapeutic approaches.

IRICoR, created in 2008, is headed by CEO and General Manager **Dr. Daniel Lamarre**. The mission of this IRIC subsidiary, which is funded by the federal government and is a Centre of Excellence for Commercialization and Research, is to develop and market discoveries made by the Institute. Its business model ensures financial spinoffs that are essential not only to the growth of its drug discovery activities, but also to the improvement of its technological core facilities. In promoting partnerships with the biopharmaceutical industry, IRICoR also enables enterprises to participate in avant-garde projects at extremely competitive costs.

IRICoR

## A rich scientific program

The importance of IRIC's work and the interest it arouses within the scientific community are also reflected in the considerable number of speaking invitations its investigators receive. Every year, its principal investigators give on average over 70 guest lectures, in addition to numerous presentations at conventions, symposia and other scientific events.

Moreover, every year, the Institute sets up several lecture programs that present the latest breakthroughs in the field of cancer research. These presentations contribute not only to enriching scientific life with new knowledge, they also make it possible to build ties with investigators around the world, attract new recruits and offer our students a high-quality, stimulating learning environment.

### In 2009–2010

1 international symposium  
(16 lectures)

38 lectures by renowned  
investigators from around the world

72 presentations of research  
progress reports  
by IRIC members

## International Symposium on Vesicular Trafficking and Cellular Signalling

May 25 and 26, 2010

Chaired by **Drs. Sébastien Carréno** and **Gregory Emery**, principal investigators at IRIC, the symposium was an opportunity to discuss the latest discoveries in molecular mechanisms that underlie vesicular trafficking and the role they play in the development of multicellular organisms and in morbid processes.

- 16 speakers (5 from Canada, 7 from the USA and 4 from Europe)
- Over 200 participants

## Distinguished Scientist Lecture Series and special lectures

These lectures are designed for graduate students and postdoctoral fellows at IRIC as well as all members of the biomedical research community. Addressing the latest breakthroughs in cancer research, they are given by renowned scientists from Canada and abroad.

- 31 presentations in the *Distinguished Scientist Lecture Series*
- 7 special lectures
- 38 speakers (13 from Canada, 18 from the USA, 6 from Europe and 1 from Oceania)

## IRIC research progress reports

In line with the philosophy of collaboration and multidisciplinary that characterizes IRIC, students, postdoctoral fellows and staff members are invited to present the results of their work to the entire IRIC scientific community as part of this weekly series. These formal presentations are a major part of student training and enable postdoctoral fellows to fine-tune their communication techniques.

- 72 presentations



Hugo Wurtele, postdoctoral fellow, presenting his research progress report.



# Training the Next Generation of Investigators

IRIC students and fellows are attracted by exceptional multidisciplinary training, seasoned research directors and a culture that promotes creativity and innovation.

- IRIC Students and Fellows
  - Study Programs
  - "Learning to Go Further"
- Sustaining the Effort, Rewarding Excellence
  - After IRIC

SINCE ITS BEGINNINGS IN 2003, IRIC HAS TRAINED 279 SCIENTISTS WHO COMPLETED THEIR MASTER'S OR PH.D. DEGREES, OR POSTDOCTORAL TRAINING. IN 2009-2010, THE INSTITUTE WELCOMED A TOTAL OF 198 GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS—AS MANY WOMEN AS MEN—WHO COME FROM AROUND THE WORLD TO FURTHER THEIR CAREERS.

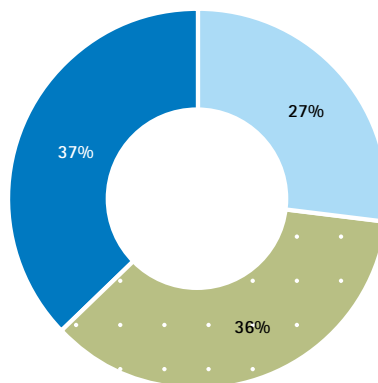
# IRIC Students and Fellows

## Registrations on the rise

In 2009-2010, IRIC saw a 12% increase in registrations, with 56 new graduate students and postdoctoral fellows from 31 academic institutions in 12 different countries, a sign that the Institute has increased its visibility at the provincial, national and international levels.

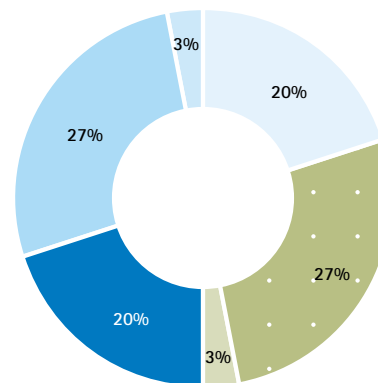
## Breakdown of graduate students and postdoctoral fellows in 2009-2010 according to their academic status

- Master's student (53)
- Ph.D. student (71)
- Postdoctoral fellow (74)



## Origin of new graduate students and new postdoctoral fellows registered in 2009-2010

- Université de Montréal (11)
- Other academic institutions
- Québec (15)
- Rest of Canada (2)
- Europe (Germany, France, United Kingdom, Serbia, Switzerland) (11)
- Asia (China, India, Iran, Lebanon) (15)
- Africa (Morocco, Tunisia) (2)



IRIC OFFERS ITS GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS OUTSTANDING SCIENTIFIC AND PROFESSIONAL GUIDANCE AND ACCESS TO THE INSTITUTE'S LEADING-EDGE TECHNOLOGICAL CORE FACILITIES.

# Study Programs

## Master's and Ph.D.

IRIC students can register for a broad range of graduate-level programs at Université de Montréal, including the new Systems Biology option of the Molecular Biology study program, created in 2006-2007. This option has been a great success in 2009-2010, 76% of Master's and 60% of Ph.D. students opted for this multidisciplinary training. In addition to daily laboratory work and regular discussions with their research directors, who are associated with various departments and programs at Université de Montréal, the students gain considerably from contact with scientists in other disciplines, all experts in their field.

## Postdoctoral

In 2009-2010, IRIC had 74 postdoctoral fellows from across the globe, including 15 new registrations. In addition to contributing to the development and outreach of research at the Institute, they are sometimes invited to collaborate in the supervision and teaching of systems biology at the summer school.

## Systems biology in the limelight

Emerging technologies and new multidisciplinary approaches now make it possible to address cancer as a whole, and training programs must fit in with these new realities. The Master's in Molecular Biology, Systems Biology option, offered at IRIC is an accelerated (1 year) interdisciplinary program that trains future scientists to tackle a problem from all angles rather than a single point of view.

Master's students participate in an intensive summer school during which a dynamic, interactive and multidisciplinary teaching approach is used that integrates bioinformatics, molecular biology, chemistry, biophysics and the more clinical aspects of cancer. Subsequently, students do two rotations in the laboratory in two different research units; they thus benefit from the expertise of at least two professors. The formula developed enables them to be trained rapidly and positions them well for a Ph.D. in Molecular Biology, Systems Biology option, or in another discipline, or to join the labour market.

## “Learning to Go Further”

A meeting between IRIC Principal Investigator Dr. Claude Perreault—source of experience, support and guidance—and a Master’s student in his lab, Krystel Vincent—source of freshness, enthusiasm and new ideas.

**Dr. Claude Perreault**, head of the Immunobiology research unit, wants the students with whom he works to be “rigorous, creative, optimistic and able to deal with insecurity.” Without these qualities, it’s a swift goodbye.

When **Krystel Vincent** came for an interview in early 2009, it did not take the investigator long to realize he had found the ideal applicant. “Her personal history made her exceptionally resilient,” he recalls. “If this young woman had been able to manage the uncertainty of her very own survival, she would certainly know how to manage the uncertainty inherent to research.”

At age 25, Krystel Vincent is a survivor. She was 19 years old when cancer struck. “All the available treatments had been exhausted when I was given a stem cell transplant,” she recalls. “The fact that I’m alive today is thanks to research. An attempt is always made to give meaning to the disease: I found one by getting a new lease on life.”

As a science student, she discovered IRIC by chance and told herself: “That’s where I have to go.” She applied and... she immediately clicked with Dr. Perreault. “His ability to simplify complex matters really impressed me. He explained things with so much passion that all of his research projects seemed so earth-shattering!” And in reality? “They’re still just as grandiose!” exclaims Krystel, who will be completing her Master’s in Molecular Biology, Systems Biology option, in fall 2010.

### “The only ones in the world to know something”

To describe his role with the students, Claude Perreault says: “They give the best of themselves, and I have to give my best in return by conveying what I have learned.” The most important skill to teach is the ability to write. Whether writing a paper or a research report, it is crucial to know how to put the right words to your ideas. “Dr. Perreault shows us how to look at our research results to get the most out of them,” explains Krystel Vincent. “If the results are contrary to what you expected, then you could be on the verge of making a major discovery!” says Dr. Perreault enthusiastically. “When students are confronted with their research results, they are both excited and terrified. For the first time in their lives, they alone know something that no one else

knows. But this knowledge is not worth much if you’re unable to communicate it.” Learning how to write is all the more difficult at IRIC. It takes special effort to integrate diverse fields of science, but this multidisciplinary approach is valued as key to the Institute’s research model.

“This type of collaboration, combined with leading-edge technological core facilities, enables IRIC students to conduct experiments whose depth and scope surpass what is done elsewhere,” says Dr. Perreault. Krystel Vincent has the final word: “Traditional training has reached its limitations. Students trained at IRIC are very lucky: they have learned to go further.”



Krystel Vincent and Dr. Claude Perreault.

IN 2009–2010, 61 MASTER'S AND PH.D. STUDENTS AND POSTDOCTORAL FELLOWS RECEIVED PERSONAL SCHOLARSHIPS FROM FUNDING AGENCIES OR PRIVATE FOUNDATIONS IN RECOGNITION OF THE EXCELLENCE OF THEIR WORK. IN ADDITION, 15 STUDENTS REGISTERED FOR A MASTER'S IN MOLECULAR BIOLOGY, SYSTEMS BIOLOGY OPTION, RECEIVED A PERSEVERANCE SCHOLARSHIP FUNDED BY DONATIONS TO THE PERSEVERANCE CHALLENGE. FURTHERMORE, 16 STUDENTS AND POSTDOCTORAL FELLOWS RECEIVED AWARDS FOR POSTERS, PUBLICATIONS OR ORAL PRESENTATIONS OF THEIR RESEARCH WORK.

# Sustaining the Effort, Rewarding Excellence



Several recipients of Persévérance scholarships.

## Personal scholarships from funding agencies and private foundations

### From Québec Montreal Centre for Experimental Therapeutics in Cancer (MCETC), Jewish General Hospital:

- Ph.D.:**  
- David Cotnoir-White
- Postdoctoral:**  
- Nader Hussein

### Cole Foundation

- Master's:**  
- Marie Cargnello  
- Alexia Rabilotta-Faure

- Ph.D.:**  
- Étienne Caron  
- Neda Delgoshaié  
- Shanti Rojas-Sutterlin  
- Marie-Claude Sincennes

- Postdoctoral:**  
- Stéphane Barakat  
- Audrey Carrière-Pazat  
- Christophe Fremin  
- Martin Giroux  
- Surapong Koonpaew  
- Elena Shirokova  
- Mathieu Tremblay  
- Brian Wilhelm

### Fonds de la recherche en santé du Québec (FRSQ)

- Master's:**  
- Jean-Philippe D'Aoust  
- Danielle de Verteuil  
- Fadi Hariri  
- Valérie Villeneuve

- Ph.D.:**  
- Fernando Frankel  
- Khalid Hilmi

- Postdoctoral:**  
- Alexandre Beautrait  
- Nicolas Chartier  
- Geneviève Despars

### Fonds québécois de la recherche sur la nature et les technologies (FORNT)

#### Master's:

- Louiza Mahrouche
- Thierry Tremblay-Boudreault

#### Ph.D.:

- Mathieu Courcelles

### From Canada

#### Natural Sciences and Engineering Research Council of Canada (NSERC)

#### Postdoctoral:

- Benoit Guillemette

#### Canada Heart and Stroke Foundation (CHSF)

#### Ph.D.:

- Martin Audet

#### Canadian Institutes of Health Research (CIHR)

#### Master's:

- Yasaman Nouhi
- Valérie De Rop

#### Ph.D.:

- Dariel Ashton-Beaucage
- Richard Bisailon
- Sonia Cellot
- Jean-Sébastien Delisle
- Éric Deneault
- Stéphanie Duhamel
- Simon Fortier
- Diana Paola Granados
- Billy Houde
- Louis-André Julien
- Carl Laflamme
- Nicolas Lahaie
- Véronique Lisi
- Wayne Stallaert
- Mona Wu

#### Postdoctoral:

- Kristin Alexander
- Martin Baril
- Emma Zumpe

#### Canadian Cancer Society Research Institute (CCSRI)

#### Ph.D.:

- Vincent Hyenne
- Martin Sauvageau

#### Postdoctoral:

- Marie-Ève Bordeleau
- Krista Heinonen
- Benoit Pelletier
- Moutih Rafei
- Cédric Tremblay

#### Cancer Research Society (CRS)

#### Postdoctoral:

- Hugo Lavoie

### From abroad

#### China Scholarship Council (CSC) (China)

#### Ph.D.:

- Xiaocui Zhang

#### Foundation for Medical Research (FRM) (France)

#### Postdoctoral:

- Brigitte Murat

#### Swiss National Science Foundation (SNSF) (Switzerland)

#### Postdoctoral:

- Jonas Dorn

### Perseverance scholarships

#### Master's:

- Elahe Ahmazadeh
- Marianne Béland
- Khaled Ben El Kadhi
- Iman Fares
- Isabelle Filiatreault
- Éric Fontaine
- Fadi Hariri
- Ghina Kaddour
- Yasaman Nouhi
- Juan José Ruiz Vanegas
- Thierry Tremblay-Boudreault
- Ramraj Velmurugan
- Valérie Villeneuve
- Krystal Vincent
- Fang Wang

### Student awards

#### Cole Foundation Research Celebration Day

#### Ph.D.:

- Étienne Caron

#### Postdoctoral:

- Martin Giroux

#### 78th Congress of the Association francophone pour le savoir (Acfas)

#### Ph.D.:

- Gaëlle Bridon
- Mathieu Courcelles

#### Postdoctoral:

- Stéphane Barakat

#### Canadian Hematology Society

#### Postdoctoral:

- Stéphane Barakat

#### 16th Scientific Day of the Molecular Biology Programs of the Faculty of Medicine of Université de Montréal

#### Master's:

- Danielle de Verteuil

#### Ph.D.:

- Éric Deneault
- Stéphanie Duhamel
- Simon Fortier
- Chantal Roubinet

#### 26th Scientific Day of the Department of Pathology and Cell Biology of the Faculty of Medicine of Université de Montréal

#### Master's:

- Marie Cargnello
- Abigail Diaz

#### Ph.D.:

- Dariel Ashton-Beaucage
- Carl Laflamme

#### Postdoctoral:

- Manuel Buscarlet
- Nicolas Chartier

ON COMPLETION OF THEIR TRAINING AT IRIC, OUR STUDENTS HAVE ACQUIRED A METHOD, KNOWLEDGE AND SKILLS TO MATCH THEIR AMBITIONS. THIS NEW BREED OF RESEARCHERS, WHO HAVE BEEN TRAINED IN A MULTIDISCIPLINARY WORK ENVIRONMENT, ARE PERFECTLY POSITIONED TO PURSUE POSTDOCTORAL STUDIES IN THE MOST PRESTIGIOUS RESEARCH CENTRES IN THE WORLD OR TO CONFIDENTLY TAKE UP A CAREER AS A RESEARCHER, AT IRIC OR ELSEWHERE.

## After IRIC

At IRIC, 2009-2010 proved a record year for graduates, with 31 Master's and Ph.D. degrees awarded. In addition, 12 postdoctoral fellows completed their training.

What do our next-generation scientists do once they have their degree in hand or their postdoctoral training completed? Close to half of them (47%) pursue an academic career, and two-thirds (64%) opt to remain in Canada.



Dr. Marie-Ève Blais

### From Montréal to Oxford

At age 32, **Dr. Marie-Ève Blais**, who graduated from IRIC in 2008, leads a thrilling life in England. Small in size but large in reputation, Oxford is one of the most popular university cities on the planet. "I adore it here. Oxford attracts people from across the world. Since getting around in Europe is easy, I travel, and I'm not alone: every week, my research centre hosts world-renowned speakers, which creates an extremely stimulating environment."

In the laboratory to which she is affiliated, Marie-Ève is trying to identify an HIV protection marker, a subject complementary to her Ph.D. in biomedical sciences, immunology option.

"For my postdoctoral training, I wanted to complete my training and focus more on applied research, particularly on humans." When she applied to Oxford, HIV was notably absent from her CV. Be that as it may: having been trained at IRIC opens many doors. "At IRIC, we're used to having discussions on a whole range of scientific topics. During the recruitment process at Oxford, my examiners could clearly see that I was able to follow their arguments. This ability to adapt definitely played in my favour."



## Master's and Ph.D. graduates in 2009–2010

### Master's

#### Biochemistry:

- Douce Michaud

#### Bioinformatics:

- Mathieu Courcelles
- Caroline Louis-Jeune
- Marie-Pier Scott-Boyer

#### Molecular Biology, Systems Biology Option:

- Elaheh Ahmadzadeh
- Marianne Béland
- Marie Cargnello
- Valérie De Rop
- Abigail Diaz Téllez
- Iman Farès
- Fadi Hariri
- Andrea Hébert-Losier

- Ghina Kaddour
- Anne-Marie Ladouceur
- Kin-Chung Lam
- Bharti Moudgill
- Donovan Nguon
- Yasaman Nouhi
- Marc-André Roy
- Ramraj Velmurugan
- Valérie Villeneuve

#### Molecular Biology, Regular Option:

- Alexia Rabilotta-Faure

#### Nutrition: Aurelia Sima

#### Pathology and Cell Biology:

- Rana Amini
- Gloria Assaker
- Andrée-Anne Grosset

### Ph.D.

#### Biochemistry:

- Madeleine Héroux

#### Bioinformatics:

- Marc Parisien

#### Molecular Biology, Regular Option:

- Mathieu Tremblay
- Sadri Znaidi

#### Chemistry:

- Marie-Hélène Fortier

## Postdoctoral fellows having completed their training in 2009–2010

- Michel Boutin
- Christel Boutonnet
- Jalila Chagraoui
- Geneviève Despars
- Mélanie Douziech
- Laurence Fleury
- Pablo A. Gutierrez Sanchez
- Julia Guy
- Evgeny D. Kanshin
- Surapong Koonpaew
- Ali Mokdad
- Hind Ray-David



# Philanthropy to Fulfil a Mission

To successfully carry out its various projects and ensure its growth, IRIC is proud to count on the support of many partners and donors. Their numbers and their generosity are ever increasing!

- The First Fundraising Campaign
  - B2Discovery
- The 2009 Perseverance Challenge
  - List of Donors
- "The Investigator, the Philanthropist and Ribavirin"

IRIC SOLICITS ITS PARTNERS AND DONORS TO SUPPORT ITS FOUR MAJOR PRIORITIES: RECRUITING ELITE INTERNATIONAL INVESTIGATORS, RECRUITING AND TRAINING STUDENTS, FUNDING ITS HIGH-IMPACT RESEARCH PROJECTS AND DEVELOPING ITS TECHNOLOGICAL CORE FACILITIES.

# The First Fundraising Campaign

On June 11, 2009, following a very generous \$5-million donation from the Marcelle and Jean Coutu Foundation, IRIC launched its first fundraising campaign. The goal of the campaign is to raise \$25 million from the business community. To date, despite the difficult economic situation, over half of this amount, a little over \$14 million, has already been raised.

Co-chaired by Robert Lacroix, chairman of IRIC's Board of Directors and former rector of Université de Montréal, and Marcel Dutil, chairman of the Board of Directors and CEO of the Canam Group, this first fundraising campaign is part of a major upcoming joint campaign with Université de Montréal, HEC Montréal and École Polytechnique.

## "Give so they can live" internal campaign

In early 2009, IRIC launched its internal campaign *Give so they can live* for the entire Institute community to raise funds to train the next generation of scientists. To date, the generosity of IRIC investigators, professionals, employees and students has helped raise \$100,000 in donations. Thank you to all those who contributed to making this campaign a great success!



**Robert Lacroix**, chairman of IRIC's Board of Directors and co-chairman of IRIC's fundraising campaign; **Dr. Guy Sauvageau**, IRIC chief executive officer and scientific director; and **Marcel Dutil**, chairman of the Board and chief executive officer of the Canam Group and co-chairman of IRIC's fundraising campaign.

Page 34: **Luc Vinet**, former Université de Montréal rector; **Marie-Josée Coutu**, president of the Marcelle and Jean Coutu Foundation; **Marcelle Coutu**; **Jean Coutu**, chairman of the Board of Directors of the Jean Coutu Group (PJC) Inc.



# Involving the Business Community in Strategic Projects



Front row: Olympic medalists **Jennifer Heil** and **Alexandre Bilodeau**. Middle row: **Pierre Pomerleau**, president and chief executive officer of Pomerleau; **J.D. Miller**, entrepreneur and co-founder of B2Ten; **Dr. Guy Sauvageau**, IRIC chief executive officer and scientific director. Back row: **Robert Turgeon**, IRIC director of development.

B2Discovery is a new funding model developed by IRIC to accelerate the advancement of cancer research. The idea is to match entrepreneurs with Institute investigators to fund innovative and extremely promising projects, but for which there exist few if any public funding programs. The money raised is allocated by the Strategic Projects Committee (SPC) to researchers whose project has been deemed a priority.

This model is based on B2Ten, an initiative by philanthropic entrepreneurs to support Canadian athletes by funding specific needs such as equipment, care, training, etc. This program enabled high-level athletes, including freestyle skiers Alexandre Bilodeau and Jennifer Heil, to earn medals at the 2010 Winter Olympics, by delivering performances that went far and above Canadian dreams.

**"To beat cancer, you need to be bold and innovative. A truly forward-thinking concept, B2Discovery makes it possible to match the interests of the business community with those of the research community, thereby increasing our chances of beating this disease."**

– Pierre Pomerleau, president and chief executive officer of Pomerleau, one of the first B2Discovery donors.



IN THE SPRING OF 2009, DR. ROBERT PATENAUDE USED HIS PARTICIPATION IN THE BERMUDA ONE-TWO SAILING RACE TO HOLD A SECOND FUNDRAISER FOR IRIC. THE INITIATIVE ENABLED HIM TO RAISE \$177,000 FROM INDIVIDUAL DONORS. THE MONEY RAISED WILL HELP IRIC STUDENTS CONTINUE THEIR STUDIES THANKS TO A SCHOLARSHIP: THE PERSEVERANCE SCHOLARSHIP. THE FIRST SCHOLARSHIPS WERE AWARDED TO 15 MASTER'S STUDENTS ON DECEMBER 8, 2009 DURING A RECEPTION FOR CAMPAIGN DONORS.

# The 2009 Perseverance Challenge

## The Face of Perseverance

In 1981, **Robert Patenaude** was a medical student at Université de Montréal when he was diagnosed with chronic myeloid leukemia, a cancer that was incurable at the time. He only had a few months to live. Hematologist **Claude Perreault** offered him an experimental treatment: a bone marrow transplant. Spurred on by his desire to live and unshakable perseverance, Robert Patenaude signed on to his doctor's vision, had the transplant and... was cured.

Since then, he has been doing well. Very well, in fact. A keen sailor and cyclist, he works as an emergency specialist at Honoré-Mercier Hospital in Saint-Hyacinthe. He has written several books, including *Surviving leukemia: a practical guide and 24 heures à l'urgence*.

His personal experience with the disease drives his desire to get involved in the battle against cancer. In 2007, Dr. Patenaude became an IRIC ambassador.



Dr. Claude Perreault (seated), principal investigator at IRIC, and Dr. Robert Patenaude (standing).

Why? In addition to renewing ties with the doctor who saved his life—IRIC founding member Dr. Claude Perreault—he believes in IRIC's research potential.

"I'm living proof that a cure can be found through research, such as the research being conducted at IRIC. Today, we successfully treat over 80% of people with the type of leukemia I had. But, despite numerous advances, cancer continues to gain ground. I have hope that IRIC, with its exceptional resources, will be able to make significant progress in the fight against cancer."

Robert Patenaude organized an initial IRIC fundraising activity in 2007. Aboard his sailboat, *Persévérance*, he participated in the Bermuda One-Two single-handed race over a distance of close to 1,200 km and raised \$75,000. With the wind in his sails, he collected \$177,605 in donations when he entered the race again, in 2009. That year, he met Léon Gosselin,

founder and former president of Axcan Pharma, and his wife, Diane. Dr. Patenaude's story inspired the couple. The Gosselin family pledged to support the training of the next generation of scientists through a substantial donation to IRIC.

Aside from his immense fundraising success, Robert Patenaude also managed a significant achievement at sea: he became the first Canadian to win the Bermuda One-Two in his category, despite a perilous collision with a whale. This success earned him the Québec Sailing Federation's Sailor of the Year award. "My rudder was shattered and I was facing the worst weather conditions in my career as a captain. But I didn't give up. If there's a lesson to be learned from this race, and from my life in general, it's that you must never throw in the towel. Even when everything seems to be against you, you have to keep going, since there's always hope of calmer waters ahead."

**"Thanks to the generous support of donors and the remarkable efforts of Robert Patenaude, IRIC is in a position to maintain its commitment to offer exceptional training to the researchers of tomorrow."**

– Dr. Guy Sauvageau, IRIC chief executive officer and scientific director.

IRIC EXECUTIVE MANAGEMENT WARMLY THANKS ALL INDIVIDUALS, FOUNDATIONS AND COMPANIES WHO HAVE BELIEVED IN ITS POTENTIAL AND WHO HAVE GENEROUSLY CONTRIBUTED TO THE CAMPAIGN AND THE VARIOUS FUNDRAISING ACTIVITIES IN RECENT YEARS.

# List of Donors

## Robert-Lacroix Fund

In 2005, the following donors contributed \$1,000 or more to IRIC to create the Robert-Lacroix Fund, the Institute's first philanthropic fund.

- Anonymous (1)
- Bell Canada
- Benoit, Claire
- Berthiaume, Guy
- Bisson, André
- Boisvert, Yves
- Bonneil, Éric
- Borden, Katherine
- Bougie, Jacques
- Bouvier, Michel
- Buono, Elvio
- CAE Inc.
- Caillé, Alain
- Canam Group Inc.
- Chagnon, Pierre
- Chartrand, Pierre
- Cliche, Yvan
- Côté, Pierre-Paul
- Desgens, Daniel
- Duchesneau, François
- Filteau, Éric
- Fournier, Daniel
- Fox, Francis
- Gagnon-Legault, Suzanne
- Gaumont, Jacques
- Goldring, C. Warren
- Gravel, Jacques
- Gravel, L.-Pierre
- Gresset, Jacques
- Hébert, Josée
- Hoang, Trang
- J.-Louis Lévesque Foundation
- Jean Coutu Group (PJC) Inc.
- Jodoin, Vivianne
- Lacroix, Robert
- Lalande, Sylvie
- Lamarre, Bernard
- Lamarre, Daniel
- Larose, Jacques
- Lépine, Yves
- Lespérance, Michel
- Mader, Sylvie
- Maheu, Louis
- Major, François
- Martin, Fernand
- Maxwell Cummings Foundation
- McCarthy Tétrault Foundation
- McNeil, Jean
- Meloche, Sylvain
- Merck
- Miller Thomson Pouliot
- Milot, Éric
- Motulsky, Bernard
- National Bank of Canada
- Normandeau, Michel

- Ogilvy Renault
- Painchaud, Gisèle
- Panet-Raymond, Robert
- Perreault, Claude
- Pfizer Canada Inc.
- Plessis-Bélair, Michel
- Racette, André
- Ratelle, Francine
- Rinfret-Raynor, Maryse
- RONA Inc.
- Rousseau, Henri-Paul
- Roy, Louise
- Roy, Sébastien
- Sauvageau, Guy
- SNC-Lavalin Group Inc.
- Tessier, Robert
- Therrien, Marc
- Thibault, Pierre
- Trahan, Michel
- Transcontinental Inc.
- Vachon, Louis

## Cumulative donations to the fundraising campaign and activities

(as of May 31, 2010)

### \$5 million and over

- Anonymous (1)
- Marcelle and Jean Coutu Foundation

### \$1 million to \$4,999,999

- Anonymous (1)

### \$100,000 to \$999,999

- Canam Group
- Métro Inc.
- Pomerleau
- Sauvageau, Monique and Guy Sr
- Wood family

### \$10,000 to \$99,999

- Agilent Technologies Foundation
- Bouchard, Yves
- Bouvier, Michel
- Goldring, C. Warren
- Hoang, Trang
- Katelyn Bedard Bone Marrow Association
- Laporte, Roger M.
- Mader, Sylvie
- Major, François
- Meloche, Sylvain
- Perreault, Claude
- Provencher, France
- Sauvageau, Guy

### \$1,000 to \$9,999

- Anonymous (2)
- Benoit, Claire
- Bérubé, Josée
- Bonneil, Éric
- Borden, Katherine
- Carréno, Sébastien
- Chartrand, Jean
- Demers, Marie-Ève
- Dion, Réal
- Emery, Gregory

- Fortin, Jacques
- Gagnon-Legault, Suzanne
- Haviernick, Martine
- Hébert, Josée
- Jodoin, Vivianne
- Kwok, Benjamin
- Labelle, Robert
- Lacroix, Robert
- Lapointe, Josée
- Le Groupe Québec Amérique
- Lessard, Julie
- Maddox, Paul
- Marier, Guy
- Martin, Richard
- Ménard, Marie-Christine
- Patenaude, Robert
- Prologue Inc.
- Raymond Chabot Grant Thornton
- Raymond, Martine
- Roux, Philippe
- Sabourin, Thomas
- Savoy, Jacqueline
- Shaub Maddox, Amy
- Supertek Canada Inc.
- Théoret, Daniel
- Therrien, Marc
- Thibault, Pierre
- Turgeon, Robert
- Verreault, Alain
- Vignault, François

### BEQUESTS

- Floc'h, Gisèle and Rousselle, Jean-Pierre

THANKS TO MONTRÉAL-BASED GROUP PHARMASCIENCE AND ITS CO-FOUNDER MORRIS GOODMAN, IRIC ENJOYS A FREE SUPPLY OF RIBAVIRIN. THROUGH THIS PARTNERSHIP, IRIC WILL BE ABLE TO CONDUCT A CANADA-WIDE CLINICAL TRIAL.

# The Investigator, the Philanthropist and Ribavirin

Since 1996, **Dr. Katherine Borden** has been looking into the effect of ribavirin, a broad-spectrum antiviral, on a specific protein: eIF4E. The activity of this protein is deregulated in 30% of cancers, including breast, prostate, head and neck, colon and stomach cancer. However, it was not until 2004, when she joined IRIC as a principal investigator, that she foresaw the possibility of clinically testing this drug. The first clinical trials, conducted in cooperation with Montréal's Jewish General Hospital, on patients with acute myeloid leukemia (AML), helped confirm her hypotheses. "Targeting eIF4E in humans has clinical benefits. The study showed that ribavirin suppresses not only the activity of the protein in question, but also had no adverse effects on patients," explains Dr. Borden.

## A major discovery

Ribavirin contributed to a net improvement in the condition of patients for whom previous treatments had failed. There was even complete remission in the case of one patient. However, it was soon discovered that some patients developed a resistance to ribavirin over time. There had to be a way around this problem, and research and clinical trials have to continue.

A new Canada-wide study conducted with the Segal Cancer Centre at Montréal's Jewish General Hospital, McMaster University/Hamilton Health Sciences and Maisonneuve-Rosemont Hospital and funded by the Leukemia and Lymphoma Society (USA) should make it possible to determine the efficacy of ribavirin combined with a chemotherapeutic agent. To conduct this study, Katherine Borden needs ribavirin, but in Canada, the drug is only approved for use in combination with interferon. The researcher must therefore procure the drug in the United States, which is very costly.

It was at this point that Morris Goodman fortuitously arrived on the scene. The Chairman of the Board of Directors of Pharmascience, one of the leading generic drug manufacturers in Canada, is also a major philanthropist. Having graduated from the Faculty of Pharmacy at Université de Montréal in 1953, he is rewarding his alma mater with his generosity. Moreover, the Morris and Rosalind Goodman Agora, adjoining the Marcelle-Coutu Pavilion which houses IRIC, bears the names of him and his wife, as does the Rosalind and Morris Goodman Cancer Research Centre at McGill University. In June 2009, he made the acquaintance of Dr. Borden. "I have an interesting tale to tell you about ribavirin," he told her. "I spent 12 years working at the company that developed the molecule in the early 1970s." Interested in Dr. Borden's research work and clinical

trials, Mr. Goodman made her a surprising proposal: "I'm going to set up a production line at my Montréal plant and I'll give you this drug for free so that you can continue your clinical trials."

### Partner and philanthropist

The very next day, he assembled his team, invested \$250,000 in the new production line... and the project was underway. One year and a few months later, the first ribavirin tablets were on their way to Dr. Borden's laboratory at IRIC. For the investigator, the savings are substantial. "By obtaining ribavirin at no cost, we will be able to use those funds to conduct a much larger-scale trial and on different types of cancer. We will even be able to test other combinations of drugs."

As for Mr. Goodman, he does not expect to see the fruits of his actions for quite some time. "We're talking of 15 to 20 years of work to develop a drug. To determine whether ribavirin is really effective in fighting certain cancers, we will still need to invest millions of dollars in research and development." So why such generosity? Morris Goodman modestly shrugs his shoulders. "Because I have a special connection to ribavirin. I have hope that this molecule will serve a purpose and I want to help patients." Is that all? "Not entirely." Morris Goodman is first and foremost a philanthropist. And that, as he puts it, "is an attitude." An attitude that gives him great pleasure, judging by the chuckle in his laugh and the sparkle in his eyes.



August 2010: The first ribavirin tablets rolled off the Pharmascience production line.



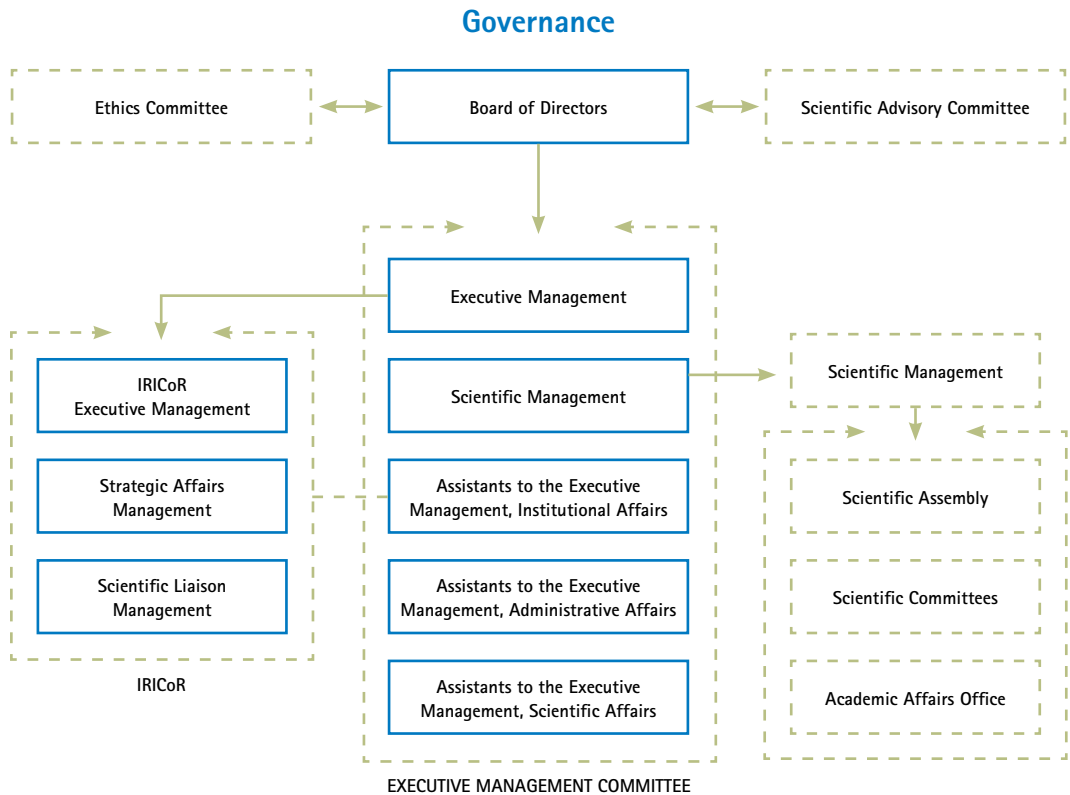
# Working, Getting Involved

IRIC provides a working environment that is intellectually stimulating. Committed to the fight against cancer, everyone has the opportunity to express their talents and grow within a dynamic work team that shares the same quest for discovery and excellence.

- Governance
- Executive Management Team
  - Board of Directors
- Organizational Structure

The number of IRIC employees has grown steadily since its beginnings and reached 200 in 2010. In 2009-2010, the research staff increased by 9% (from 162 to 177 employees), which represents 89% of people working at the Institute. To support its team of scientists, IRIC can also count on its administrative staff, comprising 23 technical, professional and management employees.

IRIC'S STRUCTURE REFLECTS ITS VALUES OF COLLABORATION, COMMUNITY, CREATIVITY, INNOVATION, EXCELLENCE AND INTEGRITY. THE STAFF, COMPRISING 200 PEOPLE WHO ARE PASSIONATE ABOUT THEIR WORK, SHARE THEIR KEY ASPIRATIONS WITH THE MEMBERS OF THE INSTITUTE'S BOARD OF DIRECTORS, WHICH IS MADE UP OF 12 LEADERS FROM THE BUSINESS AND ACADEMIC COMMUNITIES.



Page 44: A group of IRIC employees: André Haman, Patrick Lacasse, Caroline Côté, Mirela Pascariu, David Grote, Gaël Dulude, Edward Ruediger, Stéphane Pinsonneault, Lama Talje, Marc Saba El Leil, Muriel Draoui, Olivier Lam, Melina Narlis, Véronique Paradis, Christian Charbonneau, Édith Giasson, Gabrielle Jacob, Marie-Pierre Hardy.

## Executive Management Team

### President of the executive management committee

#### Guy Sauvageau

Chief executive officer, scientific director, and principal investigator

### Members of the executive management committee

#### Claire Benoit

Deputy director, institutional affairs

#### Michel Bouvier

Deputy director, administrative affairs, and principal investigator

#### Marc Therrien

Deputy director, scientific affairs, and principal investigator

## Board of Directors

### Board chairman

#### Robert Lacroix

Former rector and professor emeritus  
Université de Montréal  
CIRANO fellow

### Board members

#### Alan Bernstein

Executive director  
Global HIV Vaccine Enterprise

#### Marc-André Blanchard

Chair and chief executive officer  
McCarthy Tétrault

#### Gérard Boismenu

Dean, Faculty of Arts and Sciences  
Université de Montréal

#### Marie-Josée Coutu

President  
Marcelle and Jean Coutu Foundation

#### Jacques Frémont

Provost and vice-rector, academic affairs  
Université de Montréal

#### Joseph Hubert

Vice-rector, research  
Université de Montréal

#### Réal Raymond

Company director

#### Jean L. Rouleau

Dean, Faculty of Medicine  
Université de Montréal

#### Guy Sauvageau

Chief executive officer  
and scientific director  
IRIC

#### Robert Tessier

Chairman of the Board of Directors  
Caisse de dépôt et placement du Québec  
Company director

### IRIC researchers representative

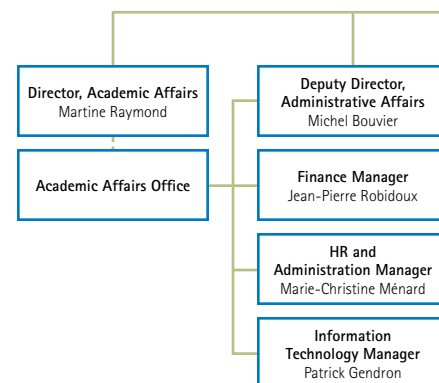
#### Michel Bouvier

Deputy director, administrative affairs,  
and principal investigator  
IRIC

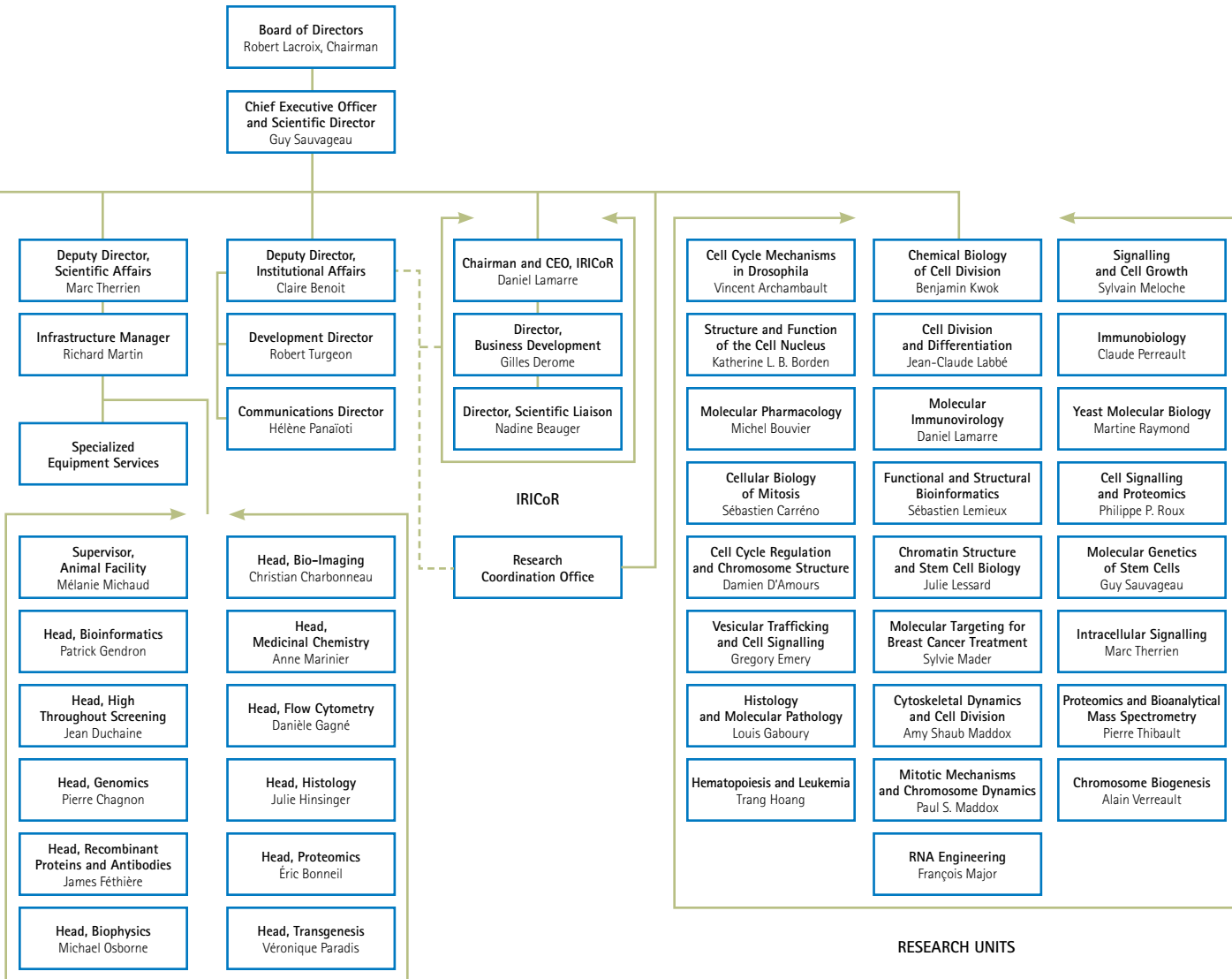
### Observer

#### Claire Benoit

Deputy director, institutional affairs  
IRIC



## Organizational Structure



# Financial Profile

In fiscal 2009–2010, IRIC had a budget of close to \$30 million. Half of this amount is used to fund research and the other half to run the Institute. In addition, the Institute received an \$8.7 million infrastructure fund to set up the new Medicinal Chemistry core facility.

GOVERNMENT AGENCIES ARE THE PRIMARY SOURCES OF FUNDING FOR IRIC'S RESEARCH ACTIVITIES. THE FUNDS, GRANTED MOSTLY ON THE RECOMMENDATION OF PEER COMMITTEES, ARE CRUCIAL TO THE OPERATION OF LABORATORIES, PAYING THE RESEARCHERS' SALARIES AND THE DEVELOPMENT OF RESEARCH SUPPORT PROGRAMS, THANKS TO WHICH GRADUATE AND POSTGRADUATE STUDENTS RECEIVE STUDY SCHOLARSHIPS.

### IRIC Financial Profile in 2009–2010 (June 1, 2009 to May 31, 2010)

	INSTITUTE OPERATIONS	RESEARCH FUNDING	TOTAL	INFRASTRUCTURE FUND <sup>(1)</sup>
<b>REVENUES</b>				
UdeM	\$4,121,000	—	\$4,121,000	—
Organizations with peer committees - Research Funds	\$5,885,000	\$12,372,001	\$18,257,001	\$8,720,000
Private companies	\$1,634,000	\$92,600	\$1,726,600	—
Other sources	\$2,474,387	\$565,000	\$3,039,387	—
<b>Subtotal</b>	<b>\$14,114,387</b>	<b>\$13,029,601</b>	<b>\$27,143,988</b>	<b>\$8,720,000</b>
Organizations with peer committees - Scholarships		\$1,935,000	\$1,935,000	—
<b>Total</b>	<b>\$14,114,387</b>	<b>\$14,964,601</b>	<b>\$29,078,988</b>	<b>\$8,720,000</b>
<b>EXPENSES</b>				
Salaries and employee benefits	\$11,385,546	\$7,729,603	\$19,115,149	
Supplies and services	\$2,517,969	\$5,848,222	\$8,366,191	
Equipment	\$347,260	\$1,370,426	\$1,717,686	
<b>Total</b>	<b>\$14,250,775</b>	<b>\$14,948,251</b>	<b>\$29,199,026</b>	

Note 1: Includes building infrastructure and research equipment

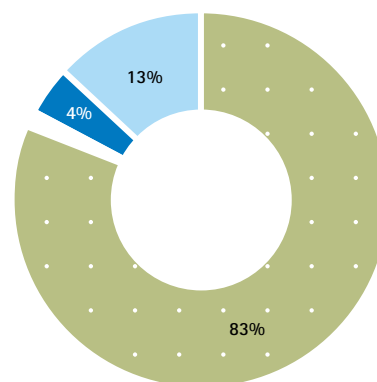
## Organizations with peer committees having funded IRIC in 2009–2010 (research funds and scholarships):

- Canada Foundation for Innovation (CFI)
- Canada Heart and Stroke Foundation (CHSF)
- Canada Research Chairs (CRC)
- Cancer Research Society (CRS)
- Canadian Cancer Society Research Institute (CCSRI)
- Canadian Institutes of Health Research (CIHR)
- Cole Foundation
- Fonds de la recherche en santé du Québec (FRSQ)
- Fonds québécois de la recherche sur la nature et les technologies (FQRNT)
- Génome Québec (GQ)
- Heart and Stroke Foundation of Québec (HSFQ)
- Human Frontier Science Program (HFSP)
- Infrastructure Canada Program (ICP)
- Kidney Foundation of Canada (KFC)
- Ministère du Développement économique, de l'Innovation et de l'Exportation (MDEIE)
- National Institutes of Health (NIH)
- Natural Sciences and Engineering Research Council of Canada (NSERC)
- Networks of Centres of Excellence (NCE)
- Québec Breast Cancer Foundation (QBCF)
- Québec Consortium for Drug Discovery (QCDD)
- The Leukemia and Lymphoma Society (LLS)

## Research funding sources in 2009–2010

**Total: \$14,964,601**

- Organizations with peer committees (research funds): \$12,372,001
- Other sources: \$565,000
- Organizations with peer committees (scholarships) : \$1,935,000
- Private companies: \$92,600



### In 2009–2010

Research funding: **\$14.9 million**  
**\$520,000** per year on average  
 per research unit (25 units in total)

**15** Canada Research Chairs

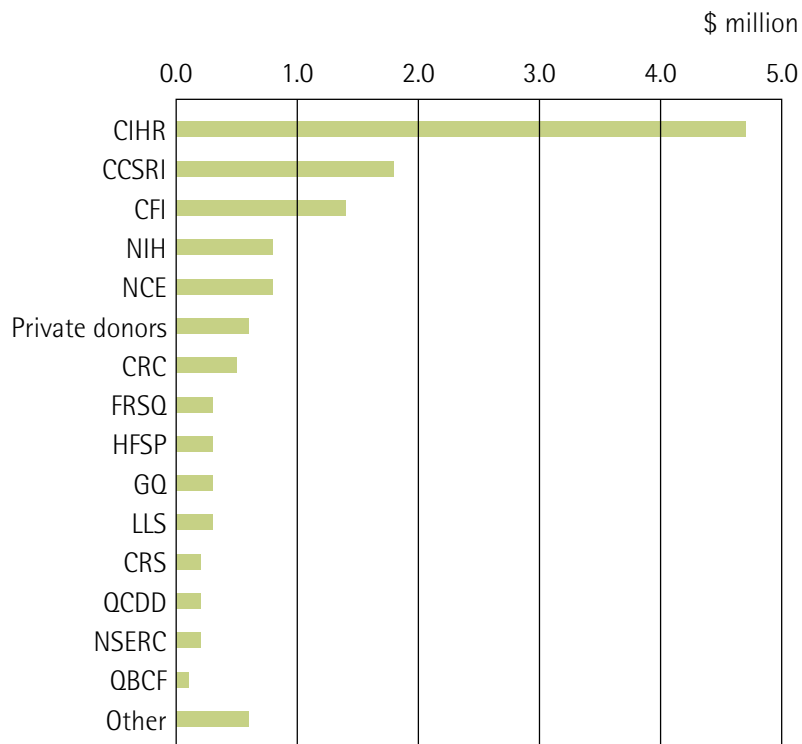
**2** private chairs

**61** personal scholarships  
 for 30% of graduate students  
 and postdoctoral fellows

## RESEARCH FUNDS

Research funding granted to IRIC from organizations with peer committees (research funds), private companies and private donors in 2009-2010

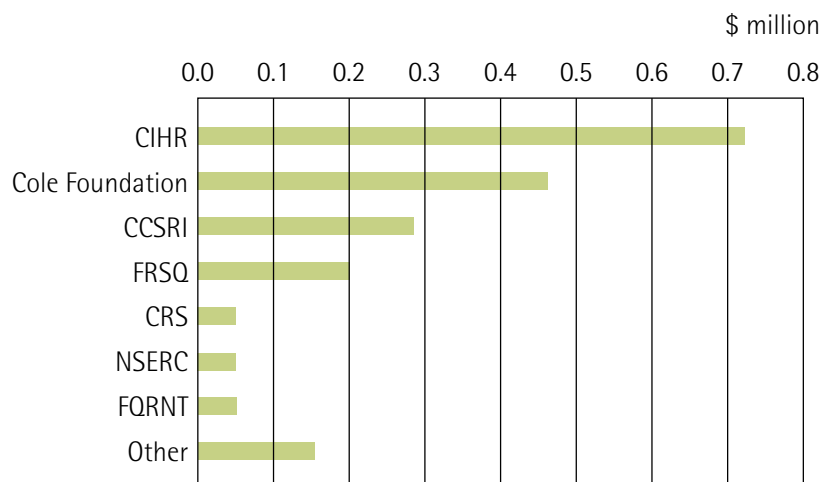
Total: \$13,029,601



## SCHOLARSHIPS

Research funding granted to IRIC from organizations with peer committees for personal scholarships for IRIC students and postdoctoral fellows in 2009-2010

Total: \$1,935,000



# "Cancer Research Cannot Take Place in a Vacuum"



Alan Bernstein, executive director of Global HIV Vaccine Enterprise and member of the IRIC's Board of Directors.

"I am impressed by IRIC," confided Dr. Bernstein to the Université de Montréal *Forum* newspaper in 2009. "This notion of bringing together exceptional young investigators and their more seasoned colleagues and offering them a multidisciplinary environment where the laboratories stay small in scale strikes me as an excellent idea."

Multidisciplinary: This is a concept lauded by Dr. Bernstein, a concept that has, moreover, largely contributed to fashioning federal policy in this matter. "Universities have long given preference to vertical, departmental structures. But today, and specifically in the biomedical

field, research must bring together a variety of expertise." And this is precisely the research model advocated by IRIC.

Currently, Alan Bernstein is serving as executive director of the Global HIV Vaccine Enterprise in New York, an alliance of independent organizations from around the globe committed to accelerating the development of an AIDS vaccine. "As with AIDS, cancer research cannot be conducted in a vacuum," he summarizes. "And I believe IRIC's founders have truly taken this to heart."

Dr. Alan Bernstein knows research. Both an exceptional scientist and manager, he was director of research at the Samuel Lunenfeld Research Institute, Mount Sinai Hospital (Toronto), from 1994 to 2000. He then moved to the Canadian Institutes of Health Research (CIHR), which he managed from 2000 to 2007. He was head of the organization when, in 2002, the young Institute for Research in Immunology and Cancer submitted its first applications for funding, which were granted. After leaving the CIHR, Dr. Bernstein continued to be so involved in IRIC's project that in 2009, at the invitation of Robert Lacroix, chairman of the Institute's Board of Directors, he became one of its directors.



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