

Institut nordique  
du Québec  
Together for the North

2020 | 2021  
**ACTIVITY  
REPORT**







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# INQ

AT A GLANCE



Veronique Dubos/ArcticNet



**16**

Quebec university  
member institutions



**+ de 250**

affiliated researchers



**+ de 90**

affiliated research entities  
(research centres, laboratories,  
institutes, and groups)



**67**

research chairs  
with an INQ-affiliated chairholder



**4**

founding nations  
(Inuit, Cree, Innu, and Naskapi  
of Kawawachikamach)



**700 000 \$**

invested in 7 scientific projects  
in partnership with Sentinel North (SN)



**3**

INQ research chairs



**+ de 35**

knowledge transfer activities  
in 2020-2021



**+ de 10**

outreach activities in 2020-2021





Photo credit/Andreeanne Beardsell

## VISION

The INQ's vision is to develop a sustainable North through innovation and knowledge creation, and by integrating western science with local and traditional knowledge. In partnership with communities, government authorities and the private sector, INQ aims to help secure the wellbeing of all people in northern Quebec and the Canadian Arctic, now and in the future, by ensuring access to clean energy, conserving healthy ecosystems and the services they provide, building viable infrastructure, supporting economic prosperity and vibrant cultures, and strengthening northern education and healthcare systems.

## MISSION

INQ's mission is to unite the stakeholders in northern and Arctic research (natural sciences and engineering, health sciences, social sciences, and humanities) to promote innovation, and to create synergy between researchers and the end-users of research to provide governments, northern communities, and the private sector with the knowledge and expert workforce required for the sustainable development of Northern Québec and the Canadian Arctic.

## VALUES

INQ's actions are motivated by the following values:

- > Excellence in research
- > Inclusion of partners
- > Scientific rigour
- > Sharing of resources

# A WORD FROM THE DIRECTORS

Who would have thought, just a short time ago, that we would be forced by governments around the world to remain confined to our homes for an indefinite period due to a pandemic? It sounds like science fiction, but that is exactly what we have all experienced this year. And it has shown us just how flexible human nature can be.

The INQ team adapted quickly to this new reality. In only a few weeks, face-to-face activities were transformed into virtual ones, with great enthusiasm, professionalism, and interest. A weekly webinar series was introduced, as well as high-quality student videos for the Mon projet nordique / My Northern Project competition, and an all-virtual scientific meeting with more than 30 presentations, 14 posters, and some 400 participants. There was also a resurgence of interest in the MOOC (massive open online course) with a record-breaking 2,000+ registrations in 2020-2021!

It was a year rich in achievements under the governance of new director Jean-Éric Tremblay, a tenured professor who has been highly active in INQ since its creation. A year in which considerable effort was made to get members and partners more involved, with vacant positions on the various committees filled and a first general meeting of members held in December in virtual mode, where all 16 regular members were present.

The strategic plan, which had been in the works for a year, was launched in November. In the scientific sphere, despite the impossibility of travelling to the North and the Arctic, research activities were adapted, and researchers reinvented themselves. The work of the three partnership research chairs continued to have a remarkable impact. Five new projects were funded under the Partnership Research Program for a Sustainable North in June. Affiliated researchers from different institutions were recruited to co-lead the five research axes, and scientific news briefs, written by an experienced journalist, were posted highlighting the work of INQ researchers. In addition, the Atiku Portal added new collections and benefited from the support of two more member institutions, and newsletters were produced monthly. Lastly, INQ was very active on social media.

But that's not all! During this year marked by the pandemic, developments on the scientific complex concept advanced at full speed. The concept was presented and approved in its entirety by all stakeholders—a major step towards the construction of a flagship centre for northern and Arctic research in Québec. This pavilion, the only one of its kind in Québec and Canada, will promote innovation and interdisciplinarity.

We also suffered an enormous loss this past year when Professor Louis Fortier, INQ Director of Science and Innovation, passed away serenely in October 2020. Louis was a visionary, a builder, and a leading figure in northern and Arctic research in Québec, Canada, and internationally. Several generations of researchers have been inspired by his initiatives and research work. Together, we are continuing to realize one of his great dreams: Institut nordique du Québec.

We would also like to thank the Government of Québec for its trust and unwavering support for INQ since its inception (this is especially appreciated in the context of the current challenging situation). In particular, we would like to thank Ministère de l'Énergie et des Ressources naturelles du Québec and Société du Plan Nord, which granted us \$3 million over the next three years. Other financial support comes primarily from Fonds de recherche du Québec, Ministère de l'Économie et de l'Innovation, and Ministère des Relations internationales et de la Francophonie du Québec.

In short, it was a year marked by resilience, a year that, despite COVID-19, was busier and more active than ever!



A handwritten signature in black ink that reads "Eugénie Brouillet".

**Eugénie Brouillet**  
Chair, Executive Committee  
Institut Nordique du Québec



A handwritten signature in black ink that reads "Jean-Éric Tremblay".

**Jean-Éric Tremblay**  
Director  
Institut Nordique du Québec



A handwritten signature in black ink that reads "Brigitte Bigué".

**Brigitte Bigué**  
Executive Director  
Institut Nordique du Québec

# ACTIVITIES UNDERGO A TRANSFORMATION

## A DIGITAL YEAR

We have all been affected by it! The pandemic has transformed our daily lives. INQ chose to be reactive and bold. The challenges resulting from government directives and health measures have done nothing to slow our desire to build a strong, interconnected research community that is open to others. Just a

few days after the announcement of the first lockdown, members of the INQ team were already working to transform ongoing activities and the projects that would emerge in these uncertain times. The ideas progressed and INQ reinvented itself.

### WEEKLY WEBINARS

The weekly Institut nordique du Québec webinars were launched on April 8, 2020. They address the multiple facets of northern research carried out within the INQ community.

Webinars included everything from planning a research project in the North and the impact of pesticides on Arctic phytoplankton to the emergence of Inuit and Innu written literature. The themes addressed were highly diverse and presented by experts in each field.

31	webinars in 2020-2021
35	speakers (from 10 different backgrounds—universities, public and private partners, and government institutions)
1,000+	live participants
1,500+	offline views
25+	hours of scientific content available for consultation on the INQ website

### MON PROJET NORDIQUE / MY NORTHERN PROJECT

Mon projet nordique / My Northern Project is a science outreach competition where students present their northern or Arctic research project in five minutes. Traditionally, the competition takes place on stage and in front of an audience. However, in 2020, due to the pandemic, the format was adapted, and students were invited to produce a video clip to be posted on social media. Even without the excitement of live presentations by the next generation of northern scientists, INQ was delighted with the enthusiasm generated by the video clips produced for the competition. By taking part, the students undeniably benefited from the increased visibility of their research work.

11	videos submitted to the competition
5	universities represented
27,000+	people reached on Facebook
6,500+	people reacted to at least one of the videos

**INQ NORTHERN DAYS | IN VIRTUAL MODE |  
NOVEMBER 10-12, 2020**

Scientific conferences, thematic sessions, a discussion panel, a virtual poster session, and video clips of the Québec finalists of the Mon projet nordique / My Northern Project, and much more. Once again, INQ Northern Days highlighted the research carried out in Northern Québec

**A 3-day event 100% live streamed**

<b>30</b>	scientific conferences
<b>7</b>	thematic sessions
<b>14</b>	scientific posters
<b>400+</b>	live viewers
<b>400+</b>	offline views

**MOOC | NORTHERN QUÉBEC: ISSUES, SPACES, AND CULTURES**

In keeping with the ever-growing interest in online training since the beginning of the pandemic, the MOOC had one of its best years in terms of enrolment in 2020-2021. Since its creation, the quality of our MOOC has been repeatedly praised by administrators of organizations north of the 49th parallel. Under the direction of Professor Thierry Rodon, the MOOC provides participants with a better understanding of contemporary socio-political issues in Northern Québec.

**Launched in 2017**

**Offered in 2 languages: English and French**

<b>2,000+</b>	registrations in 2020-2021
<b>10,000+</b>	registrations since its launch

# HIGHLIGHTS

It was a year marked by numerous achievements, with new projects introduced and others wrapping up. Seven years after its creation, INQ continues to develop, and more and more researchers are involved in its research program.

## NEW DIRECTOR

As of **July 2020**, INQ has been under the leadership of Jean-Éric Tremblay, an oceanography professor and researcher in the Biology Department at Université Laval. Chosen following a call for applications launched in March 2020, Dr. Tremblay has extensive knowledge of northern and Arctic issues. He has also been involved with INQ since its inception.

## FIVE NEW PROJECTS FUNDED UNDER THE PARTNERSHIP RESEARCH PROGRAM FOR A SUSTAINABLE NORTH

In **July 2020**, INQ and Université Laval's Sentinel North Research Strategy announced the funding of five additional projects under their Partnership Research Program for a Sustainable North. A total of \$1.5 million was awarded in this second call for proposals for inter-institutional and multidisciplinary projects that will generate new knowledge about the North and the Arctic, with a view to sustainable development of Northern Québec and the well-being of the communities living there.

An impartial selection committee composed of INQ partners, researchers with varied expertise, and representatives of northern communities was responsible for conducting a detailed evaluation of the 14 applications deemed eligible for the call launched in February 2020. These five new projects are in addition to the two projects previously funded under the same program. A description of all the projects can be found on pages 40 and 41 of this report.





## LAUNCH OF THE 2020-2025 STRATEGIC PLAN

INQ's strategic plan, released in **November 2020**, was inspired by the inclusive vision and broad mission that define INQ both from a scientific and operational perspective. The plan is structured around 7 major orientations set out in 7 strategic objectives and 45 priority actions.



## CO-DIRECTORS FOR THE RESEARCH AXES

Since **March 2021**, each of the five INQ research axes is now co-directed by two scientists from different academic institutions. Their three-year mandate consists of leading and coordinating the scientific activities of the research axes under their leadership. See page 31 of this report for the profiles of the co-directors.



## SCIENTIFIC NEWS | SPOTLIGHT ON NORTHERN RESEARCH IN QUÉBEC

To celebrate the excellence of Québec's northern research and highlight the various challenges and issues related to these territories, INQ launched a series of scientific articles devoted to the work being conducted by its affiliated researchers. The articles are written by science journalist Valérie Levée, who interviews the research teams and their partners to provide a fascinating and reader-friendly portrait of the research being conducted north of the 49th parallel. The series of monthly articles was launched in **March 2021** and will continue over the coming months.

## Québec | INQ FUNDING

The provincial budget tabled in **March 2021** earmarked funding for INQ operations until 2023. This funding comes from Québec's Ministère de l'Énergie et des Ressources naturelles and Société du Plan Nord. The exciting announcement is a sign of confidence in INQ and its many partners who are committed to advancing the scientific knowledge necessary for the sustainable development of the North. It is worth recalling that INQ operations have been funded for the last two years by Ministère de l'Économie et de l'Innovation and Société du Plan Nord. In addition, Fonds de recherche du Québec and the Sentinel North Strategy (Canada First Research Excellence Fund) both support the development of INQ research.



## NEW COLLABORATORS AND NEW COLLECTIONS FOR ATIKU<sup>U</sup> | NORTHERN AND ARCTIC STUDIES PORTAL

The creators of Atiku<sup>U</sup> developed two new collections: "General Public" and "First Peoples of the North." The former features works of different kinds related to the North and the Arctic. All of the resources in this collection are freely accessible. The "First Peoples of the North" collection includes approximately one hundred documentary resources that deal with the northern First Nations and Inuit. Moreover, Atiku has two additional collaborators that were recruited during the year: librarians from Université de Montréal and Concordia University. The portal, which now boasts more than 300 documentary resources, continues to develop.



Michèle Séguin-Letendre/ArcticNet



Photo credit/Lucasi Kiatainaq

## MEMBERS' TOUR

INQ continued the tour of its member institutions, which began in 2019-2020, in virtual format. The purpose of these meetings is to speak with INQ-affiliated researchers about opportunities offered by INQ. These discussions help foster a better understanding of the different areas of expertise in northern and Arctic research across the province. The tour will continue in 2021-2022.

- > April 28, 2020 | Meeting with administration and researchers at Université du Québec à Montréal
- > February 15, 2021 | Meeting with administration and researchers at Université du Québec en Abitibi-Témiscamingue

## GENERAL MEETING OF INQ REGULAR MEMBERS

The first general meeting of INQ members was held on December 19, 2020.

It was the first virtual meeting, and all 16 regular members were present. This first gathering was an opportunity to present recent developments at INQ, approve the new INQ bylaws and statutes (reflecting recent governance changes), adopt the budget, and formally appoint representatives to the executive committee. A presentation of the 2020-2025 strategic plan was also on the agenda. It was an opportunity to foster dialogue among members, who praised the initiatives put forward by INQ in recent years. The vitality and extraordinary resilience demonstrated by INQ in this pandemic year were also lauded.

# INQ SCIENTIFIC COMPLEX

During this year marked by the pandemic, the development of the concept for the scientific complex moved forward at full speed.



The initial schedule was of course adapted as a result of the delays caused by the pandemic. Construction on the new building is expected to begin in 2022 in an economic landscape quite different from the one originally envisaged. This is an opportunity for INQ to contribute to the economic recovery of Québec City at a key moment in its modern history.

The essence of the project remains the same: INQ is committed to creating a knowledge and research hub on northern development. This pavilion, unique in Canada, will promote northern innovation, interdisciplinarity, and teamwork. It will consolidate the partnerships developed with northern communities, northern Indigenous nations, INQ's 16 member universities, the college community, and public and private sector stakeholders.





Funding and construction of this flagship research infrastructure—an \$83.5 million project—was announced on August 17, 2018, at Université Laval. The innovative project received backing from the Government of Canada (\$25.5 million), the Government of Québec through Société du Plan Nord (\$27.5 million), and the City of Québec (\$5 million). Université Laval and its partners are working to secure the remainder of the funding. Construction is slated to begin in 2022.

The INQ pavilion will be a symbol of research dedicated to providing answers to the challenges surrounding sustainable development and climate change, two hugely important issues that have an impact on communities. The pavilion will bring together the social sciences and humanities, natural sciences, health, and engineering.

Specialized facilities will include laboratories, warehouses, and workshops for technological innovation and the preparation of northern missions in terrestrial and marine environments.

With a view to partnership and knowledge transfer, the complex will be equipped with a videoconference room to ensure communication with northern communities and other partners. The pavilion will also house areas dedicated to training and research end-users.

**The pavilion, the only one  
of its kind in Canada,  
will promote northern  
innovation, interdisciplinarity,  
and teamwork.**

## RESEARCH STATIONS IN THE NORTH

In collaboration with Société du Plan Nord, INQ continued to help set up stations to meet the research needs of communities. These projects are located in the different regions covered by Plan Nord and ensure key territorial representation for INQ. Following are the main developments over the last year for the Uapishka and Umiujaq stations:

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### UAPISHKA STATION

Uapishka Station is situated at the foot of the Uapishka Mountains (Monts Groulx), on the Manicouagan Reservoir. It is in the heart of a rich assemblage of northern ecosystems composed of exceptional geological phenomena, in a unique Innu heritage setting. Located within the Nitassinan of Pessamit on a territory designated as a "biosphere reserve" by UNESCO, the station offers year-round logistical support services for scientific activities. In 2020-2021, Uapishka Station, INQ, and Université du Québec à Rimouski published a guide outlining research needs for the development of an investigative and monitoring program on the territory of Uapishka Station with the goal of spurring the development of scientific projects and addressing local needs.

The following research themes were identified:

- > Northern vegetation and ecosystems
- > Nitassinan: Territory and culture
- > Nitassinan wildlife
- > Climate and hydrological monitoring

The station also signed a memorandum of understanding with Natural Resources Canada's Laurentian Forestry Centre regarding the following areas of cooperation:

- > Sustainable forest management
- > Forest-related climate change
- > Risk management for forest fires and pests
- > Cumulative effects of natural resource development
- > Wood fibre
- > Forest competitiveness
- > Indigenous traditional knowledge

Lastly, this year the station joined the network of circumpolar research stations known as International Network for Terrestrial Research in the Arctic (INTERACT). This membership will attract international researchers from various disciplines to the station.



## UMIUJQAQ RESEARCH STATION

Acquired by Centre d'études nordiques (CEN) in 2010, the Umiujaq Research Station in Nunavik is ideally located for the study of climate dynamics, permafrost, and subarctic ecosystems. Widely used by scientists from Canada and abroad, the current station will be sold and a new station will be built (on a different site) to meet the growing demand of research teams looking to stay there to conduct their research. CEN plans to build a carbon-neutral, smart building better suited to the needs of Arctic research and participatory science. The new station will also include space for training and community use.

In 2020-2021, with \$31,000 in funding from the Northern REACHE Program (CIRNAC), the CEN team simulated energy production and loads for the integration of three renewable energy sources into the new station: biomass, solar energy, and geothermal energy. The results of these tests are encouraging and will help guide the station managers towards the achievement of a carbon-neutral building. CEN has also begun work on the design of a central integration and control device (domotics) that will be at the heart of the smart building. Construction on the new station is slated to begin in 2023.

## AN EXPANDING NETWORK

The goal is to expand our infrastructure network to better serve local communities and research teams. These stations, strategically located near northern communities, will boost the multidisciplinary scientific research conducted on the territory in collaboration with local populations. Over the next few years, INQ plans, in collaboration with UQAC and UQAT, to establish new infrastructure in the regions of Eeyou Istchee Baie-James and north of Saguenay-Lac-Saint-Jean.

# THE INQ COMMUNITY

REGULAR MEMBERS	AFFILIATED RESEARCHERS	AFFILIATED CENTRES	AFFILIATED CHAIRS
École de technologie supérieure	3	2	-
École nationale d'administration publique	2	1	-
Institut national de la recherche scientifique	18	3	4
Polytechnique Montréal	7	2	2
Concordia University	3	-	-
Université de Montréal	11	8	2
Université de Sherbrooke	11	8	3
Université du Québec Network	-	-	-
Université du Québec à Chicoutimi	17	10	9
Université du Québec à Montréal	11	8	2
Université du Québec à Rimouski	21	5	8
Université du Québec à Trois-Rivières	5	1	-
Université du Québec en Abitibi-Témiscamingue	2	1	-
Université Laval	70	12	23
McGill University	70	32	14
Université TÉLUQ	-	-	-
<b>TOTAL</b>	<b>251</b>	<b>93</b>	<b>67</b>



## DID YOU KNOW?

To become affiliated with INQ, researchers must sign a document entitled "Researcher's Agreement" in which they agree, insofar as possible, to apply the recommendations contained in the "**Research Guidelines**." This guide to good practice was developed by the INQ First Peoples Committee to assist research teams in the development and realization of their projects in the North. It draws on over 70 references on the topic and is available on our website.

## AFFILIATION OF ASSOCIATED RESEARCHERS

Laurentian University

University of Ottawa

University of New Brunswick

Trent University

Université du Québec à Chicoutimi



## A CHANGING MEMBERSHIP

Every two years, INQ updates its membership. Affiliated researchers are associated with one of the post-secondary institutions in Québec that are members of INQ. Researchers work in the fields of humanities, health, social sciences, or pure and applied sciences. At the time of affiliation, the majority of their research and innovation efforts must clearly address issues and challenges facing the North—Northern Québec (>49th parallel) or the Canadian Arctic and circumpolar Arctic.

The list of affiliated researchers is submitted by the regular member (institution) to the INQ Executive Committee, which must endorse the researcher's affiliation. Researchers wishing to affiliate with INQ must refer to their vice-rectorate of research or its equivalent.

Photo credit/Lucas Klatainaq

# AN IMPRESSIVE MOBILIZATION

The driving forces behind the INQ come from these 16 post secondary institutions. Here is a brief overview of these renowned universities with complementary strengths, teams and expertise. This ambitious network of actors who are mobilized for the sustainable and ethical development of the North reinforces the quality of our efforts and contributes to the reach of our actions.



## ÉCOLE DE TECHNOLOGIE SUPÉRIEURE

ÉTS researchers are contributing to the sustainable development of the North by focusing their efforts on the impacts of climate change on the hydrology of northern regions. They are also interested in the energy sector, specifically dielectric materials, and the effect of ageing insulating systems used in electrotechnics.



## ÉCOLE NATIONALE D'ADMINISTRATION PUBLIQUE

The researchers at ÉNAP with a focus on the North are renowned for the remarkable quality and complementarity of their work. Some are looking at matters of governance and diplomacy specific to Indigenous communities as reflected in the political discourse and in social media. Others are focusing on government and political science, including an analysis of the factors contributing to both conflict and cooperation among states; nordicity as a component of identity in Canada and Québec; and the role of the Canadian Armed Forces in delivering government services in the North.



## INSTITUT NATIONAL DE LA RECHERCHE SCIENTIFIQUE

Three of the four centres that make up INRS are actively involved in INQ'S activities. Eau Terre Environnement Research Centre is devoted to Québec's sustainable development in hydrology, aquatic biogeochemistry, earth sciences, sanitation and reclamation. Armand-Frappier Santé Biotechnologie Research Centre has developed a unique expertise in the areas of human and animal health and sustainable environments, specifically in environmental biotechnologies and environmental toxicology. Urbanisation Culture Société Research Centre, through the DIALOG network and the ODENA alliance, provides leadership in the field of Indigenous studies, supports the social, economic, political and cultural development of Indigenous peoples and offers an innovative space for dialogue between First Peoples and academia.



## POLYTECHNIQUE MONTRÉAL

Polytechnique Montréal contributes to the development of the North and northern communities, notably through its engineering research and training. Dams and infrastructure, glaciology, geotechnics and permafrost, environmental engineering, structural geology, hydrology of cold regions, water quality modelling, geothermal energy, mining exploration and operations, and rare earth metals are just some of the areas of specialization in which researchers at Polytechnique Montréal bring their unique expertise to INQ's work. Not only do they contribute by creating knowledge, but also by adapting civil and industrial infrastructure in the face of climate change and the transition to a more sustainable society.



## CONCORDIA UNIVERSITY

Concordia University is active in the field of renewable energies. A technical and economic feasibility study on the potential for geothermal systems in Nunavik is underway, with a view to improving access to cleaner energy for remote communities in Nunavik.



## UNIVERSITÉ DE MONTRÉAL

Université de Montréal is a catalyst for interdisciplinary and interinstitutional initiatives in both animal health and climate science. The university is a pioneer in northern arts studies and in research into the rights of First Peoples and is always at the vanguard on issues relating to territory and societies. Its numerous innovation labs are currently hard at work incorporating knowledge related to experience, memory, culture, heritage, narratives and research. In a perspective of recognition and reconciliation, the university is striving to improve the integration of First Nations and Inuit peoples as well as their philosophies and cultures.



## UNIVERSITÉ DE SHERBROOKE

Researchers at Université de Sherbrooke are working on the characterization of water and snow in the North. They also specialize in remote sensing and geographic information systems (GIS) and are studying the complex relationships between human activity, climate change and natural risks in the North.



## RÉSEAU DE L'UNIVERSITÉ DU QUÉBEC

The member institutions of the Université du Québec network are conducting a wide range of teaching, research and creation and community services for, by and with various actors and communities in Northern Québec. They are engaged in diverse fields, including the health and development of Indigenous communities, traditional knowledge, promotion and sustainable use of natural resources, ecosystem conservation and climate change. The team at Université du Québec actively supports initiatives put forth by the institutions and their partners and stimulates collaboration to develop relevant, innovative and collective solutions to the major challenges affecting the future of northern territories and their inhabitants.



## UNIVERSITÉ DU QUÉBEC À RIMOUSKI

UQAR is home to a diverse group of researchers who focus on northern environments from an interdisciplinary perspective. This critical mass of researchers is spread across several departments, as well as Institut des sciences de la mer, BORÉAS institutional research group, the Uapishka Research Station and five Canada Research Chairs which focus on northern biodiversity, integrative biology of northern fauna, geochemistry of coastal ecosystems, coastal geosciences and marine geology.



## UNIVERSITÉ LAVAL

A pioneer for over half a century in northern and Arctic research, Université Laval is home to several major interuniversity research centres, including Centre d'études nordiques (CEN), Québec Océan (QO) and Centre interuniversitaire d'études en recherches autochtones (CIÉRA). It oversees the Sentinel North research program and is home to Institut nordique du Québec and ArcticNet, three front-line northern research initiatives. CCGS Amundsen, a state-of-the-art research icebreaker deployed in the Arctic Ocean and Takuvik Joint International Laboratory (CNRS/UL), which is devoted to remote sensing of Canada's new Arctic frontier, are also hosted by Université Laval.

## UQAC

### UNIVERSITÉ DU QUÉBEC À CHICOUTIMI

The university boasts expertise in regional initiatives, land planning and use, history and archaeology, economy of the North and eco-consulting. UQAC has also made a name for itself in risk management in remote areas, whether for tourism engineering or the development and safe implementation of outdoor activities (touristic, educational, industrial or scientific).



### UNIVERSITÉ DU QUÉBEC À TROIS-RIVIÈRES

UQTR boasts a dynamic environmental science department and is innovative in research on tourism, economics, engineering and health sciences. Its researchers have developed an interdisciplinary approach to understanding the transformations in northern ecosystems and the cryosphere. Experts in psychoeducation are helping improve services to the Inuit, while UQTR-trained midwives are assisting in childbirth and playing a vital role in Nunavik communities.



### MCGILL UNIVERSITY

McGill University is the architect of the Centre for Indigenous People's Nutrition and Environment, as well as the Centre for Indigenous Conservation and Development Alternatives, the Quebec Centre for Biodiversity Science, the McGill Arctic Research Station and the McGill Institute for the Study of Canada. The mission of the RUIS McGill integrated university health-care network is to provide Quebecers with improved access to healthcare. It is responsible for a territory stretching from Montreal to Nunavik, where it facilitates the delivery of care to inhabitants, along with teaching, research and the evaluation of healthcare technologies.



### UNIVERSITÉ DU QUÉBEC À MONTRÉAL

At UQAM, 14 departments work in the North and Arctic. The training activities dedicated specifically to the North are divided into many disciplines: history, politics, tourism, literature, the arts, religious sciences, linguistics and sociology. UQAM researchers collaborate with Indigenous communities on projects to analyze social, cultural, economic and environmental issues related to the North and the wintery world. The UQAM Northern and Arctic Research Portal, available online, chronicles the research and training activities related to the North and the Arctic that are carried out or organized at UQAM. This portal also aims to strengthen links between researchers from different disciplines and promote the development of multisectoral training activities.



### UNIVERSITÉ DU QUÉBEC EN ABITIBI-TÉMISCAMINGUE

From the study of hydrogeological dynamics of aquifers north of the 49th parallel, to analyzing the impact of mining sites on northern biodiversity and developing best practices in ethical research in an Indigenous context, UQAT has positioned itself as a pioneer in participatory research with First Peoples. UQAT researchers have a strong and recognized expertise in forestry. As a result, UQAT hosts l'Institut de recherche sur les forêts (IRF), whose mission is to contribute to the maintenance of forest ecosystem services through an interdisciplinary approach to research, training, and the dissemination and integration of knowledge among the territory's many users.



### UNIVERSITÉ TÉLUQ

With an outlook that's open to the world, Université TÉLUQ encourages and promotes learning at all stages of life and helps develop knowledge by offering a vast selection of online programs and courses available from anywhere in the world. Its training activities are innovative and stimulating, both in terms of their content and pedagogical approach. Université TÉLUQ's teaching staff is devoted to developing new knowledge, high-level research and educational innovations.

# LEADING RESEARCH CENTRES

Nearly one hundred research centres are affiliated with INQ. Together, they provide the varied expertise necessary for the sustainable development of Northern Québec and the Canadian Arctic. Following are three affiliated centres that contribute to the intersectoral approach to research embodied by INQ:



## CENTRE INTERUNIVERSITAIRE D'ÉTUDES ET DE RECHERCHES AUTOCHTONES (CIÉRA)

The mission of CiÉRA is to conduct studies and research on Indigenous issues in Canada and around the world, using participatory approaches with Indigenous nations and communities.

It brings together researchers working on Indigenous realities by promoting multidisciplinary, comparative, and often interdisciplinary perspectives. CiÉRA promotes the development of research that respects the self-determination of Indigenous nations and communities and contributes to the mobilization of knowledge and policy improvement. CiÉRA training activities are also aimed at promoting reconciliation.

Many CiÉRA members work with Indigenous communities north of the 49th parallel on various research projects such as Caroline Hervé's Saimastianiq: Documenting, mobilizing, and promoting Inuit legal practices to preserve social harmony in Nunavik; and Thierry Rodon's work with the creation of the MinEraL network: "Knowledge Network on Mining Encounters and Indigenous Sustainable Livelihoods: Cross-Perspectives from the Circumpolar North and Melanesia/Australia". CiÉRA took over from Groupe d'études inuit et circumpolaires (GETIC) in 2004 when it became a research centre officially recognized by Université Laval. CiÉRA also works in close cooperation with the editorial board of the journal *Études Inuit Studies*.



## AMUNDSEN SCIENCE

Amundsen Science is the non-profit organization responsible for the scientific mandate of the research icebreaker CCGS Amundsen. With funding primarily from the Canada Foundation for Innovation provided to Université Laval, Amundsen Science manages and maintains the vessel's scientific equipment, coordinates scientific expeditions in collaboration with the Canadian Coast Guard, and provides technical support to scientists when the ship is at sea.



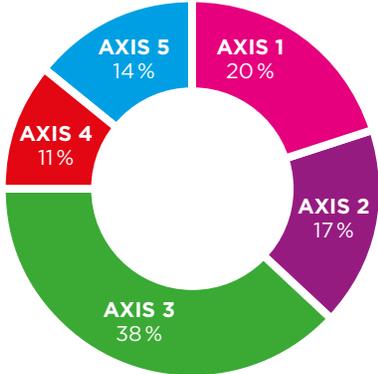
## RESEARCH CENTRE ON THE DYNAMICS OF THE EARTH SYSTEM (GEOTOP)

Geotop is an inter-university centre of excellence in geoscience training and research. Its mission is to understand the geological processes that govern the dynamics of the Earth at different spatial and temporal scales, through a systemic approach of the planet incorporating unique expertise in isotopic geochemistry and geochronology. The knowledge acquired, both fundamental and applied, will provide us with a better understanding of the present and future state of the Earth system.

# AMBASSADORS FOR NORTHERN RESEARCH

More than 250 researchers are affiliated with INQ. This research community is dedicated to the development of knowledge about the North and the Arctic. Researchers transcend traditional research methods, co-constructing with northern communities and addressing issues in a multi-disciplinary manner. Researchers cover a wide range of expertise. From geology and nutrition to environmental chemistry and Arctic governance, the expertise of the INQ research community is diverse and fascinating. Here is a look at some of the scientists affiliated with Institut nordique du Québec who contribute to Québec’s knowledge about the North.

## BREAKDOWN OF EXPERTISE OF INQ-AFFILIATED RESEARCHERS



AXES	NUMBER OF RESEARCHERS
● Societies and Culture	53
● Health	44
● Ecosystem Functioning and Environmental Protection	99
● Infrastructure and Technology	29
● Natural Resources	37



**CAROLINE DESBIENS**

Caroline Desbiens is a professor in the Geography Department at Université Laval and holds the Canada Research Chair in Indigenous Heritage and Tourism. Her research, which uses a participatory approach, focuses on the geographies of nomadism, both tangible and intangible. She collaborates with different Indigenous communities and organizations to document and develop heritage sites in Northern Québec, particularly in regions affected by hydroelectric development. She is also interested in narrative cartography, toponymy, memory, and the meaning of places from a perspective of community reappropriation of Indigenous cultural landscapes.

Desbiens has been a visiting professor at the University of Bergamo and the University of Bordeaux, scientific advisor at Musée de la Civilisation, and a commissioner for Commission de toponymie du Québec. Her book *Power from the North: Territory, Identity, and the Culture of Hydroelectricity in Quebec* was published by UBC Press in 2013, and in French by Presses de l’Université Laval in 2015.



**CATHERINE GIRARD**

Catherine Girard is a professor of microbiology at UQAC. She is interested in the response of microorganisms to climate change and their impact on ecosystems and human health. She uses omic approaches to explore microbial heritage, particularly in the Arctic, where she works with Indigenous partners to understand how global warming is transforming the microbial ecology of northern landscapes and their resources. As a researcher, she takes a collaborative approach with her northern partners. Girard aims to co-construct interdisciplinary research projects with both Indigenous and non-Indigenous collaborators to link knowledge.



**VINCENT CLOUTIER**

Vincent Cloutier is a professor at Institut de recherche en mines et en environnement (IRME) at UQAT. Professor Cloutier is recognized for his expertise in applied hydrogeochemistry and in the characterization of regional and local flow systems. He is the scientific director of the Groundwater Research Group (Groupe de recherche sur l'eau souterraine; GRES) at UQAT, a laboratory whose mission is to enhance knowledge about groundwater and contribute to its sustainability. GRES-UQAT is currently conducting a pilot project to acquire knowledge on groundwater in partnership with the Eastmain Cree Nation.



**CÉCILE AENISHAENSLIN**

Cécile Aenishaenslin (DVM, MSc, PhD) is a veterinarian and an epidemiologist with post-doctoral training in intervention research. Her work focuses on the development and evaluation of interventions, programs, and policies consistent with a "One Health" approach to the prevention and control of zoonotic diseases and antibiotic resistance. She favours a participatory research approach with communities and decision-makers, and uses a mixed methodology, integrating quantitative (epidemiological estimations and methods) and qualitative approaches. Her current projects are related to the monitoring of antimicrobial resistance and zoonotic diseases in the Canadian Arctic.

# GROUPS DEDICATED TO PRIORITY ISSUES

INQ's committees and working groups adapted to the new reality, holding numerous virtual meetings. They continued their activities in 2020-2021 to fulfill their mandates. The committees and working groups are comprised of INQ-affiliated scientists, northern partners, and representatives from the public and private sectors. Composed of individuals with different backgrounds and areas of expertise, these teams reflect on and propose measures, tools, or

activities to fuel reflection and spur the engagement of researchers around priority issues in northern and Arctic regions. The committees are permanent structures within INQ, while working groups are formed on an ad hoc basis and are eventually disbanded, in keeping with the research needs expressed by our northern partners.



## WORKING GROUP ON NEW AND RENEWABLE ENERGIES

This group is actively seeking alternatives to the use of hydrocarbons in the North, a source of energy with a negative impact on the ecological footprint of northern regions. The costs associated with the fuel itself, and with transporting it, also place an economic burden on these regions. The working group is also looking at several other options to meet the energy needs of Québec's remote regions—all of them focused on new and renewable energy—in order to bolster the energy transition essential to the sustainable development of Northern Québec.

### Main achievement in 2020-2021

The group is working on the development of video clips on energy efficiency standards for housing in Nunavik and on housing preferences among the Inuit. A series of interviews were conducted and the results of this work will be made public in 2022.

#### Chair

**Jasmin Raymond**  
Institut national de la recherche scientifique (INRS)

#### Members

**Kodjo Agbossou**  
Université du Québec à Trois-Rivières (UQTR)

**Cédric Arbez**  
Nergica

**Olivier Arsenault**  
Hydro-Québec

**Karim Belmokhtar**  
Nergicabre

**Myriam Blais**  
Société du Plan Nord (SPN)

**Francois Bouffard**  
McGill University

**Martin Bourbonnais**  
Cégep de Jonquière

**Marie-Pier Breton**  
Société d'habitation du Québec (SHQ)

**Pierre Brisson**  
Transition énergétique Québec (TEQ)

**Christian Carrier**  
Carboniq

**Guy Dumas**  
Université Laval (ULaval)

**Marie-Ève Dupont**  
Institut de recherche d'Hydro-Québec (IREQ)

**Richard Gagnon**  
TEQ

**Nicolo Giordano**  
INRS

**Louis Gosselin**  
ULaval

**Didier Haillot**  
École de technologie supérieure (ÉTS)

**Innocent Kamwa**  
ULaval

**Christophe Krolik**  
ULaval

**Patrick Labbé**  
Hydro-Québec

**Joë Lance**  
Tarquti Energy Corporation

**Daniel Martineau**  
Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)

**Félix Ménard-Saint-Denis**  
SHQ

**Fuzhan Narsiri**  
Concordia University

**Mathieu Olivier**  
ULaval

**Taha Ouarda**  
INRS

**Mathieu Payeur**  
TEQ

**Julia Purdy**  
Natural Resources Canada

**Marc-André Richard**  
IREQ

**Laurie-Ann Rioux**  
SPN

**Jean Rouleau**  
ULaval

**Meli Stylianou**  
Natural Resources Canada

#### Coordinator

**Debra Christiansen-Stowe**  
Institut nordique du Québec



## INFRASTRUCTURE MANAGEMENT COMMITTEE

The committee facilitates and optimises the sharing of research infrastructure belonging to INQ member institutions, entities and partners. It provides recommendations to the Scientific and Development Committee on the funding, deployment, sharing and valorization of research infrastructure and establishes rules for its use by researchers.

### Main achievement in 2020-2021

The committee continued its work on the development of Lab-O-Nord.

#### Chair

**Keith Lévesque**  
Sentinel North (SN)

#### Members

**Nathalie Foisset**  
McGill University

**Alexandre Forest**  
Amundsen Science

**Marie-Hélène Forget**  
Takuvik

**Mickaël Lemay**  
Centre d'études nordiques

**Luc Michaud**  
Amundsen Science

**Stéphane Prémont**  
Institut national de la  
recherche scientifique

**Brigitte Robineau**  
Québec-Océan

**Jean-Marie Trudeau**  
SN

#### Coordinator

**Debra Christiansen-Stowe**  
Institut nordique du Québec



## TRAINING COMMITTEE

The committee has five main objectives: i) establish an inventory of existing training about Northern Quebec at the founding and partner universities, ii) support university initiatives to train the student population, northern stakeholders and professionals called upon to work on northern issues, iii) develop non-credit continuing education programs for academics, professionals and general population with a focus on knowledge transfer, iv) offer a general non-credit training about Northern Quebec in the form of a nanoprogram, and v) encourage the involvement of Indigenous people at all levels and forms of education.

### Main achievement in 2020-2021

Development of the second edition of Introduction to Northern Research and Issues. This immersive training will be offered in the fall of 2021 and will focus on mobilizing and sharing knowledge.

#### Co-Chairs

**Catherine Girard**  
Université du Québec  
à Chicoutimi

**Thierry Rodon**  
Université Laval (ULaval)

#### Members

**Marie Audette**  
ULaval

**Brigitte Bigué**  
Institut nordique du Québec

**Marie-France Gévry**  
Sentinel North

**Caroline Hervé**  
ULaval

**Jim Howden**  
McGill University

**Isabelle Laurion**  
Institut national de la  
recherche scientifique

**Marie-Ève Marchand**  
ULaval

**Loretta Robinson**  
First Nations  
Education Council

#### Coordinator

**Debra Christiansen-Stowe**  
Institut nordique du Québec



## SUSTAINABLE DEVELOPMENT COMMITTEE

The committee draws on the United Nation's Sustainable Development Goals and validates those that are relevant for the North within INQ, while developing appropriate indicators for the North and a sustainable development toolbox for northern research.

The members of this committee were not able to meet in 2020-2021. Their work will resume in 2021-2022.

#### Chair

**Murray Humphries**  
McGill University

#### Members

**Étienne Berthold**  
Director, Institut EDS

**Jasmin Raymond**  
Institut national de la  
recherche scientifique

**Thierry Rodon**  
ULaval

#### Coordinator

**Debra Christiansen-Stowe**  
Institut nordique du Québec



## FIRST PEOPLES COMMITTEE

The committee's mandate is to define 1) joint and specific research needs and priorities for Indigenous communities in the North, ii) a code for the responsible conduct of research in the North in keeping with the activities of the First Peoples, and iii) Indigenous knowledge and establish its role within INQ.

### Main achievement in 2020-2021

The past year for this committee was very special as northern communities poured all their energy into protecting their populations from COVID-19. Indigenous committee members helped their communities to manage this crisis. In addition, the committee was consulted on several occasions, notably on INQ's future scientific complex.

#### Chair

**Melissa Saganash**  
Representative  
of the Cree Nation

**Serge Ashini Goupil**  
Innu representative

**Ellen Avard**  
Representative of the Inuit  
of Nunavik and the Nunavik  
Research Centre

**Najat Bhiry**  
Centre d'études nordiques

**Mark O'Connor**  
Makivik Corporation

**Glenda Sandy**  
Representative of the Naskapi  
Nation of Kawawachikamach

**Michel J. Tremblay**  
ULaval

#### Coordinator

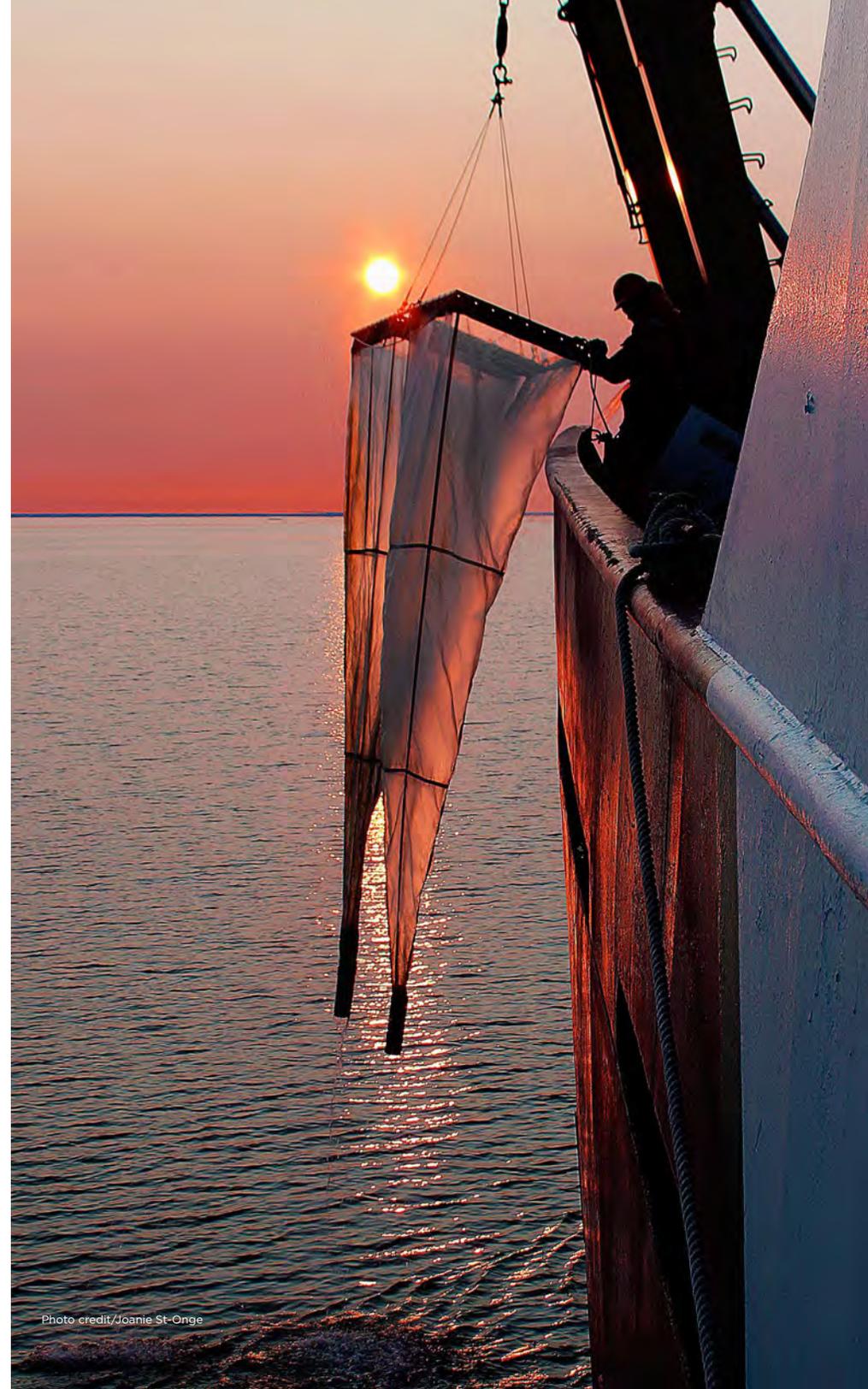
**Catherine Charest**  
INQ Northern Sustainable  
Development Research Chair

# SCIENTIFIC PROGRAM

In September 2020, a call for applications from INQ-affiliated researchers went out among the 16 member institutions. The objective was to recruit scientists who would be responsible for engaging in the five research axes of the Institut Nordique du Québec's scientific program. The call stated that each axis be led by two scientists from different institutions. Therefore, 10 co-director positions were to be filled. At the end of the call, an independent committee evaluated the applications received based on the following criteria:

- > Field of expertise
- > Research leadership
- > Proven ability to manage research teams
- > Openness to creating interdisciplinarity and intersectorality
- > Contribution to the promotion of research at the local, national, and international levels

The selected scientific duos were announced in March 2021. They are now responsible for contributing to scientific reflection within INQ, leading the current scientific program, promoting the emergence of innovative projects, being on the lookout for research opportunities that meet the needs expressed, and organizing networking activities.



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**AXIS 1**

**SOCIETIES AND CULTURES**

Improve our knowledge of social and cultural issues of Northern Quebec by studying different development models as well as heritage, identities, territoriality, knowledge, living environments, and governance. This priority also emphasizes the planning of research agendas, compliance with ethics protocols in Indigenous settings, and the decolonization of research.

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**Co-directors**



**Daniel Chartier**  
Professor  
Département d'études littéraires  
Université du Québec à Montréal



**Thierry Rodon**  
Professor  
Département de science politique  
Université Laval

.....  
**AXIS 2**

**HEALTH**

In keeping with the themes and priorities identified by people in the North, and using a partnership approach, this priority focuses not only on research into illness and disease, but also on resilience, adaptation, and the positive aspects of health. Intervention research, both clinical and population-based, aims to identify optimal solutions and best practices to improve the health of northern populations and reduce health-related inequities.

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**Co-directors**



**Mélanie Lemire**  
Professor  
Département de médecine sociale  
et préventive  
Université Laval



**Cathy Vaillancourt**  
Professor  
Armand-Frappier Santé  
Biotechnologie Research Centre  
INRS

.....  
**AXIS 3**

**ECOSYSTEM FUNCTIONING  
AND ENVIRONMENTAL PROTECTION**

The ecosystems of high northern latitudes are feeling the combined effect of accelerated socioeconomic development, strong demographic growth, and global warming. This priority examines the consequences of such stresses on marine, terrestrial, and freshwater ecosystems in order to preserve and protect the food security and well-being of people living in the North. This research priority explores global warming, thaw, freshwater, food security, and the greenhouse effect, with an emphasis on coastal environments.

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**Co-directors**



**Philippe Archambault**  
Professor  
Département de biologie  
Université Laval



**Esther Lévesque**  
Professor  
Département des sciences  
de l'environnement  
Université du Québec à Trois-Rivières

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## AXIS 4

### INFRASTRUCTURE AND TECHNOLOGY

Developing Quebec's North will require new technologies and infrastructure adapted to its harsh environment characterized by a cold climate, remote communities, and melting permafrost. To address the needs of northern communities, this priority explores issues including the rapid implementation of telecommunications channels, development of environmental technologies to ensure the protection of the potable water supplies of northern communities, the development of infrastructure adapted to harsh environments, and the conversion and management of waste from a standpoint of health and sustainable development.

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#### Co-directors



**Abdellah Chehri**  
Professor  
Département des sciences appliquées  
Université du Québec à Chicoutimi



**Louis-César Pasquier**  
Professor  
Eau Terre Environnement  
Research Centre INRS

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## AXIS 5

### NATURAL RESOURCES

The North's ecosystems are home to considerable forest, mineral, hydroelectric, and wind resources. This priority looks at the economic value of natural resources while taking into account the extreme vulnerability of northern ecosystems to climate change and the impact of human activity. In keeping with the aspirations of northern communities, it will study and document overexploitation, seek to achieve social acceptability, and encourage the local spinoffs of economic activity. Through optimization and planning, this priority seeks to develop tools that will ensure that strategic resources in the North are developed in a sustainable manner.

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#### Co-directors



**Annie Desrochers**  
Professor  
Université du Québec  
en Abitibi-Témiscamigue  
Amos Campus



**René Therrien**  
Professor  
Département de géologie  
et de génie géologique  
Université Laval

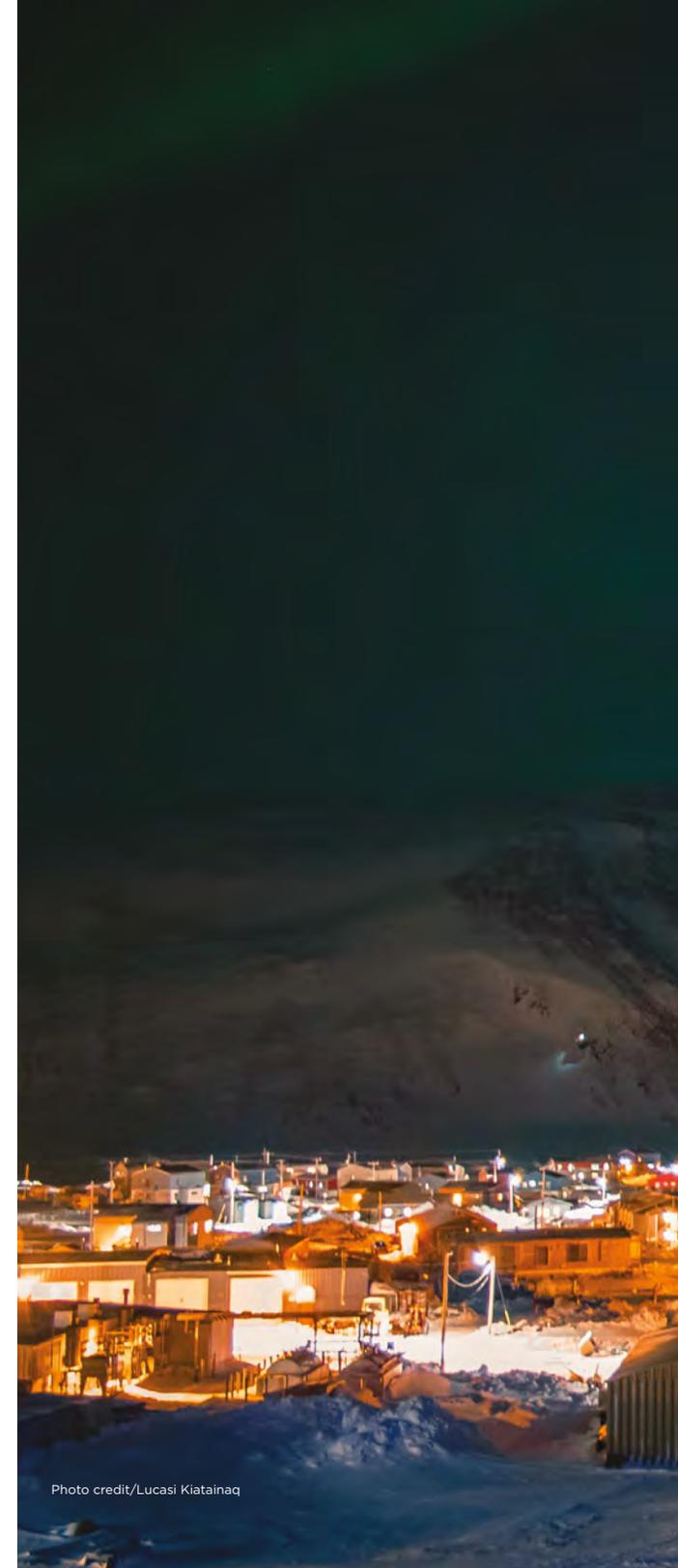


Photo credit/Lucasi Kiatainaq



# RESEARCH ACTIVITIES CONDUCTED BY INQ RESEARCH CHAIRS

The INQ chairs cover the production of renewable energy, wildlife conservation, food security, and sustainable development in the North. All three chairs are in their fourth year of funding by INQ. Here is an overview of their recent accomplishments.



**INQ-MCGILL CHAIR IN NORTHERN RESEARCH – WILDLIFE CONSERVATION AND TRADITIONAL FOOD SECURITY**

**Chairholder** **Murray Humphries**, Professor  
Agricultural and Environmental Sciences Department,  
McGill University

The Chair focuses on the protection and sustainable development of Northern Québec's natural resources. The research looks at how resource development and other forms of environmental change impact the abundance and health of northern wildlife populations and their contribution to traditional food security. The Chair conducts work in close collaboration with research partners in Northern Québec, including organizations involved in the study of climate change, Indigenous health and food security, the subsistence economy, regional governance, environmental protection, and sustainable development.

In the past year, the Chair continued its study on beaver expansion in Nunavik, the characterization and valorization of Indigenous food systems and coastal habitats in the Eeyou Marine Region. In addition, the Chair's team co-developed and initiated, in collaboration with local and regional partners, three new projects, one dealing with the quality of moose habitat under the adapted forest regime in Eeyou Istchee, a second on the ecology of polar bears in the Eeyou Marine Region, and a third on the prospects for adaptation of Indigenous food systems in Northern Québec.

The Chair's key achievements during the pandemic include regional and local mobilization and participation (with remote assistance by researchers) in continued data collection in the field, particularly for the comprehensive study of coastal habitats in the Eeyou Marine Region.



### INQ RESEARCH CHAIR ON NORTHERN SUSTAINABLE DEVELOPMENT

**Chairholder** **Thierry Rodon**, Professor  
Département de science politique, Université Laval

The main objective of the Chair is to analyze and define development models based on the specific needs of the North and meet the imperatives for sustainable development in a northern context. Over the past year, the Chair has focused its work on developing research and partnerships within the Knowledge Network on Mining Encounters and Indigenous Sustainable Livelihood (MinErAL). Within this network, the Chair's team worked directly on certain research projects. The Realizing Indigenous Rights: Effective Implementation of Impact and Benefit Agreements (IBA) project began this year, and the collaborative agreement with the community of Matimekush-Lac John, which is involved in the project, is in the process of being signed.

Fly-In / Fly-Out: Impacts on women and communities in the North is also in its final year. The guide to good practices for communities and the final report of the James Bay Status of Women Committee (Condition Féminine Baie-James), produced within the framework of the project, were launched at the end of 2020. In addition, the Chair collaborated with the INQ Northern Geothermal Potential Research Chair to identify the incentives and obstacles to renewable energy projects in the Arctic. On a different note, the Chair's team worked on updating the Nordicity Indices (VAPO) developed by Louis-Edmond Hamelin. An interactive map was also created and will be published in the coming year. Two research projects related to free, prior, and informed consent are ongoing (Resource Governance and Indigenous Rights and Indigenous Consultation and Engagement). Lastly, the Chair continued its research in the areas of governance, education, and the subsistence economy.

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### INQ NORTHERN GEOTHERMAL POTENTIAL RESEARCH CHAIR

**Chairholder** **Jasmin Raymond**, Professor  
Centre Eau Terre Environnement, INRS

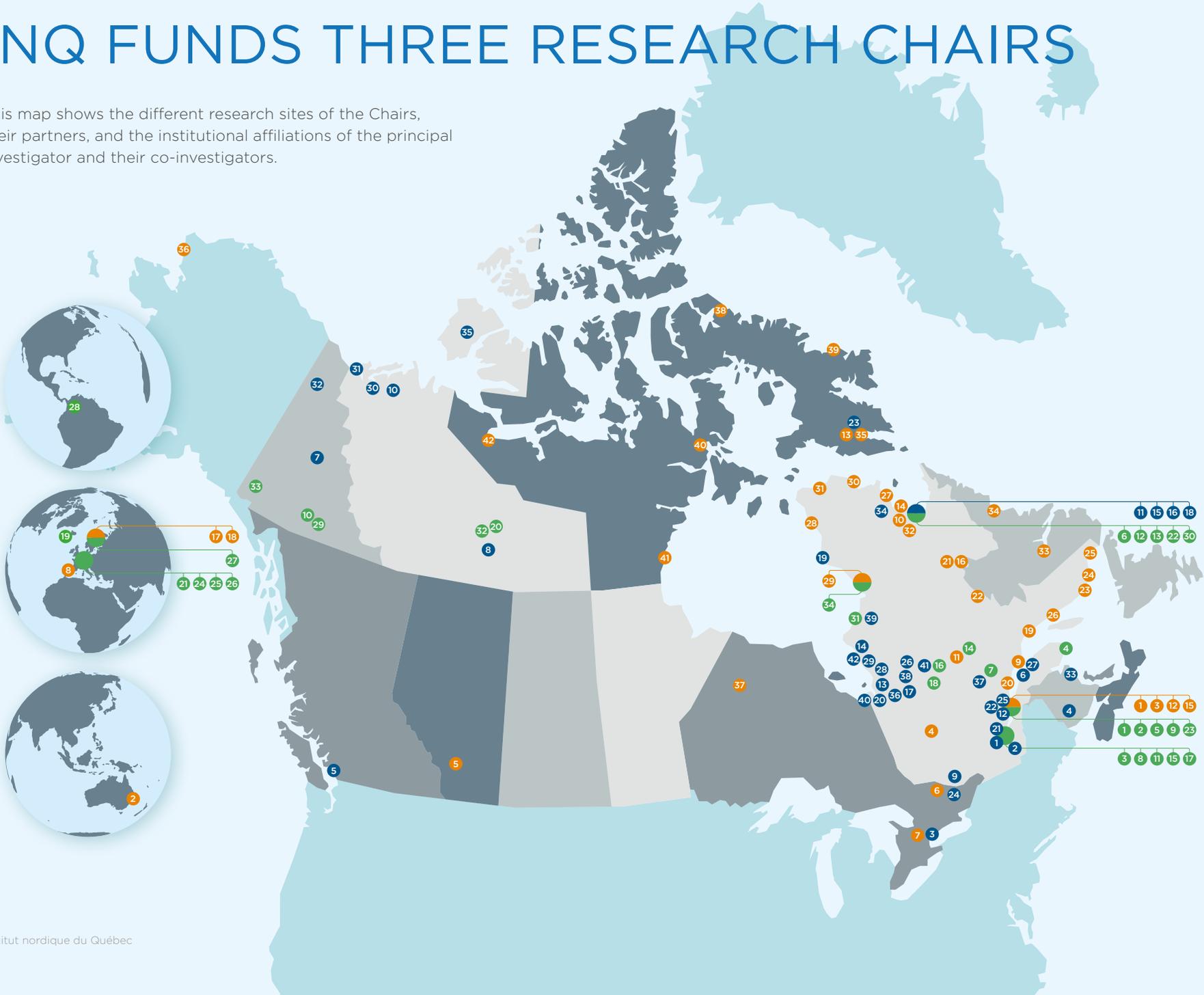
The scientific objective of this Chair is to improve the understanding of heat transfer processes that define the extent, sustainability, and feasibility of geothermal resource development in Northern Québec. The Chair also aims to raise awareness among northern communities and companies to improve knowledge related to the development of geothermal and energy efficiency projects in Northern Québec. Over the years, the Chair has helped train a critical mass of experts whose project findings indicate that it would be more economically viable and less damaging to the environment to heat northern buildings with geothermal energy rather than with diesel.

Their research is reaching a turning point with the development of small-scale pilot projects of real systems to investigate the feasibility of harnessing geothermal energy on a larger scale for the benefit of northern communities. The next research stage will require major efforts to expand the demonstration projects to more communities, or to increase the size of the systems to demonstrate viability on a larger scale. In just under four years, the Chair's work has led to major scientific breakthroughs, from mathematical proof of concept to the installation of a real geothermal system—no easy feat in a northern context. Even more promising results are expected with the operation of the geothermal system for the Kuujuaq community pool and the collection of real data in the summer of 2021.

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# INQ FUNDS THREE RESEARCH CHAIRS

This map shows the different research sites of the Chairs, their partners, and the institutional affiliations of the principal investigator and their co-investigators.



### INQ-McGill chair in Northern research – wildlife conservation and traditional food security

1	McGill University	
2	Université de Sherbrooke	
3	University of Toronto	
4	University of New Brunswick	
5	University of British Columbia	
6	Université du Québec à Rimouski (UQAR)	
7	Yukon Territorial Government	
8	Government of Northwest Territories	
9	Parks Canada	
10	Gwich'in Renewable Resources Board (GRRB)	
11	Makivik Corporation	
12	Ministère des Forêts, de la Faune et des Parcs	
13	Cree Trappers Association	
14	Cree Board of Health and Social Services of James Bay	
15	Nunavik Regional Board of Health and Social Services (NRBHS)	
16	Regional Nunavimmi Umajulivijit Katujaqatigininga (RNUK)	
17	Cree Nation Government	
18	Kativik Regional Government	
19	Nunavik Marine Region Wildlife Board	
20	Eeyou Marine Region Wildlife Board	
21	Ouranos	
22	Environment and Climate Change Canada	
23	Nunavut Tunngavik Inc.	
24	Inuit Tapiriit Kanatami	
25	Cree-Québec Forest Board	
26	Niskamoon Corporation	
27	Institut des sciences de la mer de Rimouski (ISMER)	
28	Eastmain	
29	Wemindji	
30	Aklavik	
31	Mackenzie Delta	
32	Old Crow Flats	
33	Tabusintac Bay	
34	Tasiujaq	
35	Banks Island	
36	Nemaska	
37	Mistissini	
38	Waswanipi	
39	Whapmagoostui-Kuujuarapik	
40	Waskaganish	
41	Oujé-Bougoumou	
42	Chisasibi	

### INQ Northern sustainable development research chair

1	Université Laval	
2	Griffith University	
3	Institut national de la recherche scientifique (INRS)	
4	Université du Québec en Abitibi-Témiscamingue, Val-d'Or Campus	
5	University of Calgary	
6	Carleton University	
7	Wilfrid Laurier University	
8	Université de Rouen Normandie	
9	Regroupement des femmes de la Côte-Nord	
10	Makivik Corporation	
11	Comité condition féminine Baie-James	
12	Crown-Indigenous Relations and Northern Affairs Canada	
13	Qaujigiartiit Health Research Centre	
14	Kativik Regional Government	
15	Société du Plan Nord	
16	Conseil de la Nation Innu Matimekush-Lac John	
17	Luleå University of Technology	
18	University of Tromsø – The Arctic University of Norway (UiT)	
19	Sept-Îles	
20	Sacré-Cœur	
21	Schefferville and Matimekush-Lac John	
22	Fermont	
23	Chevery	
24	La Tabatière	
25	Rivière-Saint-Paul	
26	Havre-Saint-Pierre	
27	Kangirsuk	
28	Akulivik	
29	Umiujaq	
30	Kangiqtujujaq	
31	Salluit	
32	Kuujuaq	
33	Happy Valley-Goose Bay	
34	Nain	
35	Iqaluit	
36	Red Dog Mine	
37	Kingfisher Lake	
38	Pond Inlet	
39	Qikiqtarjuaq	
40	Nauyasat	
41	Arviat	
42	Kugluktuk	

### INQ Northern geothermal potential research chair

1	Institut national de la recherche scientifique (INRS)	
2	Université Laval	
3	École de technologie supérieure ETS	
4	Nergica	
5	Transition énergétique Québec	
6	Englobe - Nunatech	
7	Cégep de Jonquière	
8	Carboniq	
9	Cima+	
10	Yukon Geological Survey / H.S. Bostock Core Library	
11	Institut de recherche d'Hydro-Québec (IREQ)	
12	Kativik Regional Government	
13	Nayumivik Landholding Corporation of Kuujuaq	
14	Développement économique Chibougamau	
15	Makivik Corporation	
16	Ville de Chapais	
17	Midland Exploration	
18	Osisko Mine	
19	University of Reykjavik	
20	Northwest Territories Geological Survey	
21	Turin Polytechnic University	
22	Société Kuujuaumiut	
23	Induktion Géothermie	
24	BRGM - French Geological Survey	
25	Université de Rennes	
26	University of Turin	
27	KTH Royal Institute of Technology	
28	University of Medellín	
29	Takhini Hot Pools	
30	Kuujuaq	
31	Whapmagoostui-Kuujuarapik	
32	Con Mine	
33	Kluane Lake	
34	Umiujaq	

# PARTNERSHIP RESEARCH PROGRAM FOR A SUSTAINABLE NORTH (INQ/SN)

The challenges of sustainable development in the North are complex and require the involvement of multiple sectors and disciplines. INQ and SN are committed to an avant-garde approach based on intersectoral and interdisciplinary research that includes social sciences, health sciences, natural sciences and engineering.



## PROGRAM OBJECTIVE

Enhance Québec's knowledge about the North and the Arctic, in keeping with INQ's scientific program and SN's objectives, with a view to sustainable development of Northern Québec and the well-being of the communities inhabiting this territory.

## PROGRAM SPECIFICS

The research projects funded under this program are multidisciplinary and involve researchers from at least two INQ member institutions. They take into account the interests and aspirations of Indigenous peoples.

## BACKGROUND

In 2019–2020, two calls for projects related to this ambitious new program were launched. A total of 21 projects were submitted. They involved...

- > 88 researchers
- > 15 universities, including 5 outside Québec
- > More than 60 collaborative organizations, including 20 Indigenous organizations and 11 government partners

These figures attest to the vitality and enthusiasm of the network participants, who are committed to the ethical and harmonious development of the North, a goal INQ has been working towards since its inception.

Once the calls were analyzed, seven projects were funded, for a total of \$1.5 million. These innovative projects are presented on pages 40 and 41 of this report.

## THE IMPACT OF COVID-19

In the past year, the scientific teams at the helm of research projects faced certain challenges arising from the pandemic, including not being able to travel to conduct fieldwork and collect data. Some teams also found that student recruitment was more difficult than usual, especially internationally.

However, the teams remained focused on their objectives and were able to take advantage of the interruption to refine their methodologies or strengthen relationships with the partners and communities involved in their projects. All of the research teams plan to resume their fieldwork activities in 2021-2022.



# RESEARCH PROJECTS

## ARISING FROM THE PARTNERSHIP RESEARCH PROGRAM FOR A SUSTAINABLE NORTH (INQ-SN)

1

### DYNAMICS OF THE INNU ANCESTRAL TERRITORY (NITASSINAN) THROUGH THE MORPHO-SEDIMENTARY AND SOCIO-CULTURAL STUDY OF LAKE MANICOUAGAN (RESERVOIR)

PROJECT STARTED IN JULY 2020

**Principal Investigator:** Patrick Lajeunesse

**Co-applicants:** Caroline Desbiens, Pierre Francus and Justine Gagnon

The research project aims to acquire knowledge about the ancestral Innu territory (Nitassinan) through a transdisciplinary study of an emblematic ecosystem in Northern Québec: the Manicouagan Reservoir, which is now part of a territory designated as a UNESCO Biosphere Reserve.

2

### IMPACTS OF CLIMATE CHANGE AND BROWNING ON SALMONID OXYTHERMAL HABITAT AND GREENHOUSE GAS EMISSIONS IN ARCTIC REGIONS

PROJECT STARTED IN JULY 2020

**Principal Investigator:** Isabelle Laurion

**Co-applicants:** André St-Hilaire, Raoul-Marie Couture and Normand Bergeron

The objective of this project is to provide essential information on the current and future state of the habitat of two fish species in Nunavik and Nunavut that play a key role in the food security of northern communities: Arctic char (*Salvelinus alpinus*) and lake trout (*Salvelinus namaycush*).

3

### NUNATSIAVUT COASTAL INTERACTIONS PROJECT (NCIP): CLIMATE, ENVIRONMENT AND LABRADOR INUIT SUBSISTENCE STRATEGIES

PROJECT STARTED IN JULY 2020

**Principal Investigator:** James Woollett

**Co-applicants:** Najat Bhiry, Anne de Vernal, Philippe Gachon, Audrey Limoges and Reinhard Pienitz

This project seeks to assess the vulnerability and resilience of the coastal ecosystem in the Nain area in response to climate fluctuations over the last 12,000 years and, with this knowledge, to more accurately predict the impacts of contemporary climate changes in the near future.



Uaspishka Station — Photo credit/Alexis Pageau

4

### HOUSING AND ENERGY TRANSITION IN NUNAVIK: GAINING A BETTER UNDERSTANDING OF HUMAN, TECHNICAL AND ENVIRONMENTAL ISSUES

PROJECT STARTED IN JULY 2020

**Principal Investigator:** Louis Gosselin

**Co-applicants:** Genevieve Cloutier, Myriam Blais, André Potvin, Genevieve Vachon and Mourad Ben Amor

This project aims to advance the state of knowledge on high-efficiency and sustainable residential buildings in order to promote the energy transition in Nunavik by and for local communities. Since the energy supply is currently dependent on fossil fuels, this project focuses on the role of housing from a perspective of energy transition.

5

### UVILUQ: THE USE OF LIQUID BIOPSIES FOR MONITORING THE HEALTH OF COASTAL MARINE ECOSYSTEMS

PROJECT STARTED IN JULY 2020

**Principal Investigator:** Yves St-Pierre

**Co-applicants:** Philippe Archambault and Jacques Corbeil

Blue mussels have long been recognized as valuable biological indicators for monitoring the effects of pollution and climate change in coastal marine ecosystems. However, the processes involved in sampling in polar environments are costly. This project seeks to develop a new sampling platform using liquid biopsies of blue mussels to facilitate monitoring of the health of polar coastal ecosystems.



6

### LINKING THE MARINE ENVIRONMENT AND THE NUTRITIONAL QUALITY OF SHELLFISH AND BELUGA NEAR QUAQTAQ

PROJECT STARTED IN NOVEMBER 2019

**Principal Investigator:** Jean-Éric Tremblay et Mélanie Lemire

**Co-applicants:** Pierre Ayotte, Philippe Archambault, Marc Amyot and Nicolas Derome

The objective of this project is to shed light on the links between the marine environment of Quaqtaq and the nutritional qualities of beluga whales and bivalve shellfish, which are an important part of the villagers' diet. In support of the Nunavik Marine Region Wildlife Board's pilot program in Hudson Strait, the project aims to provide new information on the variation in mercury, selenoneine, and fatty acid levels in beluga whales in relation to their specific population, diet, age, and sex.



Photo credit/iStock

7

### TECHNICAL-SOCIAL SOLUTIONS TO EXPAND THE USE OF RENEWABLE ENERGIES FROM WHAPMAGOOSTUI-KUJJUARAPIK TO OTHER REGIONS OF NUNAVIK

PROJECT STARTED IN NOVEMBER 2019

**Principal Investigator:** Jasmin Raymond | **Co-applicants:** Louis Gosselin, Christophe Krolik and Thierry Rodon

This project aims to solve the problems of renewable heat supply and long-term energy storage in cold regions. The CEN Research complex in Whapmagoostui-Kuujuarapik will serve as a living laboratory to develop a concept for the integration of hybrid energy systems that can be expanded to other villages in Nunavik. The proposed work will help define and optimize energy management strategies adapted not only to the polar climate, but also to the northern socio-political context.

# RESEARCH PROJECTS

## FUNDED BY INQ AND SENTINEL NORTH

**PROJECT 1** | Dynamics of the Innu ancestral territory (Nitassinan) through the morpho-sedimentary and socio-cultural study of lake Manicouagan (reservoir)

- |   |  |  |
|---|--|--|
| 1 | Uapishka Station                               |  |
| 2 | Université Laval                               |  |
| 3 | Institut national de la recherche scientifique |  |
| 4 | Uapishka Station                               |  |
| 5 | Franquelin                                     |  |
| 6 | Pessamit First Nation                          |  |

**PROJECT 2** | Impacts of climate change and browning on salmonid oxythermal habitat and greenhouse gas emissions in arctic regions

- |   |  |  |
|---|--|--|
| 1 | Kangirsuk                                      |  |
| 2 | Kangiqtualujuaq                                |  |
| 3 | Institut national de la recherche scientifique |  |
| 4 | Institut national de la recherche scientifique |  |
| 5 | Université Laval                               |  |
| 6 | Makivik Corporation                            |  |
| 7 | Qikiqtani Inuit Association                    |  |

**PROJECT 3** | Nunatsiavut coastal interactions project (NCIP): climate, environment, and Labrador Inuit subsistence strategies

- |   |                                 |  |
|---|---------------------------------|--|
| 1 | Université Laval                |  |
| 2 | Université Laval                |  |
| 3 | Université du Québec à Montréal |  |
| 4 | University of New Brunswick     |  |
| 5 | Geological Survey of Canada     |  |
| 6 | Trent University                |  |
| 7 | Nain                            |  |

**PROJECT 4** | Housing and energy transition in Nunavik: gaining a better understanding of human, technical, and environmental issues

- |   |  |  |
|---|--|--|
| 1 | Université Laval                       |  |
| 2 | Université Laval                       |  |
| 3 | Université de Sherbrooke – Main Campus |  |
| 4 | Société d'habitation du Québec         |  |
| 5 | Transition énergétique Québec          |  |
| 6 | Quaqtuaq                               |  |

**PROJECT 5** | UVILUQ: The use of liquid biopsies for monitoring the health of coastal marine ecosystems

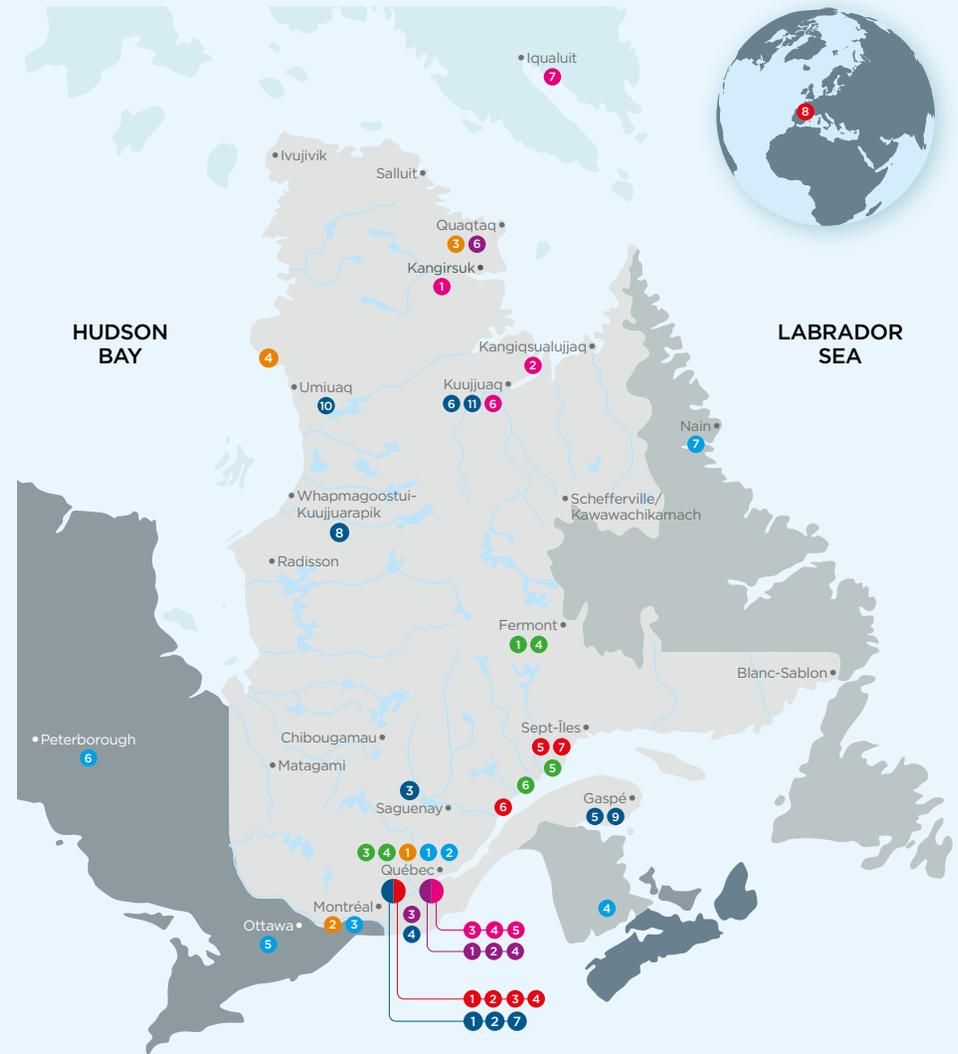
- |   |   |  |
|---|---|--|
| 1 | Institut national de la recherche scientifique                                    |  |
| 2 | Université Laval  |  |
| 3 | Québec Indigenous Science and Engineering Association                             |  |
| 4 | ArcticNet   |  |
| 5 | Northern Institute for Research in Environment and Occupational Health and Safety |  |
| 6 | Parks Canada – Saguenay–St. Lawrence Management Unit                              |  |
| 7 | Port of Sept Îles   |  |
| 8 | CNRS – Unité Stress Environnementaux et BIOSurveillance des milieux aquatiques    |  |

**PROJECT 6** | Linking the marine environment and the nutritional quality of shellfish and beluga near Quaqtuaq

- |   |                                      |  |
|---|--------------------------------------|--|
| 1 | Université Laval                     |  |
| 2 | Université de Montréal               |  |
| 3 | Quaqtuaq                             |  |
| 4 | Nunavik Marine Region Wildlife Board |  |

**PROJECT 7** | Technical-social solutions to expand the use of renewable energies from Whapmagoostui-Kuujuarapik to other regions of Nunavik

- |    |  |  |
|----|--|--|
| 1  | Institut national de la recherche scientifique   |  |
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| 9  | Gaspé  |  |
| 10 | Umiuqaq  |  |
| 11 | Kuujuuaq   |  |



**LÉGENDE** Principal investigator's institutional affiliation | Co-investigators' institutional affiliation | Partner | Research site

A photograph of a research vessel on the ocean with a large ice floe in the foreground. The vessel is a white and red ship with a Canadian flag on its mast. The ice floe is large and white, with a blue tint from the water. The sky is a clear, light blue.

# OUTREACH AND STRATEGIC POSITIONING |

## A YEAR OF STAYING CONNECTED WITH OUR PARTNERS AND POLICY MAKERS

Due to the pandemic, 2020-2021 was marked by the cancellation of several events that would have brought together the northern and Arctic research community. That said, many of our partners showed great creativity in digitally transforming their networking and science dissemination activities. INQ was happy to step up and support these bold initiatives! Below is an overview of the various events in which INQ took part this year as well as the meetings with political decision-makers from home and abroad.

**April 2020 to March 2021** | Meetings with CÉGRIM stakeholders to develop a joint call for projects. Project underway

**December 7-10, 2020** | Arctic Change 2020 | INQ had a virtual booth.

**February 11-12, 2021** | 6th Symposium of Centre d'Études Nordiques | INQ had a virtual booth.

**March 19-26, 2021** | Arctic Science Summit Week 2021 | Online participation of the INQ team at the invitation of researcher Warwick F. Vincent, speaker at the event

**March 25, 2021** | Meeting between INQ and Lisa Rice Madan, Canada's Ambassador to Portugal, to acknowledge the recent signing of three memoranda of understanding between Portuguese and Canadian institutions active in the field of polar research. Portugal's Minister of Science, Technology, and Higher Education, Mr. Manuel Heitor, was also present at the meeting.

**March 2021** | Signing of a "Memorandum of Understanding on Cooperation in Northern and Polar Research" between INQ, Centre d'Études Nordiques, and the College on Polar Research Environments (Polar2E) at the University of Lisbon

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