

Ottawa Carleton Student Northern Research
Symposium 2026
Conference Proceedings



Fri., March 13th, 2026

8:30 – 16:15

Conference Schedule

8:30-9:15	Coffee, pastries and networking
9:15-9:30	Opening remarks
9:30-10:15	Keynote address by Prof. Charles Brunette Sea Ice, Undisciplined
10:15-10:45	Poster Session/ Networking/Break
10:45-12:00	Session 1-Built Infrastructure and Governance <ol style="list-style-type: none"> 1. Blair Maddock– Ferrie & Braeden Radley- Extractive Colonialism Reloaded: Arctic Development Policy, Indigenous Economic Sovereignty, and Canada's Territorial Vulnerability Canada's Arctic 2. Yaning Zhang– Assessing the Influence of Subgrade Hydrothermal States on Road Surface Roughness Condition in the Arctic Regions 3. Kate Nixon Anania– An opportunity to get it right: an exploration of fisheries management opportunities in the Central Arctic Ocean 4. Peng Yang– Utilization of Lightweight Raft Foundation Reinforcement Layer in All-Season Roads to Mitigate Permafrost Degradation in Northern Canada 5. Lena Dedyukina– Edézhíe Protected Area as a site of environmental peacebuilding: Peace with nature and Indigenous environmental stewardship in Canada
12:00-13:00	Lunch
13:00-14:30	Session2 - Food, Culture and Well-being <ol style="list-style-type: none"> 1. Alison Schultz– Shifting Climates of Care: Navigating wildfire evacuations while pregnant in Yellowknife, NWT 2. Chelsea Uppahuak- Prusky– Community food bank in Arviat 3. Camille Slack– “They were saying prices are going to be cheaper, cost of living is going to go down, and we’d get so many opportunities”: Capturing Household Experiences of the Inuvik-Tuktoyaktuk Highway through a Co-Developed Cost-of-Living Survey 4. Julia Ussuk– Presentation on Sewing 5. Tamara Donnelly– Exploring Arctic Youth Connections to Country Foods: Insights from visual survey responses 6. Keasha Kingmeatok– Impacts of Limited Mental Health Resources on Inuit in Nunavut
14:30-15:00	Break
15:00-16:15	Session 3- Ecosystems, Environment and Contaminants <ol style="list-style-type: none"> 1. Zac Musch– Developing a Yukon-wide strategy for contaminants research 2. Caitlin Lewis– Exploring the role of species interactions in Arctic-breeding bird distributions 3. Mojtaba Niazalizadeh Moghada– From Ship Hulls to Seafloor: Paint-Derived Microplastics as an Overlooked Type of Microplastics 4. Felix Addo–Wastewater and Environmental Monitoring of M. tuberculosis in Nunavik’s Decentralized Sanitation Systems 5. Katie Stewart–The Role of Freshwater Systems in the Arctic Carbon Cycle
16:15	Closing Remarks

Keynote Address

Charles Brunette

Assistant Professor - Department of Geography, Environment and Geomatic

University of Ottawa

Sea Ice, Undisciplined



Session I**I. Blair Maddock-Ferrie & Braeden Radley*****Extractive Colonialism Reloaded: Arctic Development Policy, Indigenous Economic Sovereignty, and Canada's Territorial Vulnerability in Canada's Arctic***

Federal policy restricts the extraction of fossil fuels on environmental grounds, while simultaneously permitting hard rock mining operations that impose acute environmental harm on Indigenous communities through tailings contamination and fly-in, fly-out (FIFO) labour models that preclude meaningful local economic participation. Drawing on Ivan Illich's concept of radical monopoly (Tools for Conviviality, 1973), this paper argues that permitted mining replicates the structural logic of extractive colonialism, external capital extracts value, communities provide social license, and departure leaves dependency and environmental liability.

Fossil fuel development, by contrast, has historically generated durable infrastructure, transferable workforce skills, and long-cycle revenues capable of supporting Indigenous economic sovereignty. This asymmetry carries consequences beyond community economics. Russia's accelerating Arctic militarization and resource development, alongside American contestation to Canadian sovereignty over the Northwest Passage, exploit the vacuum created by Canada's own development restrictions. Effective occupation, the legal and political foundation of Arctic sovereignty claims, requires permanent, economically viable communities. Canada cannot credibly claim the Arctic Archipelago as its "jewel" while imposing development models that ensure northern communities remain economically marginal.



2. Yaning Zhang**Assessing the Influence of Subgrade Hydrothermal States on Road Surface Roughness Condition in the Arctic Regions****Key Words:** Frozen soil subgrade, Hydrothermal state, Road roughness, Machine learning**Feature importance**

Road infrastructure is the primary transportation mode in Canada for both people and goods. Remote communities are especially dependent on high-intensity freight transportation to ensure the continuous delivery of essential supplies in northern regions. However, the vast and ice-rich permafrost terrains are highly sensitive to climate change. In recent decades, there has been compelling evidence of permafrost experiencing significant degradation due to global warming. The thawing permafrost subgrade will result in structural instability and uneven settling, which will ultimately lead to road failure. These degradations not only shorten service life but also directly affect driving comfort and traffic safety, which are critical for a reliable all-season road infrastructure. Currently, the road profile measurement based International Roughness Index (IRI) is widely used to evaluate the roughness of road surface in Canada. Such a parameter is highly correlated to the subgrade conditions; however, permafrost subgrade hydrothermal states are neglected in IRI analysis. To address this gap, this preliminary study incorporates permafrost subgrade conditions, traffic, and climate factors to evaluate the impacts of permafrost subgrade hydrothermal states on IRI. The traffic (traffic volume) and climatic factors (air temperature, precipitation, humidity, freeze-thaw and freeze index) obtained from Long-Term Pavement Performance (LTPP) database, together with permafrost subgrade-related factors (soil temperature, ice content, and soil type) collected in Northwest Territories and Northern Quebec, are used to achieve this objective. Machine learning models are developed to predict IRI, and the SHapley Additive exPlanations (SHAP) are used to assess factor importance. By comparing model performance and feature importance, this study is expected to demonstrate whether subgrade hydrothermal factors improve IRI prediction and identify the dominant drivers of IRI deterioration in cold region roads. The findings offer a novel perspective on IRI deterioration in cold regions to support road maintenance and management decisions.



3. Kate Nixon Anania

An opportunity to get it right: an exploration of fisheries management opportunities in the Central Arctic Ocean

Climate change-caused ice melt has led to unprecedented changes in access to the Arctic Ocean, including projected access to the international waters of the Central Arctic Ocean, which has historically been inaccessible to commercial ventures, including fisheries (Pezard et al., 2025). As access increases, commercial fisheries may expand into the international waters of the Central Arctic Ocean. Commercial fishing in the Central Arctic Ocean will require a new international fisheries management regime, with Arctic Ocean-adjacent nations (including Canada) facing a need to adapt to these anticipated shifts. The Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean was passed in 2021 and is in force until at least 2037; signatories include Canada, China, Denmark (via Faroe Islands and Greenland), the European Union, Iceland, Japan, Norway, South Korea, Russia, and the United States (“Agreement to Prevent...”, 2021). This band of signatories includes both nations with territorial Arctic Ocean access and nations who have expressed interest in Arctic resource extraction. Additionally, negotiation around the management of the Central Arctic Ocean includes the nonstate Arctic Indigenous community as a major stakeholder in the process; the Central Arctic Ocean Fisheries Agreement is the only international commercial fisheries management agreement that requires the consideration of Indigenous knowledge as part of its science and decision-making processes (Pezard et al., 2025). Fisheries management approaches requires that successful management solutions be tailored to the specific factors for each region and fishery (Ahmad, 2020). When managed properly, fisheries provide food security for coastal communities, and income generation opportunities for fishers and the seafood sector more broadly. The Arctic Ocean, with its geography, climate, ecology, geopolitics, oceanography and (relatively limited) human access and impacts, is different from other oceans. The management of emerging Arctic fisheries will require thoughtful and innovative application of the tenets of fisheries management.

4. Peng Yang***Utilization of Lightweight Raft Foundation Reinforcement Layer in All-Season Roads to Mitigate Permafrost Degradation in Northern Canada*****Key words: Cold Region Roads, Permafrost Subgrade, Lightweight Raft Foundation Reinforcement Layer**

Permafrost degradation poses an increasingly serious threat to the stability of road infrastructure in cold regions. Current mitigation technologies are costly and poorly adaptable, making them unsuitable in a changing climate. This study introduces the raft foundation concept, laying a continuous and solid slab beneath the entire structure that could effectively distribute loads commonly used in construction, to overcome these obstacles in northern Canada. A novel lightweight raft foundation reinforcement layer (LRFRL) with thermal disturbance and moisture resistance properties was designed and validated as a preliminary study for this purpose. First, three candidate materials were identified: cellular concrete (CC), foamed glass aggregate (FGA), and harvested branches (HB). Their mechanical, thermal conductivity, and moisture resistance properties were evaluated to screen suitable materials in Canada. Next, a small-scale (250 × 500 mm) LRFRL prototype was constructed together with the entire road structure for each material to evaluate its stability and durability under coupled Thermal-Hydro-Mechanical (THM) conditions. Finally, extreme environmental conditions (temperature from -40°C to 40°C, ice content around 20%), traffic load (equivalent to ESAL=125) and freeze-thaw cycles (20-year) were simulated in a laboratory environment for this purpose. This LRFRL solution provides a cost-efficient and climate resilient foundation system, offering a promising mitigation strategy for road infrastructure in the Arctic regions. Even though the potential outputs are promising, there still exists limitations like scale effects and representativeness, laboratory-simulated under extreme climate conditions. In the follow-up study, scale-up testing will be conducted to validate its applicability in the field sections.

5. Lena Dedyukina***Edézhíe Protected Area as a site of environmental peacebuilding: Peace with nature and Indigenous environmental stewardship in Canada***

This project critically examines the potential of Indigenous Protected and Conserved Areas (IPCAs) to promote environmental peacebuilding in the Canadian context, challenging the assumption of Canada's 'peacefulness' by utilizing the concept of "positive peace," which denotes the absence of structural indirect violence. In this context, IPCAs can be seen as places where positive peace is reimagined as an interconnected web of human and natural systems, building on the idea of 'peace with nature.' Considering settler-colonial realities surrounding environmental protection and governance, there is a need for a critical approach to reconciliation in Canada, one that aims to decolonize relationships and pave the way for Indigenous self-determination, worldviews, and knowledge rooted in relational responsibilities to land, water, and all living beings. The proposed project aims to understand how First Nations communities in the Dehcho region (Northwest Territories), the Dehcho First Nations, and the Edézhíe Management Board exercise self-determination through the Edézhíe Protected Area. Using a combination of document, thematic, and discourse analyses, this research seeks to advance scholarship and policy by providing empirical evidence to inform conversations on environmental peacebuilding, IPCAs, reconciliation, decolonization, and Indigenous self-determination.

Session 2

I. Alison Schultz

Shifting Climates of Care: Navigating wildfire evacuations while pregnant in Yellowknife, NWT

During the summer of 2023, wildfires began to encroach on the city of Yellowknife, NWT, causing 19,000 residents to evacuate (KPMG, 2024). Feelings of fear, anxiety, and unknown were apparent among those who had to quickly leave their homes and set South. For those who were pregnant, these feelings echoed tenfold. This paper reflects on the experiences of pregnant people during the evacuations, how they navigated care, and their recommendations for future programming and evacuee support. Woven throughout is the critical importance of listening and learning from patient perspectives, drawing from a public health feminisms approach on care informed by those who receive it. A co-created work informed by the stories shared from pregnant evacuees, this paper highlights topics of risk-based care, access, the fractured entanglement with routine birth evacuation, and the need for better wildfire evacuation preparedness for pregnant people who must receive regular care during extreme climate events.



2. Chealsea Uppahuak-Prusky

Community food bank in Arviat

3. Camille Slack

“They were saying prices are going to be cheaper, cost of living is going to go down, and we’d get so many opportunities”:

Capturing Household Experiences of the Inuvik-Tuktoyaktuk Highway through a Co-Developed Cost-of-Living Survey

Understanding the social, political and economic impacts of road infrastructure developments for Arctic communities requires collaborative and community-driven research approaches, which effectively capture local perspectives and experiences. As such, our research team partnered with community researchers in the Inuvialuit community of Tuktoyaktuk to co-develop and implement a household cost-of-living survey designed to examine changes in affordability, access, and connectivity in the years following the 2017 opening of the Inuvik-Tuktoyaktuk Highway (ITH). This research aims to capture household level experiences that might otherwise be overlooked in broader economic analyses. The survey builds on earlier phases of research in Tuktoyaktuk, including 2 community focus groups (2018), 17 semi-structured interviews (2021-2025), and a participatory workshop with over 30 local participants (2024). These research efforts highlighted central themes related to the ITH, including impacts on food prices, access to country foods, food sharing and livelihoods. Concerns around equipment needs, species monitoring, and community well-being were also raised. Drawing on these insights, the survey was co-developed with community research leads and launched in February 2025 following an iterative piloting and editing process. Following in-person training, the data collection process was led by three community research leads, supported by regular check-ins and communication with researchers in Ottawa. Beyond generating new insights into the role of roads as agents of change in Arctic communities, this project contributes to broader understandings and lessons learned regarding survey co-design, logistical challenges of randomized household surveys in small northern communities and sustaining community guidance and engagement throughout the research process.



4. Julia Ussuk

Presentation on Sewing

5. Tamara Donnelly***Exploring Arctic Youth Connections to Country Foods: Insights from visual survey responses***

In the Inuvialuit Settlement Region, wild-harvested country foods are central to cultural identity, food security, and overall wellbeing. However, the ongoing nutrition transition, high harvesting costs, and social barriers can limit youth participation in traditional food systems. Understanding youth perspectives is essential for informing effective land-based learning opportunities and cultural initiatives.

Between September 2022 and November 2023, 164 students from Aklavik, Paulatuk, Tuktoyaktuk, Ulukhaktok, and Sachs Harbour participated in an image-based survey on harvesting and country food preferences. Using a creative prompt, students were invited to “*Write or draw a picture of a memory you have of harvesting or preparing country food*”. Using a mixed methods analytical approach, we conducted a quantitative characterization of responses complemented by a qualitative thematic analysis to explore recurring patterns.

A total of 63% (104/164) of students responded to the creative prompt, offering valuable insights into how youth experience and value land-based practices. Responses reflected strong place-based knowledge, intergenerational learning, and culturally significant practices. Themes also revealed demographic differences in the responses, highlighting how harvesting skills develop with age and vary by gender. The use of creative, image-based methods proved effective in engaging students and eliciting rich data that may not have surfaced through closed-ended survey questions.

This research highlights the importance of applying youth-informed, culturally grounded approaches in northern research. Findings can support the development of youth programming that aligns with their interests and lived experiences, contributing to strengthened knowledge transmission and country food engagement across the Inuvialuit Settlement Region.

Tamara Donnelly, Sonja Ostertag, Sonia D. Wesche, Maria Ramirez Prieto, Alissa Sallans, Celina Ruben, Kelly Skinner

5. Keasha Kingmeatok

Impacts of Limited Mental Health Resources on Inuit in Nunavut

Session 3

I. Zac Musch

Developing a Yukon-wide strategy for contaminants research

My thesis involves the development of a strategy for contaminants in Yukon. This work is supported by the Northern Contaminants Program in collaboration with the University of Ottawa and Yukon University. The project originates from the Yukon Contaminants Committee identifying a need for a consolidated database of past and current contaminant research. The database will be used to support First Nations and other governments with decision-making around environmental governance. The project involves compiling and analyzing existing contaminant records to examine spatial and temporal trends of contaminants of interest to the Northern Contaminants Program. These contaminants include Mercury, Persistent Organic Pollutants (POPs), per- and polyfluoroalkyl substances (PFAS), among others. The dataset includes samples derived from multiple environmental and biological sources including air, water, wildlife, and humans. Focus groups are planned this summer and will be used to identify local priorities and knowledge related to contaminants. Insights from these discussions will help inform the final strategy, and results will be shared with communities upon project completion.



2. Caitlin Lewis

Exploring the role of species interactions in Arctic-breeding bird distribution

Key Words: Glaciology; Surging; Remote Sensing

The Canadian Arctic is vast, and only a small proportion of the available nesting habitat is used by shorebirds. Despite comprehensive habitat suitability models, questions remain about how Arctic-breeding shorebirds choose where to nest. We used the Program for Regional and International Shorebird Monitoring data (1994-2018) collected from across the Canadian Arctic to investigate the hypothesis that breeding shorebird distributions are influenced by both their surrounding environment, and interspecies interactions. We included 17 focal shorebirds, and 33 other breeding bird species in hierarchical community models, using variance partitioning to determine the extent to which environmental predictors and interspecific interactions contribute to occurrence. We found that interspecies interactions contributed to shorebird distributions, but substantial variation in occurrence remained unexplained. Our results suggest that shorebirds cluster together, implying that these species are below carrying capacity in their breeding grounds. For these rapidly declining populations, the presence of other birds continues to be an important cue for suitable breeding habitat.



3. Mojtaba Niazalizadeh Moghada

From Ship Hulls to Seafloor: Paint-Derived Microplastics as an Overlooked Type of Microplastics

Key Words:

Microplastics have become a growing concern in marine environments, including the Arctic (Bergmann et al., 2019; Tamburri et al., 2022). Microplastics are defined as plastic particles smaller than 5 mm and originate from a wide range of sources (Turner, 2021). While knowledge of microplastic pollution has expanded substantially, critical uncertainties remain regarding the paint-derived microplastics (Gaylarde et al., 2021; Turner, 2021). Paint-derived particles have been detected in Arctic waters, indicating that Arctic marine systems are receiving inputs of paint-related materials (Hamilton et al., 2021). However, their environmental significance remains poorly understood. A major barrier to advancing is the lack of standardized methods for extracting paint-derived microplastics from sediments. Due to their high density and complex chemical composition, paint particles are often underrepresented or excluded in monitoring efforts. This study focused on developing a laboratory method for isolating dense paint-derived microplastics from sediments. Method development was conducted using fabricated samples consisting of Ottawa River sediment mixed with known quantities of microplastics and paint particles. The extraction workflow included freeze-drying, digestion, density separation, filtration, and microscopic analysis. Initial testing with CaCl_2 ; $\sim 1.4 \text{ g/cm}^3$ and NaI ; $\sim 1.6 \text{ g/cm}^3$ achieved moderate recovery of low-density microplastics but failed to extract paint-derived particles. A two-step density separation protocol combining CaCl_2 and SPT; $\sim 2.6 \text{ g/cm}^3$ successfully isolated both particle classes while producing cleaner filters suitable for analysis.

4. Felix Addo***Wastewater and Environmental Monitoring of *M. tuberculosis* in Nunavik's Decentralized Sanitation Systems***

Key Words: Arctic communities, Decentralized sanitation systems, Nunavik, Tuberculosis, Wastewater Environmental Monitoring

Tuberculosis (TB) remains a major public health concern in Nunavik, where remote geography, overcrowded housing, and limited access to diagnostic services contribute to sustained transmission. Wastewater Environmental Monitoring (WEM) offers a non-invasive, population-level surveillance approach that may complement clinical case detection, particularly in settings where healthcare access is constrained. However, the application of WEM in decentralized, truck-hauled sanitation systems common across Arctic communities has not been well characterized. This study evaluated the feasibility of implementing TB-focused WEM in three Nunavik communities between June and November 2025. Wastewater samples were collected during routine sewage truck off-loading events using a field-adapted stainless-steel sampler designed for Arctic operational conditions. A total of 130 sewage truck-run samples were analysed using validated qPCR assays. Pepper Mild Mottle Virus (PMMoV) was consistently detected across all samples, confirming reliable faecal signal recovery within truck-hauled systems. The RD9 genomic region of *Mycobacterium tuberculosis* DNA was also detected in two communities with concurrent clinical TB activity (13/40 and 5/28 samples), while no detections occurred in the third community (0/62 samples). GPS-informed route reconstruction enabled estimation of contributing buildings and population per sampling event, allowing logistics-informed interpretation of detection patterns. Positive signals clustered within specific truck routes, indicating spatial heterogeneity in community-level contributions. Pooled prevalence modelling provided indicative estimates of the number of potentially affected buildings and individuals contributing to positive wastewater signals. These findings demonstrate that TB-targeted WEM is technically feasible in Arctic communities relying on decentralized sanitation. While not diagnostic at the individual level, WEM may serve as an equitable, community-scale surveillance tool to support targeted public health response and strengthen infectious disease monitoring in northern regions.



5. Katie Stewart***The Role of Freshwater Systems in the Arctic Carbon Cycle***

In northern regions, low temperature and pH inhibit microbial carbon processing within wetlands, indicating that aquatic C most likely enters freshwater systems primarily from outside sources. Much of the CO₂ released from these systems is introduced from the surrounding terrestrial environment. Dissolved organic carbon (DOC) enters Arctic aquatic systems as surface and groundwater passes through organic rich soil layers and litter, contributing to the supersaturation of dissolved CO₂ and CH₄ as DOC is decomposed in Arctic freshwaters. This study tested the hypothesis that DOC and freshwater CH₄ and CO₂ concentrations increase with decreasing water body size due to their proximity to land, and the increased lateral flux of CO₂ and CH₄ from the terrestrial environment. Dissolved gases were collected using the direct headspace equilibration method in freshwater (lakes, ponds, streams and puddles) near Daring Lake, Northwest Territories and were analyzed using gas chromatography. Water samples were also taken at each sampled site to analyze DOC content along with ancillary variables including water temperature, pH and dissolved oxygen. Preliminary results indicate that DOC and dissolved CO₂ and CH₄ were greatest in smaller water bodies (ponds, puddles and streams) than larger water bodies (lakes). Temperature and DOC were significant predictors of dissolved CH₄ and CO₂ concentrations. Preliminary results also indicate DOC and CO₂ were negatively correlated with dissolved oxygen and pH. Initial results suggest that CH₄ flux is generally from freshwater to the atmosphere, as freshwater concentrations exceed atmospheric concentrations. Conversely, CO₂ flux showed more variation among sites. These results will help quantify the role of Arctic freshwater systems in regional greenhouse gas emissions.



Poster Session

Katelyn Stead

Post-Depositional Remobilization of Legacy Gold Mining Contamination Evidenced by Elevated Arsenic in Jackson Lake, Northwest Territories

Katelyn Y. Stead¹, Carling R. Walsh¹, R. Timothy Patterson¹, Jennifer M. Galloway², Nawaf A. Nasser³

¹Department of Earth Sciences, Carleton University, Ottawa, ON, Canada, ²Department of Earth Sciences and Engineering, Missouri University of Science and Technology, Rolla, Missouri, USA, ³Natural Resources Canada (NRCan), Geological Survey of Canada, Calgary, Alberta, Canada

Gold mining was a major industry in Yellowknife, Northwest Territories, from the mid-20th century to the early 2000s. During ore processing, arsenopyrite roasting released large quantities of highly toxic arsenic trioxide (As_2O_3) through stack emissions, contaminating the surrounding region. A freeze core collected in 2019 from Jackson Lake, north of Yellowknife, was analyzed using end-member modeling analysis (EMMA), inductively coupled plasma mass spectrometry (ICP-MS), Rock-Eval pyrolysis, and ^{210}Pb dating to assess arsenic contamination and sedimentological and geochemical processes influencing arsenic distribution in lake sediments.

EMMA results indicate that sediment accumulation is dominated by low-energy transport processes, with periodic variations affecting transport and deposition. High arsenic concentrations occur throughout the core, with maximum concentrations in the upper 8.0 cm (post ~1990 deposition), suggesting post-depositional remobilization under fluctuating redox conditions. Similar downcore trends in other redox-sensitive elements, including antimony and sulfur, along with increased organic matter, support a redox-driven remobilization mechanism. Increases in concentrations of less mobile contaminants, such as gold and mercury, align with historical gold mining activity, further supporting a primary mining-related contamination source.

These results demonstrate that arsenic concentrations in Jackson Lake sediments reflect the combined influences of historical gold mining, sediment transport processes, and ongoing redox-driven remobilization, thereby explaining persistently high surface arsenic in Jackson Lake, decades after mining activities ceased.

*Shifra Fern-Weinbren****Community impacts of sealift shipment delays and cancellations in Paulatuk, Inuvialuit Settlement Region, NWT***

Shifra Fern-Weinbren, Celina Ruben, Sonia Wesche, Tiff-Annie Kenny

Retail and wild-harvested country foods are both central to modern Inuit food systems. However, there are challenges in accessing retail foods, as many remote Arctic communities do not have road access, including the Inuit hamlet of Paulatuk (population 298) Inuvialuit Settlement Region (ISR), Northwest Territories (1). As such, retail foods are primarily flown in, resulting in extremely high grocery prices (2). These remote Arctic communities, also rely on an annual sealift shipment for their non-perishable food items, equipment for country food harvesting, construction materials and vehicles (3). In recent years, sea ice and climatic conditions have caused several sealift delays and cancellations (2). Building on long-standing research relationships and using a collaborative, community-based approach, this research will investigate how sealift shipment delays and cancellations impact the community of Paulatuk, with a particular focus on household level impacts. This research will be guided by the following research questions: (R1) What factors are contributing to sealift delays and cancellations? (R2) How are sealift disruptions impacting households in Paulatuk? (R3) What climate adaptation measures and logistical or policy changes could be implemented to improve sealift deliveries. Recognizing the limited research on sealift shipping for Arctic food resupply, I will conduct a systematic media analysis to identify when and why sealift disruptions are occurring and how community members are impacted. Then, working alongside a community research lead, we will conduct talking circles and key informant interviews in Paulatuk. This research is driven by community priorities raised by Paulatuk residents and could help inform policy changes, government resource allocation, and climate adaptation measures for sealift activities in the Arctic.

Sara Ellacott

Experimental controls on arsenic release during permafrost thaw

The Arctic has been experiencing an increase in temperature that is causing permafrost thaw across northern regions. Investigations of permafrost in Yukon's Dawson Range demonstrated that thawing permafrost resulted in chemically reducing conditions that favored the mobilization of iron, manganese, and arsenic at hazardous concentrations. The conditions required for high arsenic release have been established for thawing permafrost, however the chemical speciation of arsenic mobilized in groundwater remains unknown. Determining the exact chemical form of dissolved arsenic (e.g., As(III), As(V), or potentially sulfur-complexed forms) is crucial, as speciation dictates its mobility, toxicity, and susceptibility to natural attenuation processes. Arsenic speciation during permafrost thaw was evaluated through laboratory incubation of thawed permafrost soils in the presence of partially oxic, anaerobic, and anaerobic sulfate-amended water. Under oxic conditions, arsenic mobility was low due to the stability of iron-(oxyhydr)oxides in oxic conditions. The anoxic conditions increased arsenic release via reductive dissolution of iron-(oxyhydr)oxides. Sulphate amendments produce pronounced declines in dissolved sulfur and arsenic concentrations over time, suggesting a role of sulfate reduction in immobilizing arsenic. Ongoing investigations are constraining dissolved and solid-phase arsenic speciation using synchrotron X-ray absorption, high-performance ion chromatography coupled with inductively coupled plasma mass spectrometry, and microbial sequencing.



*Marie Daniels**Assessing the relationship between soil carbon and nitrogen stoichiometry and decomposability in Yukon wetlands*

Marie Daniels, Adriana Caswell, Elyn Humphreys

Northern wetlands are vital global carbon sinks, yet rising northern temperatures threaten to accelerate organic matter decomposition, potentially shifting these systems into carbon sources. Wetlands can be classified into mineral wetlands (swamps, marshes, and shallow waters) and organic wetlands (bogs, fens and sometimes swamps). Soil stoichiometry, specifically the carbon to nitrogen ratio (C: N), reflects C and N flows through the soil-plant-atmosphere continuum, can indicate decomposition rates, and amounts of N required to support a given level of C storage. This research investigates how C and N stocks, the relationship between C: N, depths, and permafrost presence, vary within and among different wetland classes near Mayo, Yukon.

During summer 2025, 444 soil subsamples were collected from 21 wetlands and 27 uplands, reaching depths of 325 cm. Organic matter was determined through loss on ignition, while C and N concentrations were measured using Dumas combustion.

This dataset will evaluate whether bogs exhibit the highest C:N ratios among wetland classes due to nutrient-poor Sphagnum, the main peat-building plant type. Swamps are expected to have the lowest ratios due to N-rich plant litter. Permafrost-affected soils are expected to maintain higher C:N ratios than non-permafrost peat soils due to reduced decomposition. This data provides baseline information to evaluate process models and understand how climate-driven shifts in nutrient cycling may impact long-term carbon storage in northern wetlands.



Julia Macpherson

A community-driven approach to understanding the role of anthropogenic activities on contaminant loads in Mittimatalik, Nunavut

Across the Canadian Arctic climate change driven reductions in sea ice, geopolitical change and changing economic trends have led to a rapid increase in shipping activities, particularly related to the extraction of mineral and energy resources. While increased shipping can create increased access and opportunities for resource development it can simultaneously pose threats to the Arctic environment. Mittimatalik, Nunavut has the highest ship traffic in Canadian Arctic waters and Inuit in the community have identified concerns related to the significant increase in shipping over the past decade. One priority concern and the focus of this project is the presence, abundance and impact of emerging contaminants from increased anthropogenic activities to the environment around Mittimatalik. The objectives of this PhD project are to 1) assess presence and abundance of priority contaminants (microplastics, trace elements and polycyclic aromatic compounds [PACs]) in various environmental matrices; 2) investigate the ecological and biological fate of contaminants in coastal ecosystems; and 3) evaluate the risks and impacts of increased anthropogenic activity on priority contaminants and the community of Mittimatalik. This work is community-driven and a direct outcome of collaboration and co-development of research questions with community representatives from Mittimatalik.



*Jameson Kukolic**A Tale of Two Stations*

In Inuvik, N.W.T there are two satellite remote sensing stations a 6-minute drive apart. Over the last few decades, the frontier of space has shifted from a publicly funded exploration of the unknown to a booming private industry. This research is a literature and article review meant to explain why there are two stations in Inuvik and how the globalized trade of earth observation affects northern communities. Like oil and gas before it as the remote sensing industry began booming lots of investment poured in. Inuvik, which is situated in an ideal position to receive data from polar-orbiting satellites, was a prime location. Six years after the original government of Canada station was built in 2010 a private one was built by Norway's Kongsberg Satellite Services in collaboration with Planet Labs of San Francisco and local entrepreneur Tom Zubko, owner of New North Networks. The public station also has private involvement with MDA Space signing a contract with the Government of Canada making them the exclusive supplier of the maintenance and installation of antennas at the ground station. MDA has been given billions in contracts and sells data obtained at the Inuvik station. Crucial to the operation of these stations is the Mackenzie Valley Fibre Link which was conveniently finished in 2017 and cost the government of N.W.T 194 million CAD. This fibre link brought better connectivity to the north but the money could have also gone towards housing or food shortages. There are no benefit-impact agreements in place and remote sensing does not create jobs in the same way the oil or gas industry does. Though the impact is smaller than an oil field life is hard in Inuvik and if the government is willing to invest billions of dollars in contracts and fibre links to help private companies profit, they should find a way to let the local community benefit and have governance on the matter. The UN Moon Treaty stated that the "[u]se of space shall be carried out for the benefit and in the interest of all countries" (UN, 1966).

Anna Brownlee***Improving Weather Forecasts for Inuit Land Users Using Terrain-Specific Post-Processing Techniques***Anna Brownlee¹, Derek Mueller¹, Joel Bédard²¹ Carleton University, ²Environment and Climate Change Canada

Residents of the Canadian High Arctic have consistently called for more accurate and localized weather forecasts. Environment and Climate Change Canada's (ECCC) High Resolution Deterministic Prediction System (2.5 km resolution) does not cover the High Arctic, leaving Inuit communities reliant on the lower-resolution Global Deterministic Prediction System (GDPS) (15 km resolution). This gap in forecast specificity, compounded by warming trends and changes in weather patterns, underscores the need for improved weather services.

In partnership with Ikajutit HTA, this project aims to evaluate the accuracy of existing forecasts and develop custom forecasts for Arctic Bay. This will be realized for the three Arctic Bay community weather stations and the ECCC station near the airport using weather forecast post-processing techniques. These methods identify and account for systematic discrepancies between local weather station data and numerical weather predictions. We aim to use the Geophisic Model Output Statistic (GMOS) post-processing technique, which corrects for terrain characteristics such as surface roughness and elevation. These corrections will be applied to key environmental variables, including temperature, humidity, wind speed and wind direction. Improved weather forecasts can increase preparedness for extreme weather events and support travel safety, with implications for food sovereignty and cultural practices.

