

Witness The ARCTIC

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Research at the University of Lapland Arctic Centre

Established in 1979 and located on the Arctic Circle, the University of Lapland in Rovaniemi, Finland, enrolls about 4,300 undergraduate and 400 graduate students and employs a staff of 650. Within the university, the Arctic Centre was established in 1989 as a multidisciplinary research institute and science centre. Its multinational staff of 80 conducts a wide range of research and education activities, carries out project services, and maintains a science centre, information service, and library. The operating budget for the Arctic Centre (€2.34 million in 2005) comes from the Finnish Ministry of Education. Arctic Centre research projects also receive funding (€1.43 million in 2005) from a variety of outside sources, including the Academy of Finland and European Union (EU) funding instruments.

Founded in 2003 at the Arctic Centre, ARKTIS is a multidisciplinary graduate school funded by the Ministry of Education. ARKTIS has 22 Ph.D. students enrolled at the Universities of Lapland,

Oulu, and Helsinki, and about 50 supervisors and associate members from multiple institutions. The theme of the school is Social and Environmental Impacts of Modernization and Global Change in the Arctic. ARKTIS students work in the social sciences—including sociology, political science, environmental politics, international relations, economics, cultural studies, law, and education—as well as biology and geography. Most research groups at the Arctic Centre also include graduate students who are funded by outside sources, such as the Academy of Finland and various foundations.

The Arctic Centre organizes and coordinates a non-degree granting Arctic Studies Program (ASP) in cooperation with the International Studies Centre of the University of Lapland. The one-year ASP provides students with comprehensive knowledge of the physical, environmental, social, and cultural aspects of the Arctic as well as research opportunities at the centre. The program is designed for a variety of

students, including Finnish and foreign degree students, international exchange students, and professionals, who would like to improve their knowledge of the North.

The Arktikum building, which houses the Arctic Centre, is on the banks of the Ounasjoki River in Rovaniemi, Finland. Photo by Timo Lindholm/ Fotoplan.

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The Arctic Centre hosts the Finnish National Secretariat of the International Polar Year (IPY; see page XX) in cooperation with the Thule Institute of the University of Oulu. The secretariat is responsible for coordination of national IPY events, international cooperation with other IPY entities, and IPY education and outreach services. The University of Lapland also operates the International Secretariat of the University of the Arctic (see page XX).

With a strong emphasis on international multidisciplinary cooperation, the 40 scientists working at the Arctic Centre combine the perspectives of natural and social sciences to understand societal and environmental problems of northern regions and contribute to management decisions with the goal of a sustainable future. While the centre has a circumpolar mandate, its primary emphasis is on northern Russia, Scandinavia, and Svalbard. Research focuses on three main themes, each of which is led by a research professor:

- global change,
- sustainable development, and
- environmental and minority law.

This insert includes highlights of recent Arctic Centre research activities.



Global Change Research Group

Led by Bruce Forbes (Biogeography/Ecology), the global change research group examines the effects of large-scale changes in climate and ecology and efforts to adapt to them. The research group emphasizes both the natural sciences and the relationship between human communities and rapid environmental change. Because the responses and resilience of northern societies are of special interest, the global change group works closely with the sustainable development research group (see page 3).

For example, a 2004 Arctic Centre project entitled Challenges of Modernity for Reindeer Management: Integration and Sustainable Development in Europe's Subarctic and Boreal Regions (REN-MAN) developed new models of participatory research and planning in reindeer management that fostered integrated and sustainable use of semi-domestic reindeer resources in northernmost Europe.

Arctic Centre researchers are using the participatory approach developed through RENMAN in a multidisciplinary analysis of energy development in northwest Russia. With primary funding from the Academy of Finland, Forbes works with Florian Stammler (Social Anthropology) on Environmental and Social Impacts of Industrial Development in Northern Russia (ENSINOR). This four-year project includes collaboration with Tuula Tuisku of the Thule Institute at the University of Oulu and Svetlana Ektova of the Institute of Plant and Animal Ecology at the Russian Academy of Sciences and with three closely related projects:

- Heterogeneity and Resilience of Human-Rangifer Systems: A Circumpolar Social-Ecological Synthesis, funded by NSF and led by Gary Kofinas, University of Alaska Fairbanks (UAF);
- Application of Space-Based Technologies and Models to Address Land-Cover/Land-Use Change Problems on the Yamal Peninsula, funded by the National Aeronautics and Space Agency (NASA) and led by Skip Walker, UAF; and
- Reindeer Herders' Vulnerability Network Study: Reindeer Pastoralism in a Changing Climate, funded by the Norwegian Research Council and led by

As part of the ENSINOR project, Anu Pajunen, a Ph.D. student in Botany, talks with a herder about forage plants in reindeer pastures in the Bolshezemel'skaia tundra, Nenets Autonomous Okrug, Russia. Photo by Bruce Forbes.



Ole Henrik Magga and Svein Mathiesen, Saami University College, Norway.

The ENSINOR project's comparative case studies examine changes resulting from energy development in two districts—Nenets Autonomous Okrug and the Yamal-Nenets Autonomous Okrug—that contain the region's most productive proven energy sources. The research team conducts biological, geographic, and anthropological investigations and works closely with migratory Nenets herders. The researchers combine quantitative methods, such as high-resolution satellite image analysis and on-site biological data collection, with anthropological research on the herders' qualitative knowledge of herding, hunting, fishing, and gathering. In December 2007, the Arctic Centre will develop a museum exhibition sharing the project's findings that will travel to regional museums in Salekhard and Naryan Mar. A final workshop will involve stakeholders, including government, the oil industry, reindeer herders, indigenous officials, and researchers.

Stammler also works with Minna Turunen (Global Change, Botany), Päivi Soppela (Global Change, Zoology), and Monica Tennberg (Sustainable Development) on a project investigating ecological and socioeconomic impacts of global change on reindeer herding in Finnish Lapland and northwest Russia. Conducted in collaboration with researchers at the University of Oulu, Finnish Forest Research Institute, and several international partners, Ecological and Socioeconomic Responses of Global Change on Reindeer Pastures (ECOREIN) uses responses of reindeer

forage plants to increasing ultraviolet-B (UV-B, 280–320 nm) radiation as indicators of climate change. Ecorein investigators manipulate plants' UV-B exposure in the field and characterize plant responses, including synthesis of defensive phenolic compounds, nitrogen metabolism, and composition of waxes and nutritive substances. The social science component of the project analyzes the human-animal-plant-relationship. An assessment, derived from participant observation and questionnaires, will identify environmental and socioeconomic factors that make reindeer herding vulnerable to change and ways herders can cope with these changes effectively. For more information, see <http://thule.oulu.fi/projects/ecorein.html>.

Arctic Centre research in glaciology and paleoclimatology is funded primarily by the Academy of Finland. John Moore leads a group of investigators specializing in geophysics (Venkata Gandikota, Aslak Grinsted, and Anna Sinisalo) and chemistry (Kristiina Virkkunen) with the aim of better understanding the climate system and its interactions with the cryosphere. They combine geophysical measurements, such as ground penetrating radar on glaciers and ice core analyses, with advanced mathematical methods to explore the non-linear mechanistic behavior of the climate system. These methods allow features that are largely obscured by complex noise processes in more traditional analyses to be extracted from time series of observed climate. Sophisticated treatment of chemistry data also allows climate information to be

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extracted from ice cores taken from non-optimum environments, greatly expanding the geographical coverage of this important climate archive. The group's approaches complement traditional general circulation modeling (GCM) but are based on real observables and allow simple descriptions of climate dynamics that can reveal the elements of the system most likely to display hysteresis and other non-linear behavior.

In 2005, several members of the team participated in an international effort that recovered a high-resolution ice core from Svalbard, Norway, containing the climatic history of the past 400 years. This adds to the team's existing archive of the past 800 years in Svalbard recovered in 1997 and the past 15,000 years in Antarctica recovered in 2003 and January 2007. They are using these records to better understand how large events, such as volcanic eruptions and industrialization, have impacted natural climate patterns, such as the Little Ice Age and termination of the last glacial period. Notable findings include:

- a sulphate inventory for the 20th century in Svalbard shows that western Europe is, surprisingly, the dominant anthropogenic source of sulphate at 1250 m elevation on Svalbard, and
- new proxy measures indicate that summer temperatures since 2002 on Svalbard are similar to those seen during the Medieval Warm Period (circa AD 1100).

Jukka Jokimäki (Ecology and Environmental Management) leads a project entitled Tourist Destinations as Landscape Laboratories: Tools for Sustainable Tourism (LANDSCAPE-LAB), funded largely by the EU LIFE Environment Programme. The team of 49 investigators is working to understand impacts of tourism on nature, culture, and local communities in Finland and to develop a system for monitoring environmental impacts of tourism that can be adapted for use elsewhere in Europe. The project focuses on the Ounasselkä fell area in northwestern Finnish Lapland. The tourist destinations of this area—Levi, Pallas and Ylläs—draw the highest volume of nature-based tourism in the country, with more than 2 million visitor-days estimated in 2003. Maintaining tourism while sustaining the environment in these areas is challenging due to the fragile ecosystem and vicinity of Pallas-Yllästunturi National Park. Project activities include analyzing the geology, landscape structure, history of land use, tourist experiences, and environmental attitudes of interest groups. The team is also conducting inventories of bird life and examining plant species suitable for restoration. More information is available at: www.arcticcentre.org/landscapelab.

With funding from several sources, Osmo Rätti (Population Ecology) investigates how habitat fragmentation influences genetic diversity in forest dwelling grouse,

whose populations have declined in recent decades, likely due to changes in forest structure. Fragmentation of breeding habitat reduces both overall population size and gene flow between different parts of the population. The results of Rätti's work on population genetics of grouse in study areas with different degrees of fragmentation will be applied to the management of grouse and their breeding habitats with the goal of preserving genetic diversity. The information is valuable for agencies responsible for forest planning and management and conservation of fauna.

Anna-Liisa Sippola (Conservation Biology) investigates the effects of forest management methods on species diversity and key habitats and cost-effective forest conservation in several projects funded by the Ministry of Environment, the Finnish Forest Research Institute, and the EU Interreg Tacis Programme. She leads Development of Polypore Indicators in Assessing the Conservation Value of Boreal Forests, a project funded by the Finnish Ministry of Environment to develop practical tools for biodiversity assessment in boreal forests. Polypores are fungi that live on decaying wood, and their species diversity reflects that of the host forest. A comprehensive dataset has been collected from Finnish polypore researchers that will be used by the National Board of Forestry and other forestry organizations.

Sustainable Development Research Group

The sustainable development research group investigates the rapid environmental and societal changes being faced by people in the Arctic and how these changes influence their institutions and livelihoods. Monica Tennberg (International Relations, Political Science) leads the research group and, with funding from the Academy of Finland, is investigating:

- international environmental cooperation, mainly by EU and Nordic countries, in northwest Russia, and
- arctic climate politics.

In the Russian project, she studies governance structures and environmental policies of the countries involved; results thus far suggest that international environmental cooperation has been insti-

tutionally effective but had only modest environmental effects. A project on indigenous peoples as international political actors (INDIPO) examines how relations between states, international organizations, and indigenous peoples have been and are currently constructed as legal and political practices; Tennberg is developing a research approach based on pragmatist ideas to study the diversity of indigenous peoples' international political agencies and their experiences in attempting to further their political interests. Initial results from INDIPO were published in *Polar Record* in 2006. In a new arctic climate politics project, she collaborates with researchers in the Northern Institute for Environmental and Minority Law (NIEM; see page XX) to

study the adaptation strategies of arctic international institutions and countries. Tennberg also leads the Finnish contribution to the pan-arctic Community Adaptation and Vulnerability in Arctic Regions (CAVIAR) consortium, which will compare local communities experiencing rapid social and environmental



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changes; the CAVIAR consortium is part of the science program for IPY 2007-2008.

The Arctic Centre emphasizes the importance of anthropological research, particularly in northern Russia. Florian Stammler (Social Anthropology) is conducting comparative anthropological research on relations between reindeer herders and industrial companies and workers in this region. Part of this work is funded by ENSINOR (see page XX). Stammler is working with Emma Wilson of Scott Polar Research Institute (SPRI) at the University of Cambridge to explore impact mitigation and the relationship between stakeholders active in and affected by industrialization. With funding from the U.K. Economic and Social Science Research Council, the team contributed to a seminar series designed to provide a forum for dialogue between academia, industry, government and civil society examining approaches to sustainable development and corporate governance in Russia (www.spri.cam.ac.uk/events/russianoil). Results of this work were recently published in a special issue of *Sibirica* (www.berghahnbooksonline.com/journals/sib/index.php?pg=toc5-2).

The Arctic has experienced considerable new institution building in the past few decades, including new types of indigenous economic enterprises; our understanding of these institutional development processes, however, is still limited, particularly in remote regions of northern Russia. Several anthropological projects at the Arctic

Centre focus on community dynamics and collectivity among inhabitants of remote villages and on the ways these community attitudes are translated into institutions. As a contribution to Global Change Vulnerabilities in the Barents Region: Linking Arctic Natural Resources, Climate Change and Economies (BALANCE), an EU-funded integrated regional impact study of the Barents Sea region, Stammler and Piers Vitebsky of SPRI are examining implications of institutional transformation on land use practices in the arctic tundra. Along similar lines, Anna Stammler-Gossmann (Social Anthropology) is investigating impacts and vulnerability of human activities such as fishing, shipping, and offshore oil and gas extraction, in the context of changing climate and sea ice conditions. This research contributes to the EU-funded Developing Arctic Modeling and Observing Capabilities for Long-term Environmental Studies (DAMOCLES) project (see page XX). In another project, she analyzes globalization and adaptation to rapid socio-political change in communities in northern Russia. She focuses on forms of regional and global interaction, such as trade, tourism, and northern identity, to better understand how sustainable development can be realized in meaningful ways.

In a new project funded by the Finnish Academy, Assessing Senses of Place, Mobility and Viability in Industrial Northern Communities (MOVE-INNOCOM), Stammler and his team have begun in-depth research on the impact of industrial restructuring on non-indigenous northern residents who originally came to the Russian North as temporary labor.

Florian Stammler in the middle of a field season among reindeer herders on the Yamal Peninsula of Russia. Photo by Bruce Forbes.

Arctic Indigenous and Sami Peoples Research Office

Established in 2005, the Arctic Indigenous and Sami Peoples Research Office contributes to the sustainable development research group by promoting research, education, and cooperation with representatives of indigenous groups at the national and international level. Led by Elina Helander-Renvall (Cultural Studies), researchers in the office study:

- indigenous knowledge and its utilization,
- knowledge related to biodiversity,
- natural resources and related conflicts,
- international indigenous politics, and
- minority law.

With researchers in the information service department at the Arctic Centre, the office recently developed a database of research projects dealing with Sami people or in Sami areas. The database, which is in English, contains more than 200 entries describing Sami-related research projects on topics such as culture, education, environment, land management, politics, and reindeer husbandry. The database is appropriately named Rádju, which in Sami means “to preserve something by collecting,” and is available at: http://arcticcentre.ulapland.fi/radju/radju_eng.aspx.

The office also recently produced a report on the status and trends of indigenous arctic peoples’ traditional knowledge as it relates to Article 8(j) in the Convention on Biological Diversity, which operates under the United Nations Environment Programme. Based on studies conducted in seven arctic nations and developed in cooperation with the Finnish Ministry of Environment, the report:

- examines retention of traditional biodiversity knowledge in the Arctic,
- describes measures to protect and promote the use of this knowledge, and
- identifies processes that may threaten the maintenance, preservation, and application of traditional knowledge, innovations, and practices.

A contribution to the European Science Foundation BOREAS program (www.alaska.edu/boreas/move), the MOVE-INNOCOM project will provide an northern perspective to a general theory of viable communities through ethnographic analyses of movement and settlement histories of individuals and families.



Northern Institute for Environmental and Minority Law

The eighteen researchers in the Northern Institute for Environmental and Minority Law (NIEM) focus on two areas of law from an arctic perspective—environmental law and human rights. NIEM, which is led by Timo Koivurova (International Environmental Law), is the only research institute that focuses specifically on arctic and northern legal issues. Main focus areas include:

- environmental impact assessment in the Arctic,
- environmental rights of arctic indigenous people,
- the role of arctic institutions and legal systems in mitigating and adapting to climate change, and
- the effectiveness of multilateral environmental agreements in the Arctic.

Major activities of NIEM staff include participating in national and international legal processes, organizing seminars and conferences on northern legal issues,

Science Centre

The world-class research conducted by Arctic Centre staff places the institution in an ideal position to relay information about contemporary research and information technologies to public audiences. The Science Centre was established in 1989 to advance this agenda by developing and maintaining permanent and temporary exhibitions of the Arctic Centre. The exhibitions help make arctic research accessible and increase public awareness and interest in science by presenting a friendly and interactive atmosphere to learn about people, environment, and issues related to the changes observed in circumpolar regions. Nicolas Gunsley heads the centre, which is highly recommended by tour companies and guidebooks.

In 2005, there were 80,000 visitors to the Science Centre, of which approximately 60% came from other European countries, Asia, and North America. The State Provincial Office of Lapland and the University of Lapland funded a renovation of the permanent exhibition. The new exhibition, which reopened in April 2007, includes four main sections:

coordinating the arctic governance curriculum for the University of the Arctic, and publishing *Juridica Lapponica*, a series describing research conducted at NIEM. Recent volumes in the series include *Arctic Governance* and *The Right to a Decent Environment with Special Reference to Indigenous Peoples*, both published in 2004.

The Academy of Finland recently funded a NIEM project on the role of international governance mechanisms in arctic climate change policy. The focus of the project is unique in climate governance research since the regional international level of governance is not addressed in other global climate governance studies or by the arctic research community.

NIEM also cooperates with other legal research

institutes in the Nordic Research Network for Sami and Environmental Law. Joint research projects between members of the network primarily focus on Sami law and the protection of arctic biological diversity. Network members are coordinating a conference on sustainable use of natural resources and conservation of biodiversity in the Arctic and related legal challenges that was held in Svalbard, Norway, in late March 2007 (www.neln.kvl.dk).

- a visual, interactive introduction to the Arctic,
- detailed information on how humans, fauna, and flora adapt and survive in the harsh arctic environment,
- demonstrations of environmental changes observed in the Arctic and their global connections, and
- questions about the future of the Arctic from a positive and optimistic perspective.

The new exhibit also includes a cold room, where visitors can learn about snow and ice, and a theater for viewing the Northern Lights. Temporary exhibitions highlight current research at the Arctic Centre or within its wider network, the European Network of Science Centres (ECSITE).

As part of its outreach efforts, the Science Centre also organizes public events

focused on life and research in the Arctic, including workshops for schools, a film festival, and conferences. The centre also works collaboratively to develop exhibitions with institutions such as the Heureka Science Centre in Vantaa, Finland.



Visitors of all ages can enjoy the Arctic Centre's interactive exhibits. Photo by Timo Lindholm/Fotoplan.

Information Service and Library

The Information Service of the Arctic Centre was established in 1989 to provide up-to-date information about the Arctic to public and university users in Finland and internationally. Led by Liisa Kurppa, the staff of six locates and assesses sources of information about the region and develops tools for information dissemination. Service activities also include cooperation with international, national, and regional institutions to develop, coordinate, and maintain electronic databases and portals containing information on arctic research, northern environments, and the Barents region. Approximately 40,000 people visit the Information Service and Library annually. Efficient customer service is one of the priorities of the library, which holds over 16,000 volumes on the Arctic and a considerable number of electronic materials.

One resource available through the service is the Barents Portal—a collaborative project of Finnish, Norwegian, Russian, and Swedish institutions that contains information and articles about the region. The portal has been organized into 28 themes, which include culture, education and research, economy and business, nature, society, and youth. More information is available at: www.barentsinfo.org.

The proximity of Russia to Finland makes it an important cooperative partner of the Information Service, helping to improve the acquisition and exchange of information in response to the grow-



Inside the main corridor of the Arktikum building. Photo by Riku Lavia.

ing need to increase expertise on Russia in recent years. In 2005, the service began working with the Aleksanteri Institute at the University of Helsinki to develop RUS-SIAinfo, a regularly updated web-based portal providing quality online resources on Russia. The portal can be searched by region or topics: public administration, politics, economy, social services and health care, education and research, culture, civil society, and environment. The portal is available online at: www.russiainfo.org.

Culturally and historically valuable documentary films about the Barents region in northwest Russia are in danger of being lost due to poor storing conditions, recycling of old film, and lack of funds. Arctic Archives and Films Under Restoration in Barents Region (AARRE) is led by Armi Pekkala; the staff of four promotes film protection, restores original films and archives found in and about northwest Russia, and works to increase access to these films. An interactive exhibition based on arctic documentary films of Murmansk and Arkhangelsk television companies and collections of a Finnish television company, Yle, will be on display in Rovaniemi and Inari, Finland, and Murmansk and Arkhangelsk, Russia. A previous project that ended in 2006, Arctic Documentary Films at Risk in Barents Region: Surveying, Protecting, and Screening (AFBARE), surveyed archives and museums to locate threatened arctic documentary films. The project staff has also created a database on approximately 35,000 documentary films from the Barents region. Detailed information, including scene-by-scene descriptions and previews, is available for more than 1,000 digitized films. More information is available at: www.arcticcentre.org/?depid=18849.



Northern Institute for Environmental Law researchers Leena Heinämäki and Juha Joonas in an ARKTIS graduate school research seminar in Seitaranta near Rovaniemi. Photo by Riku Lavia.