

NRC-CNRC

The Arctic Circular

●●● News from the Arctic and Northern Challenge program

Issue 1 (October 2023)

The NRC's Arctic and Northern Challenge program (ANCP) works closely with members of communities and local organisations to address pressing issues affecting the quality of life of Northern peoples. The program supports Northern-led research projects that have a strong focus on Northern capacity building. By providing both research funding and scientific expertise, the program will support strong and sustainable Northern communities through applied technology and innovation in 4 research themes: food, health, housing, water.

Message from Anne Barker, program director

Welcome to our first annual edition of Arctic and Northern Challenge program news! Keeping our partners informed of the latest news is key for our success. In every issue, we'll bring you updates on current research projects, the people behind the projects, new initiatives and opportunities to partner with the National Research Council of Canada (NRC) on collaborative research and more.

It's only been 1 year since the Government of Canada announced the launch of the NRC's Arctic and Northern Challenge program. In that short time, we've accomplished a lot and set the path for more high-impact projects and collaboration in the next 6 years. Read on to find out about what has happened over the past year and what's coming up!

Although this Challenge program is very new, we're building on the knowledge and best practices we've gained through decades of Arctic and Northern research at the NRC. That being said, the priorities and projects under this new program are led by our Northern and Indigenous collaborators and members of Arctic and Northern communities. We're working with a program advisory committee with members from across Northern Canada. The insight they provide is crucial to the success of the program and in ensuring it remains relevant.

If you're interested in being a part of the NRC's Arctic and Northern Challenge program, get in touch to learn how we can partner on important research projects or help identify solutions to address your needs. If you'd like more information on our past research efforts or to read research papers on



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Council Canada

Conseil national de
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Canada

these and related topics, visit the NRC's publications archive at nrc-publications.canada.ca.

Finally, I would like to extend my sincere thanks to all of our NRC employees, partners and research collaborators. Your interest, initiative, effort and enthusiasm have been and will continue to be key to the successes of the program. Our informal motto has been "learn by doing," and I believe this is truly what we do. Collectively, we're trying new ways of carrying out collaborative research. Sometimes we'll make mistakes, but that's okay because it means that we're doing things! A big part of that is advancing research together in new and innovative ways with new processes, partners and priorities. Thank you everyone.

Advisory members

Bobbie Jo Greenland

Brian Pottle

Caitlyn Baikie

Jamal Shirley

Jenn Parrott

Joe Dragon

Martin Lougheed

Sabrina Kinsella

Program advisory committee

The Arctic and Northern Challenge program advisory committee is an appointed committee that acts in an advisory capacity. The committee provides strategic advice on matters relating to the program's collaborative research projects. This work includes reviewing the program's project portfolio and performance metrics, which can tell us if we're doing the right things, moving in the right direction in order to reach our goal and what success will look like when the program is complete. In addition, it will provide input on the scientific progress, Northern capacity development and incorporating Indigenous knowledge of the projects in the program.

After an introductory meeting in early March 2023, the committee held their first official meeting the following month. At that meeting, the committee reviewed the terms of member participation, listened to and provided comments on program updates, provided input on the program's performance metrics and selected the chairs. We are very pleased that Martin Lougheed, Manager of the Research and Information Department at Inuit Tapiriit Kanatami's Inuit Qaujisarvingat, and Joe Dragon, who leads the strategic consulting company Dragonworks Inc., have agreed to co-chair the committee. You can read more about Martin and Joe in their short bios below.

Martin Lougheed was born in Ottawa and earned a bachelor's of environmental science from the University of Guelph. A beneficiary of the Labrador Inuit Land Claims Agreement, Martin worked in both research and

conservation for 5 years in the Torngat Mountains National Park, located at the northern tip of Nunatsiavut, in Newfoundland and Labrador. He also worked in promotion and visitor services for Parks Canada. Martin has returned to work for the national Inuit organization Inuit Tapiriit Kanatami (ITK) in Ottawa, where he serves as manager for the research and information department, Inuit Qaujisarvingat. He supports a team of 9 that focuses on research in Inuit Nunangat, the homelands of Canada's Inuit, and also helps provide data, information and research support to the rest of ITK.

Joe Dragon is a member of Smith's Landing First Nation. After over 28 years in the territorial and federal public service, he created Dragonworks in December 2020. Joe Dragon began his career as a wildlife biologist for the Government of the Northwest Territories while completing his PhD in wildlife ecology and management at the University of Alberta studying caribou. After working in senior management positions with the territorial resources, wildlife and economic development departments and the Ministry of Aboriginal Affairs in Yellowknife, he relocated to Ottawa, where he spent 14 years in executive positions at Agriculture and Agri-Food Canada, Employment and Social Development Canada, Indigenous and Northern Affairs Canada, Treasury Board Secretariat and the Department of National Defence. In 2017, he returned to the territorial government to serve as the deputy minister of Environment and Natural Resources followed by an appointment as deputy minister of Infrastructure, where he was also chair of the board for the Northwest Territories Power Corporation. Dragon was born in Fort Smith, Northwest Territories, and received a Queen's Diamond Jubilee Medal in 2012 for his community service. He is married with 3 children and is actively involved in national board activities such as the Canadian Mountain Network (chair), the Gordon Foundation (director) and Fulbright Canada's Honouring Nations Canada (founding member). More recently, he was appointed as a strategic advisor to the Vice President of Research and is an adjunct professor in the Department of Political Science at Wilfrid Laurier University.





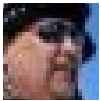
Andrew Arreak
SmartICE Inc.



Michel Tsamados
University College London



Rob Briggs
National Research Council
of Canada



Rex Holwell
SmartICE Inc.



Leanne Beaulieu
SmartICE Inc.



Trevor Bell
SmartICE Inc.

Great progress on the first round of Arctic and Northern Challenge program–CINUK projects

Our first round of projects under the Canada–Inuit Nunangat–United Kingdom (CINUK) Arctic Research Programme is well underway. The projects address key themes connected to climate-driven changes to the terrestrial, coastal and near-shore marine environments in Inuit Nunangat as well as impacts on Inuit and community health and well-being. The NRC supports and participates in 6 of the 13 CINUK projects. For more information on CINUK, visit www.cinuk.org. Read on to find out how these projects are bringing together international team members to address Northern research priorities.

Sikuttiaq: empowering our communities to map rough ice and slush for safer sea ice travel in Inuit Nunangat

“Helping to keep my community safe when they travel on the ice is very important to me, and I am very proud that my community trusts me to provide the SmartICE ice monitoring and mapping service for them. They have been noticing that the ice is changing and becoming less predictable, with more rough ice and slush. The Sikuttiaq project will generate more ice mapping tools and information that my SmartICE colleagues and I can use to help our communities manage these added travel risks.” – Andrew Arreak

About the project

Sea ice roughness, thickness and slush are key characteristics important for determining safe and efficient ice travel for Inuit. The changing climate is negatively affecting these characteristics as well as mental health, food security and cultural practices. Our Inuit-led project team will combine Inuit Qaujimagatuqangit (Inuit knowledge and values) with satellite, drone and ground sensor data to generate new data layers for community ice travel safety maps (Sikumik Qaujimajjuti SmartICE project).



Travel over rough ice is damaging to snowmobiles, costly in time and fuel, and more dangerous than smooth ice. Credit: Eric Guth.



In spring, unexpected pockets of slush can stall snowmobiles, potentially leaving Inuit wet, cold and stranded many hours from safety. Credit: Marzena Marosz-Wantuch

Project collaborators

- Arctic Eider Society
- Bird's Eye Inc.
- Institut national de la recherche scientifique
- MakeTech Aerospace Corporation
- National Research Council of Canada
- SmartICE
- University College London
- University of Victoria

Read more: www.cinuk.org/projects/sikuttiaq/



Heather Shilton
Nunavut Nukkiksautiit
Corporation



Cameron Johnstone
University of Strathclyde



Carsen Banister
National Research Council
of Canada

REMIROCaN: Renewable Energy Microgrid Integration for Remote, Off-grid Cabins in Nunavut

“Nunavummiut pay some of the highest electricity prices in the country and continue to rely almost entirely on diesel fuel for electricity generation. The potential for renewable energy to significantly reduce costs, increase resiliency in Nunavut and reduce greenhouse gas emissions in the territory is immense. Nunavut Nukkiksautiit Corporation is pleased to be leading this resevarch together with our partners to identify innovative solutions to integrate renewable energy at a cabin scale, which will have far-reaching benefits by increasing energy independence in Nunavut.” – Heather Shilton

About the project

Many communities across Inuit Nunangat are interested in integrating renewable energy to reduce their high dependency on fossil fuels for heating and electricity needs. This project aims to reduce carbon emissions and energy costs in remote communities in Northern Canada that have a strong dependence on petrochemicals. It focuses on applying the Inuit Qaujimagatuqangit principles of Qanuqtuurniq, which is being innovative and respectful towards the environment, and Avatittinnik kamatsiarniq, which is having respect for the environment. The project will help increase energy resilience and reduce the impact of climate change in Inuit Nunangat.

Project collaborators:

- Cardiff University
- Concordia University
- Growler Energy
- National Research Council of Canada
- Nunavut Nukkiksautiit Corporation
- University of Ottawa
- University of Strathclyde

This project is possible thanks to the valuable contribution of the Inuit collaborators Jordan Okalik-Musgrove, Daniel Baril, and Jackson Lindell.

Read more: www.cinuk.org/projects/remirocan

Anirniq: resilient responses to protect lung health in Nunavik

About the project

Climate change has serious repercussions, including negative effects on lung health in Northern and remote communities. In Nunavik, this problem is becoming increasingly urgent because of the growth of mould in homes and buildings caused by deteriorated indoor conditions, which is expected to get exacerbated under the future climatic trends, as well as poor air quality caused by forest fires. The Anirniq project, named after an Inuktitut word meaning “breath of life,” addresses this issue. Undertaken in partnership, and under guidance of, the Inuit-led Kativik Municipal Housing Bureau and Ungava Tulattavik Health Centre, it brings together researchers, health care workers and community members from Nunavik to co-create a novel lung health program led by community health workers and the program will seek to address biomedical, housing-related and social determinants of lung health based upon the Nunavik Inuit cultural model of health.

As of August 2023, this project team is still recruiting homes and participants from across Nunavik for their study. Contact Yasemin Didem Aktas by email at y.aktas@ucl.ac.uk for more information about the housing-related aspect, and Faiz Ahmad Khan at faiz.ahmadkhan@mcgill.ca for the health-related aspects.



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Larry Watt
Ungava Tulattavik Health
Centre



The Ungave Tulattavik in Kuujuaq. Credit: Faiz Ahmad Khan

Project collaborators

- KMHB
- National Research Council of Canada
- Research Institute of the McGill University Health Centre
- Ungava Tulattavik Health Centre
- University College London
- University of Oxford

Read more: www.cinuk.org/projects/anirniq



Peter Kikkert
St. Francis Xavier University



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Nunavut Search and Rescue (NSAR) project:
supporting Inuit health and well-being, food security,
economic development and community resilience by
strengthening Inuit Nunangat's whole-of-society
search and rescue capacity

"I am very excited for the regional search and rescue roundtables that are at the core of this project. Community responders have highlighted the need to elevate discussions to the regional level, where participants can share their knowledge with and learn from practitioners in other communities, exchange lessons learned and best practices, discuss issues with federal and territorial partners and build the relationships that allow search and rescue operations to succeed. In doing so, these roundtables will serve as both a research opportunity and a resilience-building measure." – Peter Kikkert

About the project

In Nunavut, community search and rescue responders have a challenging task: providing 24/7 response in a harsh and changing environment with a heavy case load, few resources and limited external assistance. The safety net they provide allows Nunavummiut to live, travel, harvest and work on the land, contributing to individual and community health and well-being.

The Nunavut Search and Rescue (NSAR) project aims to strengthen search and rescue preparedness, prevention and response through the identification of strengths, challenges, best practices and lessons learned and by co-developing practical tools and procedures to improve capabilities. The project also aims to develop a decision support model to assist community, territorial, federal and Inuit organizations in conducting search and rescue planning and human and physical infrastructure development grounded in Inuit.



Gjoa Haven's new Coast Guard Auxiliary vessel increase search and rescue capacity. Credit: Winnie Hatkaiittuq

Project collaborators

- Dalhousie University
- Kugluktuk Search and Rescue
- Fisheries and Marine Institute of Memorial University of Newfoundland
- National Research Council of Canada
- St. Francis Xavier University
- University of Strathclyde

Read more: www.cinuk.org/projects/nsar



Michael Lim
Northumbria University



Dustin Whalen
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Deva-Lynn Pokiak
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Hamlet of Tuktoyaktuk



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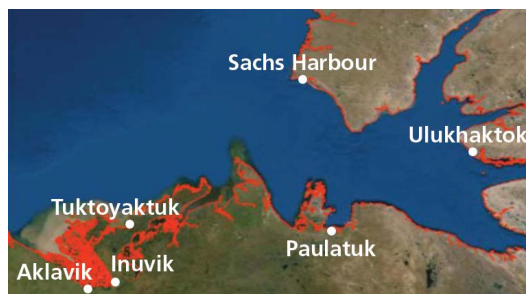
Nuna: effective mitigation and adaptation to changing ground conditions for resilient coastal futures

“The acceleration of the impact of climate change in the Canadian North is truly astonishing. As a Canadian and a Northern researcher, I have always felt it is my responsibility to learn more about these changes so communities like Tuktoyaktuk can adapt. In Nuna, the research is blessed with the power of the community and the Inuvialuit people so we can address these concerns head on. Our project is co-designed with the community to provide the answers and capacity in technology, innovation and people they need for a future in a rapidly changing world.” – Dustin Whalen

About the project

Permafrost encompasses a substantial portion of Canada’s landmass, stretching across vast expanses of coastline and extensive seabeds in the Arctic region. The Nuna project aims to co-develop, with Arctic and Northern communities, new tools and solutions to predict future ground changes and their impact in order to inform key decisions on community planning and mitigation measures. Nuna will also provide new and accessible information on risks to health and well-being associated with changes in land, air and water.

This project will equip and train community climate monitors so they can develop more accurate predictions of future erosion rates to know when to relocate and can assess and monitor ground conditions at potential relocation sites to ensure resilient strategies for development.



Monitoring the coasts is an important part of improving climate change resilience. Credit: Michael Lim.



Working with experienced wildlife monitors to help interpret and design the aerial survey collections.
Credit: Michael Lim.



Research teams are studying new and innovative methods to mitigate the thaw of permafrost and develop resilient and sustainable infrastructure in the Canadian Arctic.



National Research Council of Canada's Dennis Krysz, Antal Prigli and Igor Egorov (from left to right), and their partners are assessing various permafrost mitigation techniques and their effectiveness in combating permafrost thaw.

Project collaborators

- Environment and Climate Change Canada
- Government of Northwest Territories
- Hamlet of Tuktoyaktuk
- Mangilaluk School
- McGill University
- National Research Council of Canada
- Natural Resources Canada
- Northumbria University
- Parks Canada
- Wilfrid Laurier University

Read more: www.cinuk.org/projects/nuna



Liz Pijogge
Nunatsiavut Government



Max Liboiron
Memorial University of
Newfoundland



Alex Bond
Natural History Museum in
London and Tring



Shan Zou
National Research Council
of Canada



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National Research Council
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Plastics and heavy metals in Nunatsiavut food ways and environments

“I am excited to advance our plastics and contaminants work from all corners of the North Atlantic and to continue to incorporate indigenous knowledge by doing so.” – Liz Pijogge

About the project

The Nunatsiavut Government leads a comprehensive Inuit-led pollution monitoring and research program. The NGPlastics project builds on this program through capacity-sharing. It focuses on birds caught for food with no plastic ingestion baselines and links plastic pollution with metal contamination, of which plastics are a potential vector. This project will identify sources of macroplastics on shorelines using forensics based in collective community knowledge and link these to microplastics ingested by animals in order to provide input on meaningful interventions for plastic mitigation.



Seawater sampling session held on September 1, 2022, featuring Liz Pijogge (standing) and (clockwise) Matthew Anderson, Sarah Semigak Lidd, Tyrieka Semigak, Josephine Jararuse, Emma Haye, the late Wilson Jararuse, Lena Onalik, Susie -Debbie Lyall. Credit: Laura M. Martinez Levasseur

Project collaborators

- Memorial University of Newfoundland and Labrador
- National Research Council of Canada
- Natural History Museum in London and Tring
- Nunatsiavut Government

Read more: www.cinuk.org/projects/ngplastics

Innovative collaboration-driven projects

In addition to supporting the CINUK projects, the Arctic and Northern Challenge program unites scientists from the National Research Council of Canada with experts from other research organisations and field specialists. Read on to find out how collaborative teams are addressing challenges raised by Arctic and Northern Peoples.

Integrating glycomics for the management of ocean food resources

About the project

Climate change has been shown to significantly impact the health status of sea species, which can cause nutritional, economic, ecological, and social consequences in Northern communities. In collaboration with multiple partners across Canada, including the fishing industry, universities and the Northern community of Kangiqsualujjuaq in Nunavik, experts from our Human Health Therapeutics Research Centre and Institut National de Recherche Scientifique are working together on integrating glycomics to study the health of mussels and fish both to determine if they are safe for human consumption and to use as an indicator of general environmental health.

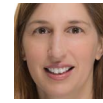
To do so, they will pursue 2 types of biomarkers for:

- analyzing liquid biopsies to study differential expression of glycogenes, and
- studying the biochemistry and identify relevant glycomics signatures of liquid biopsies collected from mussels and fish.



Project collaborators

- ArcticNet
- GlycoNet
- Institut national de la recherche scientifique
- National Research Council of Canada
- Université Laval



Janelle Sauvageau
National Research Council
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Jonathan Power
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Melvin Mahar
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Indigenous clothing ensembles for northern operations

About the project

Indigenous knowledge has been used to craft clothes to keep people warm in Arctic conditions for decades, but there haven't been official studies to compare how traditional techniques for making clothing compare with synthetic alternatives. The overall objective of this project is to investigate the ability of Indigenous-made clothing to protect the wearer through its construction and purpose, thus providing guidance for its use as personal protective equipment for harsh weather. Recently completed work focused on measuring the thermal insulation of various Indigenous-made garments using a thermal manikin and compared the results against those of commercially available clothing currently worn by Government of Canada personnel.



Credit: NWT Arts



A series of tests can be performed to evaluate the performance of clothing in cold weather, using a thermal mannikin. Credit: National Research Council of Canada, 2022

Project collaborators

- Ashley Andersen (Goose Bay)
- Aurora Heat (Fort Smith)
- Aurora Research Institute
- Barry Buckle (Forteau)
- Canadian Coast Guard
- Cheryl Fennell (Yellowknife)
- Craft Council of Newfoundland & Labrador
- Defence Research and Development Canada
- Dene Fur Clouds (Fort Providence)
- Elsie Broomfield (Makkovik)
- Fisheries and Oceans Canada
- Flora House (Happy Valley–Goose Bay)
- Gerri Sharpe (Yellowknife) and Kiluk (Arviat)
- Margaret Broomfield (Makkovik)
- National Research Council of Canada
- Northwest Territories Arts Program
- Nunatsiavut Government Arts Program
- Nunavut Development Corporation
- Parks Canada
- Peggy Anderson (Nain)
- Sarah Cleary (Yellowknife)
- Ulukhaktok Arts Centre (Ulukhaktok)
- Uqqurmiut Arts (Pangnirtung)

Read more: nrc.canada.ca/en/stories/weaving-together-indigenous-expertise-western-science-arctic-clothing



For more information or to get in touch:

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