

In Canada, Inuit Communities Are Shaping Research Priorities

Scientists wishing to do research must now consult with Inuit groups — and consider long-neglected local priorities.

Top: The SmartICE team monitors the SmartBUOY, an advanced data acquisition and remote monitoring climate change adaptation tool, in the landfast ice around the community of Qikiqtarjuaq, Nunavut. Visual: SmartICE, Inc.

BY MATTHEW HALLIDAY
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TEN YEARS AGO, the 1,200 residents of the tiny, mostly Inuit village of Nain, in Canada's far northeast, lived through a natural disaster unnoticed by most of the world. From January to March, the average temperature — typically in the low single digits Fahrenheit — hovered well over 10 degrees above normal. What little sea ice formed was thin, cracked, and pockmarked with open patches. Hunting became risky or impossible, food supplies ran low, and a community survey found that one in 12 (<https://www.nrcan.gc.ca/climate-change/impacts-adaptations/canadas-climate-adaptation-blog/smartice-canadian-innovation-garners-international-recognition/21272>) ice travelers suffered accidents that year. That spring, at least one person drowned when their snowmobiles plunged through weak ice.

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Ice travel has never been risk-free, and for centuries Inuit have relied on traditional trails and time-tested knowledge for mitigating risk — paying attention to ice’s color, texture, or the resistance it offers a sharp blow with a harpoon. But 2010 was different. “That year was so extreme and impacted people so clearly,” said Robert Way, a climatologist of Inuit heritage at Canada’s Queen’s University. “There was a terrible sense of loss and anxiety about what it meant for the future.”

That year was also, however, a year of celebration: the fifth anniversary of the creation of Nunatsiavut (pronounced noo-nut-see-ah-voot), a self-governing Inuit territory with Nain serving as the administrative capital. Meaning “Our Beautiful Land” in Inuktitut, Nunatsiavut is today the only ethnic Inuit government in Canada. (The territory of Nunavut, though majority Inuit, uses a non-ethnic public government model.)

In 2010, that fledgling government had few resources to handle an existential climate threat, but it did have plenty of scientists and researchers traipsing through its immense backyard, studying everything from permafrost to prehistoric glaciation. In the past, little of their work felt directly relevant to locals. “Researchers would come through, do their work, not tell anyone what they were doing, and then leave without having any beneficial impact on the community,” said Carla Pamak, the Nunatsiavut government’s Inuit Research Adviser, who lives in Nain.

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So that June, with the disastrous winter fresh in mind, the government hosted the Tukisinnik Community Research Forum, bringing together locals and a handful

of academics whom the community already trusted. The idea was to re-orient research toward local priorities — sea ice high among them. The meeting “really set the agenda for the next five to 10 years,” said Trevor Bell, a participant and geography professor with Memorial University in St. John’s, Newfoundland and Labrador. “Out of it came an understanding that research is something the community can control for its own benefit.”

Bell’s own claim to fame is SmartICE. Created in collaboration with the Nunatsiavut government, SmartICE integrates traditional ice knowledge with real-time data gathered from sensors embedded in and pulled across sea ice. Piloted in Nain beginning in 2012, SmartICE aims to generate a reliable map of travel hazards, accessible by desktop or smartphone.

SmartICE isn’t alone. Over the past decade, the Nunatsiavut government has redirected outside researchers’ efforts toward Inuit priorities, including mental health, marine pollution in wild foods, housing shortages, and, of course, sea ice. In doing so, Nunatsiavut has been an early contributor to the change now spreading across Canada’s four Inuit regions, which altogether encompass more than 1.4 million square miles, from the Alaskan border to the Atlantic. The consequences could transform the conduct of Canadian and international researchers in the north — a part of the world that holds vital clues about the future of a warming planet, but where the legacy of science-as-usual remains shadowed by centuries of mistrust, anger, and exploitation.

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INDIGENOUS COMMUNITIES around the globe, including Inuit in Canada, have a long and fraught relationship with science and academia. As long ago as the 1880s, Inuit were frequently featured as anthropological oddities in traveling Victorian expositions; and as recently as the 1970s, according to an ongoing lawsuit (<https://aptnnews.ca/wp-content/uploads/2019/06/2019-06-07-Filed-Statement-of-Claim-07-19-283-CVC-1.pdf>), Canadian university researchers used Inuit as human test subjects, performing skin grafts, measuring pain reactions, and forcing them to stand underdressed in frigid weather to test cold tolerance.

Especially among older generations, this legacy has created wariness of researchers and institutions from what Inuit call “the south”: typically, southern Canada, but also the United States, Europe, or just about anywhere else. Not helping matters is a history of often brutal Canadian colonial policies. These included the mass killing of sled dogs

(https://www.qtcommission.ca/sites/default/files/public/thematic_report_from_the_1950s_to_70s_and_the_forced_separation_of_children_from_parents_into_residential_schools

(<http://www.trc.ca/about-us.html>). Inuit dress, language, and customs were forbidden at these schools, the last of which closed in 1996. Inuit today suffer a litany of well-documented social ills, including addiction, poverty, and some of the world’s highest suicide rates.

These conditions have been scientifically

(https://www.researchgate.net/profile/Lori_Idlout/publication/50349231-Being_Unhappiness_Health_and_Community_Change_Among_Inuit_linked

(<https://www.sciencedirect.com/science/article/pii/S2352827318302909>)
to cultural breakdown resulting from decades of colonialism.

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Against this backdrop, science-as-usual can remain a source of tension and mistrust. Trevor Bell has worked in Canada's north since the 1980s, when he was studying prehistoric climate change. Back then, he said, he was doing the same things Indigenous people disliked: "landing in airports and jumping on helicopters to remote locations, not really interacting with the community, not reporting why we were there."

That tension remains, even as a wave (<https://thecanadianencyclopedia.ca/en/article/aboriginal-people-political-organization-and-activism>) of Inuit political activism has started producing serious structural change (<https://www.aadnc-aandc.gc.ca/eng/1100100016900/1100100016908#chp14>) in Canadian politics. Six years before Nunatsiavut formed, the majority-Inuit territory of Nunavut was created in Canada's high Arctic, and Canada's other two Inuit regions are today moving (<https://www.makivik.org/nunavik-inuit-and-canada-sign-mou-on-self-determination/>) toward (<https://www.irc.inuvialuit.com/self-government>) limited self-government. All four regions come together as Inuit Tapiriit Kanatami, a group that represents Canadian Inuit interests federally. In 2018, ITK launched the National Inuit Strategy on Research (<https://www.itk.ca/wp-content/uploads/2018/03/National-Inuit-Strategy-on->

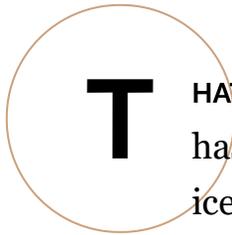
Research.pdf) (NISR), aiming to elevate research self-determination and give Inuit communities greater say in the research that takes place in their homeland.

“The academic community often thinks of itself as enlightened, or very progressive,” said the group’s president, Natan Obed, who is originally from Nain. “And we as Inuit are walking into this room, crowded with non-Inuit, and saying, ‘Sorry, but you’re actually behind.’” In Obed’s view, the constitutional and political transformation in Canada that has enabled governments such as Nunatsiavut has advanced more quickly — with more profound implications for Inuit society — than have changes to the scientific status quo.

SmartBUOYs are deployed in sea ice at locations determined by local and traditional knowledge. *Visual: SmartICE, Inc.*

One of the organization’s chief complaints focuses on research funding and decision-making. Most research conducted in Inuit regions occurs with little or no input from Inuit, who are rarely represented on government or university granting bodies. As a result, scientists’ research priorities have skewed heavily to biological and physical sciences, rather than to the social sciences — a bias that is likely to persist now that the region is generally regarded as a window into our collective global future. In 2014, a report (<https://www.nap.edu/catalog/18726/the-arctic-in-the-anthropocene-emerging-research-questions>) from the National Academies of Sciences, Engineering, and Medicine stated that “what happens in the Arctic has far-reaching implications around the world.” The region holds a significant amount of the world’s fish and oil reserves, while melting snow and ice exacerbates climate change and contributes to rising sea levels.

Critical as they are, these facts are often far from top-of-mind for Inuit. “Walk into any community, any hamlet office, and ask to look in the filing cabinet,” said Bell. “They don’t have a file that says ‘climate change’. They have a file that says ‘unemployment’, ‘poverty’, ‘homelessness’, ‘suicide.’ We know that climate change probably negatively impacts all of those issues. But it’s hard to talk to someone about climate change when they’re hungry.”



THAT REVELATION IS what led to SmartICE, which since 2013 has gone through four generations of massive, stationary ice-thickness sensors — called SmartBUOYS — deployed in sea ice at locations determined by local and traditional knowledge. The system is complemented by SmartQamutiks — named for a traditional Inuit sled — which use electromagnetic currents to discern ice thickness. The data are uploaded to a website (<https://siku.org/#/about>), available as color-coded ice-thickness tracks and a buoy time series.

The idea is to address a whole basket of community issues. Safer travel, after all, helps hunters access food, improves mental health, and helps get less-experienced travelers on the ice, enhancing traditional cultural knowledge among youth.

The project hasn’t been without hiccups. Most significantly, in 2016, the funding for pilot-testing the more advanced SmartBUOYs and SmartQamutiks moved from Nain to Pond Inlet, Nunavut, 1,200 miles to the northwest. This created some hard feelings in Nain, some locals say. But this year has seen the most widespread

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deployment yet, with the program now operating in 17 communities across the Canadian north, including Nain.

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SmartICE owes much of its success to the Nunatsiavut Research Center, one of only three Inuit-owned research facilities in northern Canada. Housed in a plain, two-story office building next door to Nain's only hotel and restaurant, the center consists of two small labs, a kitchenette and common area, workstations, offices, and overnight accommodations. In large part, its success has gone hand-in-hand with Nunatsiavut's political autonomy. Pamak said that many of the goals put forth in the National Inuit Strategy on Research have already been met in Nunatsiavut. "And a lot of what has happened here," she said, "has sparked the national strategy."

As Inuit Research Adviser, Pamak co-chairs Nunatsiavut's research advisory committee, which meets monthly to assess research applications, evaluating their objectives, their value to the region, and how results will be communicated to locals. If a project runs afoul of the committee's guidelines, the advisory committee works with the principal investigator to find a solution — which usually succeeds.

SmartICE isn't the only fruit of this collaboration, nor the only ice-related project. McGill University associate professor Bruno Tremblay studies sea-ice mechanics. He travels regularly to Nain to learn the effects of tides and wind on ice anchored to the shore or the ocean floor — called landfast ice — which acts as a seasonal extension of the coastline. As with SmartICE, his research involves deploying buoys to develop more accurate predictive models of sea-ice coverage. In order to work in Nunatsiavut, he shares data freely with community members, and tends to place buoys where the

community requests. “There will always be interesting science questions no matter where we deploy,” said Tremblay, “so we try to go with their priorities.”

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Tremblay and other researchers work regularly with Joey Angnatok, a 43-year-old Inuit hunter, fisherman, handyman, search-and-rescue worker, and part-time citizen scientist. Angnatok helps non-locals glean at least a little of what the icebound world means to Inuit. To a southerner, the landscape appears beautiful but bleak, a labyrinth of frozen mountains and bays. Angnatok brings it down to a human scale, pointing out stories and myths about particular islands or bodies of water, describing which areas were historically occupied by which families, and identifying the most extraordinary landforms, such as PiKalujak (“Iceberg”) Island, a nearly vertical face of bare rock that rises dramatically from the frozen waters of Nain Bay.

As a search-and-rescue volunteer, Angnatok knows intimately the dangers inherent to ice travel. He was instrumental to SmartICE’s pilot phase, working with Bell and other collaborators to help them get the lay of the land, deploying and checking on buoys, and hauling SmartQamutiks.

“I’ve always been sort of a science geek,” Angnatok said.

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“I’d talk to elders and they’d say, ‘Oh I’ve never seen a hole there in the ice before, I wonder what’s going on?’

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And then you talk to researchers and they'd be able to talk about water salinity and other observations, and you begin to see how it works together.”

T

HE QUESTION OF how science and Inuit knowledge can complement and enhance one another is key to another effort, in the community of Pond Inlet, where SmartICE launched its second major pilot. Here, a program called Ikaarvik (“bridge,” in Inuktitut) fosters collaboration between Inuit youth and outside researchers. (One of the program’s partners has been SmartICE, which used Pond Inlet as its second major pilot site after Nain.)

“Young Inuit are often feeling pulled in two directions,” said Eric Solomon, director of Arctic Programs at the nonprofit Ocean Wise, which administers Ikaarvik. Elders want the youth to uphold traditional values, he said, even as the world rapidly changes around them.

Solomon recalls an afternoon he spent several years ago, with an Inuit elder, in a town about 155 miles north of the Arctic Circle. The two men were out on the ice, and in the quiet of the moment, Solomon asked the older man about the changes he’d seen in his lifetime, and what they’d meant to him. The man sat quietly for a moment, before describing how he had always been able to navigate by the wind, the sky, and the condition of the ice. He had learned these skills from his parents and grandparents and now it was his turn to give this knowledge to the next generation. But the pace of change in his lifetime had undermined much of its usefulness.

“He believed,” said Solomon, “that his role in his society had become obsolete.”

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This kind of story, said Solomon, can change researchers' perspectives on the urgency of marrying research concerns to community needs. But for all the promising endeavors — and the attention and celebration that has greeted marquee projects like SmartICE — such efforts remain exceptions. One problem, he believes, is the traditional scholarly funding model, which requires clear-cut research questions to be identified before work gets underway. This means researchers are unable to travel to remote communities to inform their research proposals, so communities can't meaningfully be involved in determining questions or methodology.

To deploy the SmartBUOY, the SmartICE team must drill through layers of ice. Since 2013, SmartICE has gone through four generations of the massive, stationary ice-thickness sensors.

Visual: SmartICE, Inc.

Even SmartICE hasn't been a perfect model of cross-cultural collaboration. In 2016, the program won Canada's Arctic Inspiration Prize, given annually to research and scientific teams working on projects of tangible benefit to northern communities. The prize was worth \$400,000. With that and the following year's United Nations Momentum for Climate Change Solutions award, SmartICE has transitioned into a "social enterprise" aimed not just at mitigating travel risk, but creating jobs and economic opportunities in the north, said SmartICE executive director Carolann Harding. Around this time, the program's pilot testing moved to Pond Inlet, Nunavut. Some locals say the transition wasn't well communicated to people in Nain, making SmartICE not exactly the model of research self-determination that Bell and its creators intended it to be.

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Meanwhile, ice accidents persist: in 2015, Nain resident Jim Andersen was riding his snowmobile near Nain Bay when a vehicle in front of him suddenly dropped into thin ice. Anderson pulled [\(https://www.cbc.ca/news/canada/newfoundland-labrador/jim-andersen-nain-bay-rescue-governor-generals-bravery-award-1.2781325\)](https://www.cbc.ca/news/canada/newfoundland-labrador/jim-andersen-nain-bay-rescue-governor-generals-bravery-award-1.2781325) the two passengers from the water and they survived. They were lucky; several years earlier, two people died in a similar snowmobile incident.

The first months of 2020, however, have seen new optimism. SmartICE recently set up the Nain Production Centre, a small facility where local youth are assembling the most advanced iteration of the SmartBUOY, to be distributed to communities throughout the north. And Nain deployed its first 4.0 buoy in early February. They had to wait until it was safe to go out to deploy it, Harding said — the ice was late to form again this year.

Matthew Halliday is a journalist, editor, and copywriter whose work has appeared in magazines and newspapers nationwide, and who writes widely for corporate and not-for-profit clients. A former senior editor at Toronto's The Grid magazine, he is more recently the co-founder and executive editor of Atlantic Canada's The Deep.

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