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ANNUAL REPORT • ԳՆՋՄԱՆՆԵՐ • RAPPORT ANNUEL











## Corporate Profile

Understanding the present transformation of the Arctic environment and anticipating its consequences is one of the great challenges faced by Canadians, the Canadian government and the national and international scientific communities. In Canada, climate warming will have tremendous environmental, socio-economic and strategic consequences that will be felt first and most severely in Arctic communities and regions.

ArcticNet brings together scientists and managers in the natural, human health and social sciences with their partners in Inuit organizations, northern communities, government and industry to help Canadians face the impacts and opportunities of climate change and globalization in the Arctic. Over 110 ArcticNet researchers and 400 graduate students, postdoctoral fellows, research associates and technicians from 28 Canadian universities and 8 federal departments collaborate on 28 research projects with over 150 partner organizations from 15 countries.

## Our Vision

A future where knowledge exchange, monitoring, modeling and capacity building will have enabled scientists, Northerners and decision makers to jointly attenuate the negative impacts and maximize the positive outcomes of the transformation of the Canadian Arctic.

## Our Mission

- Build synergy among existing Centres of Excellence in the natural, human health and social Arctic sciences.
- Involve Northerners, government and industry in the steering of the Network and scientific process through bilateral exchange of knowledge, training and technology.
- Increase and update the observational basis needed to address the ecosystem-level questions raised by climate change and globalization in the Arctic.
- Provide academic researchers and their national and international collaborators with stable access to the coastal Canadian Arctic.
- Consolidate national and international collaborations in the study of the Canadian Arctic.
- Contribute to the training of the next generation of experts, from north and south, needed to study, model and ensure the stewardship of the changing Canadian Arctic.
- Translate our growing understanding of the changing Arctic into regional impact assessments, national policies and adaptation strategies.



Dr. Louis Fortier,  
Scientific Director,  
President and CEO

Mr. Bernie Boucher,  
Chair of the Board of Directors

Dr. Martin Fortier,  
Executive Director,  
Vice-President and COO

## Message from the Chair of the Board, Scientific Director and Executive Director

### Sustaining Canada's growing research effort in the Arctic

By all measures, the warming and transformation of the Arctic World has intensified again in 2007 and 2008. September sea ice extent plummeted from an historical average of 8 million km<sup>2</sup> to 4.2 million km<sup>2</sup> in 2007 and 4.5 million km<sup>2</sup> in 2008, the two lowest values on record. New analyses revealed the massive loss of multi-year sea ice over the last decade, culminating with record minima in overall ice volume in 2007 and 2008. On land, ArcticNet researchers reported record high temperatures and spectacular occurrences of permafrost destabilization in the High Arctic. They documented the ecological impacts of the rapid dislocation of the last ice shelves bordering Canada's northernmost coast. On the human front, ArcticNet surveys emphasized the vulnerability of Inuit communities to their rapidly changing environment, and the poor health of Inuit relative to other Canadians. As the

world further woke up to the urgency of reducing greenhouse gas emissions, ArcticNet continued to produce cutting-edge scientific knowledge to inform Arctic policies and strategies. Four major milestones marked the Network's activities and development in the last two years.

First, ArcticNet sailed through its mid-term review with flying colors. The Evaluation Committee recognized the excellence, relevance and trans-sector nature of the research program. The Committee also raised exciting challenges for us to meet during Phase II (2008-2011), including the importance for ArcticNet to strengthen collaborations with the private sector. We are happy to report substantial advances on this front since the mid-term review. ArcticNet has recently developed a research collaboration with Imperial Oil to study jointly the geology, environment, and ice regime in the new offshore acreages auctioned by the Federal Government



at the edge of the Mackenzie Shelf in the Beaufort Sea. Similar collaborations with other corporations are in the making and should extend well into Phase III of a renewed ArcticNet.

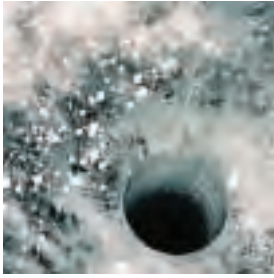
Second, the field work for most of the 35 International Polar Year (IPY) projects that enrich the scientific program of ArcticNet was initiated and/or completed in 2007-2008. From marine lipids to charrs; from microbial diversity to water systems; from mammals to glaciers; from the ecology of the tundra to the resilience of human communities, ArcticNet researchers tremendously expanded their analyses of the response of the Arctic system to climate change. Among the 55 projects funded by the Federal and/or NSERC IPY programs, two major endeavours led by ArcticNet investigators onboard the CCGS *Amundsen* stand out by their magnitude and complexity. During nine months, the Circumpolar Flaw Lead System Study (CFL) looked at all aspects of the ecosystem in the circum-arctic lead between the mobile central ice pack and the landfast ice, a region of lesser ice cover that is the embryo of a future seasonally ice-free Arctic Ocean. Using the ArcticNet co-funded survey of human health in the 14 communities of Nunavik (*Qanuippitaa? – How are we?*, 2004) as a model, the IPY-funded Inuit Health Survey (*Qanuqitpit? Qanuippitali? Kanuivit? – How about us? How are we?*, 2007/2008) extended the first iteration of a longitudinal survey of Canadian Inuit health to the remaining 37 communities of Nunavut, Nunatsiavut, and the Inuvialuit Settlement Region.

Third, ArcticNet benefited from the International Partnership Initiative of the Network of Centres of Excellence program to consolidate its numerous international collaborations. A partnership with the Nansen-Amundsen Basin Observational System (NABOS) to deploy Long-Term Oceanic Observatories in the Laptev and East Siberian Seas was expanded. The Network also connected solidly with the Norwegian ARCTOS (Arctic Marine Ecosystem Research Network) to collaborate on

a range of initiatives including the exchange of students and data, joint publications, and the implementation of international efforts such as the CFL study. In December 2008, ArcticNet and its national and international collaborators hosted the International Arctic Change 2008 Conference where over 900 researchers, graduate students, policy makers and stakeholders from more than 15 countries gathered in Quebec City to report on the current state of the changing circumpolar Arctic. Official agreements to ensure lasting cooperation between researchers in Canada, Norway, Greenland and France have been signed with ARCTOS and the French-led Malina Network. Similar arrangements are in the making with the American SEARCH (Study of Environmental Arctic Change) towards increased scientific cooperation in the Arctic.



Fourth, ArcticNet successfully renewed its scientific program through a call for new proposals that targeted seven research priorities: (1) Monitoring of ocean and terrestrial climate indicators; (2) Coast, landscape, and infrastructure destabilization; (3) Impacts of climate on marine and terrestrial ecosystem services; (4) Economic, geopolitical and legal impacts of environmental change; (5) Socio-cultural, economic, and human health impacts of climate change and modernization in northern communities; (6) Projections of regional-scale Arctic climate; and (7) New and innovative research contributing to ArcticNet's Strategic Framework. The 28 studies now funded directly by ArcticNet represent an enormous



...the last two years saw the issues of sovereignty and development of the Arctic come to the very forefront of the Canadian political agenda. The announcement by the Federal Government of major new research infrastructures in the North, such as the Canadian High Arctic Research Station and a new polar-class icebreaker, gave a new urgency to ArcticNet's mission to train the next generation of arctic specialists and to help establish new researchers in Canadian universities, federal departments and northern organisations.

research effort shouldered by over 110 Network Investigators (NIs) including 42 new NIs and 400 graduate students and postdoctoral fellows, research associates and technicians from 28 Canadian universities and 8 federal departments. Admittedly, however, some imbalance persists between the natural sciences and the health and social sciences within the scientific program of the Network. Until and after renewal in 2011, the Network's management will focus on new avenues to support more projects in these important sectors of Arctic research.

Finally, the last two years saw the issues of sovereignty and development of the Arctic come

to the very forefront of the Canadian political agenda. The announcement by the Federal Government of major new research infrastructures in the North, such as the Canadian High Arctic Research Station and a new polar-class icebreaker, gave a new urgency to ArcticNet's mission to train the next generation of arctic specialists and to help establish new researchers in Canadian universities, federal departments and northern organisations. Overall, in preparation for the renewal of the Network in 2011, these last two years spectacularly confirmed the relevance of ArcticNet's efforts to transform Canadian arctic research and to inform policy in the Canadian Arctic.





## Message from the Co-Chair of the Board



Ms. Mary Simon, Co-Chair of the Board of Directors and President of Inuit Tapiriit Kanatami

It was a great honour to be acclaimed president of Inuit Tapiriit Kanatami (ITK) for a second term

this past June in Nain, Nunatsiavut. I will continue to act as the voice of Inuit on national issues and remain committed to bringing the concerns of Inuit to the ArcticNet program in my capacity as co-chair of the ArcticNet Board of Directors.

Inuit struggle with the social and economic consequences of the European Union seal product ban, the up-listing of polar bears on the US endangered species list, tuberculosis rates that are 90 times higher than the Canadian average, and issues of mental wellness, environment contaminants and food insecurity. Most recently, it has been identified that the H1N1 flu virus may be affecting Inuit communities more seriously than the rest of Canada.

Under the backdrop of these concerns, ArcticNet is now embarking on its second term, conducting important research on the scientific elements of climate change. I have always hoped that the ArcticNet program could be more successful at placing its research into a “human” context. Inuit believe that climate change is not just a bio-physical issue but a social, economic and political one as well, affecting people and communities at various levels and degrees. ArcticNet has great potential to enhance the social and humanities side of its world-class science program, resulting in research that will help Inuit communities become more adaptable and resilient to the impacts of change. To have ArcticNet researchers and Inuit working together on these issues can only improve our opportunities for success, increase the overall possibility of ArcticNet’s

renewal in 2011, and ensure an appropriate and lasting legacy is felt in the North.

It is no secret that I advocate strongly on behalf of Inuit youth. This is also where ArcticNet has an opportunity to create positive change in Inuit communities. A number of achievements stand out. During Arctic Change 2008, I had the pleasure of chairing a topical session, coordinated by Inuit that highlighted the collaboration between many ArcticNet and Inuit researchers. I was brought to tears, as was most of the audience, by the presentations of Inuit youth. In a time of many social concerns, with Inuit suicide rates numbering the highest in North America, it is critical to find engaging research projects to help heal and support our Inuit youth. If we are going to see young Inuit become the researchers of tomorrow, then we must endeavour to improve all Arctic research programs. ArcticNet provides a rare opportunity to approach Arctic research in the long-term. This suits Inuit ideals, as Inuit plan to have a lasting presence in the Arctic — we plan to live here for centuries to come!

The past two years have provided us with both encouragement and ways to improve. We now have between 3 to 10 years to lay an appropriate foundation to achieve the goals we have identified for the future. I have outlined some challenges and opportunities that ArcticNet and Inuit face together. Daunting and difficult as these tasks are, I believe that with an improved partnership and good leadership this dream of ours could become a reality.

A handwritten signature in black ink, appearing to read 'M. Simon', with a long, sweeping underline.



## ArcticNet Research



ArcticNet's trans-sectoral research program brings together scientists in the natural, human health and social sciences with their partners in Inuit organizations, northern communities, federal and provincial agencies and the private sector to study the impacts of climate change in the coastal Canadian Arctic. During Phase I (2004-2008), 29 ArcticNet projects were structured into four Research Themes focused towards producing Integrated Regional Impact Studies (IRISes) of the consequences of change on society and

ecosystems in the coastal Canadian High Arctic, Eastern Arctic and Hudson Bay. An IRIS summarizes and combines knowledge and models of relevant aspects of the ecosystems of a region affected by change, with the objective of producing a prognosis of the magnitude and socio-economic costs of the impacts of change. The knowledge gained through this research process aids policy and decision makers in the development of policies and strategies for adapting to a changing Arctic environment.

### Phase I (2004-2008) Research Program

#### Theme 1: Climate Change Impacts in the Canadian High Arctic: A Comparative Study Along the East-West Gradient in Physical and Societal Conditions

**Theme Leader:** Yves Gratton, Institut national de la recherche scientifique - Eau, Terre et Environnement

##### **Warming Coastal Seas and Shrinking Sea Ice**

Project Leaders: Yves Gratton and David Barber

##### **Coast Vulnerability in a Warming Arctic**

Project Leaders: Donald Forbes, Wayne Pollard and Trevor Bell

##### **Contaminant Cycling in the Coastal Environment**

Project Leaders: Robie Macdonald and Gary Stern

##### **Marine Productivity and Sustained Exploitation of Emerging Fisheries**

Project Leader: Jean-Éric Tremblay

##### **Changes in Dietary Pattern and Impacts on Chronic Diseases Emergence**

Project Leader: Éric Dewailly

##### **The Opening Northwest Passage: Resources, Navigation, Sovereignty and Security**

Project Leaders: John Hughes Clarke and Steve Blasco

##### **Canada's Arctic Waters in International Law and Diplomacy**

Project Leader: Michael Byers

## **Theme 2: Food, Water and Resources in the Shifting North-South Thermal Gradient of the Terrestrial Eastern Canadian Arctic**

**Theme Leader:** Warwick Vincent, Université Laval

### **Changing Food Diversity, Wildlife Patterns and Exploitation**

Project Leaders: Dominique Berteaux and Gilles Gauthier

### **Water Quality, Supply and Indicators of Change**

Project Leaders: Warwick Vincent and Éric Dewailly

### **Emerging New Infectious Diseases in Humans and Wildlife**

Project Leaders: Benoit Lévesque and Éric Dewailly

### **Climate and Coastal Landscape Instability: Socio-Economic and Ecological Impacts**

Project Leaders: Michel Allard and Wayne Pollard

### **Cultural Self-Determination, Endogenous Development and Environmental Changes**

Project Leaders: Mark Nuttall and Dominique Berteaux

### **Warming the Tundra: Health, Biodiversity and Greenhouse Gas Implications**

Project Leaders: Greg Henry and Yves Bégin

### **Climate Impacts on the Sentinel Species Arctic Char in Northern Canada**

Project Leader: Michael Power

### **Climate Change in Northern Québec and Nunavik: Access to Territory and Resources**

Project Leader: Christopher Furgal





### **Theme 3: The Hudson Bay System Study: Land-Ocean Interactions in Subarctic Hudson Bay**

**Theme Leader:** David Barber, University of Manitoba

#### **Ocean-Ice-Atmosphere Coupling and Climate Variability**

Project Leader: David Barber

#### **The Hudson Bay Coastal Zone in a Changing Climate System**

Project Leader: Tim Papakyriakou

#### **Climate Variability, Change and Marine Ecosystem Resources in Hudson Bay**

Project Leader: Michel Gosselin

#### **Carbon and Contaminant Cycling in the Coastal Environment**

Project Leader: Gary Stern

#### **Persistent Organic Pollutants and Human Health**

Project Leaders: Pierre Ayotte and Laurie Chan

#### **People and Environmental Change: Linking Traditional and Scientific Knowledge**

Project Leaders: Jill Oakes and Rick Riewe

#### **Nunatsiavut Nuluak: Baseline Inventory and Comparative Assessment of Three Northern Labrador Fiord-based Marine Ecosystems**

Project Leaders: Ken Reimer and Marina Biasutti

### **Theme 4: Adapting to Change in the Canadian Arctic: Knowledge Transfer, Policies and Strategies**

**Theme Leader:** Gordon McBean, University of Western Ontario

#### **Projecting into the Future: the Canadian Arctic Environment, Tomorrow to 2100**

Project Leader: David Barber

#### **Reducing Human Vulnerability to Environmental Changes in the Canadian Arctic**

Project Leader: Barry Smit

#### **Vulnerabilities and Adaptation to Meteorological and Related Hazards**

Project Leader: Ronald Stewart

#### **Climate Change, Key Traditional Food Species and Community Health in the Arctic**

Project Leaders: Laurie Chan and Christopher Furgal

#### **Surveillance and Management of Climate Change Impacts in the North: Implications for Northern Public Health Policy and Infrastructure**

Project Leader: Pierre Gosselin

#### **Conservation, Economic Development and Community Values: Legal, Policy and Ethical Perspectives**

Project Leader: Milton Freeman

#### **Science-Policy Interactions**

Project Leader: Gordon McBean

#### **Strengthening Climate Cooperation, Compliance & Coherence**

Project Leader: Richard Janda

## Phase I (2004-2008) Research Highlights

With 1500 scientific contributions including over 350 in refereed journals, the implementation of ArcticNet's research plan over Phase I (2004-2008) resulted in spectacular progress in our understanding of the ongoing transformation of the Arctic and its impact on Northerners.

A small sample of the long inventory of the Network's key research highlights to date includes:

- The vulnerability of Canada's longest coastline is being mapped using land-based measurements and the CCGS *Amundsen* and CSL *Heron* SONARS to document geological structure and ice content of the coastal sediment in the High Arctic.
- The Network has progressed tremendously in the reconstruction of past climate and sea ice regimes, and the mapping of geological structure and hazards to navigation of the Canadian Arctic Archipelago in preparation for the potential opening of the Northwest Passage to increased navigation and exploitation.
- Mercury levels in the marine arctic ecosystem over the last 60 years have been reconstructed from the analysis of archived beluga teeth. Coal banks along the Mackenzie River have been identified as potential "hot spot" sources of the mercury responsible for increasing contamination in Beaufort Sea belugas. Mercury emissions from melting coastal permafrost have been assessed. Inuit communities throughout the Canadian Arctic have been engaged in the sampling of the food web for contaminant determination.
- Major successes have been achieved in understanding the potential response of key elements of the marine arctic ecosystem to variability and change in ice regime and ocean climate. The role of nutrient renewal at key oceanographic locations in promoting future primary production has been documented. Immense aggregations of Arctic cod have been discovered on the shallow shelves in winter, thus elucidating the mystery of the missing cod. Newly-developed passive acoustic hydrophones have yielded the first circum-annual record of marine mammal vocalizations, frequentation and activity in key regions of the Arctic, revealing among others the presence of large whales in southern Hudson Bay and the Beaufort Sea in winter.
- A uniquely exhaustive multidisciplinary program is deciphering the response of the terrestrial Eastern Arctic ecosystem to climate variability. Eight weather stations provide regional climate on Bylot and neighbouring islands while the population dynamics of foxes, lemmings, caribou, shorebirds, and geese are studied and modeled. The program makes intensive use of traditional knowledge and harvest data to develop a climate-envelope approach to assess regional effects of climate change on wildlife in Canada's Arctic.
- From glacier mass balance to drinking water quality, from hydroelectric reservoirs to paleohydrology, all aspects of the Arctic freshwater cycle are studied and modeled in a context of climate variability and change. Indicators of present and past climate, water quality and water supply in northern lakes and reservoirs have been developed to identify risks and vulnerability along a N-S transect from southeastern Hudson Bay to Ellesmere. Making headlines, the team was first to visit and confirm the break out of the Ayles Ice Shelf and water-column profiling confirmed the loss of the epishelf lake in Ayles Fiord. Determination of thermotolerant coliforms and other microbial pathogens, cyanobacteria and chemical indicators in raw water, tap water and water stored in plastic containers helped identify the best water supply practices in Nunavik and Nunatsiavut communities.

## Two major health surveys led by ArcticNet Network Investigators in 2004 and in 2007-2008

allowed multidisciplinary teams ... to visit 47 coastal Inuit communities with the research icebreaker *CCGS Amundsen* in order to assess the health of over 2000 Inuit....

- Our permafrost specialists have measured the risks and socio-economic impacts associated with climate-induced coastal and landscape instability in different Arctic regions. Direct applications include the mapping of risk zones for infrastructure and development in northern communities.
- Early response of the tundra to Arctic warming has been observed through experimental and observational approaches from Hudson Bay to Ellesmere Island. The High Arctic plant communities at Alexandra Fjord have changed significantly in 20 years with earlier flowering dates matching the changes seen in the warming experiments.
- In close collaboration with Manitoba Hydro, the Network is modeling the response of the coastal zone (terrestrial/marine interface) of Hudson Bay, in terms of energy, freshwater, methane and carbon cycling, to modifications in oceanic and terrestrial climate. All relevant aspects of the tundra systems have been parameterized including rainfall interception, blowing snow, field capacities, hydrologic conductivity and evapo-transpiration, towards numerical simulations of the system by Canada's Regional Scale Climate Model (CRCM).
- Downscaling algorithms have been developed to extract high resolution information from the Canadian Global Climate Model (CGCM3). The ArcticNet IRIS Modeling Scenarios (AIMS) database provides access to archived data from Environment Canada's GEM model and a portal to the North American Regional Reanalysis data in Boulder.
- In close partnership with communities, ArcticNet researchers have investigated the relationship between environmental change and traditional food security in Inuit regions. Both qualitative and quantitative data on perceived environmental changes and the reported impacts these changes have on food availability and accessibility in Nunavik and Nunavut have been collected. Dietary surveys were used to estimate the impacts that these changes have on nutrient intake and contaminant exposure. Researchers are combining the scientific projection of effects of climate change on wildlife populations and the local observations of climate change to model the potential impacts on food security in the North and to include these impacts into the policy development exercise.
- Two major health surveys led by ArcticNet Network Investigators in 2004 and in 2007-2008 allowed multidisciplinary teams of health researchers, nurses interpreters, interviewers and scientists to visit 47 coastal Inuit communities with the research icebreaker *CCGS Amundsen* in order to assess the health of over 2000 Inuit participants, including lifestyle, diet, heart disease, bone density, safety habits and exposure to environmental contaminants. Cutting edge equipment allowing specific testing not usually available in the North was also installed onboard the vessel to allow mammography, carotid thickness and bone densitometry testing. Results from these surveys are already used to develop better preventive and curative actions to improve the quality of health care and disease prevention in the North.

## Phase II (2008-2011) Research Program

Following the successful completion of its first mid-term review in November 2007, ArcticNet secured its second phase of funding constituting an investment of \$19,323,000 by the Government of Canada for continuation of ArcticNet research, networking and outreach activities. ArcticNet held a general call for proposals in the fall of 2007 to develop its Phase II (2008-2011) research program. After an extensive review process, 28 projects were selected to form the core research program until March 2011. A total of 110 Network Investigators are now funded as part of ArcticNet, including 42 new researchers to the Network.

ArcticNet's Phase II research program continues to support a multidisciplinary approach with a breadth of research topics including the

monitoring and modeling of climate indicators, the study of infrastructure destabilization, marine and terrestrial ecosystems, geopolitics, and the socio-cultural and health impacts of climate change. Research projects are increasingly focused towards Integrated Regional Impact Studies (IRISes) dedicated to the consequences of change on the society and ecosystems of the coastal western and central Arctic, eastern Arctic and Subarctic, and Hudson Bay. The ultimate goal of integrating research results within this framework is the production of Regional Assessments that will be a key tool for decision-makers in developing policies and strategies for an increasingly stressed Arctic system. The 28 projects, detailed below, each contribute to one or more of the IRISes.



### **IRIS 1: Western and Central Arctic**

Leader: Gary Stern, Fisheries and Oceans  
Canada & University of Manitoba

Coordinator: Ashley Gade

### **IRIS 2: Eastern Arctic**

Leader: Trevor Bell, Memorial University  
of Newfoundland

Coordinator: Philippe Leblanc

### **IRIS 3: Hudson Bay**

Leader: David Barber,  
University of Manitoba

Coordinator: Dan Leitch

### **IRIS 4: Eastern Subarctic**

Leader: Michel Allard, Université Laval

Coordinator: Mickaël Lemay

### **Permafrost and Climate Change in Northern Coastal Canada**

**Project Leaders:** Michel Allard and Wayne Pollard

This project will analyze how permafrost is likely to respond to a changing climate. Regional climate models will be used to determine ground surface temperatures, both under current and projected climate conditions. Changes to the landscape will be monitored, including the development of landforms, modification of drainage patterns, and coastal erosion. Policy makers, managers and land use planners will be provided with the tools needed to assess the impact of landscape modifications on northern communities and ecosystems.

### **Impact of Climate Change on Arctic Benthos**

**Project Leaders:** Philippe Archambault

Life on the ocean floor is astonishingly diverse, but still poorly known in polar regions where ice cover and remoteness have restricted sampling. This project will establish benchmarks at biodiversity hotspots, areas with a high number of species and abundance, and *coldspots*, where opposite conditions prevail. Knowledge resulting from this research effort will provide a better understanding of how Arctic benthos will be affected by climate-driven changes in oceano-

graphic conditions and resource exploitation. Overall, this research will help partners establish monitoring programs and conservation strategies.

### **The Role of Sea Ice in ArcticNet IRISes**

**Project Leader:** David Barber

The Arctic system is changing from one dominated by multiyear sea ice to one dominated by first-year sea ice related processes. The next few decades will proceed with significant challenges: marine ecosystems will come under increasing pressure, industrial activity will increase as more exploration and development occurs, and Inuit will increasingly find it a challenge to use sea ice for cultural and subsistence purposes. This project will provide sea ice expertise to the coordinated ArcticNet Integrated Regional Impact Studies of the coastal Canadian Arctic, supplying the required information for sound management of these challenges.

### **Freshwater-Marine Coupling in Hudson Bay**

**Project Leaders:** David Barber and Kevin Sydor

Climate models predict warming in the Hudson Bay watershed that may alter the amount and timing of runoff and, hence, the load of suspended solids, dissolved organic matter and other major nutrients, and heat delivered to the Bay. The overarching objective of this project is to describe the impact of such runoff on marine processes within Hudson Bay and to examine the cumulative impacts of climate change and hydroelectric development on these processes.

### **Analysis of Past Hydro-Climatic Variations in Nunavik**

**Project Leader:** Yves Bégin

The 15 percent decrease of precipitation in Central Québec over the last thirty years could have serious socio-economic consequences as nearly 50 percent of the Province's hydroelectric production comes from this area. Using an extended network of tree-ring chronologies, the project will study temporal and geographical hydroclimatic variations over the past 250 years



and, at some locations, over the last millennium at a yearly resolution. The records and the reconstructions of climatic variables will be used to get a picture of the climatic variations over the pre- and post-industrial period.

#### **Instability of Coastal Landscapes in Arctic Communities and Regions**

**Project Leaders:** Trevor Bell and Don Forbes

Future climate scenarios and impacts modeling predict changes in climate variables that may increase coastal landscape instability and hazard risk. Through improved understanding of changes in climate, sea-level, sea ice, storms and waves, this project will assess integrated impacts on coastal landscape stability, including flooding, erosion, habitat integrity, and community vulnerability. Together with northern communities and partners, the project will integrate local and external research and knowledge on climate change trends and impacts in order to promote informed choices of adaptation measures and enhanced resilience in northern coastal communities.

#### **Effects of Climate Change on the Canadian Arctic Wildlife**

**Project Leader:** Dominique Berteaux

Many northern biological systems are undergoing major shifts related to climate change. An

understanding of this transformation and its consequences is critical to anticipating ways in which negative and positive effects on wildlife populations may be mitigated or addressed. The project will identify the main vulnerabilities of Arctic wildlife to climate change, implement the second phase of a wildlife monitoring program, and use the collected data to analyze past and present responses of wildlife to climatic variability. Decision-makers in the wildlife sector will be provided with a sound basis for developing appropriate management and adaptation strategies.

#### **The Law and Politics of Canadian Jurisdiction on Arctic Ocean Seabed**

**Project Leader:** Michael Byers

The possibility that the Arctic Ocean seabed contains vast deposits of hydrocarbons is attracting considerable attention. This research project focuses on several outstanding maritime boundary disputes — involving the United States, Denmark and potentially Russia — that must be resolved before Canada can submit a comprehensive package of information to the UN Commission on the Limits of the Continental Shelf by 2013. The project will analyze the legal and political differences involved in the different disputes, explore the various options for resolving them, and provide detailed recommendations.

**Food Security, Ice, Climate and Community Health: Climate change impacts on traditional food security in Canadian Inuit communities**  
**Project Leaders:** Laurie Chan, Christopher Furgal

Collaborating with Canadian Arctic communities, this project seeks to investigate how and to what extent climate change is affecting the traditional diet profile of northern aboriginal residents presently and potentially in the future, and what implications this may have for individuals' health. Specifically the project is focusing on: nutrition and potential changes in nutrient intake; exposure to contaminants; and levels of food security. Modeling and qualitative approaches are used to integrate both scientific and local/ traditional knowledge.

**Population Dynamics of Migratory Caribou in Nunavik/Nunatsiavut**  
**Project Leader:** Steeve Côté

Where migratory caribou are now abundant in northern Québec and Labrador, caribou herds are declining almost everywhere else in Canada and the factors responsible for these declines are poorly known. This project will establish how climate, population density, and industrial activities affect caribou abundance and distribution in the Arctic. Partners from government, Aboriginal groups and industry, will be provided with new tools to monitor the demography of caribou and improve their conservation in the face of a changing Arctic.

**Marine Fatty Acids in a Changing Canadian Arctic**  
**Project Leader:** Éric Dewailly

Inuit diet historically consisted mainly of fish and mammals. It is well known that marine lipid consumption by Inuit plays an extremely important role for energy intake and other critical human biological functions. A warming climate might affect the molecular composition of these lipids through changes in microalgae lipid composition, the basis of the entire Arctic food web. These changes ultimately will have an impact on Inuit children and adults. This project seeks to understand the impact of these changes on the health of Inuit and to orient public policies to prevent the consequences of these changes.

**Multi-Species Tracking of Aquatic Animals in the Canadian Arctic**  
**Project Leader:** Terry Dick

This project aims to provide current and long-term monitoring of the Arctic Ocean using Canadian-made sensory arrays that record the physical and chemical conditions of the water column and simultaneously record the movement and behaviour of marine animals through the use of acoustic tags. Partnered with the Ocean Tracking Network, this project is part of a global ocean monitoring network that aims to provide new knowledge so people can make better choices related to their environment, consumption of local plant and animal life, but also to society, economics, culture and health.





### Impacts of Global Warming on Arctic Marine Mammals

**Project Leader:** Steven Ferguson

Knowing how polar ecosystems may change with global warming will help us develop strategies for conservation and species management. It is important to recognize the changing distribution and numbers of Arctic mammals, as Northerners depend on these species as a food source and integral part of their unique culture. This project will examine global warming and its effects on water-based mammals in the Arctic. Several areas of mammal health will be studied, including diet, diseases, contaminants, and stress. Research results will help Inuit communities adapt to changes in marine mammal distribution and abundance.

### Long-Term Observatories in Canadian Arctic Waters

**Project Leader:** Yves Gratton

This project will correlate sub-surface ocean properties recorded by moored instruments to satellite records of surface temperature, chlorophyll, suspended sediments and sea ice type and thermodynamic state. The objectives are 1) to provide long-term detailed observations of the ocean-sea-ice-atmosphere coupling in the Canadian High Arctic, 2) to identify the oceanic/atmospheric processes underlying changes in these variables and 3) to provide baseline physical information required to understand the complexities of physical-biological coupling in the arctic marine environment.

### Impacts of Vegetation Change in the Canadian Arctic: Local and Regional Assessments

**Project Leader:** Greg Henry

The tundra across the Canadian Arctic is already reacting to climate change. Northerners and scientists are observing changes, such as shrubs getting taller and more numerous. The research team will study changes to tundra vegetation near Arctic communities across the North, including changes in the amount of berries produced each year in traditional berry picking areas. Community members will be involved in designing the studies and in conducting measurements. The results will be used by the communities and will contribute to national and international efforts to understand the responses of tundra ecosystems to climate variability and change.

### Integrating and Translating ArcticNet Science for Sustainable Communities and National and Global Policy and Decision-Making

**Project Leaders:** David Hik and Chris Furgal

This project will investigate the Arctic policy landscape and how ArcticNet science contributes to informed policy decisions in Canada and globally. This will be accomplished through a quantitative and qualitative analysis of the influence of ArcticNet science on Arctic policy development. The conclusions from this project will allow ArcticNet to address the most effective ways to use and translate ArcticNet research results on urgent issues such as climate change into “action” or decision-making at the local, regional, national or international levels.



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**The Canadian Arctic Seabed:  
Navigation and Resource Mapping**

**Project Leader:** John Hughes Clarke

This project undertakes the core seabed mapping component of the ArcticNet research program. Acoustic mapping of the seabed relief, sediment distribution and shallow subsurface sediments are the prime datasets used by researchers to understand the geological processes shaping the seafloor, to assess natural hazards and coastal habitats, and to reconstruct the history of past climatic changes.

**High Arctic Hydrological, Landscape and  
Ecosystem Responses to Climate Change**

**Project Leaders:** Scott Lamoureux  
and Melissa Lafrenière

Research at the Cape Bounty Arctic Watershed Observatory, Melville Island, Nunavut, will investigate how climate change affects rivers, permafrost, soils, vegetation, greenhouse gas emissions and the release of contaminants into High Arctic rivers and lakes. This integrated watershed network will provide an unprecedented understanding of the sensitivity and anticipated future effects of climate change on the High Arctic ecosystem. Impact models based on river flow and related environmental systems will be developed for scientists, Northerners and other stakeholders to identify and adapt to the impacts of climate change.

**Development of an Ocean Modeling Capacity  
for the Canadian Arctic Archipelago**

**Project Leader:** Paul Myers

The objectives of this project are threefold. First, a capacity for ocean and sea ice modeling for the Canadian North and the Canadian Arctic Archipelago will be developed. Secondly, the research team will examine current ocean transports in and out of the entire Canadian Arctic Archipelago based on the analysis of available data and modeling effort along the shelves of Eastern Canada. Finally, the processes underlying snow distribution patterns on land-fast sea ice in the Canadian Arctic Archipelago will be quantified using a combination of in situ based observations and surface and satellite-based optical and microwave remote sensing data.

**Carbon Exchange Dynamics  
in Coastal and Marine Ecosystems**

**Project Leader:** Tim Papakyriakou

Absorption and release of carbon dioxide by the oceans is one of the primary factors controlling the atmospheric CO<sub>2</sub> concentration, and some of the highest CO<sub>2</sub> uptake rates reported anywhere have been observed within the Arctic's peripheral seas. This project will undertake field studies to parameterize the effects of several factors affecting both the distribution of dissolved CO<sub>2</sub> in Arctic surface water and the mechanism by which the gas is exchanged with the atmosphere. Newly developed parameterizations will be imple-

mented into a coupled atmosphere-sea ice-ocean biogeochemistry model to learn how the ocean's response to climate change and variability will affect the atmosphere-ocean cycling of CO<sub>2</sub>.



#### **Growth Variability and Mercury Tissue Concentration in Anadromous Arctic Charr**

**Project Leader:** Michael Power

This project will examine climate change related impacts on land-locked and migratory populations of Arctic charr. Differences in total mercury accumulation rates in the two types of Arctic charr will be analysed and the relative influences of diet, temperature and habitat on growth and total mercury accumulation along a north-south gradient will be assessed. An enhanced understanding will permit more accurate predictions of the effects of climate change on the important migratory stocks of Arctic charr used by Inuit in traditional subsistence fisheries. This research will also inform management decisions about the issues associated with country food consumption in the face of climate change.

#### **Understanding and Responding to the Effects of Climate Change and Modernization in Nunatsiavut**

**Project Leaders:** Ken Reimer and Marina Biasutti

This project will address Inuit concerns about the impacts of climate change, modernization and contaminants on the health of marine ecosystems and communities of northern Labrador. Research will provide important insights into how the environment is changing, what it means for the long-term health of marine ecosystems and how northern communities will access and manage their land and freshwater resources in the future. The involvement of Inuit, the Nunatsiavut Government and federal agencies will ensure adaptation strategies and policies developed have direct relevance for the people, industries and environment of northern Labrador.

#### **Adaptation in a Changing Arctic: Ecosystem Services, Communities and Policy**

**Project Leader:** Barry Smit

This project documents the changing physical, biological and socio-economic conditions that are affecting people in the Arctic and identifies policies and strategies to assist communities in dealing with these changes. A main focus of the project involves integrating scientific and traditional knowledge of ice, permafrost, coastal dynamics and wildlife with information about community use of these ecosystem services. The other main thrust is to identify the opportunities in existing policies and co-management arrangements for adaptation strategies to help communities deal with changing conditions.

#### **Effects of Climate Change on Contaminant Cycling in the Coastal and Marine Ecosystems**

**Project Leaders:** Gary Stern, Robie Macdonald, and Feiyue Wang

Contaminants pose a potential hazard to Arctic fish and marine mammal health, and ultimately to Northerners that consume their tissues as part of their traditional diets. The research will help assess the vulnerability of coastal Inuit communities

to climate change, document and project impacts of climate change on traditional food security and community health, and provide the information required by communities, scientists and policy makers to develop adaptation strategies. Findings will help test and shape policy for the future management of contaminant emissions and long range transport to the Arctic and will support integrated ocean management programs.

#### **Coping with Atmospheric-Related Hazards in the Canadian Arctic**

**Project Leader:** Ronald Stewart

Atmospheric-related hazards are a major concern to residents in all regions of the Arctic and vulnerabilities to changing weather conditions have been identified in several communities. This study will address hazards through a combined effort among local communities, social scientists and physical scientists. It will assess the current knowledge of atmospheric hazards, and it will identify past and current hazardous events with the latter ones benefiting from enhanced measurements. Improvements in the prediction of hazards and suggestions for adaptation to present as well as future conditions, will be conveyed to local communities and the public.

#### **Marine Biological Hotspots: Ecosystem Services and Susceptibility to Climate Change**

**Project Leaders:** Jean-Éric Tremblay and Michel Gosselin

The microalgae that grow in the brine channels of ice and in surface waters are the ultimate source of food for the marine food web. Changes in the lower food web are bound to affect the nutrition and spatial distribution of higher trophic level organisms such as seals, whales, and polar bears. This project will examine how changes in the physical environment affect the productivity and species dominance of organisms in the lower part of the food web. A comprehensive synthesis of the food web will be assembled to inform stakeholders.

#### **Freshwater Resources of the Eastern Canadian Arctic**

**Project Leader:** Warwick Vincent

Lakes and wetlands are major ecological features of the circumpolar Arctic, and they provide many essential services including habitats for aquatic wildlife, drinking water supplies for northern residents, and water for industrial activities. The project will continue and extend observations on lakes and wetlands at key sites in the eastern Canadian Arctic to identify and measure aquatic indicators of environmental change in the past and present. These studies will allow assessments of future changes in northern freshwater ecosystems to help guide the formulation of environmental management and monitoring policies.

#### **Hydro-ecological Responses of Arctic Tundra Lakes to Climate Change and Landscape Perturbation**

**Project Leader:** Fred Wrona

Significant changes in climatic regimes are expected to have far-reaching impacts on the hydrology and ecology of Arctic freshwater ecosystems. This project will conduct integrated landscape-lake process and modeling studies that will improve the regional understanding of the sensitivities and responses of upland tundra lakes to climate variability and change. An integrated landscape-geochemical, lake-ice, hydro ecological model for Arctic systems will be developed and validated. The project will produce legacy data and products of direct benefit to the development of adaptation options for the conservation, protection and management of Arctic freshwater ecosystems.

“In addition to the many records broken by this year’s expedition, we need to focus on the excellence of work conducted onboard the CCGS *Amundsen* and the numerous collaborations brought about through ArcticNet and the International Polar Year. The concrete results of this research will be the subject of numerous publications in the coming years. Let us hope that the contributions of our researchers will be used by leaders to make the best possible management decisions for the future of this new frontier.”

— Louis Fortier, ArcticNet Scientific Director



## 2007-2009 ArcticNet Research and Monitoring Efforts



ArcticNet is committed to providing its researchers, students and partners with improved and stable sea and land access to the Canadian Arctic. Through improved and stable access, researchers can establish the long-term observations and studies necessary to understand and document Arctic change. On land, researchers have access to a network of research stations and laboratories such as the ones maintained by the Polar Continental Shelf Program (PCSP), the Centre d'études Nordiques (CEN), the Nunavik Research Centre, the Churchill Northern Studies Centre, the Aurora Research Institute and the Nunavut Research Institute. At sea, researchers from various disciplines use the Canadian research icebreaker CCGS *Amundsen* as a mobile research platform to study the coastal Arctic. Through collaborative partnerships, researchers, working on land and at sea, also have access to the expertise of communities, northern regional authorities and governments.

### On Land

During 2007-2009, ArcticNet researchers conducted research in each of the four Inuit regions of

Canada, as well as in Manitoba and in the Yukon. A total of 125 separate locations were visited, including 41 of the 53 Canadian Inuit communities. Numerous ArcticNet researchers use the CEN Qaujisarvik network of research stations to research and monitor Arctic ecosystems distributed throughout all the ecozones of northeastern Canada, from the northern edge of the boreal forest (53°N) up to the northernmost ice shelves of the Canadian High Arctic (83°N). With research occurring across the Canadian Arctic and Subarctic, ArcticNet researchers are able to better address the variation in climate change across the Arctic and the range of impacts being observed. Research conducted in and around northern communities covers the spectrum of health, social and natural sciences, with Network Investigators studying a range of issues including wildlife diversity, coastal erosion, and permafrost degradation.

### At Sea

On 26 July 2007, the CCGS *Amundsen* left its home port of Quebec City for an historical 15-month expedition to the coastal Canadian Arctic.



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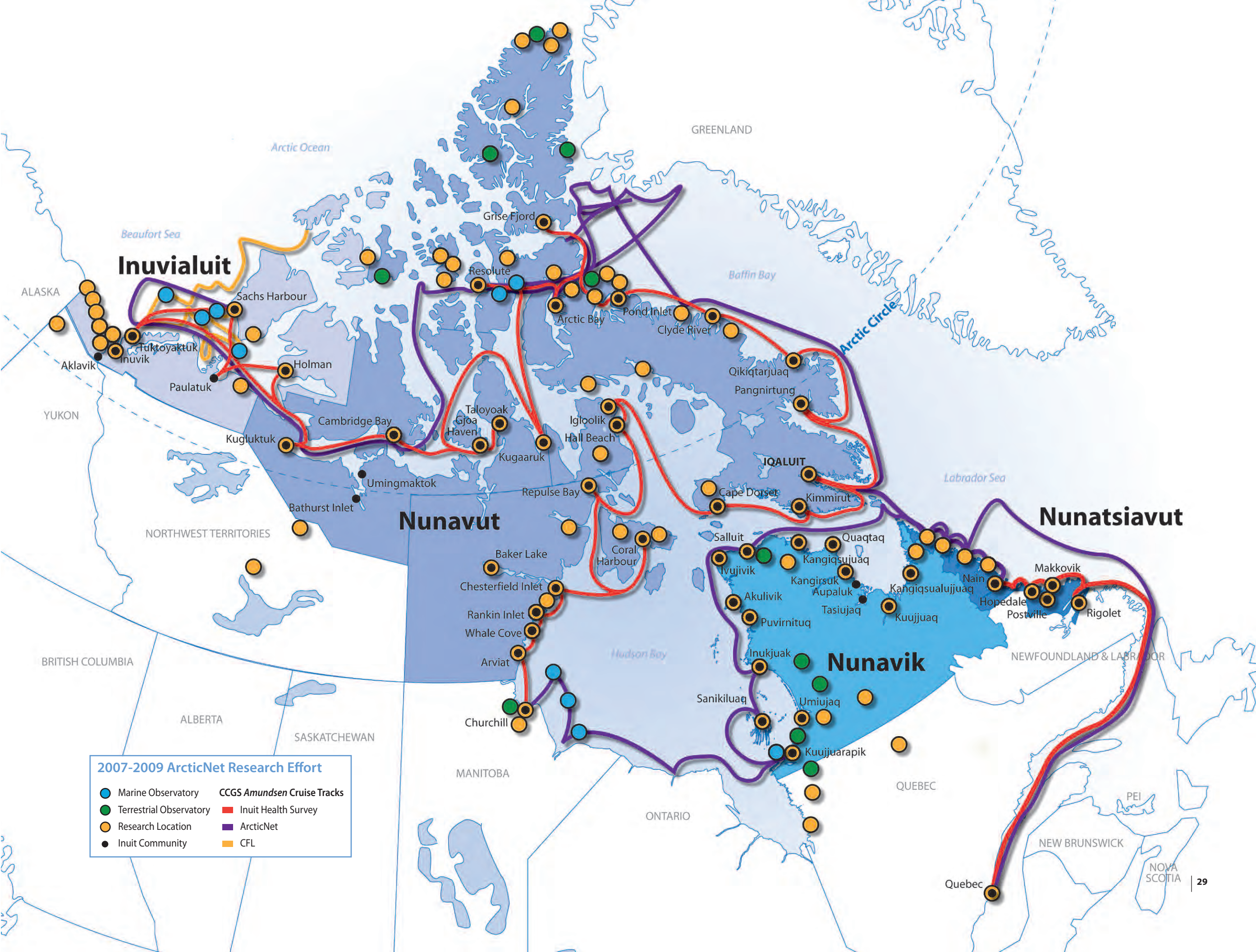
In addition to the annual ArcticNet expeditions, the ship supported some of the largest and most ambitious Canadian-led International Polar Year (IPY) research programs to advance climate change and human health research. With over 430 participating scientists, students and collaborators from 27 countries, the CCGS *Amundsen* transited through the Labrador Sea, Hudson Bay, Foxe Basin, Baffin Bay, the Canadian Arctic Archipelago and the Beaufort Sea. On its October 2008 return to Québec City, the *Amundsen* had spent 448 days at sea and traveled over 58,000 km.

ArcticNet researchers continued their annual observations of the marine and coastal Arctic environment as input to ArcticNet's Integrated Regional Impact Studies. Network researchers traveled to mooring and oceanographic stations and, while in transit, instrumentation continuously monitored surface seawater properties, high resolution bathymetry, seabed geophysical characteristics, zooplankton abundance and fish distribution.

For more than ten weeks during the expedition, the *Amundsen* was transformed into a floating

human health facility in support of the IPY Inuit Health in Transition and Resiliency Study. Under the leadership of Dr. Grace Egeland, McGill University and ArcticNet Network Investigator, a team of nurses, interpreters and human health researchers visited every coastal community in Nunavut, the Inuvialuit Settlement Region and Nunatsiavut to assess the impacts of climate change and modernization on the health and well-being of Inuit.

From early October 2007 to the end of August 2008, the *Amundsen* supported the IPY Circumpolar Flaw Lead (CFL) System Study led by Dr. David Barber, University of Manitoba and ArcticNet Network Investigator. With over 370 participants from 27 countries, this major international project examines the importance of climate processes in changing the nature of a flaw lead system in the Northern Hemisphere and the effect these changes have on the marine ecosystem, contaminant transport, carbon fluxes and greenhouse gases.



**2007-2009 ArcticNet Research Effort**

<span style="color: blue;">●</span> Marine Observatory	<span style="color: purple;">—</span> CCGS Amundsen Cruise Tracks
<span style="color: green;">●</span> Terrestrial Observatory	<span style="color: red;">—</span> Inuit Health Survey
<span style="color: orange;">●</span> Research Location	<span style="color: purple;">—</span> ArcticNet
<span style="color: black;">●</span> Inuit Community	<span style="color: orange;">—</span> CFL





## Education and Training

“ArcticNet provides us with a unique opportunity to develop long-term relationships with communities. These are particularly important in trying to work with them to find ways to adapt to a changing climate.” —Dr. James Ford, ArcticNet and 2007 NCE Young Innovator Awards Recipient

The accomplishments of over 300 ArcticNet graduate students and post-doctoral fellows provide a positive direction for the future of Arctic research and the management of an environment buffeted by climate change and globalization. Graduate students are at the core of the humongous effort of ArcticNet research. The multi-disciplinary and trans-sectoral training environment provided by ArcticNet is supported by interactions with the international scientific community, as well as the efforts of Inuit organizations to deal with the social, health and environmental changes they are experiencing.

### Schools on Board

ArcticNet education and training programs are designed to inform and educate students from high school to the post-doctoral level about the Canadian Arctic and Arctic science. The Schools on Board Program offers high school students the opportunity to bridge the gap between Arctic science taught in the classroom and research conducted directly in the field, onboard the CCGS *Amundsen*. The ultimate goal of the program is to engage youth from northern and southern communities and highlight the education and career opportunities that surround studying and managing the changing Arctic environment.

In recognition of the International Polar Year (IPY), the 2008 Schools on Board Field Program went global expanding its highly successful Canadian program to include international youth, teachers and high schools. Collaborating

with ArcticNet and the IPY Circumpolar Flaw Lead System Study, Schools on Board offered two international field programs and one Circumpolar Inuit field program. With participants from Canada, China, Germany, Norway, Scotland, Spain, USA and the UK, the International Field Programs offered students and teachers the ultimate experiential education experience — participating in science activities onboard the CCGS *Amundsen*. The Circumpolar Inuit Field Program brought together Inuit from the circumpolar Arctic to participate in the program. Youth from Nunavik, Nunavut, Northwest Territories, Alaska, Greenland and Russia learned through active engagement in ship science how scientists study the vast Arctic marine environment. With visits to Inuit communities, youth also gained a sense of respect for the changes Northerners face and how they are adapting. Agencies from all over the world contributed to the success of these programs. As such, research centers from Canada, China, Spain, Germany, Norway, Scotland, the USA, and the UK partnered to provide young people and accompanying teachers with the support they needed to fully experience their scientific Arctic journey.





“I am representing my Inuvialuit community of Sachs Harbour, Northwest Territories. As a student at Trent University in Indigenous Environmental Studies, the Circumpolar Inuit Schools on Board Field Program is an excellent opportunity to gain a better understanding of northern environmental science, and improve communications between researchers and northern communities. It also gives me and the other students a chance to learn about our Inuit brothers and sisters from around the world.”

—James Kuptana, 2008 Schools on Board Program participant

The success of the Schools on Board Program has not gone unnoticed. In 2007 Schools on Board was awarded a PromoScience award from the Natural Science and Engineering Research Council (NSERC). The PromoScience Program provides support for organizations who promote an understanding of science and engineering through “hands-on learning experiences for young students and their science teachers.” In

2008, the Canadian Network for Environmental Education and Communication presented the Schools on Board Program with a 2008 Canadian Award of Excellence in Environmental Education. Lucette Barber, Program Coordinator, accepted this award on behalf of the Program and the commitment and energy of the scientists who work with the Program’s participants.

## ArcticNet Student Association

The ArcticNet Student Association (ASA) continues to build on its initial growth and success. The Executive Committee of highly motivated graduate students from across Canada leads in the planning of a range of activities, including the writing of newsletters, regional and national meetings, and the development of partnerships. Each activity is designed to broaden the ArcticNet student experience through the promotion of learning, leadership, research and networking. Not exclusive to students, the ASA works with academics, partner organizations and Northerners in its value-added approach to challenge students to expand their education experiences.

The third annual ArcticNet *Student Day, Students Today, Leaders Tomorrow: Preparing for Future Arctic Research and Policy*, was held on December 11, 2007 in Collingwood, Ontario. The event was an exciting and interesting networking opportunity for more than 150 students and other participants involved in northern research. The day began with an informative lecture on *The Challenges of Linking Science and Public Policy* by David Anderson, the former federal Environment Minister and current Director of the Guelph Institute for the Environment. Following Mr. Anderson's talk, and selected research presentations by ASA members, the afternoon break out sessions provided students with the chance to learn about proposal writing, education and outreach, involving Northerners in Arctic research and data management within ArcticNet.

With ArcticNet students attending 28 universities across Canada, the ASA developed the concept of regional research groups to provide geographically connected students a forum for discussion and networking in addition to the annual Student Day. The third annual regional workshop for the Québec region was held at Université Laval in May 2008. Thirty students participated in discussions focused on the transition of the ArcticNet research program to Phase II. In spring

2008, some University of Northern British Columbia students initiated a research group of 16 students that meet monthly to promote collaboration and knowledge transfer. Looking to maintain connections external to the network, the ASA has linked with the international Association of Polar Early Career Scientists (APECS) to improve collaborative efforts between the two groups. The efforts of the ASA to promote communication and information sharing speak to the multidisciplinary and international networking capabilities of these future Arctic research leaders.

## Arctic Change 2008 International Student Day

Highlighting the achievements of the next generation of Arctic researchers and managers was the Arctic Change 2008 International Student Day. Directly preceding the main conference, Student Day attracted a record 450 student participants from high school to post-doctoral fellow — evidence that Arctic research will continue on its momentum for years to come. The students welcomed Mary Simon, President of Inuit Tapiriit Kanatami, as their keynote speaker. Student presentations and breakout sessions on topics of great relevance to the training of highly qualified students followed. Students from the Ottawa-based Nunavut Sivuniksavut training program provided a fresh and very objective perspective on the “human” side of research and how to communicate research results to Northerners. Thirteen students were recipients of 2008 Graduate Student Poster Awards including a Northern Partnership of Excellence Award which acknowledge excellence in research and scientific presentation.

## Training Fund

Over the last two years, 18 ArcticNet students were awarded a grant from the ArcticNet Training Fund. Well established within the Network since its beginning, this fund encourages students to take part in international field schools covering different axes of Arctic research. These field schools are built by leading Arctic research

centers in Canada, Italy, Russia, Norway, the Netherlands, the UK and the USA. They provide students with expert insight and technical training in fields ranging from glaciology and climate to satellite imagery analysis and microbial ecology.

### Recognition of Excellence for ArcticNet students

Over the last two years, numerous ArcticNet students have been rewarded for the excellence of their research and dedication to Arctic research. Dr. James Ford, then ArcticNet post-doctoral fellow, was awarded a 2007 Networks of Centres of Excellence Young Innovator Award for his contribution to social science research in the Arctic. The NCE Young Innovator Awards recognizes “young entrepreneurs by honouring outstanding individuals who, with the help of their networks, have been exceptionally successful in transferring their innovative research to a business, process, or service to benefit society at large.” While working under the supervision of Dr. Barry Smit at the University of Guelph, James Ford noted an important knowledge gap in climate research in relation to human vulnerability and adaptation to climate change in the Arctic. Dr. Ford recently took a tenure-track faculty position in the Geography Department of McGill University.



Many ArcticNet graduate students were also recognized as among the most promising northern scholars in Canada. In 2007, the W. Garfield Weston Foundation announced a one million dollar commitment to northern scientific research and the “young Canadians who will play an increasingly important role as northern

scholars, educators, and global ambassadors.” Eight ArcticNet students were among the 19 Canadian graduate students awarded scholarships as 2007-2008 and 2008-2009 recipients of the Garfield Weston Awards for Northern Research.

#### Doctoral Scholarships (\$40 000)

- Alexandre Forest, PhD candidate, Biology, Université Laval
- Paul Smith, PhD candidate, Biology, Carleton University
- Laura McKinnon, PhD candidate, Biology, Université du Québec à Rimouski
- Dominique St-Hilaire, PhD candidate, Geography, Memorial University of Newfoundland
- Vicki Sahanatien, PhD candidate, Biological Science, University of Alberta

#### Masters Scholarships (\$15 000)

- Melanie Irvine, MSc candidate, Geography, Memorial University of Newfoundland
- James Hudson, MSc candidate, Geography, University of British Columbia
- Elise Bolduc, MSc candidate, Wildlife Management, Université du Québec à Rimouski

Two ArcticNet graduate students also received the prestigious Vanier Canada Graduate Scholarship (CGS) valued at \$50 000 per year, for up to three years. Administered by the three research granting councils, the CGS program aims to attract and retain world-class doctoral students by supporting students who demonstrate a high standard of scholarly achievement in graduate studies as well as leadership skills. Both ArcticNet recipients have been actively involved in the ArcticNet Student Association (ASA).

- Brent Else, PhD candidate, Geography, University of Manitoba and current ASA president
- Tristan Pierce, PhD candidate, University of Guelph and former ASA communications officer

## Recognitions and Awards

Over the last two years, many ArcticNet researchers were recognized for their commitment to Arctic research and their dedication to knowledge transfer processes as a means to ensure that the issue of climate change remains at the forefront of the political agenda and on the minds of Canadians.

### Order of Canada

As the centrepiece of Canada's honours system, the Order of Canada recognizes a lifetime of outstanding achievement, dedication to the community and service to the nation.

In October 2007, Louis Fortier, ArcticNet Scientific Director and professor at Université Laval, was named Officer of the Order of Canada in recognition of his tireless efforts to promote international multidisciplinary cooperation in Arctic research. In June 2008, he was also named Officer of the National Order of Quebec (Ordre national du Québec).

In December 2008, Gordon McBean, ArcticNet Network Investigator and professor at the University of Western Ontario, was named Member of the Order of Canada for his contributions to the advancement of climate and atmospheric sciences in Canada, and for his leadership in national and international scientific organizations.

### 2008 Northern Science Award

Dr. Michel Allard, ArcticNet IRIS leader and professor at Université Laval, was awarded the 2008 Northern Science Award in May 2008. Created in 1983 to mark the 100th anniversary of the First International Polar Year, the Northern Science Award is presented annually to an individual or indigenous group who has made distinguished contributions to Canadians' knowledge and understanding of the North through their scientific work. The award is comprised of a Centenary Medal and a prize of \$10 000. Michel



Allard has built an extensive network over the last twenty years to detect rapid global warming in Nunavik and to measure its impact on permafrost.

### 2007 Nobel Peace Prize

Since its publication in February 2007, the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) has had a massive impact on the public, politicians and business leaders around the world. On 12 October 2007, the 2007 Nobel Peace Prize was awarded jointly to Al Gore Jr. and the IPCC for their work on climate change. The following ArcticNet Network Investigators and Nobel Peace prize co-laureates were among the 1200 authors from over 130 countries to contribute to the Climate Change 2007 assessment report:

- Chris Furgal, Trent University
- Gordon McBean, University of Western Ontario
- René Laprise, Université du Québec à Montréal
- Terry D. Prowse, University of Victoria
- Barry Smit, University of Guelph
- Fred Wrona, University of Victoria

“ArcticNet has built an extraordinary network whose scientific achievements are recognized worldwide. It is hard to believe, in fact, given these achievements, that ArcticNet is still early in its existence. They have helped form important partnerships, partnerships among researchers from many diverse disciplines, partnerships between researchers and members of the Arctic community.”

— Dr. Suzanne Fortier, President of the Natural Sciences and Engineering Research Council and Chair of the Steering Committee of the Networks of Centres of Excellence



## Networking and Partnerships

Climate change and Arctic issues including the health of Inuit, intercontinental shipping, national sovereignty, oil and gas exploration, and the expansion of national jurisdictions are moving to the top of national and international agendas. Circumpolar nations face an increased urgency to expand the observational basis needed to formulate strategies and policies that will minimize the negative impacts and maximize the positive outcomes of the on going transformation of the Arctic. With the help of Canadian and international partners, ArcticNet seeks to provide the knowledge needed for Canada to adapt to its newly rediscovered Arctic dimensions.

### International Polar Year (IPY)

The last two years marked an important milestone for international collaboration in Arctic research. The trans-sectoral and international research program conducted by ArcticNet and its foreign partners received a major boost from the Fourth International Polar Year (IPY) of the International Council for Science (ICSU) and the World Meteorological Organization (WMO). This fourth IPY has involved thousands of scientists from 60 nations participating in over 200 projects. Canada committed \$156 million in new funding to support the logistics, data management, and communication and outreach activities of 55 IPY research projects. Seventeen of the selected projects in the social, natural and human health sciences are led by ArcticNet Network Investigators and 35 projects involve ArcticNet Investigators as collaborators. With some of the most ambitious projects conducted onboard the Canadian research icebreaker *CCGS Amundsen* in 2007-2008, IPY represents an investment of over \$50 million in new funding towards research contributing to the ArcticNet program. From joint international planning workshops of field logistics to shared personnel, research equipment and data management, the contribution of ArcticNet to the International Polar Year effort is considerable.

### ArcticNet Annual Scientific Meeting 2007

ArcticNet's Fourth ASM was held from December 11-14, 2007 at the Village at Blue Mountain Conference Centre in Collingwood, Ontario. Over 300 participants, including 110 graduate students and post-doctoral fellows presented more than 50 oral presentations and 130 scientific posters from all fields of Arctic research. During a dynamic panel discussion on *Shrinking Sea Ice and Increased Access to the Canadian Arctic*, a wide array of views on, and approaches to, Arctic sovereignty were discussed by the panel of experts. As a Guest Speaker, Canadian astronaut Dr. Dafydd Rhys Williams captured the imagination of conference delegates with his talk on space missions and the efforts of the Canadian Space Agency to monitor the Arctic.



### International Arctic Change 2008 Conference

Building on the success of its previous Annual Scientific Meetings, ArcticNet and its national and international partners welcomed the international Arctic research community to Quebec City's Convention Center for the Arctic Change 2008 Conference. Coinciding with the climax of the International Polar Year and the 400th anniversary of Quebec City, Arctic Change 2008 welcomed over 900 researchers, students, policy makers and stakeholders from 16 countries to address the global challenges and opportunities brought by climate change in the circum-Arctic.

As an important part of its mandate, ArcticNet continues to consolidate collaborations with the private sector. Building on existing collaborations with Manitoba Hydro, the Network recently initiated new major research collaborations with the oil and gas industry.



Over 250 oral and 300 poster presentations from all fields of Arctic research were presented, reflecting the multidisciplinary research being conducted in the face of rapid environmental, health and socio-economic changes in the circumpolar Arctic. Through plenary and concurrent sessions, Arctic Change highlighted the latest research results from leading Arctic experts, as well as management and policy options from managers and government officials at the frontlines of change. Electronic copies of the Arctic Change 2008 proceedings and oral presentations are available on the ArcticNet website.

Recognizing the importance of Inuit knowledge and collaborative research, Arctic Change 2008 welcomed a large Inuit delegation from Canada, Alaska and Greenland. Through partnership with Inuit Circumpolar Council (Canada) and Inuit Tapiriit Kanatami, Inuit were active participants

in leading concurrent sessions and participating in plenary discussions. The Igloolik-based Artcirc Inuit youth acrobatic circus troupe amazed the attendance during the banquet reception where Steven Blaney, federal Member of Parliament for Lévis-Bellechasse and Suzanne Fortier, NSERC President and Chair of the NCE steering committee underlined the accomplishments of ArcticNet.

### Strengthening our International collaborations

Building on the incredible opportunity provided by IPY, ArcticNet also benefited from the International Partnership Initiative (IPI) of the Network of Centres of Excellence program to consolidate its numerous international collaborations. The IPI initiative first allowed us to expand our partnership with the Nansen-Amundsen Basin Observational System (NABOS) to deploy Long-Term Oceanic Observatories in the Laptev and East Siberian Seas. The Network also connected solidly with the Norwegian ARCTOS (Arctic Marine Ecosystem Research Network) to collaborate on a range of initiatives including the exchange of students and data, joint publications, and the implementation of







international efforts such as the CFL study. Official agreements to ensure lasting cooperation between researchers in Canada, Norway, Greenland and France have been signed with ARCTOS and the French-led Malina Network. Similar arrangements are in the making with the American SEARCH (Study of Environmental Arctic Change) network towards increased scientific cooperation in the Arctic.

### Connecting at the local level

In addition to direct interactions between researchers, regional organizations and community members, one of the primary means enabling ArcticNet to connect at the local level and involve Northerners in the scientific process is through the Inuit Research Advisors (IRA) working in all four Inuit regions of Canada. Co-funded by ArcticNet, the Nasivvik Centre for Inuit Health and Changing Environments and the Northern Contaminants Program, the IRAs offer essential assistance and guidance in engaging Inuit and ArcticNet researchers in undertaking research activities of importance to northern communities.

### Consolidating collaborations with the private sector

As an important part of its mandate, ArcticNet continues to consolidate collaborations with the private sector. Building on existing collaborations

with Manitoba Hydro, the Network recently initiated new major research collaborations with the oil and gas industry.

Recent interest in the offshore Beaufort Sea has resulted in major bids from industry on offshore exploration licenses located in a geographical area sampled extensively by ArcticNet researchers since 2002. In addition to an annual fall sampling program, ArcticNet researchers have led two major international overwintering research programs conducted onboard the CCGS *Amundsen* in 2003-2004 (CASES) and in 2007-2008 (CFL) in the Beaufort Sea. A marine observatory of a minimum of 4 oceanographic annual moorings (from 4 to 17 moorings) has been deployed and retrieved annually in the area since 2002.

As part of a collaborative agreement between ArcticNet and Imperial Oil, one of the major goals of the 2009 ArcticNet expedition to the western Arctic will be to increase the level and spatial coverage of sea ice, geological and environmental data collected by Network researchers in the Beaufort Sea/Mackenzie Shelf/Amundsen Gulf region with a special focus placed in the area recently awarded offshore exploration licenses by the Government of Canada. Future research collaborations with BP and Petro-Canada/Suncor are also under development.



## Sharing Knowledge

ArcticNet strives to develop new and unique means of disseminating knowledge to engage, inform and enable the science community, decision-makers and the general public. The following examples of communication and outreach activities highlight ArcticNet's commitment to shape public opinion with the objective of consolidating Canada's leadership in the study, management and stewardship of the Arctic.

### Accessible Science

Through numerous efforts, ArcticNet research results are made accessible for decision-makers, fellow scientists and, increasingly, the public. Science results empower decision-makers at all levels with the information necessary for effective strategy and policy development to address climate change and modernization in the Canadian Arctic. Published research results spur on new and more innovative science thus increasing the possibilities for collaborations in order to focus on the climate change conundrum. At the community level, access to research enables individuals to make informed decisions about their environment and to push decision-makers towards addressing the issues Northerners deal with on a daily basis.

In 2007-2008 alone, ArcticNet supported 335 scientific publications, with 145 of these in refereed publications of high scientific calibre. Research results were also presented in numerous other formats, including books, technical reports and conference proceedings.

Over the past year, ArcticNet also developed the Polar Data Catalogue along with the *Canadian Cryospheric Information Network* (CCIN). As a fully operational online metadatabase, the catalogue will ensure the management of research results

to maximize the accessibility of relevant information and leave a long-term legacy for future comparisons and analyses. The Polar Data Catalogue Search Facility was developed to allow users to view this information through an interactive map and advanced search options. The Facility also features various map layers (e.g., research stations, land status, political regions, resources, heritage sites) and plain language texts, as well as a tutorial package to assist Catalogue users.

The Catalogue is available online at [www.polardata.ca](http://www.polardata.ca) and continues to be updated and refined in close collaboration with the CCIN. Several programs are now using this portal, notably the Canadian Arctic Shelf Exchange Study (CASES), the Government of Canada Program for the IPY and the Northern Contaminants Program, thereby increasing the science results available to the public.

### In the Media

Throughout 2007-2009, ArcticNet maintained a high level of media coverage nationally and internationally, through television, radio, web and print outputs.

Highlighting the expert knowledge of Arctic issues found within ArcticNet, Management and Network Investigators are repeatedly called upon



by journalists to provide testimony on issues of critical importance to Canadians and their government. Many projects led by ArcticNet Network Investigators received intense national and international media coverage, raising Arctic climate change research awareness with millions of viewers and readers worldwide. Among some of the highlights are:

- A *Montreal Gazette* seven-day front page series entitled “*On Thin Ice*” highlighted ArcticNet research in the coastal Canadian Arctic.
- Numerous ArcticNet researchers and research activities were featured in a 3 part documentary entitled “*L’Arctique en pleine mutation/Arctic Meltdown*” that aired on Radio-Canada’s *Découverte* and the CBC’s *The Nature of Things*.
- A 360° broadcast on BBC World News and a feature documentary entitled “*Northwest Passage*” airing on BBC World’s *Our World* reached millions of viewers and listeners worldwide.
- A report on ArcticNet research activities in the Northwest Passage aired on NBC’s *Today Show* and *NBC Nightly News*, reaching over 10 million viewers.
- The forty-three journalists from international (BBC, *Nature*, *National Geographic*), national (CBC, Canwest Global, Toronto Star) and northern (APTN, CBC North) media outlets boarding the CCGS *Amundsen* during the Circumpolar Flaw Lead (CFL-IPY) Study produced over 100 articles about the project and Arctic climate change published in numerous countries including Canada, France, Germany, Guatemala, India, Italy, Lebanon, The Netherlands, Russia, Spain, Switzerland, Japan, UK and the USA. Fifteen of the journalists were winners of a competition organized by the World Federation of Science Journalists.
- Two feature stories aired on the CBC’s *The National*, with anchorman Peter Mansbridge reporting directly from the CCGS *Amundsen* in the Beaufort Sea.
- The permafrost meltdown caused by record



high temperatures recorded at the Cape Bounty Observatory on southern Melville Island, Nunavut in 2007 was featured in hundreds of websites and news outlets, including CBC radio's Quirks and Quarks.

- Inuit leaders and ArcticNet Board members, Mary Simon and Duane Smith, were omnipresent in the news over the last two years, representing Inuit views on a range of topics such as Inuit education, health, Arctic sovereignty and the status of the polar bear.

### **Bacon and Eggheads Seminars**

Since the beginning of ArcticNet in 2004, five Network researchers have had the privilege of presenting their research as part of the Bacon and Eggheads seminar series. By bringing together parliamentarians with experts across science and engineering, showcasing outstanding Canadian research accomplishments, this prestigious forum represents a unique opportunity for scientists to communicate important findings to a distinguished and influential audience, which includes key decision-makers.

In April 2007, Prof. John Hughes Clarke of the University of New Brunswick discussed the science behind the latest marine mapping advances and why these new technologies will become essential tools for defining and protecting our offshore frontiers and for laying the groundwork for the possible future use of their resources.

In March 2009, marking the end of the International Polar Year, Prof. Warwick Vincent of Université Laval informed parliamentarians on some of the recent IPY discoveries such as the spectacular decline in ancient ice revealed through satellite imaging, the astonishing picture of the richness of Arctic life emerging from environmental genomics, and the power of new information databases that can be used to assist Northerners to adapt to the rapid changes in the Canadian North.







**Inuit — ArcticNet  
Partnership Committee  
Comité de partenariat**

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**Mary Simon (Chair),**  
President, Inuit Tapiriit Kanatami

**Bernie Boucher,**  
President, JF Boucher  
Consulting Ltd.

**Martin Fortier,**  
Executive Director and COO,  
ArcticNet, *Ex-officio, non voting*

**Christian Thivierge,**  
Program Officer, Networks  
of Centres of Excellence

**David Thomas,**  
President and Chairman,  
The Axys Group

**Industry Partnership  
Committee  
Comité de partenariat  
avec l'industrie**

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**Bernie Boucher (Chair),**  
President, JF Boucher  
Consulting Ltd.

**Glen Bishop,**  
Vice-president, Canadian Arctic,  
ConocoPhillips Canada

**Martin Fortier,**  
Executive Director and COO,  
ArcticNet, *Ex-officio, non voting*

**Carmen Loberg,**  
President and CEO, NorTerra Inc.

**David Thomas,**  
President and Chairman,  
The Axys Group

**Ed Wojczynski,**  
Division Manager of Power  
Planning and Development,  
Manitoba Hydro

**Officers and Administrative Staff  
Directeurs et personnel  
administratif**

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**Christine Barnard,**  
Data Manager, ArcticNet

**Jean-Luc Bernier,**  
Communications Officer, ArcticNet

**Jaime Dawson,**  
Communications Officer, ArcticNet

**Christine Demers,**  
Executive Assistant, ArcticNet





### [Trent University](#)

Christopher Furgal (Phase I & II)

Brendan Hickie (Phase II)

Holger Hintelmann (Phase II)

Peter Lafleur (Phase I & II)

### [Université de Montréal](#)

Alain Cuerrier (Phase II)

Suzanne Lalonde (Phase I & II)

Nicholas Ogden (Phase I)

Bouchra Serhir (Phase I)

### [Université du Québec à Chicoutimi](#)

Mathieu Cusson (Phase II)

### [Université du Québec à Montréal](#)

Laxmi Sushama (Phase II)

René Laprise (Phase II)

### [Université du Québec à Rimouski](#)

Philippe Archambault (Phase II)

Dominique Berteaux (Phase I & II)

Joël Bêty (Phase I & II)

Michel Gosselin (Phase I & II)

Mike Hammill (Phase I & II)

Pierre Larouche (Phase I & II)

Christian Nozais (Phase II)

Michel Poulin (Phase I)

André Rochon (Phase I & II)

François Saucier (Phase I & II)†

Yvan Simard (Phase I & II)

Guillaume St-Onge (Phase II)

### [Université du Québec à Trois-Rivières](#)

Esther Lévesque (Phase I & II)

### [Université de Sherbrooke](#)

Marco Festa-Bianchet (Phase II)

### [Université Laval](#)

Michel Allard (Phase I & II)

Pierre Ayotte (Phase I)

Steeve Côté (Phase I & II)

Éric Dewailly (Phase I & II)

Christian Dussault (Phase II)

Louis Fortier (Phase I & II)

Jacques Gagné (Phase I)

Gilles Gauthier (Phase I & II)

Pierre Gosselin (Phase I)

Bruno Hubert (Phase I)

Pierre Julien (Phase II)

Patrick Lajeunesse (Phase I & II)

Daniel Le Roux (Phase II)

Benoit Lévesque (Phase I)

Connie Lovejoy (Phase I & II)

Reinhard Pienitz (Phase I & II)

Jean-Eric Tremblay (Phase I & II)

Jean-Pierre Tremblay (Phase II)

Warwick Vincent (Phase I & II)

### [University of Alberta](#)

Andrew Derocher (Phase II)

John England (Phase II)

Christopher Fletcher (Phase I)

Alastair Franke (Phase II)

Milton Freeman (Phase I)

Mark Nuttall (Phase I)

Paul Myers (Phase II)

Martin Sharp (Phase I & II)

Vincent St-Louis (Phase I & II)

### [University of British Columbia](#)

Michael Byers (Phase I & II)

Greg Henry (Phase I & II)

Grant Ingram (Phase I)†

### [University of Calgary](#)

Roger De Abreu (Phase II)

Edward McCauley (Phase II)

Julie Pietrzak (Phase II)

John Yackel (Phase I & II)

### [University of Guelph](#)

Benjamin Bradshaw (Phase II)

Doug Campbell (Phase I)

Victoria Edge (Phase I)

Scott McEwen (Phase I)

Derek Muir (Phase I & II)

Barry Smit (Phase I & II)

### [University of Manitoba](#)

David Barber (Phase I & II)

Fikret Berkes (Phase II)

Terry Dick (Phase II)

Steven Ferguson (Phase I & II)

John Hanesiak (Phase I & II)

David Lobb (Phase I)

Robie Macdonald (Phase I & II)

Christine Michel (Phase I)

Lisa Miller (Phase II)

Jill Oakes (Phase I)

Peter Outridge (Phase I & II)

Tim Papakyriakou (Phase I & II)

Simon Prinsenbergh (Phase I & II)

Rick Riewe (Phase I)

Ken Snelgrove (Phase I)

Gary Stern (Phase I & II)

Ronald Stewart (Phase I & II)

Gregg Tomy (Phase II)

Charles Tang (Phase I)

Mario Tenuta (Phase I)

Feiyue Wang (Phase I & II)

### [University of New Brunswick](#)

Steve Blasco (Phase I)

John Hughes Clarke (Phase I & II)

### [University of Northern British Columbia](#)

Laurie Chan (Phase I & II)

### [University of Ottawa](#)

Laurier Poissant (Phase I)

### [University of Toronto](#)

Terry Bidleman (Phase II)

Kue Young (Phase I)

### [University of Victoria](#)

Mairi Best (Phase II)

Gregory Flato (Phase I & II)

Thomas James (Phase II)

Kim Juniper (Phase II)

Ted McDorman (Phase I & II)

Daniel Peters (Phase II)

Terry Prowse (Phase II)

Verena Tunnicliffe (Phase II)

Svein Vagle (Phase II)

Frederick Wrona (Phase II)

### [University of Waterloo](#)

Brian Dempson (Phase II)

David William Doidge (Phase II)

Marlene Evans (Phase II)

Michael Power (Phase I & II)

### [University of Western Ontario](#)

Gordon McBean (Phase I & II)

Karen Pennesi (Phase II)

### [Wilfrid Laurier University](#)

Derek Armitage (Phase II)

### [York University](#)

Richard Bello (Phase I)

Kathy Young (Phase I & II)

# ArcticNet Partners

## Partenaires d'ArcticNet

### ᐅᐸᐅᓃᑦᑕᑦᑕᑦᑕᑦ ᑕᐸᓃᑦᑕᑦᑕᑦ

#### Federal Departments and Agencies Ministères et organismes fédéraux ᑕᑦᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦᑕᑦ

Canadian International Polar Year Secretariat  
 Canadian Museum of Nature  
 Canadian Polar Commission  
 Canadian Space Agency  
 Environment Canada  
 Canada Centre for Inland Waters  
 Canadian Centre for Climate Modelling and Analysis  
 Canadian Ice Service  
 Canadian Wildlife Service - Northern Conservation Division  
 Canadian Wildlife Service - Quebec Region  
 King City Radar Facility  
 Meteorological Service of Canada  
 National Hydrometeorology and Arctic Laboratory  
 Northern Ecosystem Initiative  
 Science and Technology Branch  
 Fisheries and Oceans Canada  
 Arctic Research Division  
 Bedford Institute of Oceanography  
 Canadian Coast Guard  
 Canadian Hydrographic Service (Central and Arctic Region)  
 Freshwater Institute  
 Maurice Lamontagne Institute  
 Oceanography and Climate Branch  
 Oceans Sector  
 Salmonids Section, St John's  
 Science Sector  
 Health Canada  
 First Nations and Inuit Health Branch  
 Indian and Northern Affairs Canada  
 Contaminants and Remediation Directorate

Environment and Renewable Resources Directorate  
 International Polar Year Federal Program Office  
 Northern Science and Contaminants Research Directorate  
 Northern Scientific Training Program  
 Renewable Resources and Environment Directorate  
 National Defence  
 Director General Environment  
 North Warning System Office  
 National Research Council of Canada  
 National Round Table on the Economy and the Environment  
 Natural Resources Canada  
 Climate Change Impacts and Adaptation Program  
 Earth Sciences Sector  
 Geological Survey of Canada  
 Office of Energy Research and Development  
 Polar Continental Shelf Project  
 Parks Canada  
 Nunavut Field Unit  
 Torngat Mountains National Park Reserve  
 Public Health Agency of Canada  
 Transport Canada

#### Provincial Departments and Agencies Ministères et organismes provinciaux ᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦᑕᑦ

Fonds québécois de recherche sur la nature et les technologies  
 Institut national de santé publique du Québec  
 Ministère des affaires municipales et des régions du Québec

Ressources naturelles et de la faune du Québec  
 Transport Québec

#### Territorial Departments and Agencies Ministères et organismes territoriaux ᑕᑦᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ

Fisheries Joint Management Committee  
 Government of Nunavut  
 Government of the Northwest Territories, Department of Industry, Tourism and Investment  
 Nunavut Wildlife Management Board  
 Nunavut Wildlife Research Trust  
 Yukon Government

#### Inuit Organizations, Governments and Agencies Organisations, gouvernements et ministères inuits ᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ, ᑕᑦᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ

Inuit Circumpolar Council (Canada)  
 Inuit Tapiriit Kanatami  
 Inuvialuit Joint Secretariat  
 Inuvialuit Regional Corporation  
 Kativik Environmental Advisory Committee  
 Kativik Municipal Housing Bureau  
 Kativik Regional Government  
 Makivik Corporation  
 Nunatsiavut Government  
 Nunavut Tunngavik Incorporated

#### Northern Communities Communautés nordiques ᐅᐸᐅᓃᑦᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ

Churchill, MB  
 Aqviuq, NL (Hopedale)  
 Nunainguk, NL (Nain)

Qipuqqaq, NL (Postville)  
Marruuvik, NL (Makkovik)  
Kikiak, NL (Rigolet)  
Aklavik, NT  
Ikaahuk, NT  
Inuvik, NT  
Paulatuk, NT  
Tuktoyaktuk, NT  
Uluhaktuk, NT

Ausuittuq, NU (Grise Fiord)  
Arviat, NU  
Igluligaarjuk, NU (Chesterfield Inlet)  
Iglulik, NU (Igloolik)  
Ikpiarjuk, NU (Arctic Bay)  
Iqaluit, NU  
Kangiqliniq, NU (Rankin Inlet)  
Kangiqtugaapik, NU (Clyde River)  
Kimmirut, NU  
Kinngait, NU (Cape Dorset)  
Kugluktuk, NU  
Kuugaarjuk, NU (Kugaaruk)  
Mittimatalik, NU (Pond Inlet)  
Naujaat, NU (Repulse Bay)  
Panniqtuuq, NU (Pangnirtung)  
Qamani'tuaq, NU (Baker Lake)

Qausuittuq, NU (Resolute Bay)  
Qikiqtarjuaq, NU  
Salliq, NU (Coral Harbour)  
Sanikiluaq, NU  
Sanirajak, NU (Hall Beach)  
Talurjuaq, NU (Taloyoak)  
Tikirarjuaq, NU (Whale Cove)  
Uqsuqtuuq, NU (Gjoa Haven)

Akulivik, QC  
Inujjuaq, QC  
Ivujivik, QC  
Kangiqsualujjuaq, QC  
Kangiqsuk, QC  
Kangirsujuaq, QC  
Kuujuuaq, QC  
Kuujuaraapik, QC  
Puvirnituaq, QC  
Quaqtaq, QC  
Salluit, QC  
Umiujaq, QC

#### Industry | Industries ᐱᓄᐱᓐᓂᓐ

Akvaplan-niva  
ConocoPhillips Canada  
Hydro-Québec

Imperial Oil Resources  
Manitoba Hydro  
Noetix Research  
NorTerra Inc.  
Ouranos  
The Axys Group  
Vale Inco Newfoundland and  
Labrador Limited

#### University | Universités ᐱᓄᐱᓐᓂᓐ

Alfred Wegener Institute  
Foundation for Polar and Marine  
Research  
Canadian Circumpolar Institute,  
University of Alberta  
Centre de recherche du Centre  
hospitalier de l'Université Laval,  
Québec (Québec)  
Centre d'études nordiques  
Centre for Earth Observation  
Science (CEOS)  
Institut des sciences  
de la mer de Rimouski  
Institut national de  
la recherche scientifique  
– Eau, Terre et Environnement  
Liu Institute for Global Issues



McGill University  
 Memorial University of  
 Newfoundland  
 Naval Postgraduate School  
 New York University  
 Québec-Océan  
 Royal Military College of Canada  
 Stanford University  
 Université de Montréal  
 Université du Québec à Rimouski  
 Université Laval  
 University of Alberta  
 University of British Columbia  
 University of Calgary  
 University of Guelph  
 University of Manitoba  
 University of New Brunswick  
 University of Plymouth  
 University of Toronto  
 University of Victoria  
 University of Waterloo  
 University of Western Ontario  
 York University

[Other](#) | [Autres](#) | 

Arctic Frontiers

Arctic Institute of North America  
 Arctic Monitoring and Assessment  
 Programme (AMAP)  
 Arctic marine ecosystem research  
 network (ARCTOS)  
 Arctic-SOLAS  
 Aurora Research Institute  
 Canadian Foundation for Climate  
 and Atmospheric Sciences  
 Canadian Cryospheric  
 Information Network  
 Canadian International  
 Polar Year Secretariat  
 Canadian Museum of Nature  
 Centre hospitalier universitaire  
 de Québec  
 Churchill Northern Studies Centre  
 Circumpolar Flaw Lead  
 System Study  
 CNRS - Laboratoire  
 d'océanographie de Villefranche  
 Greenland Institute  
 of Natural Resources  
 Institute for Catastrophic  
 Loss Reduction  
 International Arctic  
 Science Committee  
 International Joint Commission

(Canadian Section)  
 International Study of Arctic  
 Change (ISAC)  
 Manitoba Conservation  
 Nasivvik Centre for Inuit Health  
 and Changing Environments  
 National Aboriginal Health  
 Organization  
 National Environmental  
 Research Institute  
 National Research Council Canada  
 National Science Foundation  
 Natural Sciences and Engineering  
 Research Council of Canada  
 Nayumivik Landholding  
 Corporation  
 Northern Rockies Conservation  
 Cooperative  
 Nunavik Research Centre  
 Nunavut Research Institute  
 OASIS  
 Qanuippitali? Inuit Health Survey  
 Students on Ice  
 Study of Environmental Arctic  
 Change (SEARCH)  
 TD Friends of the Environment



## Financial Overview Survol Financier

ArcticNet Inc. was audited in May 2008 and May 2009 in accordance with generally accepted Canadian auditing standards. The following figures and financial overview are prepared from the unqualified financial statements.

ArcticNet Inc. a été vérifié en mai 2008 et mai 2009 selon les normes de vérification généralement reconnues au Canada. Les données financières suivantes sont extraites des rapports financiers produits sans restriction.

### Revenues, expenses and changes in net assets Revenus, dépenses et ajustements de l'actif net

For fiscal years ending respectively March 31, 2008 and 2009

Pour les années fiscales se terminant les 31 mars 2008 et 2009

<b>Revenues   Revenus</b>	<b>2007-2008</b>	<b>2008-2009</b>
Networks of Centres of Excellence Grant Subvention des Réseaux de centres d'excellence	\$ 6,441,000	\$ 7,256,000 <sup>1</sup>
Network partner contributions to shiptime Contributions des partenaires du réseau au temps de navire <sup>2</sup>	94,175	74,825
Other Autres <sup>2</sup>	120,839	391,610
	<b>\$ 6,656,014</b>	<b>\$ 7,722,435</b>
<b>Expenses   Dépenses</b>		
Research Projects Projets de recherche	3,838,049	2,759,531
Core infrastructure – Shiptime Infrastructure majeure – Temps de navire	1,610,859	2,104,137
Networking and Communications Réseautage et communications	379,076	488,466
Salaries of Administrative Staff Salaires du personnel administratif	411,938	472,281
Travel and Meetings Déplacements et réunions	219,659	583,914
Administrative Centre Centre administratif	89,633	56,857
	<b>\$ 6,549,214</b>	<b>\$ 6,465,186</b>
<b>Surplus (deficiency) of revenues over expenses Excédent (déficit) des revenus sur les dépenses</b>	106,800	1,257,249
Net assets, beginning of year   Actif net, début de l'exercice	807,459	914,259
<b>Net assets, end of year   Actif net, fin de l'exercice</b>	<b>\$ 914,259</b>	<b>\$ 2,171,508</b>

1 This contribution includes a \$815,000 grant received from the NCE through the International Partnership Initiative  
Incluant une subvention de 815,000 \$ reçue dans le cadre du programme d'Initiatives de Partenariats Internationaux des RCE.

2 Funds received and managed directly by the ArcticNet Administrative Centre  
Fonds reçus et gérés directement par le centre administratif d'ArcticNet

## Statement of cash and in-kind contributions Sommaire des contributions en espèces et en nature

For fiscal years ending respectively March 31, 2008 and 2009

Pour les années fiscales se terminant les 31 mars 2008 et 2009

	Cash   En espèces		In-kind   En nature	
	2007-2008	2008-2009	2007-2008	2008-2009
<b>NCE   RCE</b>	<b>\$ 6,441,000</b>	<b>\$ 7,256,000<sup>1</sup></b>		
<b>Non-NCE   Non-RCE<sup>2</sup></b>				
Provincial Provinciales	309,184	539,553	147,000	134,100
Federal Fédérales <sup>3</sup>	13,103,781	9,444,725	1,679,400	4,112,888
University Universitaires	438,895	537,371	889,700	748,832
Industry Industrielles	344,428	140,418	303,393	2,337,500
Other Autres	418,857	645,762	272,500	156,600
<b>Total non-NCE Total non-RCE</b>	<b>\$ 14,615,145</b>	<b>\$ 11,307,829</b>	<b>\$ 3,291,993</b>	<b>\$ 7,489,920</b>
<b>Total NCE and non-NCE Total RCE et non-RCE</b>	<b>\$ 21,056,145</b>	<b>\$ 18,563,829</b>	<b>\$ 3,291,993</b>	<b>\$ 7,489,920</b>

1 This contribution includes a \$815,000 grant received from the NCE through the International Partnership Initiative  
Incluant une subvention de 815 000 \$ reçue dans le cadre du programme d'Initiatives de partenariats internationaux des RCE.

2 Certain funds contributed by Network Partners to support research projects are forwarded directly to researchers and are not managed by the ArcticNet Administrative Centre  
Certaines contributions des partenaires du réseau aux projets de recherche parviennent directement aux chercheurs et ne sont pas gérées par le centre administratif d'ArcticNet.

3 These federal contributions do not include contributions received from the Federal granting councils, the Canada Foundation for Innovation and Genome Canada.  
Ces contributions fédérales n'incluent pas les contributions des conseils de recherche, de la Fondation Canadienne pour l'Innovation et de Génôme Canada.





































**ᑭᓄᓂᓴ 1 (2004-2008)  
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**Phase I du programme  
de recherche (2004-2008)**

**Thème 1: Impacts des changements  
climatiques dans le Haut-Arctique canadien  
— une étude comparative des conditions  
physiques et sociétales le long du gradient  
est-ouest**

**Chef de thème :**

Yves Gratton, Institut national de la recherche  
scientifique-Eau, terre et environnement

**Le réchauffement des mers côtières  
et l'amincissement de la banquise**

Directeurs de projet: Yves Gratton  
et David Barber

**La vulnérabilité du littoral dans  
un Arctique en réchauffement**

Directeurs de projet: Donald Forbes, Wayne  
Pollard et Trevor Bell

**Le cycle des contaminants dans  
l'environnement côtier**

Directeurs de projet: Robie Macdonald  
et Gary Stern

**La productivité marine et l'exploitation  
de pêcheries émergentes**

Directeur de projet: Jean-Éric Tremblay

**Les changements dans les habitudes  
alimentaires et les impacts sur l'émergence  
de maladies chroniques**

Directeur de projet: Éric Dewailly

**L'ouverture du passage du Nord-Ouest:  
ressources, navigation, souveraineté et  
sécurité**

Directeurs de projet: John Hughes Clarke  
et Steve Blasco

**Les eaux de l'Arctique canadien face aux  
lois internationales et à la diplomatie**

Directeur de projet : Michael Byers

































ბილანსი და ანტი-ბიოლოგიური რისკების  
პრობლემების შესახებ 2013. და აღნიშნული რისკების  
რეგულაციების შესახებ დასაბუთებული დასაბუთებული  
შედეგების დასაბუთებული დასაბუთებული დასაბუთებული  
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contaminants et les degrés de sécurité alimentaire. Les connaissances scientifiques et les connaissances locales et traditionnelles seront intégrées grâce à des méthodes qualitatives et à la modélisation.

**Dynamique des populations de caribous au Nunavik/Nunatsiavut**

Directeur de projet : Steeve Côté

Alors que le caribou migrateur est présent en abondance dans le nord du Québec et au Labrador, les troupeaux de caribous sont en déclin presque partout ailleurs au Canada et les facteurs responsables de ce déclin sont peu connus. Ce projet vise à déterminer quels sont les effets du climat, de la densité de population et des activités industrielles sur l'abondance et la distribution du caribou dans l'Arctique. Les partenaires du gouvernement, des groupes autochtones et de l'industrie obtiendront de nouveaux outils pour surveiller la démographie du caribou et améliorer sa conservation dans un milieu arctique en plein changement.

**Acides gras marins dans l'Arctique canadien en transformation**

Directeur de projet : Éric Dewailly

Traditionnellement, le régime alimentaire des Inuits se compose principalement de poissons et de mammifères. Il est bien connu que la consommation de lipides marins par les Inuits joue un rôle extrêmement important dans l'apport énergétique et dans diverses autres fonctions biologiques essentielles. Un réchauffement du climat peut affecter la composition moléculaire de ces lipides par le biais de changements dans la composition lipidique des algues microscopiques, la base de tout le réseau alimentaire de l'Arctique. Ces changements auraient ultimement un effet sur les enfants et les adultes inuits. Ce projet a pour objectif de comprendre les répercussions de ces changements sur la santé des Inuits et d'orienter les politiques publiques pour prévenir les conséquences de ces changements.





















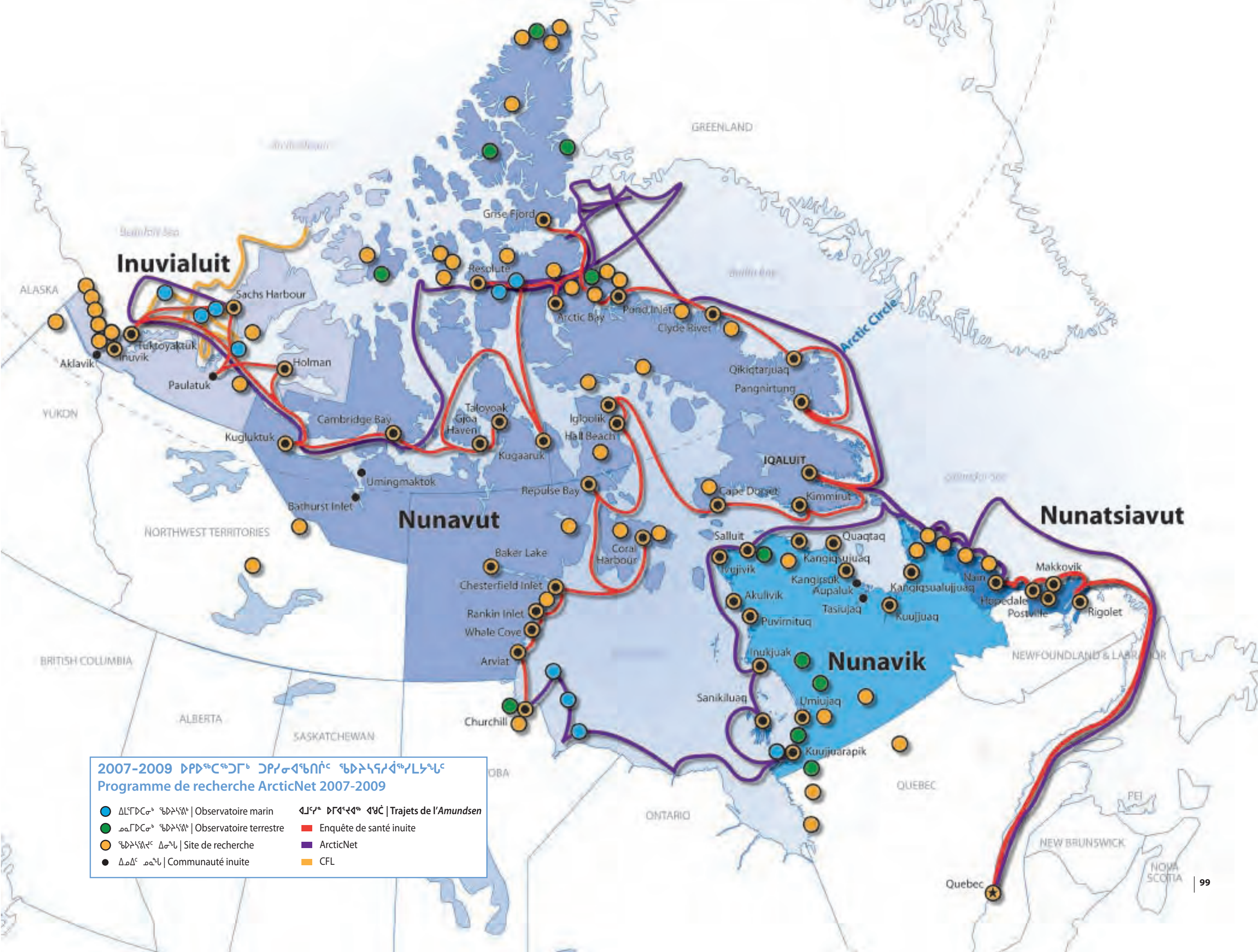












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 Programme de recherche ArcticNet 2007-2009

- ᐃᑦᑕᑦᑕᑦ ᑦᑕᑦᑕᑦ | Observatoire marin
- ᐃᑦᑕᑦᑕᑦ ᑦᑕᑦᑕᑦ | Observatoire terrestre
- ᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦ | Site de recherche
- ᐃᑦᑕᑦ ᑦᑕᑦᑕᑦ | Communauté inuite
- ᐅᑭᐅᑦᑕᑦᑕᑦ ᐃᑦᑕᑦ | Trajets de l'Amundsen
- ᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ | Enquête de santé inuite
- ᐃᑦᑕᑦᑕᑦ | ArcticNet
- ᑕᑦᑕᑦᑕᑦ | CFL













ბილაჟი, დოკუმენტაცია და სხვა ადგილებზე დასრულებულია. ამასთანავე, დოკუმენტაცია და სხვა ადგილებზე დასრულებულია. ამასთანავე, დოკუმენტაცია და სხვა ადგილებზე დასრულებულია.

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### დოკუმენტაცია და სხვა ადგილებზე დასრულებულია 2008

ამასთანავე, დოკუმენტაცია და სხვა ადგილებზე დასრულებულია. ამასთანავე, დოკუმენტაცია და სხვა ადგილებზე დასრულებულია.

ateliers concomitants de l'après-midi ont permis aux étudiants d'approfondir divers thèmes comme la rédaction d'une proposition de recherche, les communications et la mission éducative, l'engagement des habitants du Nord dans la recherche arctique et la gestion des données dans le cadre d'ArcticNet.

Les étudiants associés au réseau ArcticNet provenant de 28 universités au Canada, l'AEA a élaboré le concept d'ateliers de recherche régionaux afin de présenter aux étudiants rattachés géographiquement une tribune de discussion et de réseautage en plus de la Journée étudiante annuelle. Le troisième atelier annuel régional pour la région de Québec s'est tenu à l'Université Laval en mai 2008. Trente étudiants ont alors participé à des discussions portant sur la transition du programme de recherche d'ArcticNet à la Phase II. Au printemps 2008, certains étudiants de University of Northern British Columbia ont lancé un groupe de recherche composé de 16 étudiants qui se réunissent mensuellement en vue de promouvoir la collaboration et le transfert de connaissances. Cherchant à maintenir des liens extérieurs au réseau, l'AEA a forgé des liens avec l'Association of Polar Early Career Scientists (APECS) en vue d'améliorer les travaux de collaboration entre les deux groupes. Les efforts de l'AEA pour promouvoir la communication et l'échange d'information témoignent des capacités de réseautage pluridisciplinaire et international de ces futurs chefs de la recherche arctique.

### Journée étudiante internationale d'Arctic Change 2008

La journée étudiante internationale d'Arctic Change 2008 a permis de souligner les réalisations de la prochaine génération de chercheurs et de gestionnaires. Précédant la conférence principale, la Journée étudiante a attiré un nombre record de 450 participants étudiants provenant du secondaire jusqu'aux chercheurs postdoctoraux – une preuve que la recherche en milieu arctique poursuivra sa lancée pendant les prochaines















































**ArcticNet**

Pavillon Alexandre-Vachon, room 4081  
1045, avenue de la Médecine  
Université Laval  
Quebec, Quebec G1V 0A6  
T: (418) 656-5830  
F: (418) 656-2334

**ᐃᐅᐅᓐᑕᓐᑕᓐᑕᓐ  
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ᐅᓐᑕᓐᑕᓐ: (418) 656-5830  
ᑕᓐᑕᓐᑕᓐ: (418) 656-2334

[www.arcticnet.ulaval.ca](http://www.arcticnet.ulaval.ca)

**ArcticNet**

Pavillon Alexandre-Vachon, local 4081  
1045, avenue de la Médecine  
Université Laval  
Québec (Québec) G1V 0A6  
Tél.: (418) 656-5830  
Télé.: (418) 656-2334