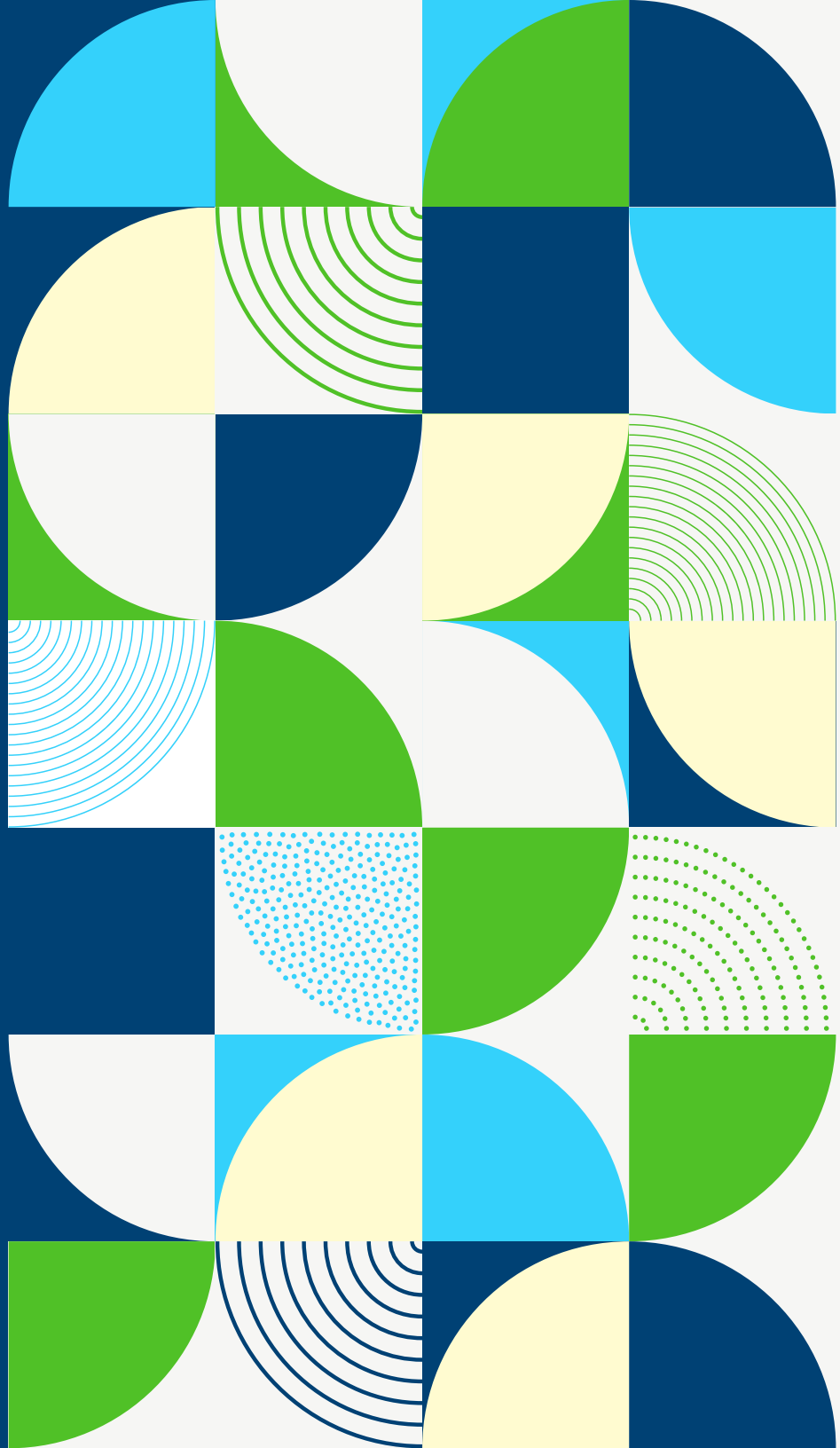
THE PROMISE OF BETTER HEALTH



ANNUAL REPORT
2024 | 2025

CRCHUM
CENTRE DE RECHERCHE
Centre hospitalier
de l'Université de Montréal

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Learn more:
crchum.com

+ A message from the Interim Director

WHERE SCIENCE TAKES CARE OF THE WORLD

Research is often a quiet pursuit. Repeated actions. Data to interpret. Hypotheses to validate. Then, one day, something changes.

At the CHUM Research Centre (CRCHUM), this change is rooted in the same collective drive shared by those who seek to understand in order to provide better care.

Every scientific breakthrough carries with it the promise of better health for all.

This past year is a testament to this. The launch of the CHUM Centre d'innovation et santé de précision, supported by a $45M donation from the Paul Durocher estate, paves the way for new clinical approaches. A $16.4M grant from the Canada Foundation for Innovation will enable us to identify diabetes biomarkers and better personalize care.

The CHUM is ranked among the top 10 research hospitals in the country and can count on the scientific power of the CRCHUM to transform knowledge into concrete benefits.

In the 2024–2025 year, our research community has achieved major milestones in HIV, cancer, metabolic diseases, neurological disorders and addiction research.

The CRCHUM is an engine of knowledge, training and inspiration. We're making advances in research thanks to talented people like Sarah Larney, Dr. Simon Turcotte, Dr. Houda Bahig, Nicolas Chomont, Martine Tétreault and Dr. Vincent Poitout.

I would like to honour the exceptional contribution of Dr. Poitout, who for a decade combined unifying leadership, scientific rigour and strategic vision. His enduring commitment has shaped the CRCHUM's identity and helped make it a scientific hub of international stature.

This annual report focuses on the ideas, work and careers of the men and women who are shaping health care research. For patients. For society. For tomorrow.

Kathy Lê
Interim Director
Research and Innovation
CHUM

For patients. For society. For tomorrow.

“Gone are the days when everyone was treated the same way for the same disease!”

Marie-Eve Desrosiers
President and CEO
CHUM

A message from the President and CEO

THE CRCHUM: A PLACE OF DARING

How can we offer Quebecers the best care? Our mission would be impossible without the CHUM’s innovation and research teams, who demonstrate their daring year after year.

The fiscal year got off to a remarkable start with the launch of the CHUM Centre d’innovation et santé de précision. This new centre reports to the Research and Innovation Directorate, and since April 2024, it has been acting as a leader in the development of best practices for the successful implementation of precision health care in Quebec’s care and service processes.

Gone are the days when everyone was treated the same way for the same disease! In 2024–2025, the CRCHUM surpassed itself in launching original projects aimed at personalizing care. There are many examples of progress in this direction.

Thanks to an investment of over $16.4M, six of our scientific teams will work to individualize the treatment of type 2 diabetes by drawing on new molecular imaging tools.

This review is an opportunity to recognize the invaluable contribution of the CRCHUM community, which is making great strides in advancing health research for the benefit of Quebec and the world. This year, these 2,200 people have once again paved the way for new treatments and enabled the CHUM to rank among the top 10 research hospitals in the country.

To all of you, members of the CRCHUM’s daring community, I say: thank you! A special thanks to Dr. Vincent Poitout, who brilliantly led the CRCHUM from 2015 to 2025 and contributed significantly to its reputation.

+ Dare to look beyond the horizon

Located in the heart of downtown Montreal, the CHUM Research Centre (CRCHUM) is Université de Montréal's major biomedical and health care research centre. It is also one of the largest of its kind in Canada.

Beyond its size, the CRCHUM is defined by its mission. A hub of creation, knowledge generation and training, it shapes the scientists who will leave their mark on the world stage of tomorrow.

Under its roof, the pillars of basic, clinical and population health research work side by side. As a whole, this rich, diverse, international community is hard at work building the future of health care.

This collective strength radiates far beyond our walls. The CRCHUM is internationally recognized for the quality of its research and collaborates with leading institutions in a dynamic, equitable and inclusive environment. Our researchers provide ultra-modern infrastructure and core facilities with cutting-edge technology.

This recognition is echoed in official evaluations. The Fonds de recherche du Québec – Santé, the provincial agency that funds research infrastructure, has confirmed the CRCHUM's position as one of Canada's leading research institutions by awarding it an "exceptional" rating as part of its 2020-2026 strategic plan.

This record of excellence is reflected in national rankings. In December 2024, the Centre hospitalier de l'Université de Montréal (CHUM) was ranked among the top 10 Canadian research hospitals for the first time.

The CHUM then moved directly up to 10th place in Canada and 2nd place in Quebec in the Canada's Top 40 Research Hospitals 2024 ranking unveiled by Research Infosource.

This breakthrough is underpinned by a remarkable financial performance. The CHUM and its Research Centre ranked 2nd in Canada in the category of Hospital Research Spending Growth with $132.3M in grants, contracts and contributions from external sources—an increase of more than 38% on the previous year. This is the first time that the CHUM joined the "closed club" of $100 million in research income.

"This success reminds us of the importance of our commitment to health research, the strength of our creativity and the dedication of the members of our community."

- Dr. Vincent Poitout, CRCHUM Researcher and Director of Research and Innovation at the CHUM until the end of February 2025.

"It is a collective achievement of which we can all be very proud!"

On June 1, 2025, Dr. Poitout officially succeeds Dr. Marie-Josée Hébert, also a CRCHUM researcher, as Vice-Rector of Research, Discovery, Creation and Innovation at Université de Montréal.

Because tomorrow's discoveries take shape today.
Here. For you. With you.

+ CRCHUM research priorities

IMAGING AND ENGINEERING

- Imaging and new tracers
- Modelling and decision support
- Image-guided therapies
- Biomechanics and biomaterials

INNOVATION HUB

- Evaluation of programs and services
- Health systems and policies
- Health promotion and prevention
- Risks to health

CANCER

- Immuno-oncology
- Targeted therapies and biomarkers
- Cell fate and therapeutic resistance
- Microbiome and tumour environnement

NEUROSCIENCE

- Epilepsy
- Neurovascular
- Neurodegeneration and neurorepair
- Neuroimmunology
- Addiction and mental health

CARDIOMÉTABOLIC

- Hypertension, diabetes and obesity
- Cardiorenal and endocrine damage
- Neurometabolic
- Phenome, genome and metabolome

IMMUNOPATHOLOGY

- Noninfectious inflammatory diseases
- Transplantation, critical care and tissue damage and repair
- Viral infectious diseases

+ The CRCHUM in figures

DATA AS OF MARCH 31, 2025

NEARLY **$157M** in research revenue

75 basic and clinical research laboratories

19 core facilities to support research

171 researchers *(research status: regular)*

332 investigators

69 researchers *(research status: health professionals)*

50 research associates

429 graduate and postgraduate students

112 postdoctoral fellows

1,055 administrative and research staff members

1,267 peer-reviewed publications, of which nearly 60% are from international collaborations and nearly 55% are open access

348 new clinical or epidemiological trials

23 Philanthropic Chairs

12 Canada Research Chairs

+ A community in action

In 2024, the Research Directorate became the Research and Innovation Directorate. This change reflects the natural evolution of an organization focused on impact, progress and turning knowledge into concrete solutions.

This same determination to advance research is also reflected in the changes in leadership within the CRCHUM's scientific research themes. In May 2024, **Gerardo Ferbeyre**, a Cancer Research Theme researcher since 2018 and full professor in the Department of Biochemistry at Université de Montréal, took over from Réjean Lapointe as head of this research theme for a four-year term.

A few months later, on November 1, 2024, it was **Valérie Mongrain**'s turn to be appointed head of the Neuroscience Research Theme. She is succeeding Nathalie Arbour. These two appointments reflect a rich renewal in the scientific governance of the Research Centre.

The CRCHUM management also recognized the exceptional contribution of a behind-the-scenes figure by awarding the **Bâtisseur Award** to **Dr. Hélène Héon** on June 13, 2024, at an official ceremony. She joined the CRCHUM as a veterinarian in 1994 and went on to manage the animal facility's veterinary services for over a decade. She and her team helped set up the centralized animal facility at today's CRCHUM, a milestone in the structuring of preclinical research.

A key figure in Canadian research, Dr. Héon has had a profound impact on animal welfare practices. She has helped set rigorous ethical standards for the care of research animals through her active role in the Canadian Council on Animal Care.

In terms of research chairs, the year was also punctuated by a number of important awards. Researcher **Sarah Kimmins** was awarded the **Canada Research Chair in Epigenetic Inheritance of Disease** (2024–2031).

For their part, Dr. Géraldine Layani and Nadia Sourial have begun their first term at the head of the GlaxoSmithKline-CIHR Chair in Optimal Management of Chronic Disease (2025–2030). Finally, Dr. Julie Bruneau and Nathalie Caire-Fon were named co-chairs of the Dr. Sadok Besrour Chair in Family Medicine at Université de Montréal (2025–2030).

Gerardo Ferbeyre
Researcher

Dr. Hélène Héon
Veterinarian

CERTIFIED EXCELLENCE IN HEALTH CARE DATA

In December 2024, the Centre d'intégration et d'analyse en données médicales (CITADEL), a core facility dedicated to the management and analysis of health care data, reached an important milestone by being awarded ISO 9001 certification—the international standard for quality management systems.

This recognition acknowledges the team's commitment to the highest standards of management, procedural rigour and partner satisfaction. It also confirms the adoption of a culture of continuous improvement throughout its operations.

"This accreditation reflects our commitment to providing reliable, efficient solutions that meet the expectations of the health care sector. We are convinced that this recognition will strengthen the confidence of our partners and help to make CITADEL a benchmark in the field of health data"

- Dr. Michaël Chassé, the core facility's scientific director at the time.

NEW FACES FOR FUTURE IDEAS

In 2024–2025, nine regular researchers strengthened the ranks of the CRCHUM. Their expertise has consolidated key research themes, nurtured emerging research niches and supported the Research Centre's influence on the Canadian and international level.

A warm welcome to Alexandre Pellan Cheng (Cancer Research Theme), Dr. Nadia Bouabdallaoui (Cardiometabolic Research Theme), Andreea Adelina Artenie, Dr. Antoine Desilets, Émilie Dufour and Rodney Knight (Health Innovation and Evaluation Hub Research Theme), Dr. Julio César Fernandes (Imaging and Engineering Research Theme), and Dr. Nicolas Garel and Dr. Laura Catherine Gioia (Neuroscience Research Theme).

These additions are accompanied by an increased commitment from the next generation. In June 2024, **Marie Gasser**, a postdoctoral fellow in the laboratory of Guy Rutter (Cardiometabolic Research Theme), was appointed to the position of postdoctoral fellows representative within the scientific committee of the CRCHUM. As of December 2024, **Élisabeth Lamoureux**, a PhD student in clinical psychology on Gabrielle Pagé's team (Health Innovation and Evaluation Hub Research Theme), also assumed the role of student representative on the same committee.

Their active contribution will support the development of the CRCHUM's social, educational and scientific activities, while encouraging greater participation by the next generation in the centre's decision-making processes.

Marie Gasser
Postdoctoral fellow

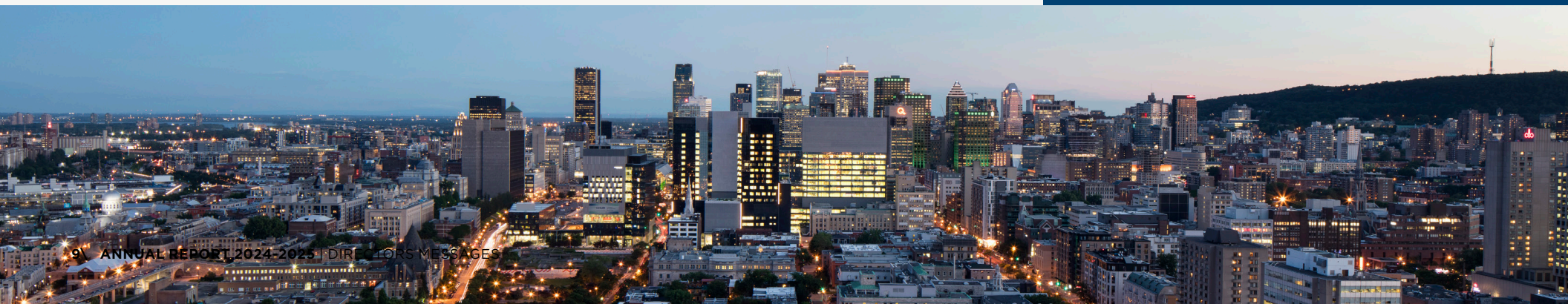
Élisabeth Lamoureux
PhD student in clinical psychology

AMONG THE MOST CITED IN THE WORLD

Six Université de Montréal scientists, including three affiliated with the CRCHUM, feature in Clarivate's 2024 ranking of the world's most cited researchers. This international recognition is based on data from the Web of Science. Nicolas Chomont, Rémi Fromentin and Dr. Alexandre Prat made the list.

A MEDAL FOR AN EXCEPTIONAL CAREER

Dr. Roy Hajjar was awarded the Governor General's Academic Medal in 2024. He was on fellowship at the Mayo Clinic that year and returned to the CHUM in 2025. He contributes to research on colorectal cancer with Dr. Carole Richard and CRCHUM immunologist Manuela Santos.



FOR MORE SUSTAINABLE HEALTH

Focus on prevention, promotion of healthy lifestyle habits and early intervention: this is the vision of the Fonds de recherche du Québec – Santé to build a healthier society. At the CRCHUM, several projects are rooted in this vision. They generate data to guide public policy and practices in the field.

» Measuring the social acceptability of interventions

Researcher Lise Gauvin of the Health Innovation and Evaluation Hub conducted an extensive Canada-wide survey. Her team surveyed over 27,000 people in 17 major metropolitan areas. The goal was to assess the acceptability of 45 measures designed to improve population health. Whether it's a question of urban planning, tax policies or social standards, the data provide a unique picture. In addition to scientific publications, a report was submitted to the Urban Public Health Network, which serves nearly half of the Canadian population.

» Cannabis legalization and addiction

Researcher Dr. Didier Jutras-Aswad of the Neuroscience Research Theme studies the effects of cannabis on mental health and addiction. In a recent publication co-authored with colleagues from Simon Fraser and McMaster Universities, he stresses the need to analyze the impact of legalization policies using a multidimensional approach. His team is also piloting a national clinical trial for the treatment of methamphetamine dependence. This is a first for the country, as the study combines medication and psychosocial therapies. This $4.9M project is supported by the Canadian Institutes of Health Research.

NETWORKS TO ADVANCE RESEARCH

The CRCHUM contributes to major national health and research initiatives. Here's a look at two projects that combine local expertise with a pan-Canadian scope.

» A pan-Canadian cancer network

The CRCHUM is a member of the Marathon of Hope Cancer Centres Network (MOHCCN), a pan-Canadian network of over 40 research centres. Phase 2 of the project has been submitted with the active participation of the CRCHUM researchers on its strategic committees.

To date, 8,835 patient genomes have been sequenced, including 1,984 in Quebec and 801 at the CHUM. An article on this initiative was published in the scientific journal Cancer Cell, highlighting advances in precision oncology across the country.

» HIV and aging: a national cohort in action

The Canadian HIV and Aging Cohort Study, launched by Dr. Madeleine Durand and Dr. Cécile Tremblay, brings together people living with HIV from 10 university centres across Canada.

In collaboration with laboratories at the CRCHUM and elsewhere, the cohort has made it possible to characterize the pathways associated with premature cardiovascular disease in people living with HIV. The cohort has also identified potential new treatment targets.

An international symposium was held at the CRCHUM in October 2024 to stimulate scientific exchange.

“In 2024–2025, more than 45 scientific events were organized by the six research themes [...]”

STAYING CONNECTED TO RESEARCH

In 2024–2025, the CRCHUM published 65 news items on its website and shared more than 500 posts on its social media.

On LinkedIn, **350** publications reached a growing community of **26,370** subscribers, with an excellent average engagement rate of **7.1%**.

On Facebook, **143** publications reached more than **7,400** people.

What’s more, our presence has expanded with the new Bluesky account launched in 2025.

To stay up to date on research that’s changing health care, subscribe to our social media and visit our website.

+ Where science takes root and rises

A RICH SCIENTIFIC PROGRAM

Each year, the **CRCHUM Scientific Day** brings the community together around major themes. The event’s 15th edition attracted over 300 participants and focused on metabolism, with the special presence of Giles Yeo, a researcher from Cambridge University, and a panel on leptin.

Another flagship event was the **Prestige Conferences**, which allowed two renowned researchers—researcher Elli Papaemmanuil (Memorial Sloan Kettering Centre, New York) and researcher Obadiah Plante (Moderna, Massachusetts)—to come share their expertise and meet CRCHUM teams.

These highlights are part of a rich scientific program. In 2024–2025, more than 45 scientific events were organized by the six research themes, and over 75% of them included international guests.

The CRCHUM supports its researchers in organizing events.

As such, the centre supported **17** scientific conferences this year: seven Quebec, three Canadian and seven international conferences. These included the 2nd conference of the Canadian Zebrafish Research Community (Éric Samarut, Neuroscience Research Theme), the 9th meeting of the Canadian Neurometabolic Club (Thierry Alquier and Stéphanie Fulton, Cardiometabolic Research Theme), as well as the annual workshop of the International Network for Research on Inequalities in Child Health (Lise Gauvin, Health Innovation and Evaluation Hub Research Theme).

AN INCLUSIVE RESEARCH CULTURE DRIVEN BY PEOPLE

At the CRCHUM, equity, diversity and inclusion (EDI) are not just keywords: they are commitments. In 2024–2025, several initiatives helped amplify a plurality of voices that are too often left unheard.

On February 11, a panel during the **International Day of Women and Girls in Science** highlighted the unique careers of four CRCHUM women researchers: Vikki Ho, Lise Gauvin, Marie Gasser and Dr. Marie-Josée Hébert. They shared their career trajectories and explained how, despite the obstacles, they were able to carve out their own paths and advance science.

Organized by the CRCHUM EDI Committee, the event brought together over a hundred members of the research community. The panel was moderated by Aïssata Sako, the program director at the Canadian Research Initiative in Substance Misuse (Quebec-Atlantic Node).

During **Black History Month**, two panels focused on the contribution of research teams to the health of Black communities and revealed their realities in care and research settings.

In September, during **Truth and Reconciliation Week**, Julie Girard, Director of the Observatoire des réalités autochtones urbaines, and Amélie Blanchet Garneau, holder of the CIHR Indigenous Research Chair in Nursing, came to discuss the perspectives of research by and for Indigenous people in urban areas in Quebec.

These actions, both large and small, reflect a clear commitment to making the CRCHUM a welcoming, equitable and human research space where all voices are heard.

SCIENCE, STAGE AND SUCCESS: A BANNER YEAR FOR OUR TALENTS

In 2024–2025, the CRCHUM continued its commitment to supporting the next generation of scientists with a rich and inspiring program.

One of the highlights includes April 19, 2024, when the CRCHUM hosted the 2nd local **Science POP** popularization contest, bringing together 70 people. The event featured 18 presentations before a lively discussion between three figures in popular science: Olivier Bernard (Le Pharmachien), Dr. Mathieu Nadeau-Vallée (Dr. TikTok) and Antoine Salaün (Antoine vs Sciences).

The next generation really stood out: Inès Cherkaoui, postdoctoral fellow in the laboratory of Guy Rutter (Cardiometabolic Research Theme), won the popularization challenge with her presentation *The extraordinary potential of stem cells*. For her part, Perrine Coquelet, a PhD student in Nathalie Arbour's laboratory (Neuroscience Research Theme), won the media prize with *Who has never had back pain?* and was also awarded the People's Choice Award—Media Challenge at the provincial final at the IRCM.

Another highlight of the year was the **25th CRCHUM Student, Postdoctoral Fellows and Resident Convention** held on October 10 and 11, 2024. Nearly 350 people attended and discovered 165 research projects through lectures, oral communications, scientific posters and a panel on scientific entrepreneurship.

Research was also showcased in images thanks to the ***Vue sur ma science*** photo competition, which exhibited 16 shots, awarded seven grants and presented a virtual exhibition. Finally, the **Meritas Ceremony** highlighted the excellence of the next generation by awarding $136,000 to 52 students in recognition of their commitment to research.

VOICES AND KNOWLEDGE, TOGETHER

Discover the scientific vitality of the CRCHUM by browsing its rich events calendar! You can also explore the various activities organized by the Student and Postdoctoral Affairs team or the Equity, Diversity and Inclusion Committee

+ Teamwork: the driving force behind research

INNOVATING WHERE IT COUNTS

In April 2024, the Centre d'innovation et santé de précision (CISP) was officially launched. It is one of six members of the Réseau d'évaluation et de l'innovation en santé established by MEDTEQ+.

The CISP is composed of five experienced specialists and offers **tailored support** to clinical teams in their efforts to implement innovations in real health care settings.

These innovations are varied and can be therapeutic, diagnostic or preventive. They range from drugs, medical devices and clinical tests to digital technologies and ways of organizing care and services.

From its first few months of operation, the CISP has attracted a great deal of interest from the community. It received 54 partnership requests, mostly from private Quebec companies, but also from Canadian and international firms.

In addition, the CISP has facilitated the acquisition of several grants for innovative projects. These include the CHUM's independent orthopedic clinic (Propulsion Santé, $400,000), which is currently in the start-up phase; Traferox (CanHealth, $200,000); and Petal Pharmacie ($46,000).

Finally, a mental health initiative illustrates the scope of this support. The team at the CHUM's Jeunes Adultes Psychotiques (JAP) clinic, supported by the CISP and in collaboration with Myelin Solutions, has been awarded a grant from the *Innovateurs(trices) en résidence* program, funded by Institut TransMedTech. The company will adapt its telehealth system to meet the needs of this clinic, which treats nearly 300 young people with first-episode psychosis each year.

WANT TO TAKE ACTION?

Discover our online toolbox that includes validated resources, such as the *Practical Guide: Evaluating Digital Health Innovations in Real-World Settings*, the *Evidence Standards Framework for Digital Health Technologies* (NICE) and the *Theoretical Framework of Acceptability* (TFA) questionnaire (in French only).

PROVIDING SUPPORT TO DISCOVER MORE

At the CRCHUM, some 570 researchers are committed to turning discoveries into concrete solutions for human health.

To support this scientific drive, **19 independently managed core facilities** offer fast, affordable and highly specialized access to cutting-edge technologies.

Nearly 150 specialists support the scientific community on the path to discovery.

In order to better meet the needs in the field, seven research and development initiatives were carried out in 2025 to tailor service offerings to team priorities.

Among the real benefits is the molecular pathology core facility, which validated nearly 100 antibodies compatible with the COMET, a new-generation instrument capable of detecting up to 40 proteins on a single tissue slide. The result was a finer characterization of cells in histological sections.

Another notable advance took place in the metabolomics core facility, which developed an experimental protocol that improves the assay of neurotransmitters that were previously undetectable in biological samples. This protocol can now be applied to other metabolite families.

This progress has also been made possible thanks to the support of the Fondation du CHUM. A total of $310,000 has been awarded to six teams for the *Imaging T2D* project on diabetes biomarkers. New equipment for the same project has already been acquired thanks to a $16.4M grant from the Canada Foundation for Innovation.

OUR CORE FACILITIES, YOUR DISCOVERIES

Pick up our brand-new core facilities brochure and stay tuned with The Core Facilities' Echo. Everything we need to move forward, together.

RESEARCH SUPPORT OFFICE: A CATALYST FOR SUCCESS

With the arrival of Chloé Tesnière and Manon Pérez in 2024, the Research Support Office (RSO) team is strengthening its strategic support for CRCHUM researchers.

As an essential point of reference, the RSO assists them in their funding applications, optimizes their strategies and facilitates access to the resources offered by funding agencies. It makes a tangible contribution to the success and growth of research activities by centralizing information and expertise.

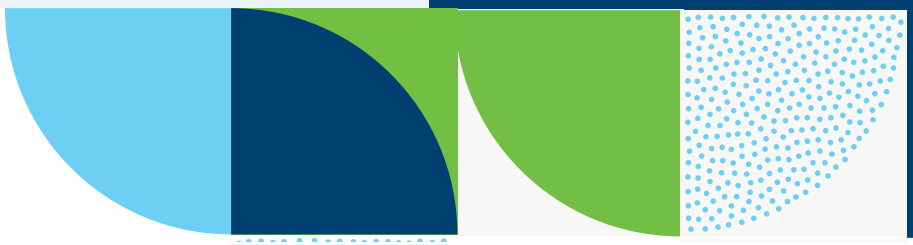
+ The RSO in figures

DATA AS OF MARCH 31, 2025

nearly
200
grant applications submitted

over
90
teams supported

over
20,000
clicks per month in our Intranet portal



THE CRCHUM: A LEADING PARTNER IN CLINICAL RESEARCH

In 2024, Japan's Pharmaceutical and Medical Devices Agency carried out an initial inspection at the CHUM as part of a clinical trial led by Dr. Marie Florescu. The result: no major non-compliance, both in terms of procedures and data collected. This success testifies to the professionalism of the teams at the Unité de recherche clinique en oncologie-hématologie (URCOH).

In the same spirit of scientific rigour and innovation, the CRCHUM research teams have worked closely with the unit for cell production and nuclear medicine. This synergy has enabled members of the clinical trial core facility (CTCF) to deepen their areas of expertise and enhance their service offering.

Thanks to these advances, the CRCHUM is now an esteemed site for pharmaceutical companies seeking excellence to conduct projects in cell therapy, in the microbiome or involving radioligand therapies.

The operational support team has also put a great deal of effort into designing tools that facilitate the management of clinical research projects and comply with regulations. Since 2016, **1,850 directories** have been created to organize essential project documentation (eREG) as well as track the qualifications and skills of employees involved in clinical research (eFIL). The amount of **paper documents has decreased by almost 90%.**

Added to this are two new features: the eRDT tool, which enables task delegation to be managed electronically; and the Registre des budgets de l'industrie (RBI), which was designed to support teams in negotiating study budgets by giving them access to the amounts agreed upon with our main pharmaceutical partners.

AT THE HEART OF AGREEMENTS, AT THE SERVICE OF SCIENCE

A strategic player at the heart of CRCHUM research, the Research Contracts Office (RCO) ensures the legal accuracy of over 1,000 agreements each year. Its **specialized 12-person team** drafts, negotiates and validates contracts between researchers and their public or private partners, while protecting institutional interests.

Backed by this expertise, the RCO assists research staff in managing agreements related to confidentiality, material or data transfer, clinical trials, academic collaborations, and the protection of intellectual property and personal information. This work supports rigorous, responsible research that strives for excellence.

More recently, the RCO has played a central role in several key research projects at the CHUM. It has issued recommendations to the Minister of the French Language concerning exemptions from the Charter of the French Language (contracts drafted in English for certain national and international partners), supported the updating of important documents, such as the Biobanking Policy, and assisted in implementing new rules on access to health information at the CRCHUM. Amid network reforms and the arrival of Santé Québec, the RCO remained a pillar for negotiating research contracts.

The team also negotiated complex agreements with major partners, particularly in the pharmaceutical industry. By creating tailored contract templates and actively participating in the Regroupement des gestionnaires de contrats de recherche du Québec, the RCO is helping to modernize and strengthen research contract review and negotiation practises across the province.

+ The RCO in figures

1,086 contracts signed in 2024–2025, broken down as follows:

372	203	164	152	120	75
Cancer (34.3%)	Immunopathology (18.7%)	Neuroscience (15.1%)	Health Innovation and Evaluation Hub (14.0%)	Cardiometabolic (11.0%)	Imaging and Engineering (6.9%)

"The Research contract office (RCO) ensures the legal rigor of more than 1,000 agreements each year."

BRINGING RESEARCH TO THE FOREFRONT OF SOCIETY

Since 2019, the CRCHUM has had a technology transfer action plan to more effectively transform scientific discoveries into concrete innovations.

This shift accelerated in 2022 with the creation of the Technology Transfer Office (TTO), which has a clear mission: to position the CRCHUM as a key player in health care knowledge transfer.

Staffed by **two technology transfer specialists**, the TTO supports researchers at every stage of the transfer process: raising awareness of intellectual property, personalized support, training and scientific entrepreneurship activities.

This work is carried out in close collaboration with internal teams and partners in the Quebec ecosystem, including Axelys, MEDTEQ+ and the Quebec Consortium for Drug Discovery (CQDM).

Thanks to its strong ties with recognized accelerators (IRICoR, MILA, IVADO, TransMedTech) and incubators (Centech, District 3, Esplanade, Millenium Quebecor, UdeM), the TTO team can call on cutting-edge expertise in the technology transfer and entrepreneurship ecosystems to direct its projects to the right resources at the right time.

The result? Since 2019, thanks to the TTO's support, 20 teams have obtained $6.1M in funding to enhance their projects, including $690,000 in 2024. The TTO also provides numerous opportunities to raise awareness, particularly among the next generation of scientists.

Its team organized or participated in five major events focusing on intellectual property, technology transfer and scientific entrepreneurship.

+ Technology transfer in figures

DATA AS OF MARCH 31, 2025

16

active spin-off companies in the following main fields:

- Digital health
- Contract research (rare diseases, oncology)
- Diagnostics (oncology, fertility)
- Molecule targeting (rare diseases, oncology, diabetes and metabolic diseases, regenerative medicine and transplantation)
- Personalized medicine (type 2 diabetes, oncology)
- Biomechanics
- Biomaterials

31

active sales agreements

14

new declarations of invention

36

families of patents

- 75 active patents
- 45 patent applications pending

over 100

active inventors

+ Fondation du CHUM: act now for tomorrow's health

The Fondation du CHUM provides a vital source of funding for the CHUM and its research centre.

For over 10 years, the Fondation's contributions have enabled the CRCHUM community to accelerate their research efforts and encouraged innovation, pushing the boundaries of medicine.

This year, in addition to continuing its major campaign, *Act Faster Than Disease,* which has the ambitious goal of raising **$200M** by 2028, the Fondation was honoured to receive a historic estate gift of **$45M** from the late Paul Durocher.

This significant bequest will be invested in deploying the CHUM Centre d'innovation et santé de précision for the benefit of the dedicated teams at the hospital and its research centre, as well as thousands of present and future patients.

The donations raised have a leverage effect for researchers, multiplying the initial contributions by 4 to 10 times.

Here are some of the innovative initiatives supported by the Fondation:

- **An extraordinary donation of $8,750,000 from the Courtois Foundation allowed the CRCHUM to create a fund to offer competitive funding to researchers at various stages of their careers and to set up a fellowship program to attract the best postdoctoral fellows. These initiatives will give an innovative boost to the attractiveness of the CRCHUM and to its ability to recruit top talent.**

- **Thanks to the Fondation du CHUM's Guy Lafleur Fund, four promising research projects dedicated to the CRCHUM personalized medicine in oncology program have each received a grant of $250,000. These are the first grants awarded by the fund since its creation by "The Flower" in 2021.**

- **At the CRCHUM, researcher Éric Samarut and his team are seeking to gain a better understanding of severe and rare childhood epilepsy, and to build precision medicine in this field. This work is made possible in part by the contribution of the Mirella and Lino Saputo Foundation to the Fondation du CHUM.**

- **Imagine being able to detect the risk and progression of complications in people with metabolic diseases, such as diabetes, at an early stage using cutting-edge imaging markers. This is the goal of the *Imaging T2D* project team, which is funded in part by the Fondation du CHUM.**

To support the training, development and improvement of CRCHUM staff, more than $4,540,000 has been awarded to fund 30 seed funds and 45 fellowships, helping to attract the world's top talent.

The Fondation is proud to be an ally to the CRCHUM, which brings together some of the most ambitious and daring scientific teams in North America.

Sarah Larney
Researcher

“With rising housing costs, increasing poverty and changes in the drug market [...], there’s a real need for increased funding and preventive support.”

ESTABLISHING A PORTRAIT OF DRUG USE FOR BETTER ACTION

Sarah Larney, who holds a PhD from the University of New South Wales, Australia, joined the CRCHUM in February 2020. You might be wondering what motivated her to cross the globe at the beginning of the COVID-19 pandemic. The answer: the prospect of improving the lives of people who use hard drugs as a researcher in the Department of Family Medicine and Emergency Medicine at Université de Montréal.

The pandemic hit drug users hard, as they are often marginalized in society. In a study published in August 2024 in *Drug and Alcohol Review*, Sarah Larney and her colleagues, including physician and researcher Julie Bruneau, analyzed accidental deaths occurring between 2012 and 2021 that were reported by the coroner as being due to opioids or stimulants. Their findings showed that drug-related mortality rates have risen sharply in Quebec and Canada in recent years, peaking in 2020. This study also highlighted the increased presence of fentanyl and the new synthetic opioids among overdose cases recorded in Quebec since 2020.

Her work also aims to redefine the concept of overdose in Canada.

“For example, talking about a “crisis” calls for quick reactions, whereas what we need instead are far-reaching reforms, such as destigmatization of drug users, reform of social policies and drug policies,” she explains.

“Sarah Larney is collaborating on the creation of a cohort of women who use drugs in Quebec and elsewhere in Canada, a first in the country.”

» Reducing infections and adapting interventions

The incidence of sexually transmitted and blood-borne infections (STBBIs) is another focus of research in Larney’s laboratory. For example, she and her team have published the results of a major study on sex and gender differences among people infected with hepatitis C who inject drugs. Among other things, she discusses access to treatment and exposure to risks, which are factors that need to be integrated into intervention strategies in order to achieve the WHO’s goal of reducing the number of infections by a factor of 10 by 2030.

With the re-emergence of syphilis becoming a major public health issue, Larney also looks at the epidemiology of this STBBI among people who inject drugs. Since the latter are not among the groups for which screening is recommended, she is particularly keen to assess its prevalence and incidence in order to determine whether new recommendations are needed.

She is also collaborating with Dr. Valérie Martel-Laferrière, from the Department of Microbiology, Infectious Diseases and Immunology, on the creation of a cohort of women who use drugs in Quebec and elsewhere in Canada. This would be the first of its kind in Canada. Their goal is to gain a better understanding of women’s needs in terms of sexual health, resilience and other factors, and to formulate recommendations for adapting interventions to them.

Larney’s expertise led her to co-organize the latest edition of the International Society for the Study of Drug Policy’s annual conference, in collaboration with her colleague David Décary-Hétu, Deputy Director of the International Centre for Comparative Criminology at Université de Montréal. The event took place at the CHUM from June 19 to 21, 2024, and brought together researchers, provincial and federal government representatives, and people from the United Nations Office on Drugs and Crime.

» Serving the collective well-being

Larney is passionate about social justice and human well-being. She hopes her research will help policymakers reform current drug use regulations, based on the actual harmfulness of substances.

“Over the next year, I’ll be continuing to work on the epidemiology and social aspects of overdoses in Quebec and Canada in an effort to reduce their number. With rising housing costs, increasing poverty and changes in the drug market—more fentanyl and more powerful substances—there’s a real need for increased funding and preventive support.”

Research theme highlights

APRIL 2024

Researcher Line Beaudet receives the 2024 Prix reconnaissance awarded by members of the Parkinson's disease and parkinsonian syndromes research group at Université de Montréal's Faculty of Medicine.

MAY 2024

The Fonds de recherche du Québec – Santé (FRQS) awards over $500,000 in grants to our researchers: Dr. Géraldine Layani, Dr. François Martin Carrier, Dr. Michaël Chassé and Dr. Madeleine Durand.

The organization also awards Dr. Jean-Charles Pasquier the status of "senior clinical researcher" in recognition of his outstanding career.

JULY 2024

The Canadian Institutes of Health Research (CIHR) awards a total of $1.7M in grants to Dr. Antoine Boivin and Ghislaine Rouly, Dr. Emmanuelle Duceppe, Vikki Ho, and Dr. Jean-Charles Pasquier.

AUGUST 2024

Researcher Vikki Ho receives a $200,000 grant from the Canadian Cancer Society.

OCTOBER 2024

Researcher José Côté is inducted as a Fellow of the Canadian Academy of Nursing.

DECEMBER 2024

Dr. Marie-Pascale Pomey receives $200,000 from the Terry Fox Research Institute for a project designed by and for cancer patients.

FEBRUARY 2025

Dr. Nathalie Auger receives $447,524 in CIHR funding for a study on maternal mortality.

In the journal *The Lancet Gastroenterology & Hepatology*, Adelina Artenie and her former colleagues from the University of Bristol characterize the extent and global distribution of hepatitis C for the first time.

Researcher Gabrielle Pagé receives the 2025 Early Career Award from the Canadian Pain Society.

MARCH 2025

A study led by Srividya N. Iyer and Dr. Ashok Malla, in collaboration with CRCHUM researchers Dr. Amal Abdel Baki and Shalini Lal, and published in *JAMA Psychiatry* concludes that a new approach could enable young people to obtain mental health assistance more quickly.

Nicolas Chomont
Researcher

“[...] our goal is to understand what children have that adults don’t.”

TOWARD AN HIV-FREE WORLD

HIV treatments have made giant strides over the past three decades. While HIV-positive people today enjoy a life expectancy similar to the general population, treatments must be taken for life, since they only control the virus, they do not eliminate it. The main obstacle: viral reservoirs, which persist despite cutting-edge triple therapies.

Nicolas Chomont’s work focuses on these infamous reservoirs. Chomont joined the CRCHUM in January 2015 and is a specialist in immunology and virology who won the 2024 ACRV-CANFAR Excellence in Research Award*, Basic Sciences category, for his contribution to advances in this field. In 2009, he identified memory T cells as the main cellular reservoirs of HIV. This discovery was published in *Nature Medicine* and has been cited over 1,000 times!

» A race against the reservoirs

Several years ago, Nicolas Chomont and his team hypothesized that the sooner triple therapy is administered after infection, the better the chances of eliminating HIV from the infected person. The goal is to act before it hides in reservoirs and to prevent the onset of comorbidities. This theory was the subject of a study carried out in Thailand and published in 2023.

Alongside this ongoing work, they are pursuing another project in Thailand, which looks at the treatment of HIV-positive infants from their very first weeks of life. By following these children over the last ten years, they have seen that, by the age of seven, the majority no longer have reservoirs. “It gives us hope that they may be completely cured and have eliminated the reservoirs naturally,” says Chomont. “Since there is a rapid decrease in the number of reservoirs, we think they have a super immunological weapon that we have yet to identify. So, our goal is to understand what children have that adults don’t.”

To carry out their research, the team is using the biosafety level 3 core facility, which is designed to handle high-risk pathogens, and for which Chomont is the scientific advisor. In addition, the cytometry core facility allows him to analyze immune system cells and identify HIV reservoirs.

**Each year, the Canadian Association for HIV Research (CAHR) and the Canadian Foundation for AIDS Research (CANFAR) present awards of excellence to career researchers who are helping to improve the lives of people living with HIV or who are at risk of contracting the disease.*

» Hope for a total cure

Since it is impossible for some HIV-positive people to start treatment within the first month of infection, it is essential to find other strategies to eradicate reservoirs. “My dream this year is to get closer to that goal,” states Chomont.

In fact, Chomont is leading a project called CanCURE as part of the HIV/AIDS and STBBI Research Initiative, which has just received $3.75M in funding over five years to develop an HIV cure protocol. 14 researchers will attempt to determine in which tissues viral reservoirs are preferentially located, by what mechanisms the virus manages to hide there and how to find it.

“Over the past two years, new cases of HIV transmission have increased by over 30% in Canada, and the global situation is even more serious. Yet there are few prevention campaigns to raise awareness of this disease. Research funding is therefore crucial,” concludes Chomont.

+ Research theme highlights

MAY 2024

Dr. Océane Landon-Cardinal receives a $145,938 grant from Fonds de recherche du Québec – Santé (FRQS) for her research into scleromyositis.

JULY 2024

The Canadian Institutes of Health Research (CIHR) awards grants to researchers Petronela Ancuta and Naglaa Shoukry of $1,285,200 and $967,726 respectively.

In a study published in *mBio*, Andrés Finzi and his PhD student Mehdi Benlarbi demonstrate that low temperatures affect the transmission of new SARS-CoV2 variants.

AUGUST 2024

In a study published in *Cell Reports*, researcher Petronela Ancuta and her PhD student Jonathan Dias demonstrate that retinoic acid derived from vitamin A helps HIV replication in macrophages.

SEPTEMBER 2024

In the journal *iScience*, Petronela Ancuta and her student Augustine Fert demonstrate that an antidiabetic drug could accelerate the immune system’s depletion of HIV reservoirs.

OCTOBER 2024

In the journal *Nature Communications*, researcher Sophie Petropoulos’ team publishes an atlas of small non-coding RNAs involved in human preimplantation development, a valuable resource for improving assisted reproduction techniques.

FEBRUARY 2025

Researcher Andrés Finzi receives $2M in funding from CIHR as part of the HIV/AIDS and STBBI Research Initiative.

In a study published in *Developmental Cell*, researcher Greg FitzHarris’ team shows how the early mouse embryo eliminates defective or unnecessary cells in pairs.

MARCH 2025

Researcher Petronela Ancuta receives $200,000 in CIHR funding as part of the *Catalyst Grant: Biomedical Research for HIV/AIDS and STBBI* competition.

In the journal *Nature Medicine*, researcher Sophie Petropoulos and her colleagues at the Karolinska Institutet publish a study allowing for a better understanding and treatment of polycystic ovary syndrome.

USING AI TO BUILD THE ONCOLOGY OF TOMORROW

According to Dr. Houda Bahig, a radiation oncologist and researcher specializing in the treatment of ENT and lung cancers, technological advances in radiotherapy offer many possibilities for optimizing care. In particular, the advent of artificial intelligence (AI) has led to huge advances in controlling side effects and disease in patients.

“Radiotherapy combines cutting-edge technology with a strong human side. It’s the prospect of developing these two aspects with the aim of improving care that particularly interests me,” she emphasizes.

Inspired by her practice with CHUM patients, she hopes to further personalize treatments to optimize survival rates and quality of life.

» From the lab to clinical trials

To this end, Dr. Bahig is conducting research in two interrelated areas. The first uses an AI tool to analyze ENT cancer patient data from the CHUM biobanks and ATiM core facilities. The goal: to predict side effects and establish the best radiotherapy treatment plans for future patients. Her team’s findings are promising and have been published in several scientific journals.

The second part of her research aims to apply the conclusions drawn from the analysis of these data to clinical trials. In one of these randomized studies, Dr. Bahig and her team tested a new treatment approach for oropharyngeal cancer.

“We’ve introduced an innovative, much shorter treatment, which uses very precise imaging technology to target the cancer,” she explains. “This allows us to reduce the dosage so that instead of seven weeks, radiotherapy now lasts four weeks.”

Given the promising preliminary results, the regional study has generated considerable interest and has allowed for patients to be recruited internationally, which is very encouraging for Dr. Bahig. “Several hospitals, such as the MD Anderson Cancer Center in Texas, followed by a hospital in London, Ontario, and soon another in Holland, expressed interest in joining us. The trial is now in phase three and will greatly contribute to improving treatments for patients.” Dr. Bahig is also pleased that most of the patients recruited for this study agreed to participate in the CRCHUM biobanks.

» A tailor-made tool for therapeutic decision making

Thanks to a grant for clinical researchers from the Marathon of Hope Cancer Centres Network and funding from the CHUM, her team is also developing a new personalized therapeutic decision support tool for patients with head and neck cancers using multiomics.* In other words, it involves using diverse patient information, genetics, imaging and clinical observations to identify biomarkers and anticipate responses to treatment. Sequencing of around a hundred patients has already been completed, feeding into the biobank at the same time. Eventually, the tool will be validated in multicentre clinical trials.

Over the next few years, Dr. Bahig hopes that her work will translate into tangible results for patients, and that she will have the opportunity to continue collaborating internationally. “We have been able to initiate studies for which we are the principal investigators at major international centres. This requires bringing together clinicians, researchers, computer engineers, surgeons and students, and then creating extraordinary synergy! It’s a big challenge, but one with big rewards.”

**Multiomics: field of biotechnology that combines genomics, metabolomics, transcriptomics and proteomics.*

+ Research theme highlights

MAY 2024

Dr. Martin Girard, Dr. Houda Bahig and Dr. Daniel von Renteln receive close to $428,000 in grants as part of the Fonds de recherche du Québec – Santé (FRQS) research scholars program.

JULY 2024

The Canadian Institutes of Health Research (CIHR) award a $493,426 grant to Dr. Daniel von Renteln for his project to improve colorectal cancer screening.

SEPTEMBER 2024

ÉTS professors Ali Ahmadi, co-director of the CRCHUM Biomaterials and Biofabrication Laboratory, and Sophie Lerouge, director of the CRCHUM Endovascular Biomaterials Laboratory, receive $100,000 from the Canada Foundation for Innovation’s (CFI) John R. Evans Leaders Fund to explore new biofabrication techniques and innovative biomaterials.

OCTOBER 2024

Researcher Nicola Hagemeister, also a professor at ÉTS, wins the Prix d’excellence en recherche et création – Volet Réalisation from Université du Québec for her extensive clinical study of osteoarthritis of the knee, published in the scientific journal *Postgraduate Medicine.*

NOVEMBER 2024

Dr. An Tang, researcher and professor in the Department of Radiology, Radiation Oncology and Nuclear Medicine at Université de Montréal, is appointed to the Fonds de recherche du Québec – Santé committee.

FEBRUARY 2025

CIHR awards $1.08M to Dr. Gilles Soulez for his project on magnetic resonance navigation in the treatment of liver cancer, and $1.34M to Dr. Daniel von Renteln for his work on reducing adverse events after endoscopic resection of large colorectal polyps.

MARCH 2025

Researcher Dr. Gilles Soulez from the Imaging and Engineering Research Theme is awarded the Scientific Contribution of the Year Award as part of the 2024 CRCHUM Awards of Excellence for his work published in *Science Robotics*.

Dr. Simon Turcotte
Researcher

“To optimize the effectiveness of the therapy, the CRCHUM launched its own cell production unit in 2024.”

REPROGRAMMING IMMUNITY WITH PRECISION ONCOLOGY

Did you know that the CRCHUM is the only centre in Quebec to use the most effective cellular immunotherapy for patients with stage 4 cancer? This treatment relies on T lymphocytes, immune cells that fascinate Dr. Simon Turcotte because of their ability to destroy cancer cells.

In 2013, he was recruited by the CHUM to practise as a hepatobiliary and pancreatic surgical oncologist, and also to start up a laboratory and research program in cellular immunotherapy.

» A first in Quebec

In 2022, his team succeeded in treating their first lung cancer patients with this T cell-based cellular immunotherapy. This work has continued over the past year, with four new studies involving people with different types of cancers.

This innovative therapy involves removing a metastasis from a stage 4 cancer, then extracting tumour-infiltrating lymphocytes (TILs). There are either too few of these lymphocytes or they are inhibited by cancer cells, so a laboratory is used to multiply them in vitro to obtain billions of them. The TILs are then transfused into the patient with the immunostimulant interleukin-2. Patient results are promising.

The process for handling TILs is delicate: they must be kept cold in nitrogen tanks, then brought to the patient’s bedside using cryogenic shippers. Medical and nursing staff have been duly trained not only to handle this product, but also to deal with any side effects in patients. To optimize the effectiveness of the therapy, the CRCHUM launched its own cell production unit in 2024. In 2026, the first cohort of CHUM patients will receive TILs made on site!

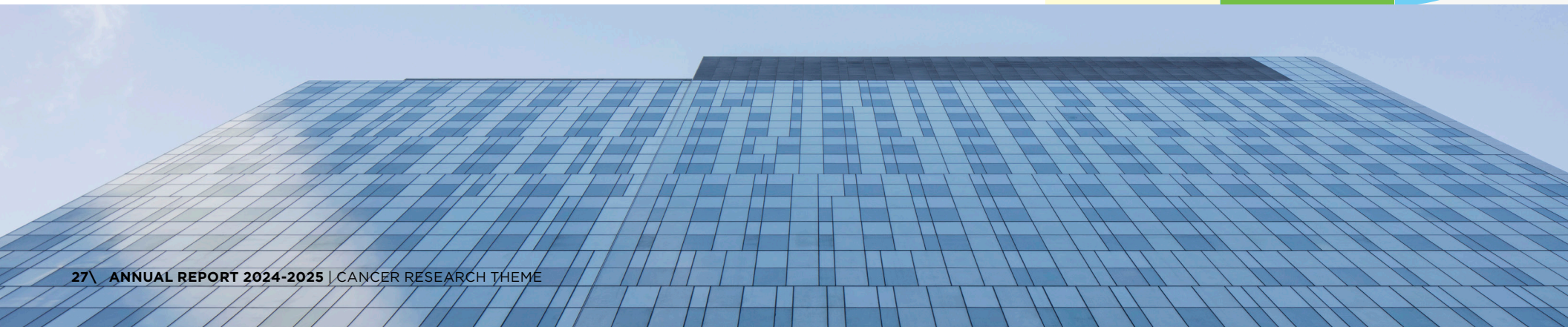
The project was made possible with the collaboration of a number of partners, starting with Jason Guertin, a researcher and health economist at the CHUQ. Through the FRQS-funded Réseau de thérapie cellulaire, tissulaire et génique du Québec, known as ThéCell, Guertin provided valuable assistance in assessing the cost-benefit ratio of cell therapies in a hospital setting. Biomanufacturing engineer Patrick Vermette is also helping to identify critical and costly steps, and to find more efficient alternatives where necessary.

» Better targeted for greater efficiency

In addition to clinical trials, Dr. Turcotte's team is also trying to track the fate of TILs and determine in the laboratory which lymphocytes should be amplified in cellular immunotherapy. Using single-cell sequencing, the specific DNA of thousands of T cells in a tumour can be established. The cytometry and cell imaging core facilities are used to examine which cells respond to tumour antigens and which do not.

Another project aims to discover new antigens on the surface of cancer cells. "What we know is only the tip of the iceberg," notes Dr. Turcotte. "There's a lot going on in the genome of a cancer cell, and it's really chaotic. The non-coding parts—known as the dark genome—make up 90% of DNA and usually remain silent. But in the case of cancer cells, this DNA is read in an abnormal way. A better understanding of this will help us not only to manufacture better antigen-specific cell products, but also to refine complementary techniques to cell therapy, such as vaccination." There's hope yet for a cure!

"What we know is only the tip of the iceberg."



+ Research theme highlights

APRIL 2024

CRCHUM researcher Dr. Bertrand Routy receives the Coup de cœur award from the Collège des médecins du Québec.

The clinical team led by urologic oncologist and researcher Dr. Fred Saad conducts a Phase 1 clinical trial in advanced prostate cancer led by Bayer, which positions the CRCHUM as the first site worldwide to be activated for the PanTHA study.

Researchers Francis Rodier and François Yu receive funding from CQDM to evaluate the therapeutic potential in oncology of an oxygen carrier derived from a marine organism.

MAY 2024

The FRQS awards $508,365 in scholarships to Marie-Claude Bourgeois-Daigneault, Dr. Dominique Trudel and Dr. Simon Turcotte.

The Canadian Cancer Society and the Weston Family Foundation invest $2M in a CRCHUM Phase 2 clinical trial to test a promising new treatment for advanced melanoma. This study is co-led by Dr. Arielle Elkrief, Dr. Bertrand Routy and scientists from the Lawson Health Research Institute.

Researcher Anne-Marie Mes-Masson is appointed a Knight of the Order of Montreal for her work on ovarian cancer.

JUNE 2024

Saima Hassan and her team win a $250,000 grant from the New Frontiers Research Fund (NFRF) to improve the detection of breast cancer.

JULY 2024

Manuela Santos receives $696,150 in CIHR funding for her research on interleukin-22 in cancer.

OCTOBER 2024

Anne-Marie Mes-Masson receives the Wilder-Penfield Award from the Quebec government.

DECEMBER 2024

As part of the Guy Lafleur program supported by the Fondation du CHUM, the teams of Dr. Isabelle Bourdeau, Dr. Arielle Elkrief, Dr. Bertrand Routy and Dr. Simon Turcotte are awarded $250,000 for their precision oncology projects.

MARCH 2025

Dr. Dominique Trudel, Anne-Marie Mes-Masson, Dr. Arielle Elkrief and Réjean Lapointe receive $400,000 from Génome Québec to integrate genomic medicine into clinical practice.

Dr. Arielle Elkrief receives a $525,000 Terry Fox New Investigator Award.

Researcher Marie-Claude Bourgeois-Daigneault receives the Institutional Contribution award as part of the 2024 CRCHUM Awards of Excellence.

Francis Rodier receives $6.5M as part of the Canadian Cancer Society's Breakthrough Team Grants to better understand cancer dormancy and recurrence.

Martine Tétreault
Researcher

“Unfortunately, there is no cure for many neurological diseases”

SEQUENCING FOR BETTER CARE

Martine Tétreault knew she wanted to devote herself to applied health research ever since her undergraduate internship in a genetics laboratory. She began her graduate studies in neurogenetics, and her keen interest in new technologies led to a post-doctorate in bioinformatics.

“I’m passionate about working on projects that can help patients directly. Unfortunately, there is no cure for many neurological diseases. Finding a genetic cause gives patients a great deal of hope.”

In the laboratory she established in 2018 at the CRCHUM, Tétreault and her team combine experimentation and computational analysis. Their goal: to compare DNA sequences from patients suffering from neuromuscular and neurodegenerative diseases with a reference genome to identify genetic variations potentially linked to these diseases.

Her group of six students, one research associate and two bioinformaticians uses bioinformatics—a science combining computer science, mathematics and biology—to analyze large quantities of genes. To do so, they use the CHUM’s local biobank, as well as those of other research centres in Quebec and Canada.

» Significant discoveries

Martine Tétreault is the winner of the 2024 CRCHUM Awards of Excellence—Emerging Researcher Award. She has co-authored 75 articles that have advanced the diagnosis of rare diseases while deepening our understanding of the pathological mechanisms of neurological diseases.

Over the past year, her research into rare diseases has led to the discovery of a variation in a little-studied gene in a patient with a muscular disease. This gene is not included in standard diagnostic tests since its link with muscular diseases is poorly understood. This discovery is crucial, as a treatment exists for this type of mutation. Tétreault therefore wishes to publish this case to inform the medical community of the importance of this gene in diagnoses.

In another research project, her team sequenced blood cells from patients with Parkinson's disease. The goal is to explore the idea that changes in the body's periphery might precede the disease's classic motor symptoms, such as tremors. Results published in May revealed that patients with Parkinson's disease have more activated immune cells and higher expression of stress-related genes compared to healthy individuals and patients with atypical forms of Parkinsonism.

This discovery could be used to design biomarkers to help distinguish Parkinson's disease from atypical forms, which is often difficult in clinical settings, especially in the early stages of the disease.

» Moving toward more precise diagnostics

Along with Éric Samarut, another CRCHUM researcher, Tétreault has also conducted research on certain ataxias as part of a grant from Ataxia Canada to study CANVAS syndrome (*Cerebellar Ataxia, Neuropathy, Vestibular Areflexia Syndrome*). The two scientists are particularly interested in repeated extensions of genetic sequences, which in the case of CANVAS were discovered in 2019.

Although the size of the genetic extension is linked to symptom severity, it does not explain all variability (severity, age of onset). In particular, the project uses long-read sequencing to identify the genetic modifiers involved. According to their hypothesis, greater genetic extension would be a factor that explains symptom variability.

Good news: last March, Tétreault and her team secured $5.7M in funding from Genome Canada and Génome Québec, in addition to $2M from the Fondation du CHUM. These funds will enable them to continue their NeuRo Genomics Initiative project, which aims to sequence the genomes of people suffering from various neurological diseases.

+ Research theme highlights

MAY 2024

As part of the research scholars program of the Fonds de recherche du Québec – Santé (FRQS), Martine Tétreault receives nearly $300,000 to study neurological diseases.

The organization also awards approximately $140,000 to Dr. Sami Obaid to study how diffusion neuroimaging can improve epilepsy surgery outcomes.

JULY 2024

Adriana Di Polo, Dr. Catherine Larochelle and Dr. Alexandre Prat receive funding totalling over $2.8M from the Canadian Institutes of Health Research (CIHR).

AUGUST 2024

Researcher Adriana Di Polo and her PhD student, Sana El Hajji, publish a study in *Science Advances* on the efficacy of daily eye drops in stimulating retinal neuron regeneration and survival in a rodent model of glaucoma.

NOVEMBER 2024

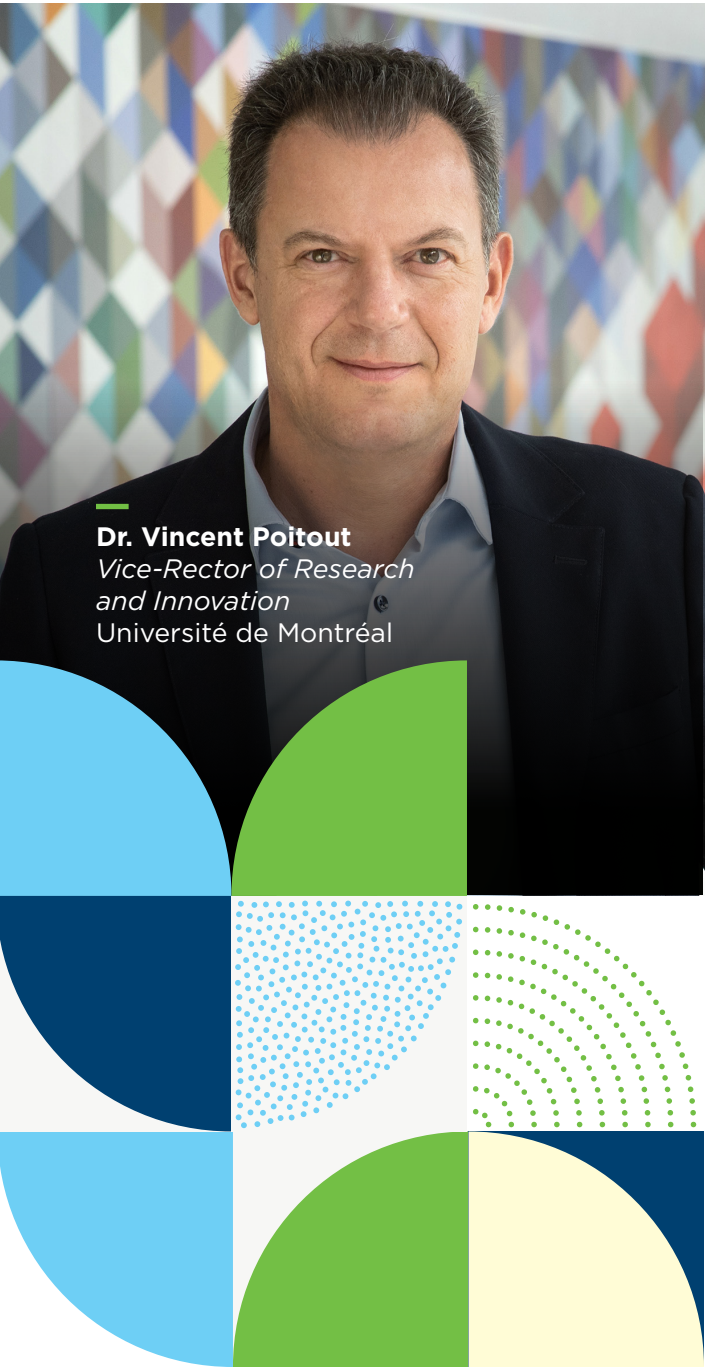
Dr. Alexandre Prat is appointed to one of the Fonds de recherche du Québec – Santé committees.

FEBRUARY 2025

Élie Bou Assi and Dr. Dang Khoa Nguyen, along with their colleague Frédéric Lesage of Polytechnique Montréal, receive $817,020 in CIHR funding to improve epilepsy diagnoses using computational analysis of electroencephalograms and machine learning.

MARCH 2025

Christine Vande Velde wins two grants from ALS Canada totalling $425,000 to shed light on the pathogenesis of amyotrophic lateral sclerosis (Lou Gehrig's disease).



Dr. Vincent Poitout
Vice-Rector of Research and Innovation
Université de Montréal

“As a former director of the CRCHUM, I’m really proud of the core facility infrastructure that has been put in place.”

UNLOCKING THE MYSTERIES OF DIABETES

After almost 11 years as Director of Research and Innovation at the CHUM and Scientific Director at the CRCHUM, Dr. Vincent Poitout takes on a new challenge as Vice-Rector of Research and Innovation, succeeding Marie-Josée Hébert as of June 1, 2025. His role is to coordinate and direct all scientific activities at Université de Montréal.

In addition to this important mandate, Dr. Poitout continues to direct his laboratory, which focuses on researching diabetes—the cornerstone of his work since his arrival at the CRCHUM 20 years ago!

» Beta cells under the microscope

In his lab, Dr. Poitout’s team is investigating the function of pancreatic beta cells, which produce insulin, the hormone that controls blood glucose levels. In people with type 2 diabetes (T2D), beta cells are unable to produce enough insulin to regulate glucose.

What causes the dysfunction of these cells in T2D? How do they react in an environment with excess glucose or lipids? How does excess weight affect these cells and worsen diabetes?

“We’re trying to understand the mechanisms of action of proteins found in large numbers on the surface of beta cells, which act as receptors for the external environment,” explains Dr. Poitout. “These proteins then transmit information to the cell that modulates insulin secretion. So, we’re trying to find out how the cell responds to its environment through these receptors.”

These receptors are easily accessible due to their position on the cell surface, making them prime targets for future drugs. As such, his research will help improve care for diabetics.

» A trigger factor

Another question that Dr. Poitout and his team are trying to answer is why type 1 diabetes (T1D) mainly occurs during puberty. In this form of diabetes, the autoimmune destruction of beta cells gradually stops insulin production. One possible explanation is that the accelerated division of beta cells during the growth spurts of puberty makes them more vulnerable to autoimmune attacks.

To test their hypothesis, Dr. Poitout's team is using an experimental model of T1D in rodents. They are also using several CHUM core facilities, including cellular imaging, cellular physiology, CITADEL, small animal phenotyping and imaging, as well as the animal facility. "As a former director of the CRCHUM, I'm really proud of the core facility infrastructure that has been put in place. They are very useful to us on a daily basis," emphasizes Dr. Poitout.

» An innovative and collaborative project

Thanks to $16.4M in funding from the Canada Foundation for Innovation, the Quebec government and several partners, including the Fondation du CHUM, Dr. Poitout will also study the early detection and treatment of T2D. This project, entitled *Imaging T2D: Multimodal Imaging Program for the Prevention and Treatment of Type 2 Diabetes*, brings together CRCHUM researchers with a wide range of expertise: Jean DaSilva, Stéphanie Fulton, Guy Rutter, Dr. An Tang and François Yu, plus Dr. Poitout and collaborators at Université de Sherbrooke.

More specifically, the program aims to develop biomarkers that predict disturbances in the functioning of the liver, brain, adipose tissue and pancreas, which are all organs affected by T2D.

Most of the funding will be used to set up a new cutting-edge imaging core facility that combines magnetic resonance, positron emission tomography and ultrasound.

+ Research theme highlights

MAY 2024

Dr. Nadine Taleb receives a $163,328 grant from the Fonds de recherche du Québec – Santé (FRQS) as part of the research scholars program to characterize and personalize the management of latent autoimmune diabetes in adults.

John Chan, Director of the CRCHUM Laboratory of Molecular Nephrology and Endocrinology, receives the 2024 Medal for Research Excellence from the Kidney Foundation, Quebec Division.

AUGUST 2024

CRCHUM researcher Dr. Jessica Forcillo installs the first-ever aortic ring on the heart of a Quebec patient. This procedure represents a major breakthrough and opens up new prospects for the treatment of cardiac anomalies.

OCTOBER 2024

Researcher Ciaran Murphy-Royal is awarded $120,000 over 3 years from the Scottish Rite Charitable Foundation of Canada to study the role of astrocytes in sleep and wakefulness disorders.

DECEMBER 2024

Researcher Stephanie Fulton, along with PhD student David Lau and former postdoctoral fellow Stephanie Tobin from her lab, reveal in a study published in *Nature Communications* that the ABHD6 enzyme in the nucleus accumbens, a region of the brain, represents a potential target against obesity.

MARCH 2025

Researcher Gareth Lim, Canada Research Chair in Adipocyte Development, wins the Emerging Researcher Award as part of the 2024 CRCHUM Awards of Excellence.

Learn more:
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