

Fonds de recherche du Québec

Société et Culture
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A YEAR MARKED BY ARTIFICIAL INTELLIGENCE

If I were to briefly sum up the past year, I would recap with the words *strategic planning*, *artificial intelligence* and *international partnerships*. The three Fonds de recherche du Québec (FRQ) completed the 2018–2022 strategic plans that were adopted at the meetings of the boards of directors in April. The seal of approval from the government is expected after the elections on October 1. The new strategic plans build on the reinvestments in research promised under Québec's research and innovation strategy—the Stratégie québécoise de la recherche et de l'innovation (SQRI)—which provides more support for young researchers, strengthens Québec's research capacity and enables the development of intersectoral research programs focused on key social challenges: demographic change and population aging, climate change and sustainable development and entrepreneurship and creativity. The plans were established following consultations with members of the research, student and government communities and civil society. I would like to thank every person who took part in the sessions, which are so important to the FRQ.

Without a doubt, the topic of the year was artificial intelligence (AI). As an international hub of expertise in AI, Québec is able to succeed in this highly competitive sphere. The province stands out for its scientific expertise in AI and its ethical and social concerns with regard to the development and application of advances in the field. On November 2 and 3, 2017, the FRQ in partnership with Université de Montréal and Palais des congrès de Montréal hosted the Forum on the Socially Responsible Development of Artificial Intelligence with over 400 delegates and world-renowned speakers in attendance. The event was the opportunity to lay the groundwork for the Montréal Declaration—a conversation between citizens, experts and representatives of public authorities to develop a responsible and ethical AI framework.

In response to the need to federate Québec's driving forces in responsible AI development, the FRQ launched the idea to create an observatory of the societal impacts of AI and digital technologies. In March 2018, the agencies invited stakeholders—and university institutions from across Québec in particular—to discuss the project. As a result of the workshop, the FRQ and ministère de l'Économie, de la Science et de l'Innovation released a call for proposals in May. The creation of the observatory is expected to be announced in late 2018.

To better understand Québec's position with regard to AI, I co-wrote two articles: one with Cédric Villani, renowned mathematician, representative for the French constituency of Essonne and author of a report on artificial intelligence (*Le Devoir*, March 14, 2018) and the other with Alan Bernstein, president and CEO of the Canadian Institute for Advanced Research (CIFAR), who is responsible for Canada's AI strategy (*La Presse*, April 28, 2018). I also contributed to missions and roundtables in Canada and around the world. In AI, things move very fast!

The past year was also very productive in terms of international meetings and partnerships. This review provides insights into some of the missions and meetings leading to initiatives that enable (or will enable) Québec researchers to strengthen and develop new scientific collaborations.



Rémi Quirion, OC, CQ, PhD, FRSC
Chief scientist of Québec

Chief scientist of Québec's Report 2017-2018

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CONTEXT

The second year of the second mandate of the Chief scientist of Québec was marked by the federal government's reinvestment in research as the government of Québec announced new credits through means including the SQRI and Stratégie des sciences de la vie (life sciences strategy). In March 2018, the Canadian government announced it would be granting substantial additional sums to research initiatives over the next five years, including \$925M to three federal granting councils to conduct basic research, \$763M to the Canada Foundation for Innovation, \$210M to research chairs and \$275M to the new fund to support international, multidisciplinary and high-risk research. These amounts are in addition to the \$125M set aside for CIFAR's nationwide AI strategy and \$950M for five super clusters, including \$250M for SCALE.ai. A large portion of these new credits are motivated by the findings of Canada's Fundamental Science Review (Naylor Report), drafted by an expert panel on which Rémi Quirion served on. These investments will enable us to stop the freefall of R&D in Canada's GDP, which plummeted from 1.89 to 1.65% between 2000 and 2015. Indeed, in the same period, the rate rose from 2.13 to 2.37% in OECD countries as a whole.

The principles of equity, diversity and inclusion (EDI) are gaining a foothold in research. Held in Montréal in November 2017, the 11th Gender Summit, in which FRQ under the leadership of Maryse Lassonde and the Natural Sciences and Engineering Research Council of Canada were partners, was among last year's key events. A range of initiatives aiming to foster diversity and inclusion in the scientific community were implemented, including the indicator that the Fonds de recherche du Québec – Nature et technologies (FRQNT) added to its assessment criteria for strategic clusters as part of the fall 2018 competition. Accounting for EDI principles in the scientific review of funding applications will have a positive impact on the quality of the research supported by the FRQ.

In closing, let us underline Maryse Lassonde's contribution as scientific director of the FRQNT. Over the past six years, she worked tirelessly to extend the agency's reach. With energy and assurance, she rose to every challenge and expanded the FRQNT's horizons through international partnerships. Her dedication to women in science was wholly reflected in the Gender Summit, Québec's participation in the SAGA project led by UNESCO and the efforts to implement a program based on the Athena SWAN model in Canada. The EDI principles that have emerged from these initiatives are also part of her legacy at the FRQ.



KEY ACHIEVEMENTS

Scientific missions and agreements



Visit of a research organization in New York.

MISSION TO THE UNITED STATES

From October 22 to 26, 2017, the Chief scientist of Québec and the scientific officers of the FRQ led a mission to Boston and New York to explore partnership and collaboration opportunities. To date, the mission has given rise to meetings and workshops between Québec and American teams (Element AI and MIT CSAIL in Boston, TransMedTech and the Wyss Institute at Harvard University, Ouranos and the Massachusetts-Québec Collaborative Research Council, Montréal Neurological Institute and Hospital and the New York Structural Biology Center, the Institute for Research in Immunology and Cancer — Commercialization of Research, the City University of New York and several universities).

MISSION TO ITALY AND FRANCE

From December 3 to 8, 2017, the Chief scientist of Québec took part in a day of discussions and research on the impacts of climate change in Rome, along with Jérôme Dupras of Université du Québec en Outaouais, Yves Bégin of Institut national de la recherche scientifique and Mohamed Cheriet of École de technologie supérieure. He also contributed to the first Conference of Paris organized by the International Economic Forum of the Americas in partnership with the OECD. These events were the opportunity to explore possible research partnerships with Italian funding agencies and meet with representatives from political institutions in Italy and France. The discussions focused especially on sustainable development, the life sciences, artificial intelligence and agri-food.

Rémi Quirion also presented Québec's research and innovation model and the role of the Chief scientist of Québec to the Office parlementaire d'évaluation des choix scientifiques et technologiques, in France. As a member of the scientific advisory committee, he handed out one of three annual awards given by Fondation Alzheimer France to young French researchers.

FRANCE-QUÉBEC HEADS OF GOVERNMENT MEETINGS

From March 5 to 9, 2018, the Chief scientist of Québec joined Premier Philippe Couillard on a major mission as part of the heads of government meeting. Established in 1977, the alternating meetings aim to set the directions and priorities of the relations between Québec and France.

Cédric Villani and Rémi Quirion jointly led a roundtable on artificial intelligence that focused on young researchers in the sector, education and breakthrough technologies. On the mission, Québec renewed its agreements with Centre national de la recherche scientifique (CNRS), Institut national de la santé et de la recherche médicale, Agence nationale de la recherche and Cancéropôle Lyon Auvergne Rhône-Alpes.

MISSION TO CHINA

From January 20 to 26, 2018, on an economic mission to China (Beijing, Hangzhou, Shanghai) led by Premier Couillard, the Chief scientist of Québec renewed the collaboration and partnership agreement with the National Natural Science Foundation of China. Under the agreement, the Fonds de recherche du Québec – Société et culture hosted a Chinese delegation at a conference on smart cities. A second event on the topic of big data is planned in China.

Partnership agreements were renewed during the mission to China.



AGREEMENT BETWEEN THE FRQ AND WADA

On May 17, 2018, the World Anti-Doping Agency (WADA) and FRQ signed a draft agreement to carry out joint research projects on the fight against doping in elite sport. Through the new partnership, Québec researchers in the agency's three sectors will contribute to the development of anti-doping knowledge and solutions. The initiatives funded under the program will focus on topics including doping biomarkers and the social

factors that contribute to doping. A first call for proposals on the use of artificial intelligence in the fight against doping in elite sport was launched in May 2018.

MISSION TO BELGIUM AND LUXEMBURG

From May 28 to June 1, 2018, the Chief scientist of Québec was invited to Liège to speak at the 32nd conference of the International Centre of Research and Information on the Public, Social and Cooperative Economy. He took

the opportunity to discuss urban farming and artificial intelligence with representatives from Innoviris, which funds research in the Brussels area, and the Fonds national de la recherche du Luxembourg. Rémi Quirion also met with Jim Dratwa, head of the European Group on Ethics in Science and New Technologies Office, and Carlos Moedas, European commissioner of research, science and innovation.

❖❖❖ Conferences and public affairs

THE FRQ IN PARLIAMENTARY COMMISSION

On September 26, 2017, the Chief scientist of Québec and the FRQ's scientific officers met with members of the Commission de l'économie et du travail for the hearings held as part of the review of the FRQ's directions, activities and administration. The three meetings led to fruitful exchanges with members of all parties.

9th CANADIAN SCIENCE POLICY CONFERENCE

At the 9th Canadian Science Policy Conference held from November 1 to 3, 2017, the Chief scientist of Québec made several presentations and spoke on the importance of investing in basic research and ensuring Canada and Québec's positions as world leaders in the knowledge economy. Following discussions with the president and CEO of the Canadian Science Policy Centre, the FRQ agreed to support the organization

by encouraging Québec researchers to take part in the centre's annual conference. The FRQ planned to host three roundtables at the 2018 event.

SCIENCE ADVICE IN CANADA AT UNIVERSITY OF OTTAWA

On January 31, 2018, the Institute for Science, Society and Policy organized a public roundtable with Mona Nemer, Canada's chief science advisor, Molly Shoichet, chief scientist of Ontario and Rémi Quirion, Chief scientist of Québec, to discuss the importance of making science accessible to citizens. It was the first roundtable on which all three chief scientists sat together.

Dr. David Naylor, Martha Crago, Art McDonald, Janet Halliwell and Rémi Quirion at the 9th Canadian Science Policy Conference.



OPENING PLENARY AT THE SALON DES TEQ

On March 13, 2018, the 12th edition of the Salon des technologies environnementales du Québec (TEQ) was held in Québec. The opening plenary was led by Chief scientist of Québec and Jean Lemire, envoy for climate change and northern and Arctic affairs of the government Québec. Both speakers touched upon key scientific challenges. Rémi Quirion presented the FRQ's action plan for environmental responsibility in research.

❖ Intersectoral project development

AN INTERNATIONAL OBSERVATORY ON THE SOCIETAL IMPACTS OF AI AND DIGITAL TECHNOLOGIES

On March 27, 2018, the FRQ and their partners held a workshop at Palais des congrès de Montréal on the project to create an international observatory on the societal impacts of artificial intelligence (AI) and digital technologies. Nearly 100 people from all of Québec's universities took part in the event, along with representatives from governments, civil society institutions and the AI sector.

In addition to being a major AI research hub, the observatory demonstrates the leadership role Québec intends to take in the socially responsible development of AI on the international stage.

ANNOUNCEMENT OF THE AUDACE RESEARCH PROJECTS

On April 30, 2018, the Chief scientist of Québec revealed the first series of research projects funded under the AUDACE program. Over \$2.7M in grants were awarded to 22 ambitious, high-risk and forward-looking projects that make a decisive break with standard research codes, including a project to produce ethical foie gras

that brings together a duck and goose producer and researchers in medical imaging and animal behaviour. The second edition of the competition was launched in July 2018.

AN INTERSECTORAL NETWORK ON FLOOD RISK MANAGEMENT

Under the SQRI, dedicated credits were granted to the FRQ to implement intersectoral initiatives in response to key social challenges, including sustainable development and the fight against climate change. The floods that occurred in spring 2017 put considerable strain on citizens and municipal and provincial authorities, and the need to develop flood research networks in a climate change context prompted the Chief scientist of Québec

to hold two meetings with experts and partners. These discussions led to the launch of a call for proposals on May 17, 2018, to create an intersectoral network on flood risk management in the context of climate change.

INTERSECTORAL STUDENT COMMITTEE

In September 2017, the intersectoral student committee contributed to the Journées de la relève en recherche ACFAS-FRQ in Québec and led a consultation on non-academic careers. The committee also released its report, which outlines a number of avenues open to members of academia. The intersectoral student committee is now a standing committee of the boards of directors of the FRQ, a status that is unique in Canada.



❖ Promoting research

G7 RESEARCH SUMMIT SERIES

On May 23 and 24, 2018, the Chief scientist of Québec and FRQ organized the G7 Research Summit on arctic sustainability in collaboration with the Royal Society of Canada. A number of speakers recalled the importance of taking local communities and their traditional knowledge into account when making decisions regarding work to be carried out on the territory. They also stressed that the lack of universities in the Canadian Arctic

weakens Canada's position in the region and illustrates the imbalance in access to education between northern and southern Canada. Over 150 people were in attendance.

WORKSHOP IN PARTNERSHIP WITH INGSA

On May 25, 2018, the Chief scientist of Québec held North America's very first workshop on scientific advice in partnership with the International Network for Government Science Advice (INGSA). Among the nearly

40 participants were Elias Micha, coordinator of science, technology and innovation of the office in the president of Mexico, Valérie Patreau, councillor for the Outremont borough and representative of Mayor Valérie Plante, Mona Nemer, chief science advisor of Canada, Molly Shoichet, chief scientist of Ontario and Karsten Henriksen, vice-president of Nunavut Arctic College. The exploratory meeting helped gauge the interest in creating a North American chapter of INGSA.

SCIENCE BREAKFASTS AT THE NATIONAL ASSEMBLY

In the past year, the Chief scientist of Québec has led two science breakfasts for elected officials in Québec's National Assembly. In November 15, 2017, the sixth breakfast focused on the impacts of public research in Québec. At the event, Dominique Anglade, Vice-Premier and Minister of Economy, Science and Innovation, presented the SQRI. The Chief scientist of Québec then provided tangible examples of the positive impacts that public research has had across the province.

The seventh breakfast—on floods—was held on March 28, 2018. Martin Coiteux, Minister of Municipal Affairs and Land Occupancy, gave the opening address. Researchers

[Minister Martin Coiteux delivered the opening remarks at the 7th science breakfast.](#)



Pascale Biron of Concordia University and Marie-Christine Therrien of École nationale d'administration publique presented their work on river dynamics and urban resilience.

BREAKFAST AT THE CONGRÈS DE L'ACFAS

On May 9, 2018, a roundtable on participative research in Québec and Canada was held at a breakfast hosted by the Chief scientist of Québec as part of the 86th annual Congrès de l'ACFAS in Chicoutimi. Rémi Quirion and his guests Mehrdad Hariri, president and CEO of the Canadian Science Policy Centre, Ted Hewitt, president of the Social Sciences and Humanities Research Council of Canada, Mona Nemer, Canada's chief science advisor and Lyne Sauvageau, president of ACFAS discussed how citizens could contribute to the development of scientific knowledge and policy. In the coming year, the FRQ will organize another session on the topic. A research initiative may be launched in 2019.

CONFERENCE ON SCIENTIFIC DIPLOMACY

At the 30th edition of the Entretiens Jacques Cartier, the FRQ and CNRS organized a conference on the use of scientific diplomacy. Held on October 17, 2017, at Cœur des sciences de l'UQAM, the event brought together some 100 people from the research and government sectors, as well as embassy and consulate representatives.

It highlighted concrete examples of how Québec and France rely on scientific diplomacy in issues including photovoltaic energy, infectious diseases, the Arctic and sustainable development and climate change.

CONFERENCE OF MONTRÉAL

On June 13, 2018, at the Conference of Montréal, the FRQ in collaboration with IVADO, MILA and SCALE.ai organized a plenary session on the societal impacts of artificial intelligence. The Chief scientist of Québec opened the session, which featured Yoshua Bengio of Université de Montréal and MILA, Sylvain Duranton of BCG Gamma and Abhay Parasnis of Adobe. The three-day event hosted 4 200 delegates, mainly from the economic, political and business sectors of over 60 countries.

[Rémi Quirion at the grandstand of the Conference of Montréal.](#)



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