



2019-2020 ACTIVITY REPORT

**INSTITUTE FOR RESEARCH IN
IMMUNOLOGY AND CANCER**

A global standard bearer in basic and
applied research to vanquish cancer

CANCER, A SOCIAL ISSUE

Cancer is a devastating disease and a major social issue. It is the leading cause of death in Canada.



1 OUT OF 2 CANADIANS
IS EXPECTED TO DEVELOP
CANCER DURING THEIR
LIFETIME



1 OUT OF 4 CANADIANS IS EXPECTED
TO DIE FROM THIS DISEASE

220,400
NEW CASES

82,100
DEATHS

Canadian Cancer Statistics (2019), CCS

IRIC, A KEY PLAYER IN THE FIGHT AGAINST CANCER

Research hub dedicated to the fight against cancer, IRIC strives to shed light on the mechanisms of the disease in order to discover more effective new therapies. Its multidisciplinary model and its innovative way of approaching research are based on the complementary expertise of its laboratories that contribute to the advancement of knowledge on a daily basis.

Cancer research provides hope. It has resulted in extraordinary advances over the last few decades: the mortality rate linked to cancer has decreased, prevention is omnipresent, there is earlier stage screening, and treatments are more and more conclusive.

IRIC IS:

CLOSE TO 500 DEDICATED INDIVIDUALS investigators, students, postdoctoral fellows, technicians, research professionals, support staff and administrative staff

29 PRINCIPAL INVESTIGATORS in basic, translational and applied research; professors from 9 departments of the Université de Montréal

1,150 SCIENTIFIC PUBLICATIONS thus far, including a significant percentage published in the most prestigious journals

10 CORE FACILITIES available to investigators from here and abroad and a **DRUG DISCOVERY UNIT**

200+ STUDENTS, part of the next generation of scientists

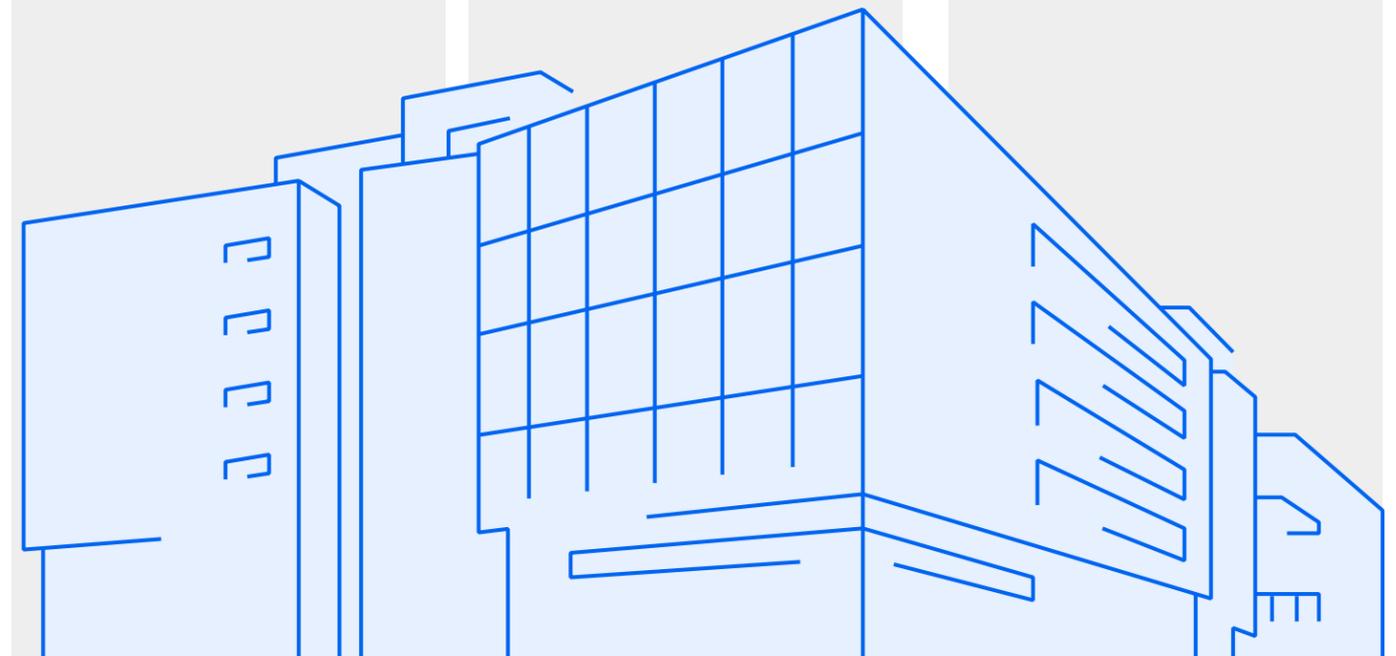
A CENTRE OF EXCELLENCE in Commercialization and Research specialized in drug discovery (**IRICoR**)

A PROMISING AND UNIQUE THREEFOLD MISSION

ACQUIRING NEW KNOWLEDGE
THROUGH HIGH-LEVEL BASIC
RESEARCH

TRAINING TOMORROW'S
SCIENTISTS

ACCELERATING THE
DISCOVERY OF NEW
THERAPIES





ROBERT TESSIER

MESSAGE FROM THE CHAIRMAN OF THE BOARD OF DIRECTORS, ROBERT TESSIER

With its innovative model linking research, training and valorization, the Institute brings together all of the ingredients for success that make it a major player in the fight against cancer.

I am proud to support its growth and to have witnessed its evolution over several years. As Chairman of the Board of Directors, I have the pleasure of working with distinguished members of the academic community and the business community. We are very excited about supporting the projects, visibility and strategic orientations of the Institute.

The spring of 2020 had a profound impact because of COVID-19, which greatly affected how the Institute's research activities were carried out. From the philanthropic standpoint, it resulted, among other things, in the cancellation of IRIC's flagship benefit-event: the annual Audacious gala. Consequently, IRIC launched an Emergency Fund to offset the shortfall. The donor community quickly mobilized to answer the call. I would like to take this opportunity to personally thank, as well as on behalf of my colleagues on the Board of Directors, all of the philanthropists who contributed over this past year to supporting the work carried out at the Institute. The pandemic reminded us, more than ever, of how important it is to support scientific research in the health fields.

MESSAGE FROM THE CHIEF EXECUTIVE OFFICER, MICHEL BOUVIER, AND THE SCIENTIFIC DIRECTOR, MARC THERRIEN

As Chief Executive Officer and Scientific Director of the Institute, we get the chance to work with and support 29 research teams with complementary expertise that contribute, on a daily basis, to the advancement of scientific knowledge and to developing new therapeutic pathways for treating cancer. It also provides us with an opportunity to foster the fulfillment of the students trained at IRIC who actively take part in the research work carried out in its laboratories. IRIC also benefits from privileged access to a research valorization cluster specializing in drug discovery, IRICoR, and to cutting-edge infrastructures.

In the spring of 2020, COVID-19 left a lasting impression all over the planet. For IRIC, the crisis context resulted in decreased on-site research activities, and a needed review of how to go about things. We still continued our mission with the constraints imposed by the situation and stepped up our ingenuity by putting the versatility of our teams to good use. Many of our laboratories, usually busy demystifying the mechanisms of cancer, managed to adapt their activities to try to find solutions to counter the virus.

The crisis highlighted, more than ever, the importance of research. We would like to take this opportunity to thank all of our partners and donors who contribute significantly to IRIC's success.



MICHEL BOUVIER



MARC THERRIEN

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Start of mandate: December 1, 2019

Jean-François Leprince

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Chairman of the Board of Directors, IRICoR*

Michel Bouvier

Chief Executive Officer and Principal Investigator, IRIC

Marie-Josée Coutu

*President, Marcelle and Jean Coutu Foundation
End of mandate : December 14, 2019*

Mrs. Coutu was named honorary member of IRIC's Board of Directors

Dr. Marie-Josée Hébert

Vice-Rector of Research, Discovery, Creation and Innovation, UdeM

Lucie Rémillard

*Philanthropist
End of mandate: April 3, 2020*

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Me Robert Paré

Strategic Advisor, Fasken Martineau DuMoulin S.E.N.C.R.L., s.r.l.

Marc Therrien

Scientific Director and Principal Investigator, IRIC

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CHAIRMAN

Michel Bouvier

Chief Executive Officer and Principal Investigator, IRIC

MEMBERS

Nadine Beauger

Chief Executive Officer, IRICoR

Richard Martin

*Director, Administration, IRIC
Nomination as Assistant General Director - Operations and Finance: December 12, 2019*

Marc Therrien

Scientific Director and Principal Investigator, IRIC

RESEARCH

IRIC's 29 research teams devote their work to understanding the mechanisms of cancer in order to develop new targeted and personalized therapies to fight the disease.

The investigators use a wide variety of approaches and experimental models. Their complementary expertise covers a broad spectrum of research areas and is at the heart of IRIC's multidisciplinary model. Mainly, these research areas are: cell division and migration, cell signaling and protein dynamics, computational analysis and modeling, targeted therapies and diagnostic tools, chemical and structural biology, genomics and epigenetics, as well as immunology and hematopoiesis.

The work of the investigators leads to important discoveries, most of which are presented in high-impact scientific journals that are often the fruit of a collaboration between several IRIC laboratories. Since the Institute was created, there have been 1,150 publications authored by one or several of their members.

IRIC also relies on 10 core facilities and a Drug Discovery Unit. The Institute can count on close collaborations with players in academia such as research institutes, universities and hospitals, as well as with industry partners.

To consult the profiles of IRIC's Principal Investigators and to learn more about their research topics: iric.ca (Research /Principal Investigators section).

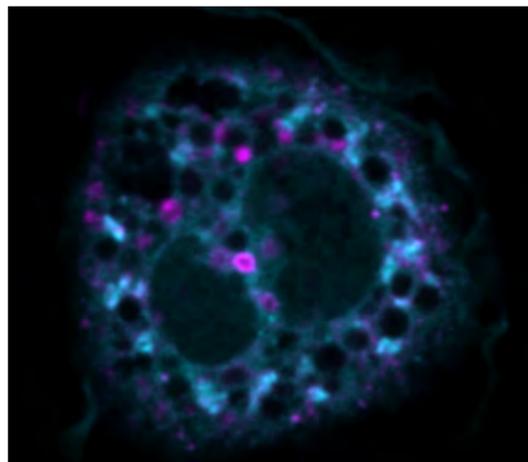
PUBLICATIONS

A MOLECULE TO CURE LOWE SYNDROME

S. CARRÉNO - *JOURNAL OF CELL BIOLOGY*



The team led by Sébastien Carréno, with collaborators at the Institut Pasteur, in France, and the University of Manchester, in the United Kingdom, discovered that a molecule could potentially treat Lowe syndrome, an orphan genetic disease. This disease, caused by the mutation of a single gene, affects one in 500,000 boys and causes brain, eye and kidney problems. It is while studying the cell division process dysregulated in cancer in *Drosophila* (the fruit fly) that the IRIC team discovered this molecule. They found that it could activate a particular signaling pathway to correct dysregulated cells, such as those present in Lowe syndrome. As proof of concept, the investigators were able to correct poor kidney function in an animal model, the zebrafish, suffering from the disease. With the help of IRICoR, a patent was filed for the use of this molecule in the treatment of Lowe syndrome. A preclinical study should get underway soon.



PREDICTING THE POSSIBLE CLINICAL EFFECTS OF NEW DRUGS EVEN PRIOR TO CLINICAL TRIALS

M. BOUVIER - *NATURE COMMUNICATIONS*



An international research team, including scientists from Michel Bouvier's laboratory, has developed a new strategy for predicting the possible clinical effects of new therapeutic molecules from very simple cellular responses. The team's ambition was to find a way to classify a large number of drug candidates based on their similarities, in the induction of several cellular responses of interest, with drugs with known clinical effects. Extensive bioinformatics analyses made it possible to compare and group the molecules according to very complete signaling profiles. As an example, it was thus possible to associate simple cellular signals produced by analgesic opioids such as oxycodone, morphine and fentanyl, with the frequency with which adverse effects were reported in the pharmacovigilance program of the Food and Drug Administration. This new type of analysis could speed up the drug discovery process for a more rapid transfer to the clinic for the benefit of patients.

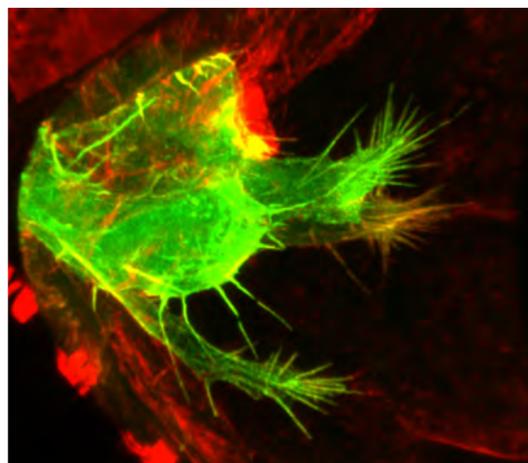


SHEDDING LIGHT ON NEW MECHANISMS RELATED TO CELL MIGRATION

P. ROUX, S. CARRÉNO, G. EMERY - *NATURE COMMUNICATIONS*



The teams headed up by Gregory Emery, Sébastien Carréno and Philippe Roux made a major discovery involving the mechanisms regulating collective cell migration. Notably, this type of displacement is used by cancer cells that break away from a primary tumor to colonize another part of the body and form metastases. The objective of their research work, carried out with the *Drosophila* fly, is to understand the way in which cells are coordinated and how their migration is controlled. They found that the Misshapen kinase enzyme (called MAP4K4 in mammals) plays a role of coordinating the collective movement of the border cells in *Drosophila*. Their displacement is the result of the action of tensile forces pulling them to the front and of contractions pushing them forward from the rear that are coordinated by the Misshapen kinase. Greater understanding of these molecular mechanisms is needed to develop, in the longer term, new strategies aimed at preventing the formation of metastases.



A POTATO VIRUS HELPS UNCOVER A NEW REGULATION MODE FOR GENE EXPRESSION

B. KWOK, K. BORDEN - *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES*



Messenger RNAs (mRNAs) transport the genetic information contained in genes to ribosomes (a cellular translation machine) where this information is read and used to produce the appropriate proteins. The protein eIF4E plays an essential role in the transport of mRNAs by attaching to a special modification at their end, known as the cap. By studying VPg, a protein from a virus that attacks potatoes, Katherine Borden's team has demonstrated for the first time that this binding to the cap can also be done via an intermediate protein, which suggests that there could be a completely different mechanism for engaging the machinery to convert mRNA to protein. In a collaboration with Benjamin Kwok, the investigators then showed that a human motor protein, KIF11/EG5, whose structure is similar to VPg, also binds to the cap binding site of eIF4E, supporting the notion that this new potential mechanism for control and engagement of eIF4E could be conserved from plants to humans. Better understanding the regulatory mechanisms of eIF4E is of great interest because it is a very promising therapeutic target in the treatment of certain cancers.



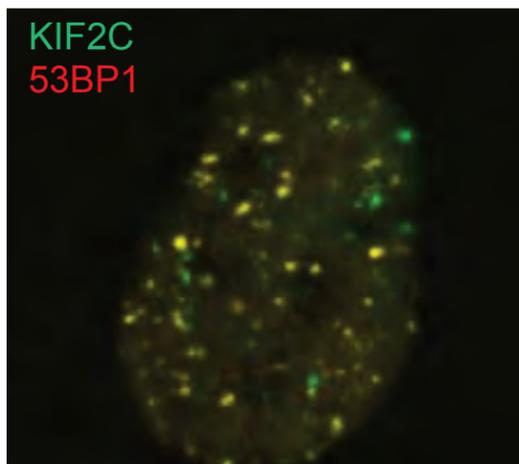
PUBLICATIONS

THE DOUBLE LIFE OF KIF2C

B. KWOK - *ELIFE*



In the treatment of cancer, drugs that damage DNA and those that disrupt the formation of microtubules are particularly effective when used in combination. Why? Investigators from Benjamin Kwok's laboratory and their collaborators at the University of Nebraska Medical Center believe they have identified part of the answer by studying the protein Kif2C. This protein attaches to microtubules, important filaments of cellular protein, and causes them to disassemble. This was thought to be its only function until the investigators discovered that it also associated with damaged DNA and played a role in its repair. By blocking the function of Kif2C linked to microtubules, the investigators showed that this function was necessary for the repair of DNA. This finding is paradoxical since microtubules are found in the cytosol of cells, while damaged DNA is found only in the nucleus. It now opens the door to a series of new questions about the possible involvement of microtubules in DNA repair, in addition to identifying Kif2C as a potential new therapeutic target.



BLOOD CANCERS: A "NEW GENERATION" STEM CELL TRANSPLANT SIGNIFICANTLY REDUCES COMPLICATIONS FOR PATIENTS

A. MARINIER, S. LEMIEUX, G. SAUVAGEAU - *THE LANCET HAEMATOLOGY*



Following a phase one and two clinical trial, the vast majority of blood cancer patients are on the road to recovery, thanks to the UM171 molecule. This molecule makes it possible to multiply cord blood stem cells in culture. It is the result of a dozen years of work carried out by the team led by Dr. Guy Sauvageau and chemists of the Drug Discovery Unit under the supervision of Anne Marinier. After a two-year clinical trial, on 22 adult patients who were at high risk of death and who received a graft of stem cells multiplied using UM171, the results exceeded expectations. The rejection problems and deaths associated with these transplants were significantly reduced during these trials led by Dr. Sandra Cohen, a hematologist at Maisonneuve-Rosemont Hospital. The benefits of UM171 are unmatched by any other process: it allows for rapid and durable engraftment, accelerates reconstitution of the immune system, less frequently triggers fever and results in very few transplant-related diseases, and a very low mortality rate. Other clinical trials are underway to make this promising treatment available to all patients as quickly as possible.

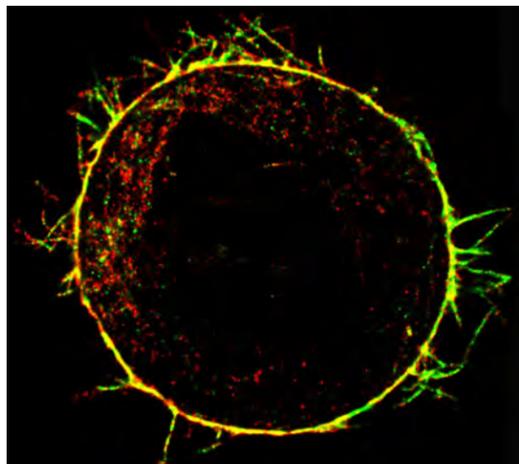


VIMENTIN: FILAMENTS WHOSE ROLE IS FAR FROM TRIVIAL

P. ROUX - *DEVELOPMENTAL CELL*



A collaboration between European investigators and the team led by Philippe Roux has revealed the unsuspected role of intermediate filaments of vimentin in cell division. The investigators looked at the stage of cell division where cells round off to allow the chromosomes to align at their center. The cells adopt this form thanks to a network of actin filaments, a component of their "cytoskeleton", which lines the internal surface of the cell membrane. They discovered for the first time the presence of vimentin filaments attached to the actin filament network. The results show that the filaments of vimentin participate in the assembly of the actin layer in addition to acting as a form of shield, preventing the network of actin fibers from extending towards the center of the cell. According to the authors of the study, the overabundance of vimentin in many cancer cells could make it easier for them to break out of their confinement to take a round shape and then divide.

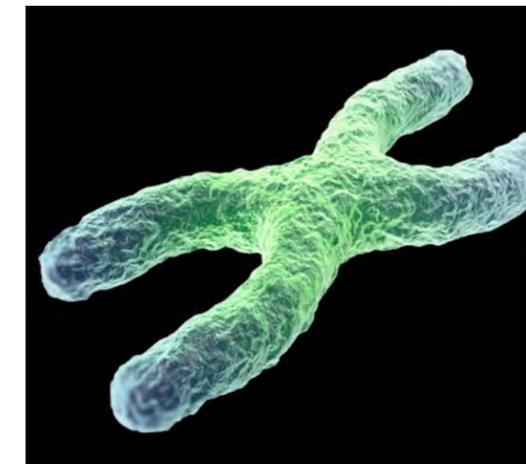


TELOMERES: MORE THAN JUST CHROMOSOMES CAPS!

L. HARRINGTON - *ELIFE*



Telomeres are particular DNA sequences at the end of chromosomes that serve as caps to protect against degradation. Long, intact telomeres are maintained by the enzyme TERT and are essential for cell viability. Telomere erosion is associated with aging. Telomere dysfunction is also known to impair stem cell differentiation, possibly through abnormal epigenetic regulation. The group led by Lea Harrington, in collaboration with colleagues at the Princess Margaret Cancer Centre in Toronto, recently identified a molecular mechanism linking telomeres and epigenetic regulation. The work focused on cells from mice genetically modified to be TERT deficient (*Tert*^{-/-}) and that display significantly shortened telomeres. It was found that *Tert*^{-/-} cells presented a genome scale perturbation of the "H3K27me3 repression mark", known to affect the level of compaction of DNA and turn off "pluripotency" genes that are essential to maintain cells in a stem cell-like, undifferentiated state. Identification of this functional link might reveal new approaches in the treatment of age-associated diseases including cancer.



AWARDS AND DISTINCTIONS



ANNE MARINIER

AWARDED THE PRIX D'EXCELLENCE 2019 DES DIPLÔMÉS DE L'UQAR

This prestigious distinction was bestowed upon her to reward her exceptional career path and her major involvement in the Université du Québec à Rimouski community and, on a broader scale, in the province. She became the 19th winner of this award among the UQAR's 51,000 graduates.

Her team is responsible for the discovery of the UM171 molecule, which provides hope for the treatment of blood cancer patients.



ÉRIC BONNEIL

1ST PRIZE WINNER OF THE 2019 FONDS DE RECHERCHE DU QUÉBEC – SANTÉ RESEARCH PROFESSIONALS EXCELLENCE AWARDS

Éric Bonneil, Manager of the Proteomics Core Facility, received this prize handed out by the three FRQ's (Health, Society and Culture, Nature and Technologies), rewarding his career and his contribution to the advancement of research. In particular, he works on enhancing sensitivity for identifying tumor-specific antigens from non-coding regions of the genome, one of the research avenues for developing a cancer vaccine.



TRANG HOANG

AWARDED THE ORDRE NATIONAL DU QUÉBEC AND THE ORDRE DE MONTRÉAL

The honorary decoration is the greatest distinction handed out by the Government of Quebec. It pays tribute to exceptional people who have done outstanding work for the province.

Trang Hoang was also appointed Commander of the Ordre de Montréal, the city's highest honorary award, highlighting exceptional people who have had a positive impact on its profile as a result of their achievements.

One of the founding members of IRIC, Trang Hoang is a pioneer in Systems Biology research and training. Among other things, her work has led to the discovery of abnormal cells responsible for acute lymphoblastic leukemias, the type of leukemia most frequently diagnosed in children.

IRIC

AWARDED A \$10 M GRANT FROM THE FONDS D'ACCÉLÉRATION DES COLLABORATIONS EN SANTÉ FOR THE DEVELOPMENT OF NEW CANCER FIGHTING DRUGS AND IMMUNOTHERAPIES

The Institute has been awarded a grant from the provincial FACS program, in collaboration with biopharmaceutical company Bristol-Myers Squibb and collaborators from six research centres (CRCHUM, Centre de recherche du CHUL, MILA, Research Institute of the McGill University Health Centre, Rosalind and Morris Goodman Cancer Research Centre of McGill University, Centre de recherche du CHUS). The announcement was made during the BIO International Convention, in the presence of Mr. Pierre Fitzgibbon, Minister of Economy and Innovation.

This support will allow the pursuit of a series of projects with an innovative concept aimed at turning research efforts into therapeutic solutions accessible to patients. We should point out decreased side effects of treatments, using the immune system to vanquish cancer and precision therapy to increase the effectiveness of the treatments.

Michel Bouvier, Anne Marinier, Dr. Guy Sauvageau and Sylvain Meloche are among the investigators who contributed.



ANNE MARINIER AND MARC T... WINNERS OF THE LEADACTION-ONCO

The two investigators were among the four recipients of a \$2.4 million grant in a competition initiated by IRICoR and Oncopole of Quebec. They received \$2.4 million over two years to support cancer drug development in Canada. Their projects involve acute myeloid leukemia and B-cell lymphoma proteins respectively. The announcement was made during the BIO International Convention, in the presence of Mr. Pierre Fitzgibbon, Minister of Economy and Innovation.

RECRUITMENT

DAVID KNAPP AND GENEVIÈVE DEBLOIS JOIN IRIC AS PRINCIPAL INVESTIGATORS



He was appointed Assistant Professor in the Department of Pathology and Cell Biology of the Faculty of Medicine of the UdeM.

His work seeks to demystify the molecular landscape that defines dysregulated cell identity in cancer progression. His team is working on designing new molecular circuits allowing the activity of genes of interest to be modulated at will in order to study their regulatory role and to direct the differentiation of cells to desired cell types. This facilitates the production of cells for regenerative medicine and paves the way for the development of new therapies for cancer treatment.



She was appointed Assistant Professor in the Faculty of Pharmacy of the UdeM.

Her research seeks to gain a better understanding of the development of drug resistance in cancers. Her team studies changes in cell metabolism that contribute to resistance to treatments by modifying the epigenetic profile of cancer cells.

Their hiring is part of a recruitment campaign undertaken by IRIC in its quest to enrich the complementary expertise of its research teams. They both took part in IRIC's Young Investigators Research Symposium the previous year.

COVID-19: LABORATORIES RALLY IN THE CRISIS CONTEXT

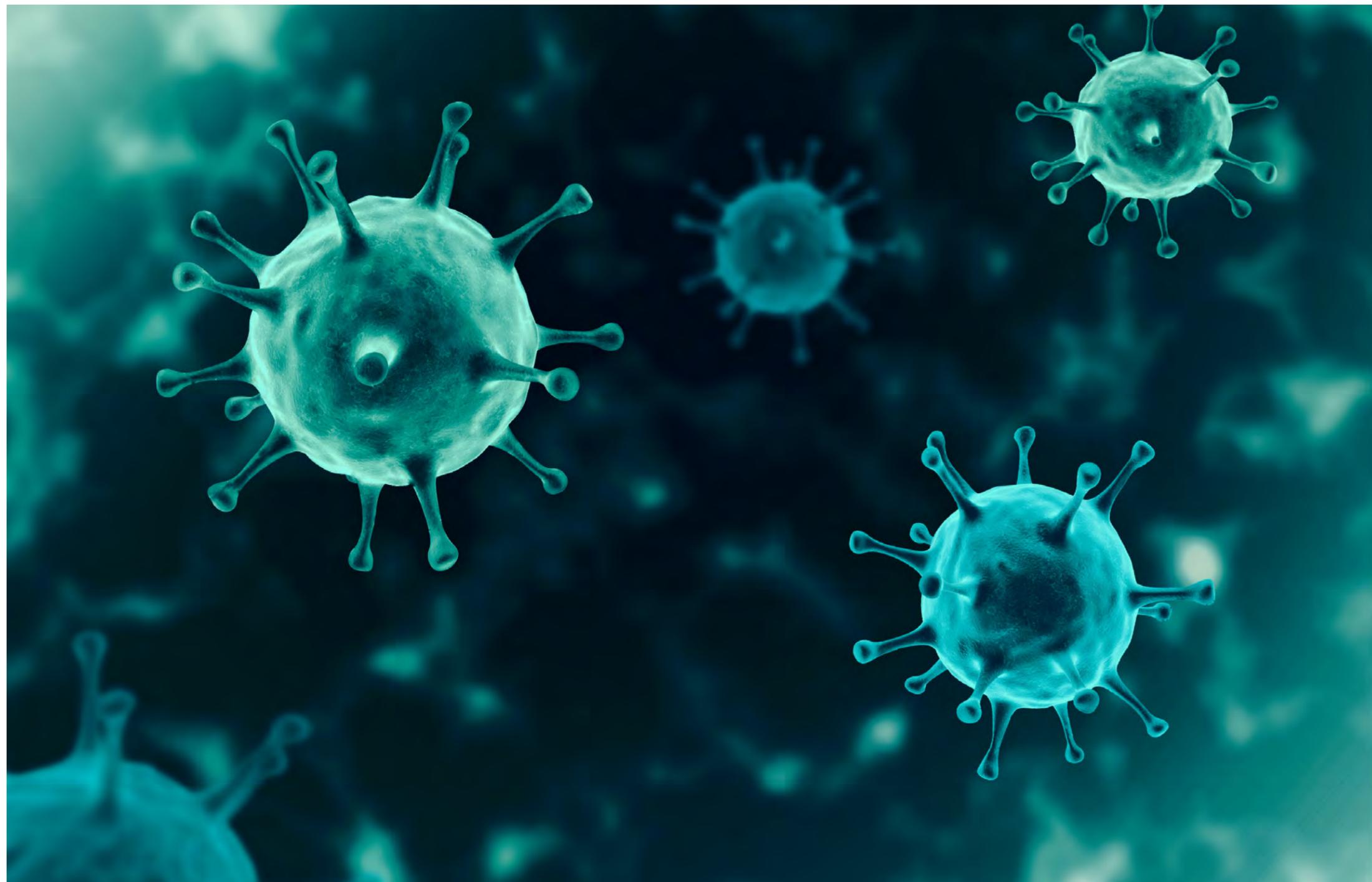
In the spring of 2020, the crisis caused by COVID-19 shook up the entire planet on all fronts. Worldwide, the scientific community quickly rallied in order to better understand and try to put an end to the pandemic. In this unprecedented context, several IRIC teams contributed to the effort.

Michael Tyers focused on identifying new therapeutic targets, in collaboration with IRIC's Drug Discovery Unit, headed by Anne Marinier, as well as Gerard Wright and Matthew Miller, both of whom are Principal Investigators at McMaster University. By bringing together expertise in functional genomics, CRISPR-based screening, virology and drug discovery, the research could also lead to developing more effective therapies to fight potential new coronavirus-associated diseases. The project benefited from a grant from the CIHR.

His team also collaborated with the one headed by Yoshua Bengio, Scientific Director of Mila. Their project seeks to identify novel molecules that target proteins in the SARS-CoV-2 virus, a prerequisite step for drug development. To do so, the investigators used neural networks to automatically assess billions of potential molecules, the most promising of which will be retained for biological evaluation and future clinical trials.

As a result of a spontaneous call for proposals initiated by IVADO, François Major worked on developing a molecular modeling protocol in order to quickly produce RNA structural virus data. The goal is to use that data to identify drugs, including those already on the market, which could prevent replication of the SARS-CoV-2 virus, at issue in the COVID-19 pandemic.

Tariq Daouda, a former IRIC student, and currently a Research Fellow at Massachusetts General Hospital, Broad Institute and Harvard Medical School, worked on a project aimed at providing the scientific community with an interactive platform capable of predicting potential COVID-19 vaccine targets, based on an artificial intelligence algorithm. He developed the platform during the course of his Ph.D. at the Institute in the laboratories headed up by Dr. Claude Perreault and by Sébastien Lemieux. It could lead to developing vaccines against other emerging viruses.



CORE FACILITIES

IRIC's research teams benefit from access to 10 cutting-edge core facilities and a Drug Discovery Unit, made up of the country's largest team of medicinal chemists and biologists in a university setting.

Operated by highly qualified professionals, the core facilities offer an impressive range of expertise, such as in vivo biology, genomics, bioinformatics, high-throughput screening, histology and proteomics, while also significantly contributing to the advancement of knowledge.

In conjunction with the Maisonneuve-Rosemont Hospital, the Institute operates the Cytogenetics Core Facility of the Quebec Leukemia Cell Bank. These core facilities are also made available to the entire UdeM scientific community, other public organizations including multiple universities, as well as pharmaceutical companies and industries that are part of the life sciences ecosystem.

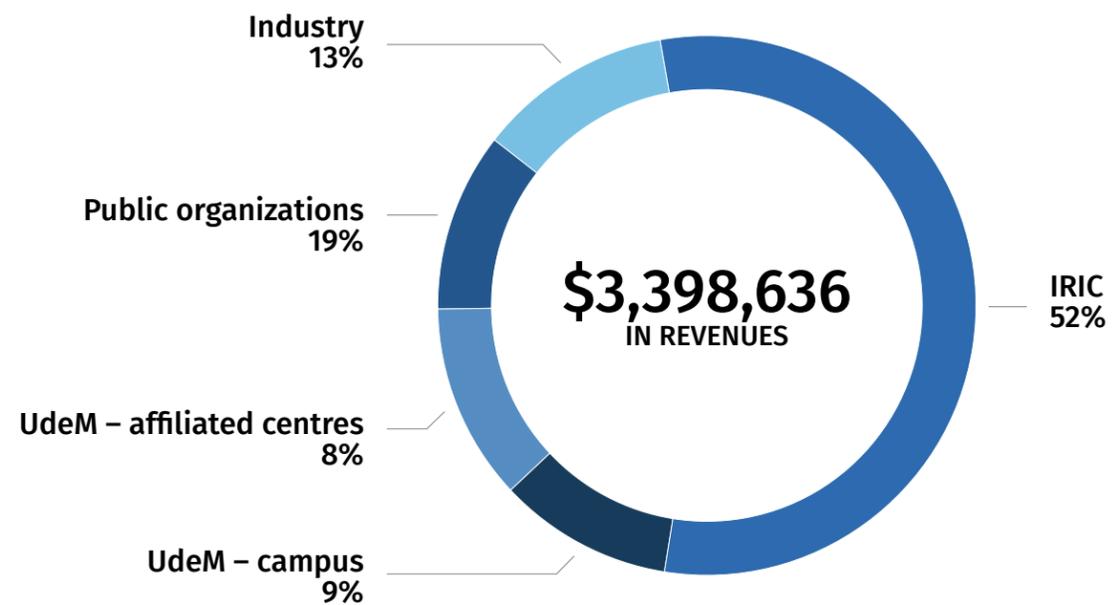
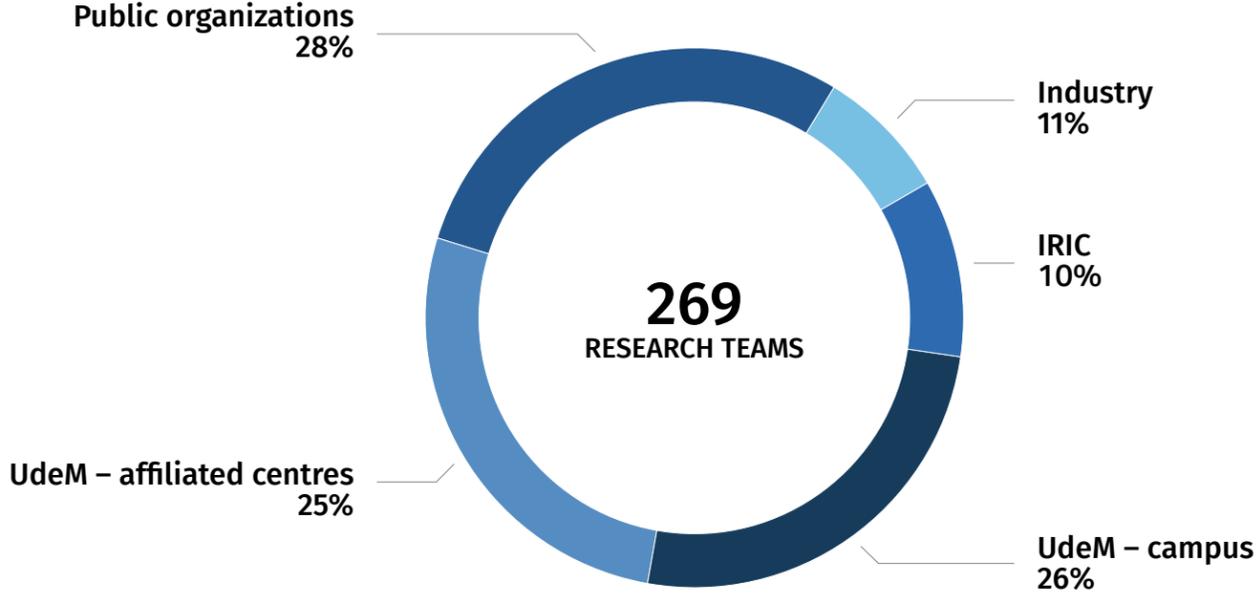
To learn more about IRIC's core facilities and infrastructures and the services offered: iric.ca (Research/Platforms and infrastructures section).

SOURCE OF USERS

OF IRIC'S CORE FACILITIES (2019-2020)

SOURCE OF REVENUE

OF IRIC'S CORE FACILITIES (2019-2020)



IRIC: 29
 UDEM - CAMPUS: 69
 UDEM - AFFILIATED CENTRES: 68
 PUBLIC ORGANIZATIONS: 75
 INDUSTRY: 29

IRIC: \$1,755,511
 UDEM - CAMPUS: \$295,319
 UDEM - AFFILIATED CENTRES: \$255,941
 PUBLIC ORGANIZATIONS: \$640,127
 INDUSTRY: \$451,738

This data excludes the revenues from grants and industry contracts allocated to the Drug Discovery Unit.

NEXT GENERATION OF SCIENTISTS

Some 200 scientists of the next generation trained annually at IRIC receive multidisciplinary training and benefit from the varied expertise of its research teams.

The Academic Affairs team assists these young scientists along their path, from their arrival at the Institute right up to their graduation, providing them with personalized support.

IRIC offers a unique Master's and Ph.D. program in Systems Biology. The training involved in both cases, which is part of the UdeM's Molecular Biology Program, focuses on close integration between theory and practice, which encompasses, among other things, cell and molecular biology, immunology, biochemistry, genetics, bioinformatics, proteomics, drug development and the more clinical aspects of cancer research.

The other programs represented at IRIC are the Master's and Ph.D. programs in the following fields of study: bioinformatics, biochemistry, molecular biology, chemistry, informatics, microbiology and immunology, pathology and cell biology, pharmacology, as well as physics.





Credit: Christian Charbonneau

2019 STUDENT RECRUITMENT EVENT

The 6th edition of the event, aimed at recruiting the finest prospects in the field of biomedical research, received over 148 applications. 37 candidates from 27 universities spread over 6 countries were selected to take part in the three days of activities.

This stay allows participants to visit IRIC's laboratories and core facilities, to meet and discuss with investigators and students and to learn about the study programs offered at the Institute. 159 interviews were held during the course of the event and 18 students joined an IRIC research team.

IRIC ON THE ROAD 2019

During its 2019 fall tour, IRIC took part in 8 higher education fairs organized at various Canadian universities located in Quebec, the Maritimes and in Ontario.

These recruitment activities provide students with an opportunity to meet representatives of educational institutions and research centres to learn more about study programs, available internships, admission criteria and scholarship possibilities.

2019 SUMMER SCHOOL IN SYSTEMS BIOLOGY

The School's objective is to provide top-notch training in cancer research. It offers a series of theoretical courses covering a variety of themes such as cell and molecular biology of cancer. It also offers practical laboratory courses in which students carry out several small-scale research projects requiring the use of IRIC's core facilities. In 2018, 30 students

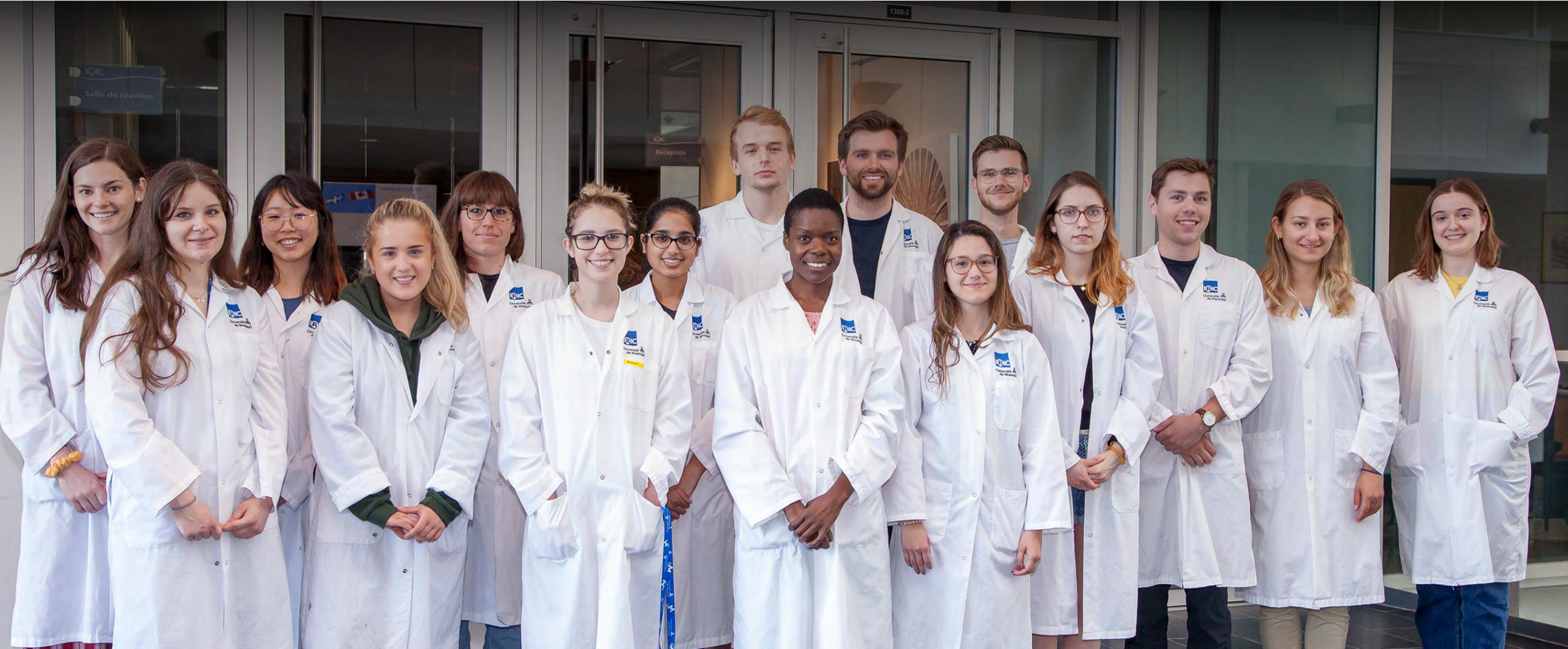
2019 IRIC NEXT GENERATION AWARDS

Offered for an 9th year, this program enabled 17 Canadian students at the undergraduate level with an outstanding academic record to receive a scholarship in order to carry out a research internship with an IRIC team during the summer of 2018. The awards are worth \$4,250 for a 12-week internship or \$5,670 for a 16-week internship.

2019 IRIC AWARDS COMPETITION

The Master's and Ph.D. Scholarship Competition aims to support students with an outstanding academic and research record, but who do not benefit from any other substantial scholarships. IRIC handed out 6 Master's half-scholarships worth \$10,000 each and 12 Ph.D. half-scholarships worth \$11,250 each (the second half being provided by the investigators).

The Travel Awards Competition aims to support Master's and Ph.D. students, as well as postdoctoral fellows, who wish to present their research findings at scientific conferences outside Quebec. IRIC awarded 6 scholarships worth \$1,000 each.



The awards are offered thanks to the support of IRIC's vast community: its employees and investigators, its Young Philanthropists, and its generous donors and partners, including the Fondation Famille Gosselin.

STUDENT MOBILIZATION



AÉIRIC – IRIC STUDENT ASSOCIATION

The AÉIRIC'S mandate is to represent Master's and Ph.D. students, postdoctoral fellows and postdoctoral researchers in institutional matters.

The AÉIRIC contributes to IRIC's development and to maintaining the quality of student life through active participation in institutional projects and by fostering interactions between the members it represents and IRIC's teams, through various organized university, scientific and social activities.



Credit: Gregory Emery

The AÉIRIC organized the 3rd edition of the scientific outreach event Behind the Scenes of Cancer Research. The 16 students representing 13 different laboratories presented their work in the form of rotating interactive workshops. Over 160 people were on hand. The event was hosted by Yanick Villedieu, journalist, author, lecturer and also host of the radio program Les années lumière on Radio-Canada for almost 35 years.

AWARDS AND HONORS

Each year, several students distinguish themselves and receive awards as part of science days or national and international conferences. Dozens of them are recipients of nominative grants and awards handed out through public, private, university, governmental and philanthropic initiatives and organizations.



Credit: Christian Charbonneau

SAMUEL MAILHOT-LAROUCHE

AWARDED A VANIER CANADA GRADUATE SCHOLARSHIP FROM THE CIHR

This scholarship is awarded by the Canadian government as part of a program aimed at attracting the best Ph.D. students. It rewards those students for their academic excellence, their research potential, and their leadership skills.

Samuel, who is a Ph.D. student in Molecular Biology under the supervision of Michel Bouvier, will benefit from \$50,000 in financial support per year for 3 years, for his project aimed at developing a new more efficient way of treating asthma and Chronic Obstructive Pulmonary Disease. He is also pursuing his medical degree at the UdeM and acts as an ambassador of research among his colleagues in medicine.



Credit: Gregory Emery

THOMAS MILAN

RECIPIENT OF A MERIT AND SOCIAL ENGAGEMENT AWARD FROM THE FACULTY OF MEDICINE OF THE UDEM

The \$2,000 award, for international students, was bestowed upon him in recognition of his outstanding academic achievements, his commitment to the community and the human qualities that he has actively demonstrated throughout his academic career.

Thomas is a Ph.D. student in Brian Wilhelm's laboratory and is the President of the AÉIRIC. He has coorganized several events, including all three editions of the scientific outreach event Behind the Scenes of Cancer Research and IRIC's Mental Health Awareness Week.

THE STUDENTS RESEARCH AMBASSADORS

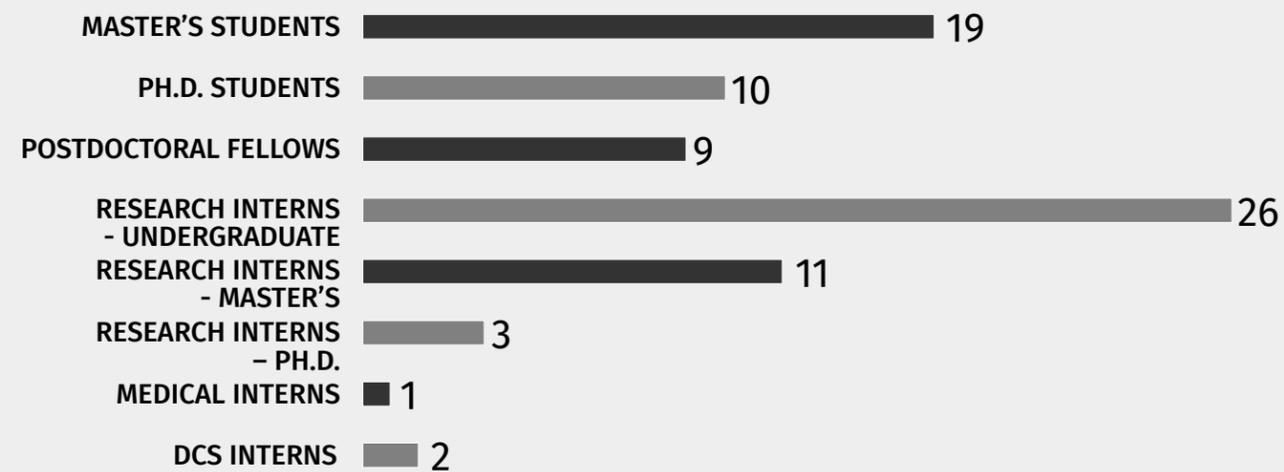
IRIC students took part in the 2019 edition of Les Audacieuses, created in honor of the International Day of Women and Girls in Science by the Montreal Science Centre and UQAM. The purpose of the event is to maintain and grow girls' interest in science and technology. The Institute's ambassadors were on hand to present a series of interactive workshops on the secrets of DNA.

NEW IRIC RECRUITS

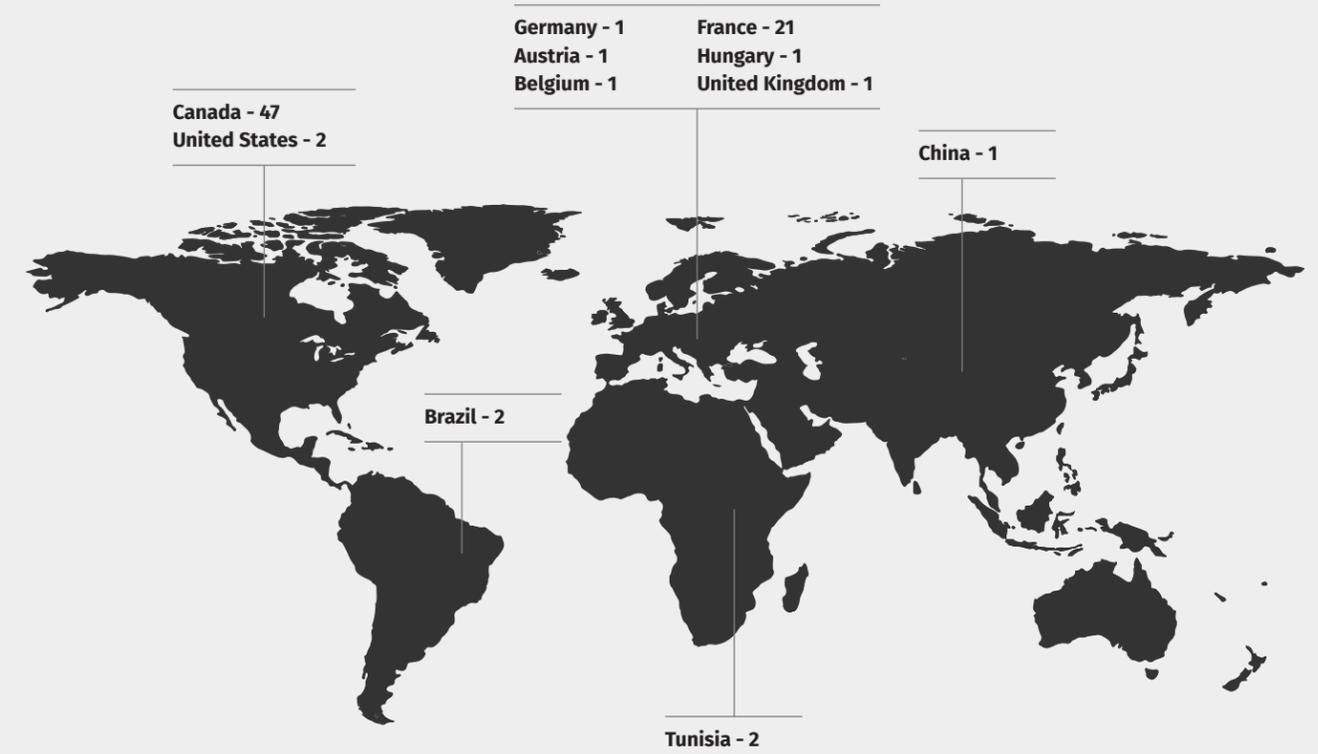
— 81 NEW RECRUITS

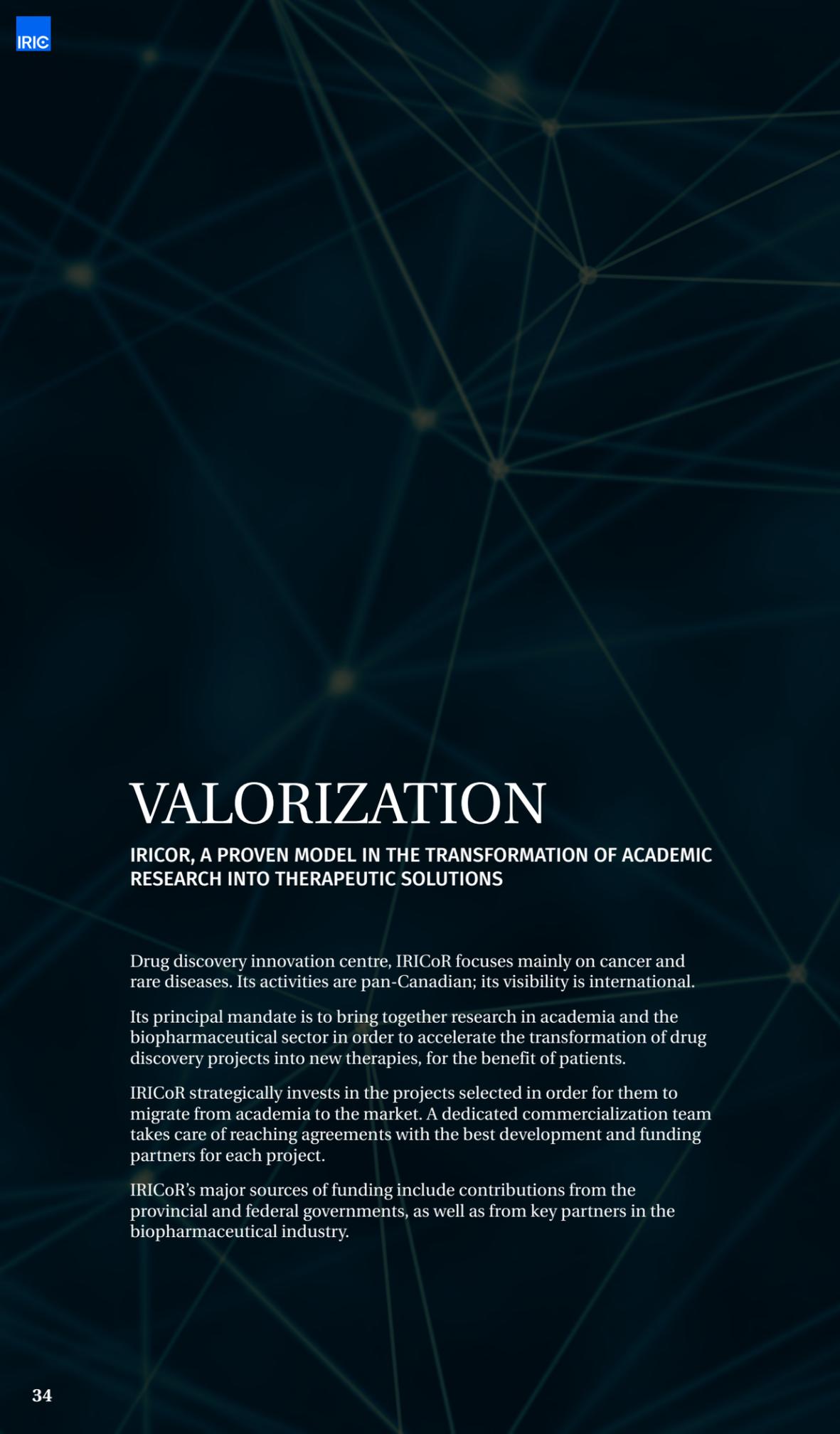
BREAKDOWN OF NEW RECRUITS BASED ON LEVEL*

*Some students are included in more than one category (e.g., in the same year, an intern becomes a student).



COUNTRIES OF ORIGIN OF THE NEW RECRUITS





VALORIZATION

IRICOR, A PROVEN MODEL IN THE TRANSFORMATION OF ACADEMIC RESEARCH INTO THERAPEUTIC SOLUTIONS

Drug discovery innovation centre, IRICoR focuses mainly on cancer and rare diseases. Its activities are pan-Canadian; its visibility is international.

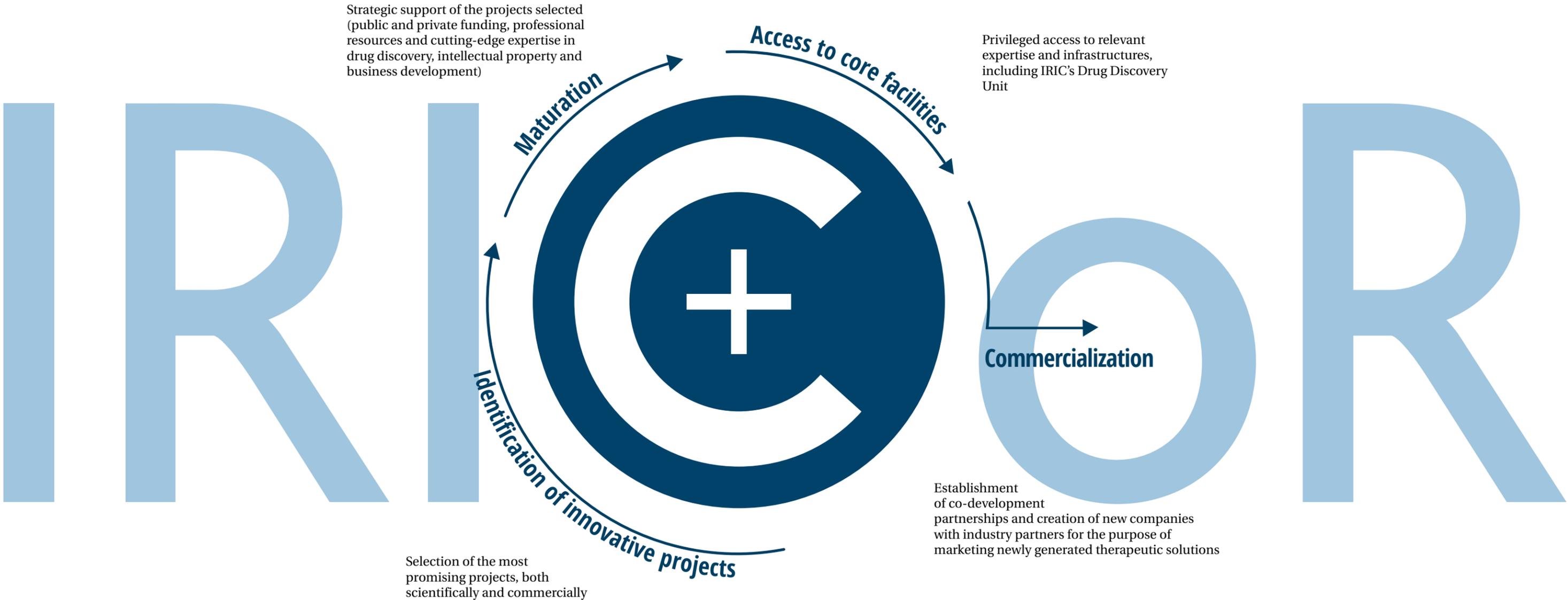
Its principal mandate is to bring together research in academia and the biopharmaceutical sector in order to accelerate the transformation of drug discovery projects into new therapies, for the benefit of patients.

IRICoR strategically invests in the projects selected in order for them to migrate from academia to the market. A dedicated commercialization team takes care of reaching agreements with the best development and funding partners for each project.

IRICoR's major sources of funding include contributions from the provincial and federal governments, as well as from key partners in the biopharmaceutical industry.



CUSTOMIZED STRATEGIC SUPPORT



HIGHLIGHTS – 2019-2020

VISIBILITY

IRICoR presented its business model and its project portfolio as part of 18 national and international events.

SUPPORTING THE NEXT GENERATION OF SCIENTISTS

6 grants were awarded by IRICoR and Oncopole as part of the 3rd edition of the Scholarship Competition – Entrepreneurship in Oncology (CEO) to fund the participation of the winners in the Life Sciences Entrepreneurship Development Program.

NEW PARTNERSHIPS AND COLLABORATIONS

Completion of a collaboration with the UdeM and Medigene involving research on novel tumor antigens for specific immunotherapies. The project led by Dr. Claude Perreault and Pierre Thibault will make it possible to identify novel targets for various types of cancer, particularly for solid tumors.

HIRINGS

Four new members joined the team:

Jean-Louis Brochu
Senior Manager, Intellectual Property

Elizabeth Wong
Business Development Analyst

Ferima Sanogo
Project Manager

Clara Scattolin
Junior Project Manager

GOVERNANCE

Three new members joined the Board of Directors:

Annie Gauthier
Lawyer and Partner, BCF

Bettina Hamelin
President, Ontario Genomics

Bernard Lachapelle
President, JBL Group Inc

FUNDING AND REVENUES

- The number of projects in IRICoR's portfolio reached 28, with 11 new financings and 6 financing renewals granted during the year.
- The projects supported by IRICoR led to the filing of 27 patent applications belonging to 16 active patent families and the development of 4 drug candidates currently at the clinical evaluation phase.
- Funding for IRICoR's activities totalled \$7.7 M from private partners and \$8.2 M from public funds.

COMPETITIONS

- Announcement of the LeadAction-Onco Competition winners, in conjunction with Oncopole and in partnership with the FRQS, aimed at accelerating the transformation of research projects in oncology and immuno-oncology into novel therapies for the benefit of patients, calling for an investment of \$2.4 million dollars over two years for four projects.
- Launch of the LeadAction Ovarian Cancer Competition, in partnership with Ovarian Cancer Canada, aimed at funding innovative ovarian cancer research projects in order to accelerate the discovery of new treatments that are accessible to patients.

HIGH IMPACT ACHIEVEMENTS — THUS FAR



PHILANTHROPY

The generous donors who support IRIC's activities directly contribute to its threefold mission of research, training the next generation of scientists and accelerating the discovery of new cancer therapies. Their support is all the more vital, because it enables the Institute's laboratories to continue to push the boundaries of research by providing them with the boldness to chart unknown territory.

Each year, IRIC organizes several benefit-events in which many philanthropists and key partners take part. The spring of 2020 deeply marked the entire planet. For IRIC, the COVID-19 pandemic caused tremendous upheaval in how its activities are carried out and funded. From the philanthropic standpoint, it resulted in the cancellation of all benefit-events, including its largest, the annual Audacious 2020 Gala.

Consequently, the Institute launched the IRIC Emergency Fund, an appeal for generosity to support the efforts being carried out in the fight against cancer and, under the circumstances, against COVID-19. The IRIC philanthropic community quickly stepped up. We should mention the IRIC Young Philanthropists, the Blais Family Fund donors and the members of the 2020 Audacious Cabinet who came together, in spite of these special circumstances.

The crisis highlighted, more than ever, the importance of supporting research, which is vital for better understanding and countering public health issues. The entire IRIC community extends its warmest thanks to its donors and partners for their unwavering support.

To consult the complete list of IRIC donors: iric.ca (Make a donation/Our donors section).

AUDACIOUS 2019: GREAT COLLABORATIONS BENEFITING CANCER RESEARCH



Close to 400 guests were on hand at the Gare Windsor for the 6th edition of the Audacious fundraising event, hosted by Ève Laurier, General Manager, Edelman Montréal. A total of \$1M was raised.

This edition, co-chaired by Madeleine Féquière, Corporate Credit Chief, Domtar, Louise Roy, Chancellor Emerita, Université de Montréal and Chair of the Board, CIRANO, and Ève Laurier, General Manager, Edelman Montréal, celebrated the strength of collaborations, by honouring the work of Susan McPeak and Anne Marinier, who personify the mobilizing power of a concerted effort in the fight against cancer.

After waging a long battle against metastatic breast cancer, Susan McPeak, who attributes her remission to a research protocol, co-founded the McPeak-Sirois Group for Clinical Research in Breast Cancer, along with her husband, Charles Sirois. The objective of the organization, which brings together six major research centres, is to increase the number of breast cancer clinical research protocols available in Quebec and thus enable more patients to have access to these cutting-edge treatments.

In 2007, Anne Marinier knocked on IRIC's door with the idea of creating a medicinal chemistry core facility that is now considered to be the country's largest of its kind in a university setting. In 2016, in collaboration with Dr. Guy Sauvageau's team, she discovered the UM171 molecule, which possesses the unique property of inducing the proliferation of the stem cells present in cord blood. Following clinical trials, this molecule has resulted in leading approximately twenty leukemia patients with a poor vital prognosis towards the road to recovery.

We should point out that 30% of the evening's proceeds were specifically earmarked for breast cancer research. First through support for the laboratory headed by Sylvie Mader, then with support serving as start-up funds for the laboratories headed by David Knapp and Geneviève Deblois, new IRIC Principal Investigators who devote part of their work to breast cancer.

An event of that magnitude, and a fundraising campaign that produced such remarkable results, would not have been possible without the contribution of many partners and sponsors. IRIC would like to thank the donors, Co-chairs, members of the Financing Committee and the many volunteers.



Credit: Dominick Gravel



Credit: Sébastien Blais

2019 BLAIS FAMILY GOLF TOURNAMENT: A RECORD AMOUNT OF \$110,250 FOR CANCER RESEARCH

IRIC is fortunate to be able to count on loyal donors who are passionate about research. That's the case with the Blais family. This year, they organized the 10th and final edition of their traditional golf tournament. The event is especially significant because the driving force behind the tournament, Mr. Pierre Blais, is himself a cancer survivor thanks to an experimental treatment offered by Dr. Guy Sauvageau.

IRIC would like to thank Ronald Lorrain, Robert Lemieux, Jean-Guy Laframboise, Gyslain Boudreault, Ronald Rochon, Jean Labrie, Julie Rivard, Patrick Brisson, Anik Maisonneuve, Eric Robillard, Eric Lafleur and Pierre Blais, honorary presidents of this edition, as well as the entire Blais family and their friends. IRIC would also like to point out the exceptional devotion of the tournament's organizer, Cyntia Plouffe, who shaved her hair off and raised an incredible amount of money in support of cancer research.

Since it was created, the Blais Family Fund to benefit cancer research has raised the remarkable amount of \$550,250.

KO CANCER 2019: \$150,000 RAISED BY THE IRIC YOUNG PHILANTHROPISTS

Created in 2016, the IRIC Young Philanthropists group brings together approximately twenty young professionals from Montreal's business community who feel strongly about supporting cancer research.

This year, they organized the 3rd edition of the KO Cancer benefit-event, a boxing gala that brought together 500 fans and 10 amateur boxers who underwent three months of intensive training for the cause. IRIC extends their warmest thanks to them for their outstanding contribution and wants to emphasize the devotion of Katrina Kontaxis and Philippe Letendre-Joachim, co-leaders of this edition.

So far, the mobilization of these ambassadors has resulted in raising \$360,000.



Credit: Gregory Emery

MANY OPPORTUNITIES FOR DONATIONS

IRIC benefits from many other opportunities to provide visibility for its activities with the community, while also mobilizing new donors

We should mention, this year, the Défis du Parc and the Grands Prix cyclistes de Québec et de Montréal: Défis du Parc participants could make a donation to the Institute when they registered; for each package sold by the Club des Leaders du GPCQM, an amount went to IRIC. To bring attention to World Cancer Day 2020, IRIC led a widespread fundraising campaign to support the research activities carried out at the Institute. Dr. Claude Perreault then delivered a lecture as part of Les Belles Soirées de l'Université de Montréal on the development of a therapeutic cancer vaccine, an opportunity for IRIC's donors and partners to get together and learn more about the project, an eloquent example of the advances made possible thanks to research.

SUBSTANTIAL DONATIONS IN SUPPORT OF IRIC'S MISSION

Over the past year, the Institute received several substantial donations from foundations and individuals who believe in the importance of the work being carried out at IRIC in the fight against cancer.

RICHARD AND EDITH STRAUSS FOUNDATION

The Foundation made donations of \$100,000 and \$50,000 to support, respectively, the projects led by Dr. Guy Sauvageau and the project led by Brian Wilhelm and Dr. Sonia Cellot, Paediatric hematologist at the CHU Sainte-Justine. The projects focus on acute myeloid leukemia (AML) and their ultimate objective is to develop optimized treatments. The Foundation renewed its commitment in January of 2020 and provided an additional amount of \$50,000 for the project led by Brian Wilhelm and Dr. Sonia Cellot.

“The Foundation [...] supports medical research, with a primary focus on gene and cell research. We are proud to be able to support the tremendous work being done in this field, the talented researchers at the University of Montreal and their affiliates.” – Current President, Mr. Luc Villeneuve

MRS. ÉLAINE AND MR. RÉAL RAYMOND

The couple made a \$100,000 donation in support of Brian Wilhelm's work in paediatric leukemia. Mrs. Élaïne and Mr. Réal Raymond had made an initial donation of the same amount in 2015 to the Institute's Investigator Recruitment Fund.

The couple has been contributing to IRIC's visibility for several years. Mr. Raymond was a member of the Board of Directors from 2008 to 2014, and a member of the Financing Committee of the 2015 and 2017 editions of Audacious.

“Cancer has deeply affected us, and we feel that we have a duty to support IRIC's Investigators in the fight against the disease and we consider ourselves fortunate to be able to directly contribute to the cause. Regardless of the amount, we encourage everyone to do their part to guarantee a better future, to support causes that they hold dear, and to leave their mark.” – Réal Raymond

MICHEL BOUVIER AND MURIEL AUBRY

As part of National Philanthropy Day, IRIC announced the testamentary donation of Michel Bouvier, and his partner, Prof. Muriel Aubry, in support of the UdeM and the Institute. Both graduates of the University, they have spent part of their respective careers in the Department of Biochemistry and Molecular Medicine and carried out research on fundamental cell mechanisms that may be involved in the development of cancers.

“[...] Like so many others, we have had to deal with cancer. Family members and friends have succumbed too often and much too soon to this disease. The conditions in which these people die are very difficult and we hope that our gift will help accelerate the discovery of more humane treatments that will have a greater chance of being successful [...]” – Muriel Aubry and Michel Bouvier



Credit: Gregory Emery

MRS. RITA AND MR. ALDO BAUMGARTNER

The couple committed to donating \$100,000 to support students of the Institute by providing the Baumgartner Fellowships, two doctoral fellowships and one postdoctoral fellowship per year, for a two-year period.

“Cancer affects everyone. We wanted to contribute in our own way to fight this terrible disease. What better way to do so than to support the next generation of researchers who hold in their hands the promise of a better future for all of us? We are pleased to support IRIC and its young researchers and hope that other philanthropists, regardless of the amount of their donation, will also decide to take a concrete step towards healing.” – Rita and Aldo Baumgartner



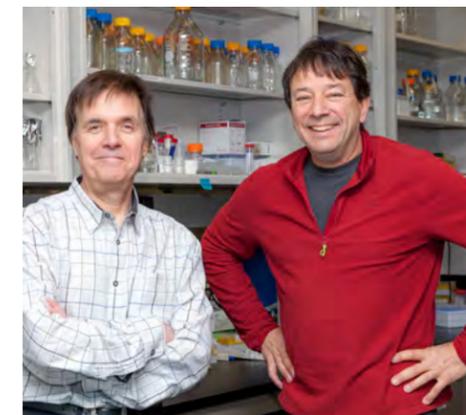
Credit: Christian Charbonneau

DR. ROBERT PATENAUDE

Dr. Patenaude, IRIC ambassador and friend for many years, launched the Fonds vaccin thérapeutique contre le cancer. The Fund is intended to support the project led by Dr. Claude Perreault, and Dr. Patenaude has made a major donation of \$25,000 to it.

Almost 40 years ago, Dr. Patenaude survived acute myeloid leukemia, thanks to a bone marrow transplant performed by Dr. Perreault. At the time, it was an experimental treatment. Having directly benefited from advances in research, Dr. Patenaude sees tremendous potential in this project to change the life of cancer patients.

“It's important for me to pay tribute to [his research], because my fight against the disease lasted only a few months, but his has been going on for over 40 years as an investigator and a physician. His passion and his stubbornness have made it possible for a lot of other people like me to recover and have a long and wonderful life.” – Dr. Robert Patenaude



Credit: Christian Charbonneau

FINANCES

IRIC is fortunate to be able to rely on several sources of revenue and funding from a variety of organizations. That support is vital to the pursuit of its mission, laboratory operations, equipment, salary support for the investigators and their teams, the development of research programs and the awarding of scholarships to the next generation of scientists.

REVENUES 2019-2020

— TOTAL OF \$43,564,124

	Operating	Research	Total
Université de Montréal	\$6,132,304	\$3,551,804	\$9,684,108
Grants	\$3,609,796	\$15,546,765	\$19,256,561
Student and postdoctoral awards		\$1,282,529	\$1,282,529 ¹
Chairs and salary awards		\$1,375,488	\$1,375,488
Contracts with industry		\$7,684,436	\$7,684,436
Core facilities – external clients	\$1,698,145		\$1,698,145 ²
Donations and sponsorships	\$642,590	\$1,786,659	\$2,429,249 ³
Other	\$153,608		\$153,608
TOTAL	\$12,236,444	\$31,327,681	\$43,564,124

EXPENSES 2019-2020

— TOTAL OF \$38,142,971

	Operating	Research	Total
Salaries and employee benefits	\$6,872,772	\$18,591,574	\$25,464,347 ⁴
Supplies and services	\$1,776,427	\$6,364,105	\$8,140,531
Maintenance and repairs	\$3,417,533	\$632,895	\$4,050,428
Scientific equipment	\$188,436	\$299,229	\$487,665
TOTAL	\$12,255,167	\$25,887,804	\$38,142,971

¹ Includes the IRIC Great Challenges Against Cancer scholarships, IRIC members Ph.D. awards, IRIC Next Generation Awards, and IRIC Award

² Excludes the amounts from IRIC investigators (\$1,793,271), these being included in research grant revenues.

³ Solely donations and sponsorships received. Excludes the IRIC Great Challenges Against Cancer scholarships, IRIC Members Ph.D. awards, IRIC Next Generation Awards, and IRIC Awards.

⁴ Includes Principal Investigator salaries paid by the Université de Montréal

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