

A one-stop-shop for research in the Arctic

- ★ The Arctic is warming faster than the rest of our planet, which is causing more sea ice to melt and accelerating permafrost thawing. The Interact consortium coordinates efforts to send scientists to conduct research in the Arctic, which will lead to a deeper understanding of the extent and impact of environmental change in the region, as **Professor Margareta Johansson** explains.

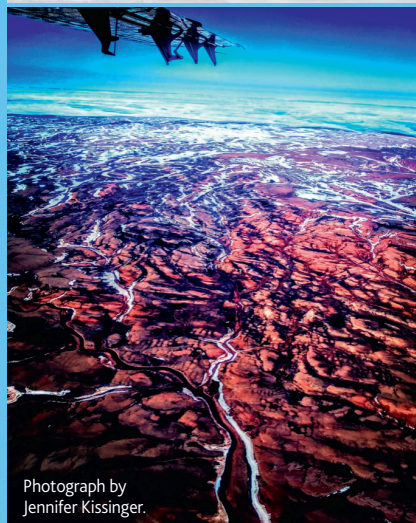
The Arctic is highly sensitive to the effects of climate change and so is the focus of a great deal of attention in research, while scientists are also investigating a wide variety of other topics in the region. The Interact project, an international consortium bringing together partners from countries around the Arctic, plays an important role in helping scientists conduct research in the region. "Interact is an infrastructure project, with 89 research stations across the Arctic and beyond," says Margareta Johansson, an Associate Professor at Lund University and the coordinator of the project. Interact started around 20 years ago, providing access to research stations around the North Atlantic, but its scope has since widened. "We started with research stations in Scotland, the Faroe Islands and several of the Scandinavian countries, but then Interact grew bigger and more research stations wanted to join," outlines Professor Johansson. "We now have a much more Arctic focus than we had at the start, while we also have research stations located in high-Alpine areas."

Interact project

There are a wide range of research stations within Interact, with varying environmental conditions and geographical features that may be of interest to scientists from different disciplines. Some stations are located close to glaciers for example, while



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others give researchers the opportunity to investigate the condition of permafrost or track biodiversity; the common theme is that they are all involved in monitoring the climate. "All the research stations monitor the climate, and have been doing so for many years," says Professor Johansson. These stations all have facilities to host external users, although Professor Johansson says it's not always possible to provide year-round access. "Some stations in places like Greenland and northern Canada can be quite difficult to access, and it's only possible to get to them during Summer," she explains. "Funding from the EU is used to send people out into the field. At the moment, 53 of these 89 research stations offer trans-national access to researchers, so scientists can go there and do their research for free."

Research proposals are evaluated by a trans-national access board in Interact, which brings together station managers and external scientists with expertise in a variety of different topics, from medicine, to ecology, to permafrost conditions. The board meets on an annual basis to evaluate proposals and decide which will be funded under the project, and Professor Johansson says the key criteria is the quality of the science. "We aim to support innovative and excellent science, but of course we also consider feasibility and value for money,"



Finse research station, Photograph by Erika Leslie.



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she stresses. Some of the field stations may be in particularly high demand at certain times, often due to their proximity to scientifically interesting areas, but this tends to vary. "We have been running this project since 2011, and we've found that it's not always the same stations that are popular," says Professor Johansson. "We usually manage to get people to all of the stations within Interact. If some stations are being under-utilised, then we can run campaigns to generate more interest."

The research stations themselves benefit from inclusion within Interact, as it heightens their visibility and awareness of the facilities they offer amongst scientists, which in turn helps to attract further visitors. While a scientist may initially be funded under Interact to visit a research station, they may want to travel independently again at a later point to conduct further research. "If you come to an area as a scientist and set up an experiment, then the likelihood of you coming back next year and paying yourself is quite high, as many researchers need a lot of data. Often researchers need more than just a snapshot, they may need a couple of years worth of data," points out Professor Johansson. The Interact project acts as a kind of one-stop-shop in this respect, raising awareness of research stations in

the Arctic and providing a base for scientists to conduct their research. "We have sent more than 1,000 scientists out into the field to the different stations so far, and a lot of interesting research has resulted from that," says Professor Johansson.

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Many of these research stations are located in very remote areas prone to extreme weather, for example the mean annual temperature at the CEN Ward Island Research Station in Northern Canada is -17.3°C, so managing them can be a major challenge. A forum within the Interact project gives station managers the opportunity to share knowledge and expertise, and to learn from each others' experiences. "Many problems can arise when you are located in a very remote area," stresses Professor Johansson. The managers meet together either once or twice a year and produce best practice guidelines on the management of these research stations. "This includes guidance on what to think about in terms of safety, as well as things like energy management. How

can you reduce the carbon footprint around your research station?" continues Professor Johansson. "If the station managers can learn from each other and minimise their costs and the environmental impact of their operations, then that is beneficial."

Climate data

A number of these research stations have been active for more than a century, and in some cases climate data has been gathered there over the entire period. This data is invaluable in terms of putting more recent trends in perspective and understanding how the climate has evolved over time, says Professor Johansson. "It's over the last 30-40 years that we have seen an acceleration in the rate of change in the Arctic," she explains. This data may be recorded in notebooks or photographs however, not modern IT systems; rather than laboriously sifting through all this material researchers are looking to use the power of artificial intelligence. "We are working with a

company and trying to figure out how we can use artificial intelligence to retrieve all the data. Some ideas are being tested at the moment, and we hope they will be applicable to many research stations," says Professor Johansson. "A further part of the project is the Joint Research Activities, where we are developing new monitoring methods."

This represents an important contribution to the wider goal of protecting the Arctic and the people who live around the region from the effects of environmental change. Researchers in the project have been working with indigenous peoples around the Arctic and station managers, looking to harness their combined knowledge to strengthen protection. "We want to see how we can use the knowledge of indigenous people and the knowledge of people at these research stations to help local society in terms of adapting to environmental changes," outlines Professor Johansson. These changes could be dramatic; for example, the coastal town of Barrow in Alaska is essentially slipping into the Sea due to permafrost coastal erosion, a topic on which Professor Johansson holds deep expertise. "There is a lot of debate about the impact of permafrost thawing. We know that there is twice as much carbon in the ground as there is in the atmosphere," she says.

The thawing of permafrost leads to the decomposition of this carbon and to increased emissions of greenhouse gases. Many of the research stations within Interact have facilities to measure both carbon and methane fluxes, which Professor Johansson says will help scientists establish a more detailed picture of environmental change across the Arctic. "The research stations have got monitoring capabilities and are gathering data, which is then collected into a shared database, so that it is then more widely available," she says.



Photograph by Jennifer Kissinger

Petuniabukta landscape, photograph by Jan Kavan



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INTERACT

International Network for Terrestrial Research and Monitoring in the Arctic

Project Objectives

INTERACT is a circumarctic network of 89 terrestrial research stations with a main objective to build capacity for identifying, understanding, predicting and responding to diverse environmental changes throughout the Arctic. INTERACT is offering access to more than 50 research stations through the Transnational Access Program.

Project Funding

INTERACT 2: EU Horizon 2020 (GA 730938)

Project period: 2016-2021

Total funding 10 million EUR

INTERACT 3: EU Horizon 2020 (GA 871120)

Project period: 2020-2023

Total funding 10 million EUR

Project Partners

• <https://eu-interact.org/partners/>

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Associate Professor Margareta Johansson



Associate Professor Margareta Johansson is based at Lund University in Sweden. Margareta's main research interest is the impacts of climate change in the Arctic focusing on permafrost. She has been involved in many Arctic impact assessments. Margareta is the Coordinator of INTERACT (eu-interact.org). She has a great interest in outreach.



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