

CENTRE DE
RECHERCHE



Our
KNOWLEDGE
brings
HOPE

2018-2019
ANNUAL REPORT

TABLE OF CONTENTS

Message from the director	5
Highlights.....	6
Year in review	8
Scholarship and Distinctions.....	11
Discoveries and Innovations	17
Patient partner involvement in scientific life	23
Student involvement in scientific life.....	25
Research in numbers	26





Our **KNOWLEDGE** brings **HOPE**

Health is such a complex topic that I can only address it with deepest humility, the humility to admit that I don't know everything. Health is so precious that I have chosen to study it, striving each day to explore the infinitely small so that I may unravel issues that are infinitely large.

This is what makes me a SCIENTIST.

Being a researcher means that my efforts serve my ideas, my intuition, my creativity. Above all, my efforts serve the patients whose needs are urgent and critical. Research requires conviction, blind faith and an open mind. It also requires concrete means: financial, technical, organizational and technological. In this regard, I am very fortunate: I am at the CRCHUS. So all I have to do is search, find, and feel the joy of sharing my discoveries, here and around the world.

This is what makes me a RESEARCHER.

At the CRCHUS, I am fortunate to work in a unique environment, with other researchers and professionals who share the same objectives. Together, we work for people who believe in us.

I represent a new perspective on disease, a reference, a source of hope and sometimes the source of a cure.

People need my expertise, my audaciousness and my knowledge. Some need me for better care, others for a better cure, or at least to enjoy a better quality of life. Empathy fills my soul and propels me every day in the quest for a healthier world.

This is what makes me a PARTNER.

My CRCHUS colleagues value my efforts. In an environment of such excellence, my mission consists of thinking outside the box to innovate and generate new knowledge that will have an impact on the population's health and well-being. The CRCHUS offers me understanding, encouragement and support.

This is what makes me so PASSIONATE...

As well as a beacon of HOPE.



MISSION

FOR A NEW RESEARCH DYNAMIC

The Centre de recherche du Centre hospitalier universitaire de Sherbrooke (CRCHUS) plays a leadership role in the creation of knowledge and its translation towards improving health. To this end, the CRCHUS fosters the excellence of its researchers by building on its strengths and setting while providing a collaborative environment conducive to creativity and partnerships. The research activities supported by the CRCHUS, contribute to the creation of innovative treatments and improved health care services.

VISION

EXCELLENCE – BOLDNESS – CREATIVITY

The CRCHUS is a world-class environment for research, innovation, and knowledge transfer that is dynamically integrated into its clinical and university setting. The collective achievements of the CRCHUS have a tangible impact on improving health.

MESSAGE FROM THE DIRECTOR

The year 2018–2019 was marked with many scientific, academic and institutional achievements at the Centre de recherche du CHUS (CRCHUS). We launched a new brand image, representing our strengths in the field of research and enabling us to highlight our talents, our skills and our patient-oriented approach. Our researchers, research professionals, students, health care staff and patient partners will identify with this new signature. *Our knowledge brings hope* speaks of the important role of research in the improvement of health care delivery.

After several years at the helm of the CIUSSS de l'Estrie – CHUS, in the spring of 2019, our President & CEO stepped down from her position for a well-deserved retirement. Allow me to draw your attention to Ms. Gauthier's invaluable contribution to the outreach of health-related research and to her dynamic engagement in the transfer of knowledge from the laboratory to the patient's bedside. At the CRCHUS, we are especially pleased with the appointment of Dr. Stéphane Tremblay as President & CEO. As a health care professional, he wishes to see research at the heart of our institution's university mission. I also wish to thank Ms. Brigitte Guérin who has agreed to take on a new role as Director of the Medical Imaging Axis, succeeding Mr. Roger Lecomte, to whom I extend my thanks for his years at the helm. He will continue to ensure the outreach of the axis, as he is staying on as Scientific Head of the Sherbrooke Molecular Imaging Centre. Thank you to the CHUS Foundation for the determined support that enables us to make even more discoveries year after year.

As part of this wind of change, I am pleased to congratulate Carole Jabet for her appointment as Scientific Director of the Fonds de recherche du Québec – Santé (FRQS) as well as Michael G. Strong for his appointment as President of the Canadian Institutes of Health Research (CIHR). In fact, Mr. Strong visited the CRCHUS and the Université de Sherbrooke (UdeS) in the spring of 2019.

Several partnerships and collaborations lie at the heart of our involvement in research. Among those that come to mind is our support of the McPeak - Sirois Group for Clinical Research in Breast Cancer during the Group's visit to Sherbrooke for the purpose of maximizing the human and economic benefits of clinical trials province-wide. Also on the Quebec stage, I wish to highlight the commitment of our researchers who play a leadership role in a number of research networks: Dr. André Carpentier (Cardiometabolic Health, Diabetes and Obesity Research Network), Louis Gendron (Quebec Pain Research Network) and Martin Lepage (Quebec Bio-imaging Network).

As a way of uniting our driving forces, the CRCHUS launched the first Pôles d'excellence competition. The researchers of the *Neuropôle* project took top honours in this scientific competition.

The CRCHUS technological platforms are conducive to national and international cooperation, specifically the Diabetes, Obesity and Cardiovascular Complications Axis. Comprised of major state-of-the-art equipment, this new platform facilitates research on the cardiometabolic complications of diabetes using imaging. There have also been several successes in the Clinical and Epidemiological Research Unit (URCE), led by Dr. François Lamontagne, notably an Oncopole-funded project focusing on the diagnosis and treatment of prostate cancer using medical imaging and radiotherapy spearheaded by Brigitte Guérin.

The CRCHUS has developed a renowned expertise when it comes to patient partnership. Boasting more than 1000 hours of volunteer engagement over the past year, committee members have elevated the Centre to the national stage.

A new strategic plan is in the works for the next six years in anticipation of our FRQS application for renewal. These orientations constitute a sound foundation for the stimulation of interdisciplinary collaboration originating at the CRCHUS, with our partners at the Université de Sherbrooke, in order to continue providing an optimal setting for the discovery of better treatments for our patients.



William D Fraser MD

Dr William D. Fraser,
M.D., M. Sc., FRCSC, CCFP, ACSS.
Scientific Director of the
Centre de recherche du CHUS

HIGHLIGHTS

PERSONNALITIES OF THE YEAR

In order to highlight the commitment of health professionals working at the CRCHUS, the director presented three honorary awards for the first time in the Centre's history. To determine the recipients, the CRCHUS community was invited to vote among the *Personalities of the Month*. The awards were presented during the CRCHUS Annual Retreat, an event that assembles the scientific and hospital community, held in May at the Club de golf de Sherbrooke. The recipients are:



RESEARCHER OF THE YEAR

Dr Alex Carignan, Microbiologist-Infectious Disease Specialist
Health: Populations, Organization, Practices Axis

PROFESSIONAL OF THE YEAR

Annie Morin, Clinical Research and Infrastructure coordinator

STUDENT OF THE YEAR

Jérôme Côté, Post-doctoral student, neurophysiopharmacology of chronic pain
Medical Imaging Axis and Inflammation-Pain Axis



BETTER MANAGEMENT OF CHRONIC PAIN

Thanks to the leadership of **Nicolas Beaudet** at the Quebec Pain Research Network and to Omnimed, a novel pain management tool was created. A standardized online form was launched to enable doctors to refer patients to a centre of expertise in chronic pain. In addition to facilitating pain relief for users, this tool will promote excellence in pain research across Quebec by enabling researchers to access high-quality data.

HIGHLIGHTS

CRCHUS EXCELLENCE HUBS OF THE COMPETITION



CRCHUS research programs mirror the dynamic driving forces in its environment and therefore constitute a priority. In order to highlight the multidisciplinary and inter-sectoral scientific links existing at the Center and to encourage their growth, the CRCHUS Excellence Hubs competition was launched in 2018. We received four outstanding applications and the *Neuropôle* project was selected.

Led by researcher **Philippe Sarret**, the Neuropôle brings together biologists, physiologists, mathematicians, chemists, medical doctors and engineers, who collectively wish to have a better understanding of how the human brain functions. The team was awarded \$75,000 per year for a period of 2 years to realize the research program. The Neuropôle includes **57 researchers** from **18 departments** and divisions in **5 different faculties**, working at **2 university campuses** and in **2 research centres**, the CRCHUS and the Centre de recherche sur le vieillissement (CdRV).

Chantal Bouffard Lends her Expertise to the Court of Cassation

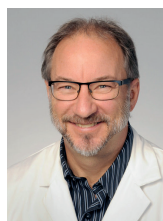


In September 2018, **Chantal Bouffard** was invited to the [Court of Cassation](#), the highest court in the French judiciary, to present an anthropological point of view on the status of the embryo as part of a review of French bioethics laws.

Michel Pavic Joins the McPeak-Sirois Group



In order to improve the care provided to breast cancer sufferers through improved access to clinical research, in October 2018, the CIUSSS de l'Estrie – CHUS became the very first regional health care institution outside of Montreal and Quebec City to join the McPeak-Sirois Group. Researcher and oncologist **Dr. Michel Pavic** now sits on the Group's scientific committee.



At the Wheel of a Driving Simulator with an Immobilized Limb

In 2010, **Dr. François Cabana**, Researcher and Orthopedic Surgeon at the Fleurimont hospital site, launched a study to determine whether patients wearing a walking brace or a plaster cast are able to [safely drive a car](#). To answer this question, he assembled a team with members from the CRCHUS and from the Research Centre on Aging (CdRV). Bringing together researchers, engineers and technicians, the team designed and built a braking simulator from the ground up in order to evaluate the patients' fitness to drive a car with a fractured foot. Using the driving simulator for testing with people whose lower limb is immobilized equips doctors with better decision-making capacity to determine whether a patient is fit to drive with an injury.



Monitoring the Side Effects of the Influenza Vaccine

Researcher and microbiologist-infectious disease specialist **Dr. Louis Valiquette** and research coordinator Cynthia Grenier have been actively monitoring the effects of the flu vaccine in real time across the Eastern Townships region since 2010. Involving over 10,000 people, this study is carried out during the annual mass vaccination campaign held at the Sherbrooke Exhibition Centre. It is a great opportunity to raise the public's awareness of research in general. Data from the project has been used by Public Health to validate, confirm or deny issues observed in other countries.

YEAR IN REVIEW

IN SCIENTIFIC JOURNALS...



Sherif Abou Elela published an article in *Nature* entitled [Introns are mediators of cell response to starvation](#). The researcher demonstrated that the presence of introns in the genome promotes cell survival when nutrients are rare. Analyses indicate that introns promote resistance to starvation by enhancing the repression of genes involved in TOR and PKA signalling pathways, which are closely associated with cancer and cellular aging. This discovery will open up new avenues to explore the way intronic mutations contribute to cancer cell tolerance of nutrient depletion.



Benoit Chabot and his co-researchers Christine Vande Velde (CHUM) and Michael Strong (McMaster University and newly appointed president of the CIHR) published an article in *Brain* magazine on the role of TDP-43 and hnRNP A1 in aggregation associated with spinal muscular atrophy.



Dr Alain Piché contributed to 25 articles on various projects from [The Cancer Genome Atlas](#) consortium. These articles were published in *Cell*, *Cell Reports*, *Cancer Cell and Immunity*. An in-depth analysis of over 11,000 tumours from 33 types of cancer has led to a better understanding of how, why and in which way tumours develop in the human body. This work is a good example of the valorization of cancerous tissue biobanks.

Dre Céline Catelin took part in a multinational neonatal study. The findings of the study were published in *The Lancet Child and Adolescent Health*. The trial is testing the effectiveness of a family integrated care program on infants hospitalized in neonatal care units.



Simon Labbé and his colleagues presented the findings of their study entitled [The Major Facilitator Transporter Str3 Is Required for Low-Affinity Heme Acquisition in Schizosaccharomyces Pombe](#) in the Journal of Biological Chemistry. In addition, the researcher chaired the Trace Elements in Model Systems session and was a guest speaker at the FASEB Summer Research Conference in California.



In 2018, **Thomas G. Poder** published 20 scientific articles in a number of well-renowned journals such as *Allergy and Value in Health*. In the latter, the researcher demonstrated that using the SF-6Dv2 health-related quality of life questionnaire (a QALY measure) introduced minimal difference between three ways of administering the form. This is of major importance and promotes the dissemination of a less costly quality of life measure compatible with economic studies.

ON TELEVISION...



Louis-Charles Fortier appeared on *Les Aventures du Pharmacien* where he discussed [bacterial resistance to antibiotics](#).



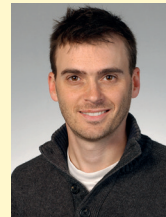
Xavier Roucou appeared on *Découverte* as part of a [feature on chronic wasting disease in deer](#). The researcher explained the role of infectious prions in this disease.

IN PRINT...



Lucie Blais and **Marie-France Beauchesne** published an article demonstrating a link between maternal asthma and postpartum depression in *MD Magazine*. The article notes that women with asthma should be screened for postpartum depression in order to detect it rapidly so it can be treated.

AT CONFERENCES...



Pain management specialist, **Louis Gendron** made several appearances to discuss the use of cannabis:

- October 2018 – [News report: Utilisation des cannabinoïdes naturels par les athlètes](#) on Radio-Canada
- May 2019 – Speaker at the 31st edition of the Quebec Kinesiologist Federation Annual Conference.
- May 2019 – Conference with patients from the [l'Association de la Fibromyalgie de l'Estrie](#)
- June 2019 – Scientific conference: *Convergence, recherche et intervention* (CRI 2019)

The Cœur des Sciences de l'UQAM, in partnership with the FRQ, hosted two debates featuring CRCHUS researchers:

- November 2018 – **Louis Gendron** took part in the *Cannabis: que faut-il craindre ou espérer?* debate.
- March 2019 – *L'effet placebo* with **Dre Sylvie Lafrenaye**, CHUS Pediatric Intensivist, and **Serge Marchand**.



For the 3rd time, **Patrick McDonald** co-chaired the [Neutrophil International Symposium](#), bringing together some 300 people from over 30 countries, who gather to learn about new therapies to relieve chronic inflammatory and autoimmune diseases.

IN PRINT...



Jean-François Beaulieu and his CRCHUS co-researchers **Caroline Saucier**, **Julie Carrier**, **François-Michel Boisvert** and **Steve Jean** published a book entitled [*Colorectal Cancer, Methods and Protocols*](#), as part of the *Methods in Molecular Biology*, Springer Protocols.



For several years, the CRCHUS has collaborated with *La Tribune* newspaper to create the [*cahier spécial L'Estrie respire la santé*](#) special insert. The November 2018 edition featured a variety of health issues under the theme *Qu'est-ce que le cerveau?* A number of experts from the Centre took part in creating the insert: **Dr Claude Cyr**, **Maxime Descôteaux**, **Dr David Fortin** and **Philippe Sarret**.



Dr Claude Cyr and medical resident Gabrielle Spiegle-Morin studied serious incident prevention in rural children. According to their research, children living on a farm are more exposed to accidents. Their findings were published in [*La Terre de chez nous*](#) magazine and in [*La Presse +*](#) newspaper.



In the spring of 2019, under the watchful eyes of journalists, Manon Bisson underwent surgery to resect a tumour while remaining fully awake. The unique intervention performed by neurosurgeon and oncologist **Dr. David Fortin**, whose aim was to preserve the patient's quality of life as much as possible, was broadcast across the province in a [*special feature*](#) by *La Tribune* newspaper via the Groupe Capitales Médias chain and in a [*news report*](#) on ICI Radio-Canada.

A recipient of the Royal College of Physicians and Surgeons of Canada [*Regional Prix d'excellence — Specialist of the Year*](#), Dr. Fortin also developed a treatment that could prolong the life of patients affected by brain cancer. This research breakthrough combines intra-arterial chemotherapy and radiotherapy, an innovation that could reduce the size of brain tumours and consequently prolong the life of patients dealing with a recurrent cancer tumour.



Luigi Bouchard contributed to the article entitled [*Et si l'avenir de chacun se jouait dans l'utérus?*](#) It was published in the October-November 2018 edition of *Québec Science* magazine. The popular science magazine features data provided by the researcher who received the 2018 Canadian Society of Endocrinology and Metabolism Young Investigator Award.



Louis Gendron and **Philippe Sarret** from the CRCHUS as well as Claude Rouillard and Normand Voyer from Université Laval wrote a chapter for chef Jean Soular's cookbook entitled *Le cannabis en cuisine: ce n'est pas comme du basilic!* to educate readers about the properties of cannabis. The book includes recipes for appetizers, soups, main courses, vegetarian dishes and desserts that can be made with... or without cannabis.

SCHOLARSHIPS AND DISTINCTIONS



The CIHR Is Funding the Outstanding Success of CRCHUS Researchers

On November 5, 2018, during a visit to [Dr. André Carpentier's laboratory](#), Marie-Claude Bibeau, Minister of International Development and Member of Parliament for Compton-Stanstead, announced that the CIHR was awarding a grant of \$1 million to **Dr. Carpentier** for his research on brown fat.

A record number of grants have been awarded for health research to CRCHUS researchers. Among them: **Sherif Abou Elela, Mannix Auger-Messier, Jean-François Beaulieu, M'Hamed Bentourkia, Florian Bentzinger, Guylain Boissonneault, François-Michel Boisvert, Vincent Burrus, Chantal Camden, André Carpentier, Benoit Chabot, Frédéric Dallaire, Robert Day, Jean-Bernard Denault, Robert Dumaine, Louis-Charles Fortier, Étienne Fortin-Pellerin, Louis Gendron, Pedro Geraldès, Nicolas Gévy, Pierre-Étienne Jacques, Pierre Lavigne, Christine Lavoie, Richard Leduc, Martin Lepage, Olivier Lesur, Patrick McDonald, Michel Nguyen, Eric Marsault, Alfredo Menendez, Benoît Paquette, Jean-Luc Parent, Nathalie Perreault, Jean-Paul Praud, Patrick Richard, Nathalie Rivard, Christian Rochefort, Dimitri B. Ryczko, Léon Sanche, Sébastien Rodrigue, Xavier Roucou, Philippe Sarret, Caroline Saucier, Lee-Hwa Tai, Eric Turcotte and Kevin Whittingstall.**

Grant program of the Natural Sciences and Engineering Research Council of Canada (NSERCC)

The following researchers are recipients of NSERCC grants: **Sherif Abou Elela, Brendan Bell, Guylain Boissonneault, François-Michel Boisvert, Benoit Chabot, Alan Cohen, Louis-Charles Fortier, Louis Gendron, Martin Lepage, Alfredo Menendez, Nathalie Perreault, Éric Rousseau, Michelle Scott and Kevin Whittingstall.**

Grant program of the Fonds de recherche du Québec – Santé (FRQS)

Several researchers have obtained new scholarships and grants from the FRQS, such as: **Sherif Abou Elela, Mannix Auger-Messier, Guylain Boissonneault, Alex Carignan, Jean-François Éthier, Étienne Fortin-Pellerin, Éric Frost, Isabelle Gaboury, Pierre-Étienne Jacques, Marie-France Langlois, Pierre Lavigne, Éric Marsault, Jean-Pierre Perreault, Patrick Richard, Philippe Sarret, Michelle Scott and Alain Vanasse.**

Grant program of the Fonds de soutien à l'innovation en santé et en services sociaux (FSISSS)

Two of the four proposals submitted to the FSISSS by the CIUSSS de l'Estrie – CHUS have received grants, namely **Pasquale Roberge's** proposal focusing on cognitive behavioural therapy and **Moulay Ali Nassiri's** proposal for the implementation of an ionizing medical imaging pilot project.

SCHOLARSHIPS AND DISTINCTIONS



The National Institutes of Health (NIH)

Dre Marie-France Hivert and **Luigi Bouchard** received a US\$3.6 million grant from the NIH for their research project on gestational diabetes, which entails a number of risks for both mother and child. The substantial amount of funding will enable them to proceed with their study entitled *Gestational Diabetes Pathophysiology Uncovered by Placental Transcriptomics*. Luigi Bouchard provided information about the grant to [Le Quotidien](#) newspaper as well as during a radio interview on [ICI Radio-Canada](#).



A new study led by **Larissa Takser**, **Annie Ouellet** and **Kevin Whittingstall** focusing on mental health during pregnancy and offspring neurodevelopment was also funded by the *NIH*. An amount of US\$3.6 million, including \$1.1 million USD allocated for the CRCHUS researchers, was awarded for the project entitled *Effects of Prenatal Maternal Depression and Antidepressant Exposures on Offspring Neurodevelopmental Trajectories: A Birth Cohort Study*. In addition, a unique research bank, comprised of biospecimens and data, was created. This research bank is extremely useful to the research community and to perinatal studies.

Larissa Takser obtained a major grant for her study entitled *Grossesse et Enfants en Santé et l'Environnement (GESTE)* which began 10 years ago. The team will now be able to continue this large-scale project for the next five years. This *NIH investment* totalling \$2.9 million USD, including \$1.1 million USD earmarked for Ms. Takser's research, will enable the addition of two components, namely brain imaging and the exploration of gut microbiome.



MEDTEQ Supporting CRCHUS Researchers:

Roger Lecomte and **Réjean Fontaine** received an amount of \$4.6 million for the design and construction of a new generation of brain PET scanner resulting in unequalled resolution.

Pasquale Roberge and Helen-Maria Vasiliadis received a grant of \$100,330 from MEDTEQ and the CRCHUS, in partnership with the CIUSSS de l'Estrie – CHUS, for their project entitled *Thérapie cognitive-comportementale transdiagnostique sur le Web pour les troubles anxieux et dépressifs en première ligne : une étude de faisabilité d'un essai pragmatique randomisé*.

Awards from the Neuroscience Centre of Excellence

As part of the *Projets pilotes 2019* competition launched by the Université de Sherbrooke Neuroscience Centre of Excellence, researchers **Alain Frigon**, **Dimitri B. Ryczko** and **Philippe Sarret** obtained funding for their project entitled *Optogenetics to Investigate Locomotor Circuits in a Model of PD*.



Chantal Bouffard received \$700,000 as part of the Genome Canada Genomic Applications Partnership Program competition, in collaboration with Fulgent. Her study aims to develop and validate Nova^{CNV+}, a high-resolution cytogenomics and molecular genetics test using next generation sequencing. In collaboration with Julie Lane, Chantal Bouffard, will design a user guide and web-based information tool adapted to the needs of physicians.

SCHOLARSHIPS AND DISTINCTIONS



Dr Alex Carignan received an amount of \$293,402 for his epidemiological study on the *Blastomyces dermatitidis* fungus infection in Québec from the Public Health Agency of Canada Infectious Disease and Climate Change Fund.



Robert Dumaine received a grant of \$266,340 from the Heart and Stroke Foundation for his project entitled *Role of Sodium Channels in Epilepsy Related Arrhythmias and Sudden Death*.



Fernand Gobeil, Philippe Sarret, Fernand-Pierre Gendron and Simon Gaudreau (Immune Biosolutions) received a grant of \$1,088,985 as part of CQDM's SynergiQc program for a pre-clinical trial to develop a new class of immunotherapy for breast, prostate, colorectal and lung cancers.

Mélanie Couture received funding in the amount of \$100,000 from the Consortium national de recherche sur l'intégration sociale (CNRIS) for her project entitled *Soutenir la participation sociale des personnes ayant un DI-TSA à travers la consolidation d'une équipe de recherche visant l'optimisation de l'organisation des services intersectoriels*.



Brigitte Guérin obtained a grant of \$1.5 million for prostate cancer treatments using medical imaging and targeted radiotherapy as part of the very first [Oncopole](#) EMC² competition. Among the seven Quebec projects benefiting from the Oncopole's financial support, this project will enable the development of new medical imaging tracers in order to better visualize and characterize the different metastatic prostate cancer cells, thus

offering more effective and customized patient therapies.

Furthermore, **Brigitte Guérin** distinguished herself on the Canadian stage by becoming the 25th Canadian woman to receive the [Clara Benson Award](#) from the Canadian Society for Chemistry, which recognized her remarkable contribution to the field of chemistry.

SCHOLARSHIPS AND DISTINCTIONS

INTERNAL COMPETITIONS



2018 Structuring Projects Program

In conjunction with the Axes, funding in the amount of \$75,000 was awarded to the following recipients:

- **Chantal Camden** (Malena Argumedes Charles, Mélanie Couture, Isabelle Gaboury, Mélissa Généreux, Catherine Hudon, Christine Loignon, Pasquale Roberge and Mathieu Roy)
- **Frédéric D'Aragon** (Luigi Bouchard, Michaël Chassé, François Lamontagne, Patrice Perron and Lee-Hwa Tai)
- **Olivier Lesur** (Mannix Auger-Messier, Étienne Fortin-Pellerin and Jean-Paul Praud)
- **Benoit Paquette** (Nathalie Fauchoux, Marc-Antoine Lauzon, Laurence Masson-Côté, Bernard Marcos, Janusz Rak, Sébastien Rodrigue and Nick Virgillo)



CRCHUS Internal Funding Assistance Program (PAFI)

Six research teams each received \$25,000 for their research project:

- **Anne-Marie Côté** (Emanuel Escher, Pedro Geraldès, Julie Lavoie and Marie-Ève Roy-Lacroix)
- **François Boudreau** (François-Michel Boisvert and André Carpentier)
- **Simon Labbé** (Alex Carignan and Louis Valiquette)
- **Alexandre Maréchal** (Pierre-Étienne Jacques)
- **Jean-Baptiste Michaud** (Alain Gervais and François Lamontagne)
- **Dimitri B. Ryczko** (Alain Frigon, José Newton Godoy-Pimenta and Philippe Sarret)

SCHOLARSHIPS AND DISTINCTIONS

AWARDS AND DISTINCTIONS



Dr Jean-Luc Ardilouze and **Fernand Gobeil** received the Université de Sherbrooke [Prix de la recherche et de la création, en Médecine et sciences de la santé](#). They developed two insulin formulations: One that increases insulin absorption in patients who are obese or have type 2 diabetes, and another that helps prolong the duration of catheters for those who use pumps.



Patricia Bourgault received the Innovation clinique Banque Nationale 2018 Award from the [Ordre régional des infirmières et infirmiers de l'Estrie](#) for her project entitled *Moderniser l'administration des analgésiques, valoriser l'autonomie des infirmières et réduire la douleur des patients en période postopératoire grâce à un Algorithme d'Analgésie Multimodale chez l'adulte (AAM-A) : résultats d'une collaboration interprofessionnelle au service des soins*. This algorithm enables nursing staff to have complete autonomy over postoperative pain management and the enhancement of patient well-being during their hospital stay.



Dr Arnaud Gagneur has joined a group of international experts on vaccine hesitancy from the European *Center of Disease Control*, where he will develop a course for health care professionals on vaccine acceptance in Europe.



Clinician-investigator **Dr. Gilles Boire's** exceptional scientific achievements in the field of rheumatology were recognized during the 2019 Annual Scientific Meeting of the Canadian Rheumatology Association. Dr. Boire is the first from Québec and the fourth Canadian to receive this honour.



In honour of his scientific career, **Dr William Fraser**, Scientific Director, received the 2018 [Michel-Sarrazin Award](#) during the 60th annual meeting of the Club de recherches cliniques du Québec.



A recipient of the *Merck Patients First Award* for his excellence and innovation in patient-centred care, **Dr. François Lamontagne** excelled by leading a group of experts who validated whether or not to resort to corticosteroids in cases of septicemia. [Guidelines](#) on corticosteroid therapy for sepsis were published in an article in the *British Medical Journal*.

AWARDS AND DISTINCTIONS



A grant for cystic fibrosis research

Researchers **Éric Marsault** and François Malouin received funding of \$100,000 per year for a period of 3 years from Cystic Fibrosis Canada for their project *New antibiotic combination for MRSA and Pseudomonas aeruginosa in cystic fibrosis*.



Dominic Létourneau, research professional in the lab of researcher **François Michaud**, received a [Research Professionals Excellence Award](#) from the Fonds de recherche du Québec.



Dr Alain Vanasse is the recipient of the 2019 Prix Étienne-Le Bel, which is given to a senior investigator with ten or more years of university experience. This award recognizes the recipient's significant contribution to the advancement of science, the quality of research and the impact of publications.



Lee-Hwa Tai received the Early Career Award in Cancer for her project on metastatic disease of triple negative breast cancer with an immunogenic cancer vaccine.



Alan Cohen was named a fellow of the *Gerontological Society of America*.



Pedro Geraldès was elected president of the Assemblée des chercheurs in November 2018. As part of this role, he sits on the Advisory Committee as well as on the Research Council. He is also responsible for evaluating certain awards, namely those given for research during the Faculty of Medicine and Health Sciences *Reconnaissance* event.



Thomas Joly-Mischlich was awarded the 2018 Prix de cancérologie during the annual cancer conference, organized by the Ministère de la Santé et des Services Sociaux (MSSS), for his project entitled [MÉLIUS : une trajectoire de soins harmonisée pour les usagers en oncologie prenant des médicaments administrés par voie orale \(MAVO\)](#).

DISCOVERIES AND INNOVATIONS



CANCER: BIOLOGY, PROGNOSIS AND DIAGNOSIS



Research in Cancer Radiotherapy Led by Leon Sanche Sheds Light on the Origins of Life on Earth

Holder of the Canada Research Chair in the Radiation Sciences, the work of **Léon Sanche** recently helped shed light upon the origins of life on earth. This major discovery is one of the top 10 most remarkable scientific discoveries of 2018 according to [Québec Sciences](#) magazine.

For over 40 years, physicist Léon Sanche's work has focused on secondary electrons. These electrons are generated in very large numbers by ionizing radiation, such as the radiation used in radiotherapy that eliminates cancer cells. In order to arrive at this impressive discovery which elucidates the mysteries of the origins of life, the research team employed techniques from previous radiotherapy studies, but at a different angle.

Two articles published by Leon Sanche in *The Journal of Chemical Physics* demonstrate that under specific conditions, secondary electrons combine to form larger molecules that promote the appearance of life, such as glycine, an amino acid that is fundamental to protein structure. This astonishing discovery suggests that molecules that promote the appearance of life, or prebiotic molecules, may have been created anywhere in the universe, not necessarily on earth.

[First scientific article](#) published in The Journal of Chemical Physics.

[Second scientific article](#) published in The Journal of Chemical Physics.



DIABETES, OBESITY AND CARDIOVASCULAR COMPLICATIONS



Increasing Fertility by 50% in Women Who Are Obese and Infertile by Helping Them Adopt Healthy Life Habits

Endocrinologist **Dr Jean-Patrice Baillargeon** and his research team launched a study focusing on the adoption of healthy life habits, the Fit-for-Fertility program. The program offers an effective and less expensive solution to improve fertility in women who are obese and infertile. This initiative has helped increase the rate of pregnancy by 50% in a group of overweight women, without the use of medication in over half of the cases.

Implemented at the Fleurimont hospital site of the CIUSSS de l'Estrie – CHUS, the Fit-for-Fertility program focuses on three components: eating habits, physical activity and psychological aspects. Fit-for-Fertility increases the chances of natural pregnancies, without expensive treatments, and results in fewer complications during pregnancy and birth. No other program of this type has been integrated into a fertility clinic in Canada.

Recognized by his peers as a leading expert on the link between bad fats and the development of polycystic ovary syndrome (PCOS), Dr. Baillargeon has demonstrated that high levels of fat and their degradation products in the ovary are associated with higher levels of male hormones and reduced fertility. PCOS affects approximately one in twelve young women. It is the most common cause of infertility and of excess male hormones in women. The clinical investigator also studies the best approaches to support obesity management as part of primary care and in fertility clinics.

An article reviewing knowledge on this subject and written by Dr. Baillargeon's team was published in the prestigious medical journal of the [Canadian Medical Association](#). Furthermore, the research team obtained a grant of \$760,000 from the CIHR to evaluate the Fit-for-Fertility program in eight fertility clinics across Canada.

Infertility affects 15% of Canadian couples. One fourth of **Canadian women of childbearing age are overweight** and **19%** are obese. Obesity may affect ovulation, menstruation, insulin resistance and other factors that impact the reproductive cycle. The **risk of infertility increases 78% in women who are obese** and **27% in women who are overweight** compared to women who have a healthy weight.

MEDICAL IMAGING



Release of the First Arterial and Venous Atlas of the Human Brain

Researchers **Kevin Whittingstall** and Stephen Cunnane and student Michaël Bernier pooled their collective knowledge to develop the [first arterial and venous atlas of the human brain](#). Thanks to this new research tool, they were able to extract images of blood vessels in the brain that are normally difficult to view using non-invasive procedures, thus becoming the first in the world to document such a complete arterial and venous atlas of the brain.

Kevin Whittingstall has dedicated years to developing non-invasive imaging techniques to view the structure and functioning of the human brain. His doctoral student, Michaël Bernier, who is now a postdoctoral fellow at *Harvard Medical School*, developed a revolutionary segmentation software tool.

The brain atlas can be compared to a fingerprint databank. The team can compare the patient's vascular tree with images taken from healthy brains and determine whether there are subtle variations. If so, the team will try to determine where they originate. Are they from a brain concussion, from the onset of Alzheimer's disease, from cerebrovascular accidents (stroke), etc.?

Much was written about this major innovation in specialized magazines, including the cover of [Human Brain Mapping](#), in the media with an article in [La Tribune](#) newspaper and television reports on [TVA](#) and [Ici Radio-Canada](#) as well as on the radio as part of the [Les années lumière](#) show.





Regenerative Medicine and Cellular Therapy Florian Bentzinger Recognized Worldwide

[The excellence in research](#) demonstrated by **Florian Bentzinger** led him to his nomination as a finalist for the prestigious annual *Sartorius & Science Prize for Regenerative Medicine & Cell Therapy* for scientists who dedicate their efforts to research that advances regenerative medicine and cell therapy. The researcher stood out from the other candidates for one of his essays published in [Science](#) magazine featuring an overview of his research.

Beyond remarkable, his studies focus on the presence of defects in stem cells. Discovering why certain stem cells fail to regenerate in aging adults may facilitate the creation, in a laboratory, of the missing cell, among the regenerating cells, and to its transplantation in a human body. For example, an older person following hip surgery may recover faster if his muscles regenerate more efficiently.

In order to identify new therapeutic targets and develop new ways of treating stem cell dysfunction, Florian Bentzinger and three CRCHUS researchers, namely **Eric Marsault**, **Mannix Auger-Messier** and **Frederic Balg**, obtained a \$99,000 grant from the Stem Cell Network for a project aiming to develop treatments for muscular dystrophy.





MOTHER-CHILD



Providing Better Care for Children Suffering from Heart Failure

Through his research, cardiologist and pediatrician **Dr. Frédéric Dallaire** wishes to identify early markers of adverse events in order to reduce the risk of incidents in children born with congenital heart disease. To this end, he is overseeing a pan-Canadian multicentre study to improve research quality in this field.

Dr. Dallaire and his co-researchers wish to create a lexicon of congenital heart disease nomenclature. This is a first step towards achieving a common disease classification system.

Published in the [*Canadian Journal of Cardiology*](#), the bilingual lexicon of medical terms will optimize national efforts to establish longitudinal coronary heart disease cohorts, capitalizing on Canada's health care infrastructure and solidifying Canadian leadership in coronary heart disease research.

Dr. Frédéric Dallaire is the founder and scientific director of the Canadian Pediatric Cardiology Research Network. He is also the scientific director of the Canadian Pediatric Cardiology Association.



HEALTH: POPULATIONS, ORGANIZATIONS, PRACTICES



The Patient, our Partner in Care and Research

A leader in the field of primary care research, clinical investigator **Dr. Catherine Hudon** pays special attention to the relationship between doctors and their patients in order to improve the practice of family medicine.

For three years, Dr. Hudon has assessed the added value of a patient partnership in order to improve health-related outcomes. She integrates the concept of the patient partner into her research and her clinical practice. The clinical investigator is attempting to gain a better understanding of patients' experience when she meets with them at the clinic, especially those who are more vulnerable, in order to pinpoint the health issues that influence their well-being.

Interested in the patient's overall health, Dr. Hudon leaves a lot of room for dialogue, especially with regard to the management of chronic diseases. A committed family physician, Dr. Hudon has a PhD in Clinical Sciences and has been teaching for nearly 20 years.



PATIENT PARTNER INVOLVEMENT IN SCIENTIFIC LIFE

Over the past year, the patient partner initiative has gained momentum and the CRCHUS is proud of our numerous, real and tangible achievements. These achievements have been recognized, applauded and applied in other settings. Thanks to the commitment and dedication of its patient partners, the CRCHUS is leading the way to give a significant voice and a new role to patients in the field of research. The time, presence and high level of collaboration of every stakeholder involved in our activities are very important. Over the past year, we have fulfilled our principal mandate which was to increase the presence and visibility of patient partners among society and researchers.

THE CRCHUS PATIENT PARTNER COMMITTEE: A DYNAMIC INITIATIVE



Over **1000 hours**
of volunteer commitment,
representing **28 weeks**
of full-time work

14 patient
partners, ranging from
29 to 85 years old



The committee is comprised
of **4 clinical investigators**
and **3 institutional**
staff members



20 patient partners
work in tandem with
researchers or with the
Axes of the CRCHUS

Patient Partner Structuring Competition

After developing the objectives and the rules of the competition, committee members proceeded to evaluate the applications. Two research projects were selected as part of this first edition of this competition:

- **François-Pierre Counil, Patrick McDonald**, Lyne Rivard and patient partner **David Héraud** for their project focusing on a new therapeutic target for cystic fibrosis.
- **Jean-Patrice Baillargeon, Belina Carranza-Mamane, Marie-Hélène Pesant** and patient partners **Caroline Jolin** and **Annabelle Boivin** for a study to increase fertility in women who are obese and infertile.



Patient Partners: Vital Allies in Research!

For the fourth consecutive year, the Diabetes, Obesity and Cardiovascular Complications Axis organized a recognition event for those who took part in clinical research projects. In the spring of 2019, some one hundred people attended the event, including Mr. Jean-Luc Mongrain, who is a great believer in the value of research. Guests at the event learned about the research that is funded by the Fonds Jean-Luc Mongrain and the CHUS Foundation.

Two patient partners were named as co-investigators on applications for grants awarded as part of the following competitions: The CIHR *Early Career Investigator - Maternal, Reproductive, Child & Youth Health - Operating Grant* and the *New Frontiers in Research Fund - Exploration*, which is held jointly by 3 Canadian organizations, namely the CIHR, NSERC and SSHRC. One patient partner sat on the CRCHUS branding committee. He has also been involved in drafting the Centre's strategic plan.

Patient Partner's Choice Award

Patient partners attended two research symposiums; the first was organized by the Cancer: Biology, Prognosis and Diagnosis Axis and the second by the Inflammation-Pain Axis. Patient partners had the opportunity of evaluating graduate student oral presentations based on self-established criteria. Julie Douchin (Véronique Giroux) and Andréa Dupelteau (Émilie Lagueux) received the *Coup de cœur patient partenaire* award for their great ability to convey information in layman's terms. Recipients were then invited to present their work during a committee meeting.

Local, Provincial and National Outreach

The CIUSSS de l'Estrie – CHUS Ethics Committee and the Q-CROC organization requested consultations with patient partner members of the CRCHUS Patient Partner Strategic Committee. Members were invited to sit on important steering committees such as the ONCOPOLÉ, the Coalition Priorité Cancer au Québec and the National Table of the *Canadian Cancer Clinical Trials Network*. Members developed an internal and external communications plan to promote research from the perspective of patient partners.



ACTIVE STUDENT INVOLVEMENT IN SCIENTIFIC LIFE

PhD student **Simon Beaudoin (Jeffrey Leyton)** received an *Entrepreneurship in Oncology* scholarship from the Institute for Research in Immunology and Cancer – Commercialization of Research and the Oncopole.

Justine Benoît-Piau (Nathaly Gaudreault and Mélanie Morin) received a scholarship from the Institut de recherche Robert-Sauvé en santé et en sécurité du travail and a scholarship from the Ordre professionnel de la physiothérapie.

Carolin Brand (Martin Bisaillon and Mannix Auger-Messier) received a Vanier Canada Graduate Scholarship for her project on the West Nile virus, the yellow fever virus and the Zika virus.

The *Neuro-Show*, a play about the cycle of life of the human brain was put on by several CRCHUS students. After the play, audience members were invited to stay for a discussion with researchers who were present on stage. Staged in less than two months, the show mobilized over 550 people! The members of the Organizing Committee (**Jérôme Côté, Marie-Pierre Cyr, Marc-André Dansereau** and **Camille Simard**) and the actors (Cesar Augusto Canaveral, Carmen-Edith Bellei-Rodriguez, Raphaël Hamel and Félix-Antoine Savoie) should be very proud of the show's outreach.

The Université de Sherbrooke and the ADÉSAQ 2018 respectively granted an honorary award to **Frédéric Couture (Robert Day)** for the excellence of his doctoral thesis on prostate cancer, considered to be the best thesis in the field of health sciences.

In May 2018, **Sarah Lafontaine** (Édith Ellefsen and **Patricia Bourgault**) received the 1st Prix du jury and Prix du public of the Ma thèse en 180 secondes competition, organized by the Association francophone pour le savoir (ACFAS). The PhD student is focusing on the education of people living with type 2 diabetes.

In November 2018, **Francis Loignon-Houle (Roger Lecomte)**, a PhD student in Radiation Sciences and Biomedical Imaging received the prestigious *Graduate Scholarship Award 2018* from the *IEEE Nuclear & Plasma Sciences Society* in Sydney, Australia.

Volatiana Rakotoarivelo (Sheela Ramanathan) was chosen as Quebec's ambassador at the 2018 ICAN Conference of the Cardiometabolic Health, Diabetes and Obesity Research Network.

RESEARCH IN NUMBERS

FUNDING SOURCES IN FISCAL 2018-2019

Grant from the Fonds de recherche du Québec - Santé FRQ-S (Centre)	\$2 460 96
Grants from FRQ-S-recognized organizations	\$15 224 379
Scholarships from FRQ-S-recognized organizations	\$5 081 173
Research contracts with the private sector	\$4 982 987
Sales and services	\$555 074
Contribution of the CHUS and its Foundation	\$779 558
Donations for research and teaching	\$12 517
Other income	\$10 522 498
Total:	\$39 619 149

Note: The total amount of funding cited herein may differ from that in the CIUSSS de l'Estrie – CHUS financial statements since some partner grants are managed by the Université de Sherbrooke.

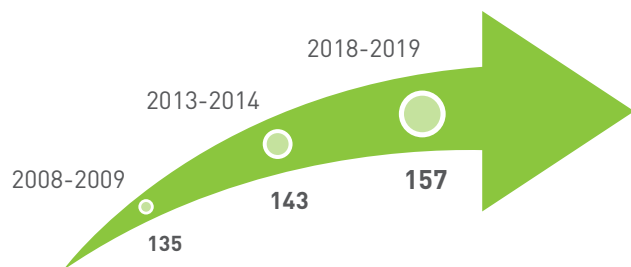
CLINICAL RESEARCH AS OF MARCH 31, 2019



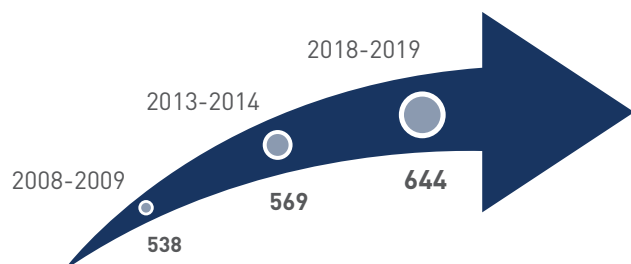
AXIS	REGULAR RESEARCHERS	ASSOCIATE RESEARCHERS	STUDENTS			SCHOLARSHIPS AND GRANTS (RGAs*)	PARTICIPATION IN PUBLICATIONS
			M. Sc.	Ph. D.	Post-Doc		
Cancer: biology, prognosis and diagnosis	38	17	51	59	18	\$5 821 705	156
Diabetes, obesity and cardiovascular complications	20	16	38	28	9	\$4 434 379	102
Medical imaging	23	10	50	50	14	\$2 488 234	105
Inflammation – Pain	37	16	76	61	11	\$3 941 328	144
Mother-child	21	29	60	40	12	\$2 074 213	126
Health – populations, organization and practices	18	19	36	18	13	\$1 545 693	133
TOTAL	157	107	311	256	77	\$20 305 552	766
	264		644				

*Recognized granting agencies, regular researchers only

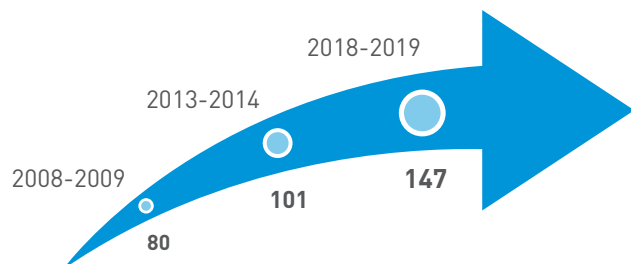
Regular researchers



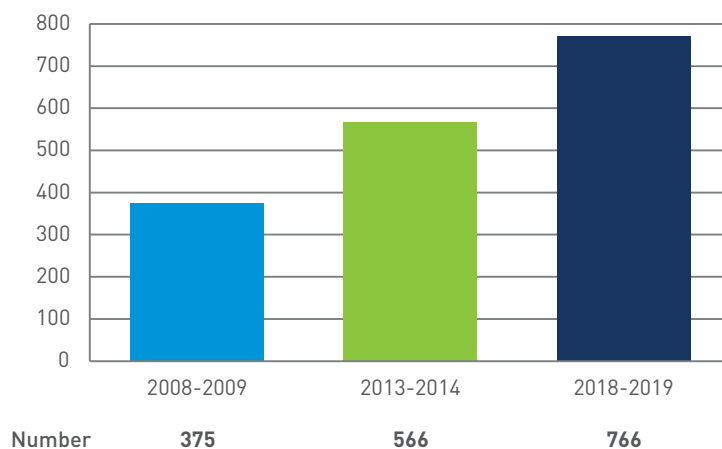
Students and Postdoctoral Fellows



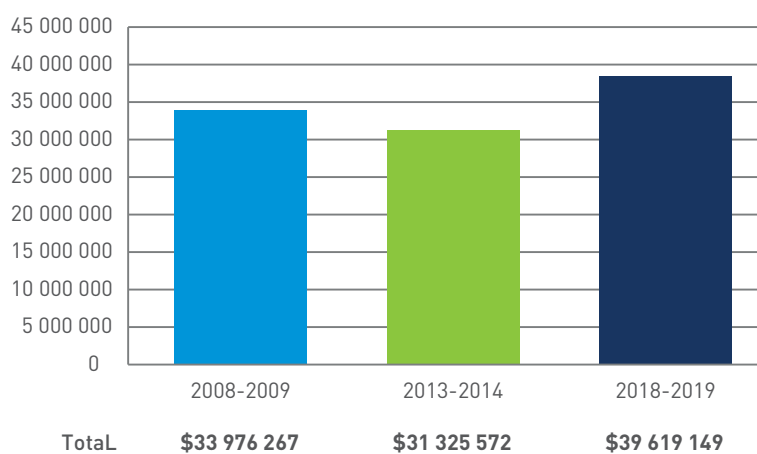
Clinical and administrative staff



Publications



Financing of research



CENTRE DE RECHERCHE DU CHUS

3001, 12th Avenue North, Wing 9, Door 6
Sherbrooke (Québec) J1H 5N4

cr.chus.qc.ca



*Centre intégré
universitaire de santé
et de services sociaux
de l'Estrie – Centre
hospitalier universitaire
de Sherbrooke*



Our partners:

