



Weston Family
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Weston Family Awards in Northern Research

2022





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The Weston Family Awards in Northern Research provide unparalleled support to young scientists in Canada pursuing research in Canada's North. Funded by the Weston Family Foundation, these annual awards are some of the most prestigious in the country for students pursuing a master's degree, a doctoral degree or postdoctoral fellowship. Weston Family Award winners undertake research projects across a broad spectrum of fields and disciplines in the natural sciences, including studies of northern ecosystems, biodiversity, flora and fauna, meteorology, oceanography, glaciology, geography and environmental studies.

Meet the 2022 award winners. These inspiring Canadians are at the forefront of northern scholarship and are helping shape a better future for Canada and the world.



Master's Level 2022





Sara Bellefontaine

Since she started working with shorebirds in 2018, Sara has been passionate about conserving their habitat. Her past work was with shorebirds during their southbound migration; Now she is following them back up North.

Sara will be looking at how weather and nest habitat affect Arctic-breeding shorebirds' behaviour and physiology. Specifically, she wants to see whether changing conditions in the birds' breeding grounds are making it more difficult for them to breed successfully.

She'll be using egg-based microphones—a relatively non-invasive method for measuring heart rate physiology of egg-laying animals. It's Sara's favourite part of project, as it means she can study the birds' physiological responses to environmental change without causing them undue stress. She hopes this project's success will encourage other field biologists to explore less invasive research methods—especially when studying ecology of declining populations or species at risk.



Connor Faulkner

Connor counts himself fortunate to be conducting a portion of his master's research in Rankin Inlet, Nunavut. The small community located along the western Hudson Bay coast is not only a great place to hunt, fish and camp—it's also where he grew up.

The University of Manitoba student's research is focused on comparing the diets of two spatially

distinct stocks of sea-run Arctic char from Rankin Inlet and Naujaat, Nunavut. More specifically, he's examining how diet influences the colour of char flesh. Connor's research stems from community-based research priorities, and he works alongside community members to address their scientific questions aided by Inuit traditional knowledge.



Sydney Goward

Sydney is a master's student at the University of Victoria's School of Environmental Studies. Her research uses remote camera traps to study Dall's sheep and mammal community ecology in the Northwest Territories' Northern Richardson Mountains. In partnership with the Gwich'in Renewable Resources Board, Sydney's project is part of a broader Indigenous-led community-based monitoring program.

Sydney is a member of the Cariboo-Chilcotin Métis Association and grew up on Secwépemc territory, in the community of Williams Lake, B.C. She is a collaborator with the First Nations—B.C. Wildlife and Habitat Conservation Forum and is involved in developing the B.C. Provincial Government's Thinhorn Sheep Stewardship Framework as part of the Indigenous perspectives working group. She is an accomplished forestry professional and emerging wildlife ecologist, skilled in working with, and for, Indigenous research and management partners.



Oliver Holt

Oliver's family roots are intertwined with those of the cedars from the Incomappleux valley. His passion for adventure has led to exploring careers in forestry, wildlife ecology and species at risk recovery. Helping sustain a positive relationship between people and nature in northern landscapes motivates him to focus his research and career in the North.

A master's of science candidate at the University of Northern British Columbia, Oliver is working in partnership with Indigenous and non-Indigenous governments to better understand how landscape alterations and climate change could influence

the future of northern mountain caribou in north-west British Columbia and southern Yukon.

In ecology, a disturbance is a temporary change in environmental conditions that causes a pronounced transformation in an ecosystem. Oliver's research compares predators' diets and the distribution of caribou across different levels of habitat disturbance which signals underlying ecological changes that could lead to future declines of northern mountain caribou within the northern boreal mountains.

He aspires to support Indigenous-led northern mountain caribou knowledge development and maintaining caribou in the North.



Rachel Mandryk

Originally from Manitoba, Rachel was first introduced to northern research as an undergraduate student at the University of Manitoba when she worked as a research assistant on the CCGS Amundsen in the Canadian Arctic. The results of her undergraduate honours thesis on diffusive methane fluxes in Lake Winnipeg were published in a special issue of the Journal of Great Lakes Research.

After graduating, Rachel moved to Ottawa to begin her master's at Carleton University where she continues to study greenhouse gas fluxes.

The focus of Rachel's current research is on how expansion of shrubs in the low Arctic tundra of the Northwest Territories affects production and emission of carbon dioxide. She is using chambers that measure soil-atmospheric carbon dioxide flux year-round and under snow cover. Rachel hopes to understand how the height and size of shrubs impacts decomposition rates of organic material in the soil and subsequent respiration of carbon dioxide, as well as how shrubs contribute to carbon cycling at an ecosystem scale.



Ella Middleton

Ella developed a passion for fieldwork while working with Fisheries and Oceans Canada during her undergraduate studies. The University of New Brunswick master's student is studying the overwintering physiology of northern fish and how increasing environmental variability may impact their health.

One of the species her research is focused on is the Arctic char, a culturally, ecologically and economically relevant species in the Canadian

Arctic. Specifically, she is interested in how char's 10-month period of starvation impacts their energy storage and how they fuel their annual migrations to and from the sea.

Her current work is based out of Ikaluktutiak, Nunavut. One of her favourite aspects of the project is collaborating with the local community, which advises on char spawning sites and helps navigate the tundra.



Tamika Mulders

Born and raised in Yellowknife, Northwest Territories, Tamika is pursuing a master's degree in earth and environmental science at the University of British Columbia Okanagan. Her research focuses on environmental assessment in the Northwest Territories, specifically how food security is considered when proposed resource development projects are being assessed.

New projects such as mines, roads or pipelines undergo environmental assessment processes to consider potential environmental, social and

economic impacts. Food security is a perennial concern in northern communities and many rely on harvesting to supplement the high cost of store-bought food. The potential impacts of development to important harvested wildlife such as caribou and access to traditional foods could adversely impact food security as well as other social, cultural and health aspects tied to food.

When she is not working on her research, Tamika loves plants, gardening, reading and downhill skiing.



Nicholas Paroshy

From a young age, Nick has been fascinated by Canadian wildlife, from red squirrels to woodland caribou. These days, the University of Alberta master's student's fascination has led him to searching for other wildlife, particularly polar bears, throughout the Canadian Arctic. He is focusing on the movement of polar bears in two distinct Canadian sub-populations: the Western Hudson Bay and the Southern Beaufort Sea.

He aims to identify critical drivers for polar bear movement, while attempting to understand how bears move across sub-population boundaries while out on the sea ice. He hopes his work will support the development of appropriate management strategies and update current policy to better aid polar bears.



Nicholas Pontone

Northern peatlands are one of the most valuable ecosystems in our fight against climate change. These wetlands are carbon powerhouses; a square metre contains five times the amount of carbon as a square metre of the Amazon's tropical forest. A dominant feature of Canada's boreal forests, peatlands are forecast to experience substantial climate-related changes.

Fluctuations in temperature and precipitation impact the ecosystem's productivity, hydrological status and vegetation composition, all of which can make it vulnerable to threats such as drought-

driven wildfires. Despite the importance of these issues, the distribution and extent of peatlands in Canada are not fully understood. That's where Nicholas' research comes in.

A master's student in geography specializing in data science at Carleton University, Nicholas is using artificial intelligence and machine learning techniques to produce maps of the extent, distribution and characteristics of peatlands in the Canadian boreal forest by connecting field observations to satellite imagery.



Arash Rafat

Driven by a real desire to help northern communities in tangible ways, Arash is looking at the impacts of climate change and variability on lake ice conditions across the Northwest Territories.

Lake ice is vital to communities across Canada's North. It provides safe transportation routes and sustenance through fish harvesting, and has immeasurable recreational and social value.

While climate change is affecting lake ice conditions in the North, it's unclear exactly how—and what communities can do to adapt. That's where Arash's research comes in. The Wilfrid Laurier University student is combining theoretical knowledge with practical, hands-on field experience, and applying knowledge gained during his co-op work and his undergraduate studies in environmental engineering.



Charlotte Rentmeister

Charlotte has always been passionate about northern wildlife and landscape ecology. It's why she is pursuing a master's in Integrative Biology at Wilfrid Laurier University. Her research is partially funded by the Government of Northwest Territories and aims to analyse muskox survey data in mainland Northwest Territories.

Understanding the relationship between a species and its habitat is important for effective wildlife management and conservation. The research will examine current muskox population density and

distribution and identify factors that contribute to their habitat selection. It will help us understand the potential habitat changes that may occur as a result of climate change and predict muskox population trends in mainland Northwest Territories.

Upon the completion of her degree, Charlotte hopes to return to Yukon, where she was born and raised, to apply the experience and knowledge she gains through her studies to the territory's wildlife management and conservation efforts.



Mary Anne Schoenhardt

Mary Anne is a master's student in the School of Environmental Studies at Queen's University who is happiest outside and finds joy in learning more about the environment around her.

Her research studies the impacts of changing vegetation on the spatial distribution and habitat use of Dall sheep in Southwest Yukon. Dall sheep

have ecological, cultural and economic significance, and inhabit environments that are rapidly changing in response to global climate change. Combining traditional field methods and spatial analysis, Mary Anne's work will contribute to an understanding of the relationship between Dall sheep and their changing environment.



Emma Sutherland

Emma is a master's student at the University of Manitoba studying the migration of the Eastern Beaufort Sea beluga population in the Inuvialuit Settlement Region (ISR).

Located in Canada's western Arctic, the ISR is the most western of the four Inuit homelands in Canada. It spans more than 90,000 square km and includes the Beaufort Sea, the Mackenzie River delta, the Yukon North Slope and the northwest portion of the Northwest Territories.

Eastern Beaufort Sea beluga whales are abundant in the ISR and are of high importance to its communities. Emma is aiming to understand how these ice-dependent top predators are evolving their migratory strategies to adapt to a changing environment.

By combining several decades of telemetry data with modern geospatial tools and statistical approaches, she is identifying specific environmental drivers that have led to shifts in beluga whale migration patterns.



Marina Taskovic

When permafrost thaws, it can create a sort of landslide known as retrogressive thaw slumps. Marina is studying how these features—and the materials they release—affect ecosystems downstream in Northwest Territories.

Her goal is to understand the metabolic fate of carbon released from thaw slump features, the role of microorganisms in this process, and their potential impacts on aquatic food web productivity and carbon cycling. Microorganisms play an important role in global carbon cycling and ecosystem function and can therefore provide key information toward understanding the effects

of permafrost thaw activity—and its potential impacts on ecosystem health.

A master's student in the University of Alberta's Department of Biological Sciences, Marina credits undergraduate studies in biology and sustainable agricultural food systems at Trent University for her interest in how living organisms contribute to the transformation of carbon and nutrients, and how environmental change can impact important animal-mediated processes. It allowed her to develop an appreciation for how terrestrial-aquatic connectivity drives ecosystem structure and function, and led her to northern research.



Sandra Yaacoub

Spruce is one of the dominant tree species in forests across Yukon. When a spruce bark beetle infestation struck Kluane between 1990 and 2012, killing more than half of the region's mature spruce trees, it had significant economic, environmental and social implications. What's more, climate change is creating uncertainty about future forest composition and disturbance trends in the territory.

A master's student in geography at Queen's University, Sandra is studying the accuracy

of using airborne remote sensing data (lidar and imaging spectrometry) to map the impacts of that devastating spruce bark beetle epidemic.

Sandra's work aims to provide maps of forest mortality, regeneration and composition of both the canopy and the vegetation beneath it. Understanding what species of vegetation grew following the infestation, how forests' structure and function have changed, and the added fire potential of beetle-killed timber will be useful for future forest management planning and fire-prevention efforts.

A young evergreen tree with several brown pine cones is the central focus. The background shows a vast forest of similar trees on a hillside, with a body of water visible in the distance. The sky is a soft, overcast blue. The overall mood is serene and natural.

Doctoral Level
2022





Aaron Bell

Aaron's interest in biogeography and island ecology can be traced back to childhood summers spent exploring the islands of Lac la Ronge, Saskatchewan and at the family cabin. The University of Saskatchewan PhD candidate is now revisiting the islands as part of his research.

After studying the island biogeography of ground beetles for his master's degree, he is now reconstructing the island's fire history

and studying potential interactions between fire, island characteristics and biodiversity. He hopes that by studying fire on islands we can better understand the needs of wildlife living in the "patchy" boreal forest mosaic.

Aaron's broad interests include ecology, entomology and conservation. When not staring at beetles through a microscope, he spends his time playing music, hockey and table-top role-playing games.



Ellyn Davidson

Ellyn is thrilled at the chance to return to Baffin Bay. The University of Windsor PhD candidate conducted her master's research in the same area and has worked on other projects in the Canadian Arctic. Currently, she is studying the movement patterns of Greenland halibut, a large deep-water flatfish.

Abundant in inshore and offshore waters across Baffin Bay, Nunavut Greenland halibut are an important part of the marine ecosystem and the primary fisheries resource in the Eastern Canadian Arctic.

While researchers are beginning to understand their behaviour in inshore areas, very little is known about their behaviour offshore; Is it a place of residency or simply a migration corridor to southern spawning grounds? Investigating this question is important for a broader understanding of Greenland halibut ecology.

Furthermore, since this species supports an active offshore commercial industry and a developing inshore community fishery, understanding its movement behaviour is also hugely valuable for maintaining sustainable management decisions.



Cassandra Elphinstone

Cassandra's first trip to the Arctic in 2011 was life-changing — and it proved not to be her last. The PhD candidate in the University of British Columbia's Department of Botany is now studying tundra plant genomics at four International Tundra Experiment (ITEX) sites where international researchers examine the effects of climate change on the Arctic's ecosystem.

Specifically, Cassandra is studying the genomes of white mountain avens plants from artificially warmed and controlled plots. She aims to determine if artificial warming consistently affects DNA sequence, methylation or expression patterns.

Using seeds from the same plants to generate a second generation, she is investigating if these environmentally induced differences can be inherited.

She enjoys hiking, backcountry skiing, mountaineering, and working on alpine huts and trails. A member and past president of the UBC Varsity Outdoor Club, Cassandra enjoys teaching backcountry skiing and introducing students to glacier travel and basic mountaineering. She is also the student representative for ITEX and is helping set up a new alpine research site in British Columbia to compare the effects of warming on arctic versus alpine plants.



Katie Florko

Katie is a PhD candidate at the University of British Columbia studying predator-prey dynamics in Hudson Bay.

Polar bears and ringed seals are valuable resources for communities and important parts of the Arctic marine food web. Seals are polar bears' primary prey and rely on fish as their main source of energy. Declines in fish can have large consequences for the seals, which in turn impacts the bears.

Katie is using new modelling techniques to quantify past and present predator-prey dynamics for the Hudson Bay system, as well as the relationships between fish, seals and polar bears.

It's among the first research to investigate the links between ecosystem change and the spatial dynamics of predator-prey interactions in the Canadian Arctic. Understanding how sea ice-loss impacts movement and foraging is essential for the conservation of these ecologically and culturally significant species.



David McGeachy

David is fascinated with the Arctic ecosystem. The University of Alberta PhD student is studying the ecology of polar bears by assessing the impacts of environmental change on population dynamics.

The Arctic is experiencing an unprecedented rate of sea ice loss due to global warming, which has profound impacts on ice-dwelling species such as polar bears, particularly those found in the southern regions of their territory.

Using data collected along the shore of Hudson Bay during the late summer period when polar

bears are forced ashore during the ice-free season, David's research assesses how changing sea ice conditions directly influence metapopulation dynamics and shifts in polar bear distribution between neighbouring populations. His project also explores the indirect impacts of environmental change on polar bear demography.

By combining multiple sources of information from several jurisdictions, it will be possible to develop new models to estimate key demographic parameters essential to the conservation and management of the species.



Francis Quinby

Francis is a PhD candidate at Trent University currently investigating the impacts of climate change on boreal forest soil ecosystems in the Kluane Region, Yukon. Specifically, he is studying how predicted climatic shifts will affect microbial community dynamics and soil nutrient cycling.

Boreal forest soils represent one of the Earth's largest carbon sinks; They absorb more carbon from the atmosphere than they release. How the soil microorganisms—bacteria, archaea and fungi living within the soil—respond to climate change will play a major role in determining whether the forest remains a carbon sink or

becomes a net source of greenhouse gas emissions. Furthermore, soil microorganisms are essential for the health of forest ecosystems as they influence plant productivity and nutrient cycling.

Francis has established a field experiment that simulates predicted shifts in temperature and precipitation on forest soils. By assessing changes in microbial community structure and function attributable to climate manipulations, his research will help predict how these soil ecosystems will respond to climate change, which has both local and global implications.



Aidan Sheppard

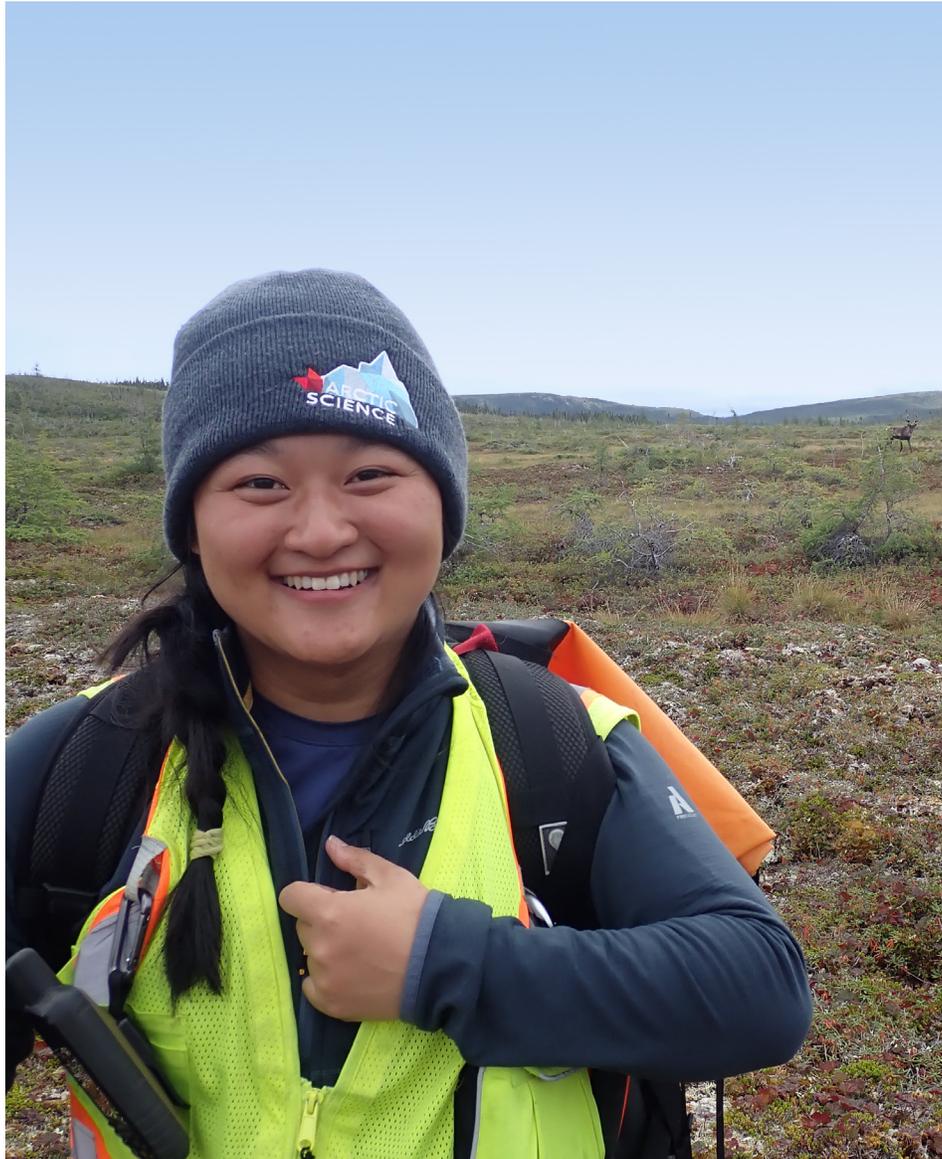
Two-Eyed Seeing involves viewing the world through both an Indigenous and a Western lens when conducting research. It's the guiding framework Aidan is using as he works towards his PhD in conservation biology at the University of Alberta. Aidan is hosted by Yukon University in the Traditional Territories of the Kwanlin Dün First Nation and the Ta'an Kwäch'än Council.

He is working in partnership with Tr'ondëk Hwëch'in First Nation and Wildlife Conservation Society Canada in Yukon South Beringia to identify and monitor climate change refugia—

areas in which a species can survive a period of unfavourable conditions—for biocultural indicator species such as wolverines and caribou.

His research will directly support and supplement ongoing climate adaptation work by Tr'ondëk Hwëch'in First Nation. It will also demonstrate novel approaches for identifying and monitoring species-specific climate change refugia in the North.

Aidan is committed to supporting Indigenous-led conservation, and contributing to structural change in research and academia as a member of the Conservation Through Reconciliation Partnership.



Yifeng Wang

Communities in Labrador regularly frequent permafrost landscapes for cultural activities including berry-picking, trapping and hunting. However, relatively little research has been conducted on permafrost conditions in the region.

Yifeng is a PhD candidate in the department of geography and planning at Queen's University. She is a member of the Northern Environmental Geoscience Laboratory and studies the distribution and sensitivity of peatland permafrost in coastal Labrador.

Yifeng is using a combination of field investigations, remote sensing and thermal modelling to understand where peatland permafrost is found, how it has changed and how it might continue to change in the future. Peatland permafrost landforms' sensitivity to climate and ecosystem-related change has implications for local wildlife habitat and cultural activities, as well as for regional infrastructure development and global carbon cycling.



Postdoctoral Level
2022





Samuel Gagnon

Samuel Gagnon is a postdoctoral researcher in geography at Université Laval. His research focuses on how climate change affects permafrost stability, and how thawing permafrost and subterranean ice impacts periglacial landscapes. He uses an integrative research approach which combines field work with laboratory analysis, modeling and digital mapping.

For his postdoctoral research, Samuel will study the impact of the proliferation of bushes on thermokarst lakes—bodies of freshwater formed by thawing ice-rich permafrost—and on the

drainage basins in Old Crow Flats, Yukon. While the spread of bushes in the Arctic is well documented, their impact on lake dynamics in the permafrost basins is still unknown.

The project also aims to produce scientific knowledge, offering support to the Vuntut Gwitchin First Nation local knowledge systems and traditional practices. This diversification of knowledge will allow the community to increase its resilience through the adaptation of creative and proactive traditional practices supported by modern scientific knowledge.



Spencer Monckton

Sawflies are a group of insects that are unusually diverse in northern North America. These herbivorous insects have great potential as indicator species in the North, but their taxonomy is poorly resolved and the full extent of their diversity is still unknown.

An entomologist completing a postdoctoral fellowship at the Centre for Biodiversity Genomics at the University of Guelph, Spencer is working to

make northern sawflies easier to identify and to better understand their diversity—including by describing species previously unknown to science.

He hopes his work will highlight Northern Canada's potential as a natural laboratory for studying insect diversity across the Northern Hemisphere. His goal is to unlock the potential of sawflies as a model system in which to study the impacts of climate change—past and present—on vulnerable northern insects.



Allison Patterson

Allison is a marine ecologist who uses animal tracking to study how seabirds interact with their environment. Her postdoctoral research at the University of Windsor combines fine-scale GPS tracking of Arctic seabirds with DNA metabarcoding (a process that can identify and categorize several species at once through DNA samples) to examine the relationships between environmental conditions, fish populations and marine predators.

Vast distances and challenging ocean conditions make monitoring fish in the Canadian Arctic using traditional sampling methods difficult. Instead,

Allison's project relies on fecal samples from Arctic seabirds who feed on fish. By measuring the effort the birds expend to catch fish, and analyzing DNA from their droppings, she can identify the species of fish these birds are eating. The information is used to detect changes in the fish species available around seabird colonies and determine if the abundance of those fish species is changing in response to marine conditions.

This research can inform planning for sustainable harvest of fisheries in the face of climate change and increased commercial activity in Canada's North.



Michael Peers

Michael has been conducting research in Yukon since 2015, broadly examining how anthropogenic change will impact northern ecosystems. A postdoctoral fellow at Yukon University, he's examining how reintroduced wood bison in southwestern Yukon impact the ecological community, particularly vertebrate scavengers. He's also exploring how increased human

activity in the region alters bison behaviour, condition and demography.

Michael's project will offer novel insight into how large mammals contribute to ecosystem functioning, while also offering applied recommendations for population management in this herd and in other planned reintroduction sites across western North America.



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