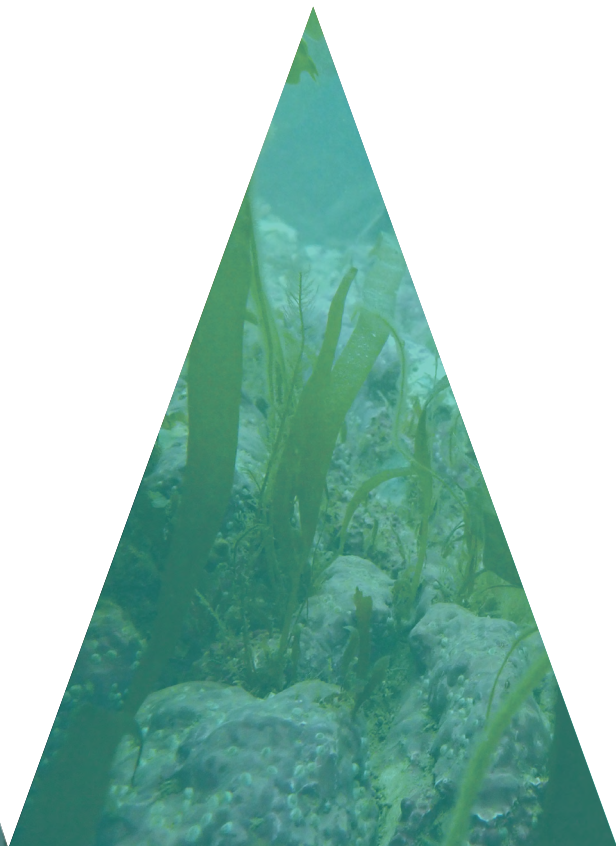
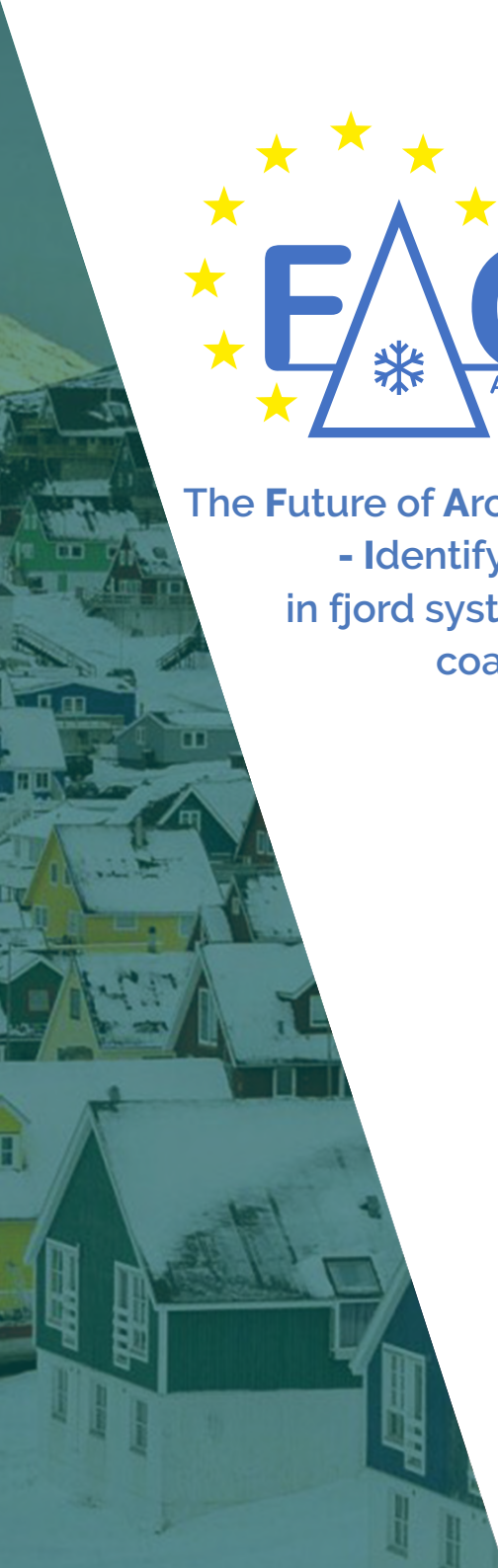




**The Future of Arctic Coastal Ecosystems**  
**- Identifying Transitions**  
**in fjord systems and adjacent**  
**coastal areas**





*Video: The changing Arctic fjord systems*



FACE-IT is funded by the European Union's Horizon 2020 research and innovation programme under the call: H2020-LC-CLA-2018-2019-2020 (Building a low-carbon, climate resilient future: climate action in support of the Paris Agreement), Grant number: 869154

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# MANAGING CLIMATE CHANGE EFFECTS IN ARCTIC SOCIAL-ECOLOGICAL FJORD SYSTEMS



**PROF DR KAI BISCHOF**

University of Bremen, Germany  
Scientific Coordinator of FACE-IT

We are witnessing alarming transitions in Arctic fjord systems. Glacier fronts are retreating, marine species are shifting their distribution and unique cultural heritage of indigenous people of the Arctic is at stake to vanish. Despite these depressing observations we must not hide in fatalism but capitalise our efforts to counter-act the trend of warming, pollution, habitat loss and degrading livelihoods. This certainly represents a task for the Global Society. To become meaningful in the management and protection of Arctic fjord ecosystems, scientific research relies on vivid interaction with local stakeholders. It needs to integrate local knowledge to be able to ask the relevant questions, which are significant to safeguard local livelihoods.

In this brochure we are introducing the approach of and efforts by the European research project FACE-IT to contribute to the sustainable management of Arctic fjord systems. We hope you will find this brochure insightful to better understand how science and society need to act together to promote ecosystem conservation. Despite the project's research focus on the high North we have to admit that most of the causes for putting Arctic fjord systems at stake originate from industrialised areas in lower latitudes. By realising this, it becomes evident that every single individual all over the world can make a - yet small - contribution towards the protection and conservation of this fascinating and unique ecosystem.

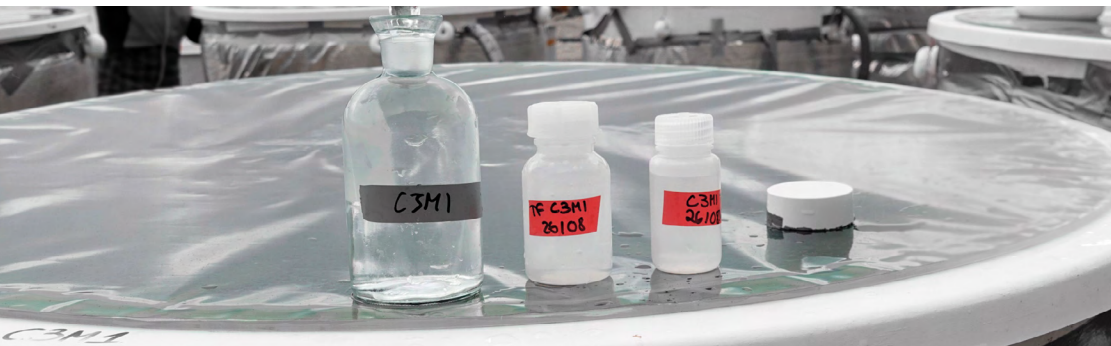


# ABOUT FACE-IT

FACE-IT is an EU-funded research program about managing the consequences of rapid changes in Arctic fjord systems with focus on marine biodiversity and Arctic societies.

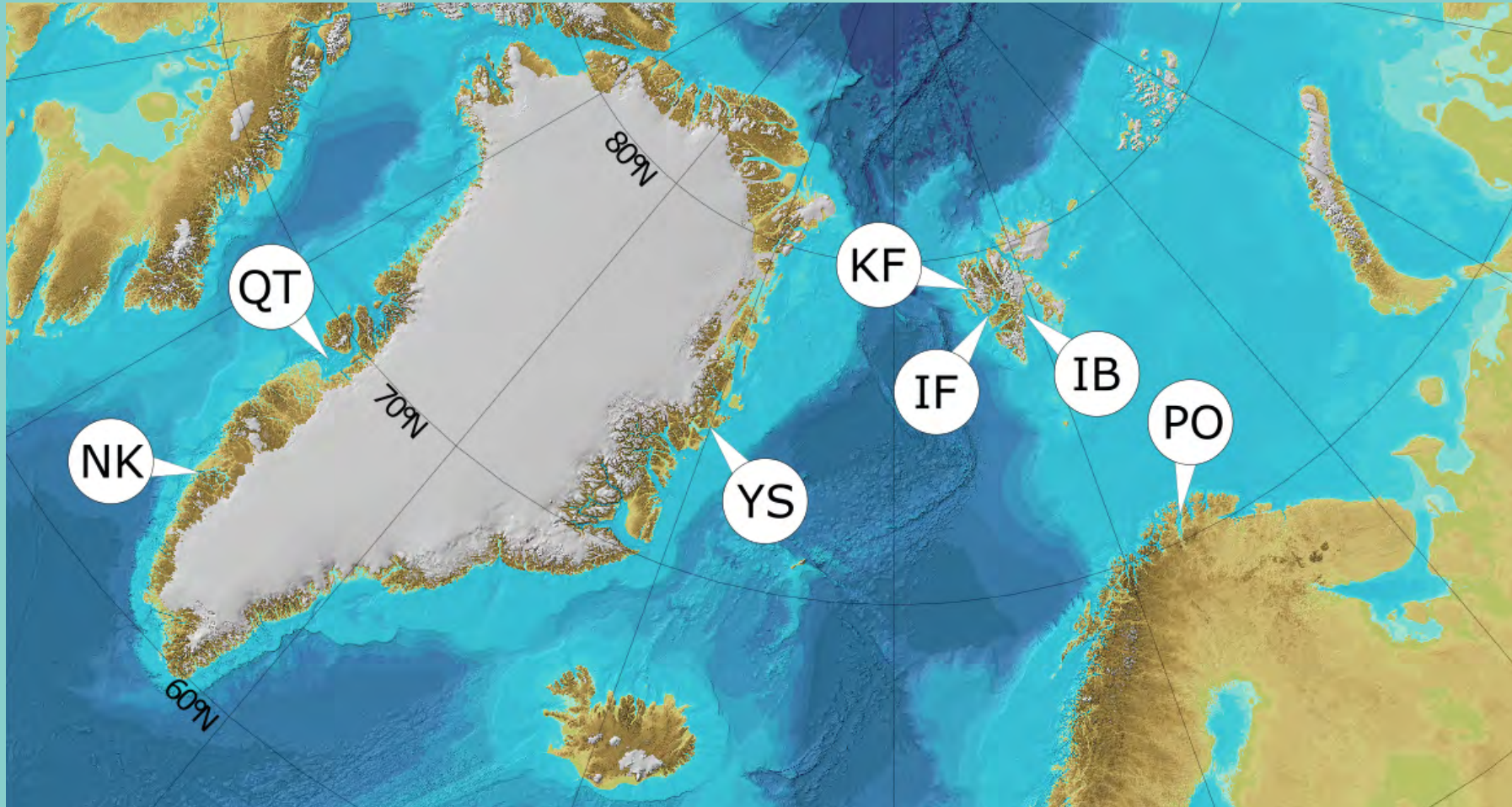
FACE-IT aims to enable adaptive co-management of social-ecological fjord systems in the Arctic in the face of rapid cryosphere and biodiversity changes.

Glacier fronts and sea ice systems are hotspots of biodiversity. Their retreat will pose threats to Arctic coastal ecosystem function and eventually local livelihoods. Together with local communities, we want to understand the relationship between environmental changes and Arctic livelihoods to support management at the local and national levels. Therefore, we compare selected Arctic fjord systems at different stages of cryosphere loss in Greenland, Svalbard and Finnmark, Northern Norway.



# WHERE DO WE WORK?

Modified from: Jakobsson et al. (2012) The International Bathymetric Chart of the Arctic Ocean (IBCAO) Version 3.0. doi: 10.1029/2012GL052219



**The study sites of FACE-IT. Greenland:** Nuup Kangerlua (NK), Qeqertarsuup tunua (QT), Young Sound (YS).

**Svalbard:** Kongsfjorden (KF), Isfjorden (IF), Inglefieldebukta (IB).  
**Norway:** Porsångguvuotna/Porsangerfjord (PO), Finnmark.



## OBJECTIVES

1. Identify and quantify **key drivers of biodiversity changes** and their past and future trends.
2. Identify **cascading effects** of a changing biodiversity associated with ongoing and projected changes in **Arctic coastal food webs**.
3. Assess the interdependencies between environmental changes and **Arctic coastal livelihoods**.
4. Support **adaptive co-management** at the local and national levels.

## APPROACHES

1. Comparison of fjords and adjacent coastal areas under **different degrees of cryosphere loss**.
2. Integration of existing data through **experimental research and modelling**.
3. Emphasis on **coproduction of knowledge** to develop and propose adaptive co-management strategies that can safeguard local coastal livelihoods in times of rapid change.

# INSTITUTIONS

## COORDINATING PARTNER



## NON EU-FUNDED PARTNERS



## EU-FUNDED PARTNERS



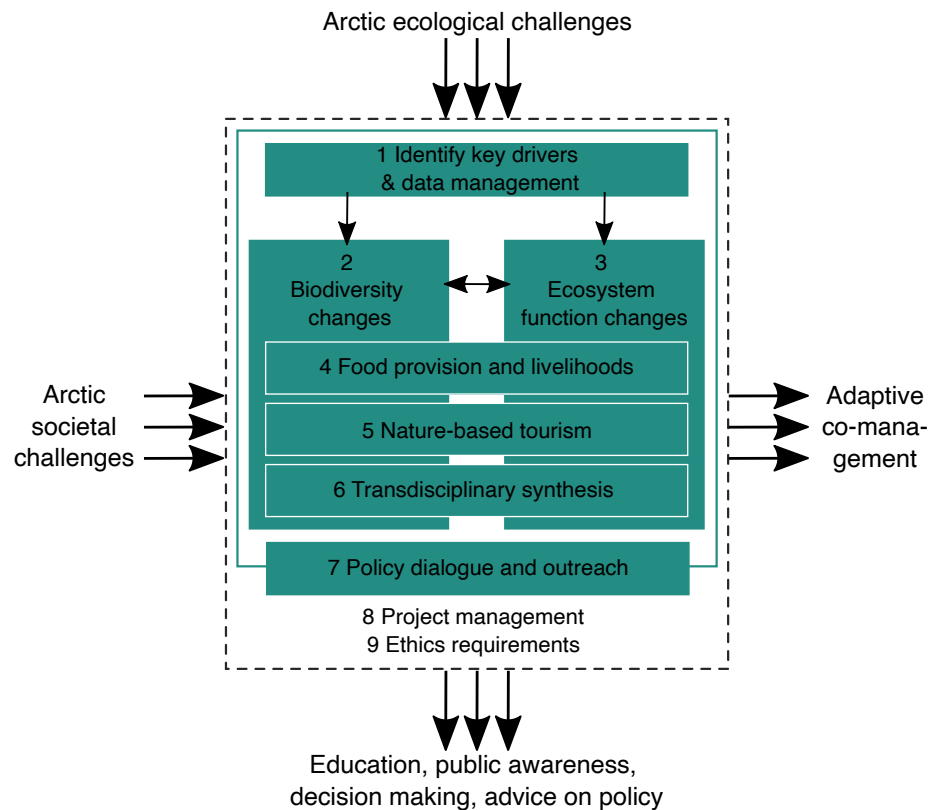
CHECK OUT THE  
FACE-IT TEAM



PARTNER PROJECTS RESEARCHING ARCTIC  
BIODIVERSITY AND ICE LOSS



# RESEARCH AREAS

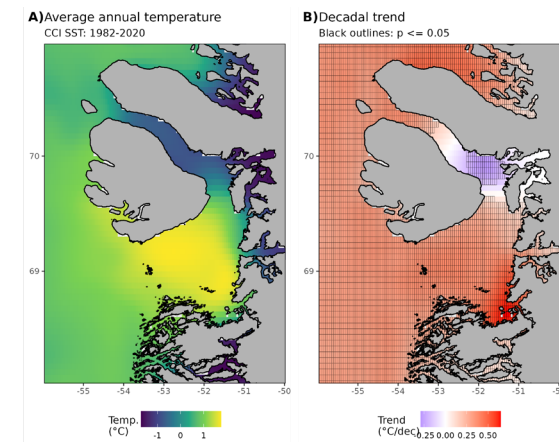


## 1. IDENTIFY KEY DRIVERS AND DATA MANAGEMENT

The key environmental and human-induced drivers of changing coastal marine biodiversity in the FACE-IT study sites will be identified and analysed. Current monitoring activities were continued and expanded and historical data will be compiled.

The following potential drivers of change have been already identified but others will likely emerge from stakeholder interviews and scenario workshops:

- Ice conditions (glacier retreat, extent and thickness of coastal sea ice, snow cover, permafrost)
- Physics and chemistry of seawater (temperature, salinity, light availability, nutrients, carbonate chemistry)
- Biological and ecological drivers (invasive species, primary production, carbon burial)
- Anthropogenic drivers (tourism, pollution, harvesting, policy)





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## 2. BIODIVERSITY CHANGES

The identified key drivers of change will be linked to biodiversity changes at different timescales to explore the phenomenon of bio-realisation in a comprehensive and quantitative manner, as well as the influence of increasing/changing human activities in the fjord systems. We assess the past, present and potential future state of biodiversity in Arctic fjords by integrating key components along the foodweb from microorganisms up to top- and mesopredators, including cryptic diversity (e.g. in algae).

These assessments will be used to project population abundances of key marine species and species of high relevance to coastal local coastal livelihoods, food provisioning and nature-based tourism (e.g. fish, crustaceans, seabirds, marine mammals).



## 3. ECOSYSTEM FUNCTION CHANGES

Two fundamental components of the marine ecosystem, carbon fixation and primary production, will be analysed towards their variability in time and space with the help of the identified key drivers and the observed changes in biodiversity. Based on modelling analyses of historical data sets, new monitoring data and experimental data, we will explore future changes in food-webs and their propagation to higher trophic levels.



These results will provide the basis for investigating how climate change may affect food provision of indigenous, local and distant communities and these may adapt to the projected changes.

## 4. FOOD PROVISION AND LIVELIHOODS

Commercial and also traditional activities such as hunting and gathering, trapping, fishing and arts and crafts and are important for providing households with food, income, and a connection with culture and the environment. Small scale business development and entrepreneurship play an important role in community wellbeing, especially for women and young families.



This part of FACE-IT will co-develop interactive scenarios with local stakeholders projecting changing coastal biodiversity of relevance for future high Arctic fisheries (Svalbard) and coastal livelihoods in West Greenland and Finnmark (Norway), based on a set of locally grounded narratives of potential futures. These scenarios provide the basis for recommendations on how knowledge coproduction and adaptive co-management of coastal resources for sustainable livelihoods can be improved.

## 5. NATURE-BASED TOURISM

Increased tourism activities in the coastal zone interlink with changes in biodiversity and ecosystem functioning. Similar to the research on food provision and livelihoods, interactive scenarios will be co-developed with local stakeholders for future tourism in Svalbard and West Greenland based on a set of locally grounded narratives of potential futures. The scenarios will also be used for assessing the potential for adaptive co-management of nature-based and marine tourism destinations, considering the relationship between tourism and climate change, and between threatened wildlife populations and explorer tourism.

Ultimately, this part of FACE-IT will co-develop new adaptation and management strategies with and for the operators and regulators of the tourism industry.



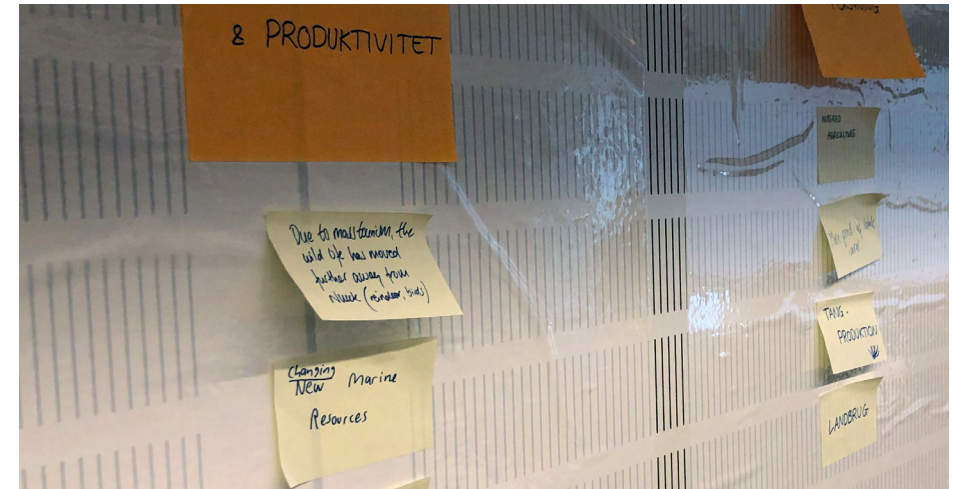
## 6. TRANSDISCIPLINARY SYNTHESIS

Viewing fjords as local social-ecological systems nested in larger-scale social and environmental processes, emphasises that long-term sustainability requires an adaptive co-management approach that recognises a diversity of perspectives and interests, including gender.

Scenario workshops will specifically analyse the implications of different management options, including their links to the national policy contexts, with a focus on ensuring that food production and tourism in Arctic fjord systems are sustainable in socio-economic and environmental terms. Together with FACE-IT researchers, local, regional and national decision-makers will identify management options that are robust under rapid change and uncertainty. Ultimately, the transdisciplinary synthesis will facilitate the development of an adaptive co-management framework.



## 7. POLICY DIALOGUE AND OUTREACH



The links to international governance, including policy development in the EU, will be explored with a policy dialogue. This process builds on co-production of knowledge involving relevant and gender balanced local and Indigenous knowledge holders, management and government agencies, and policy makers across governance levels. This dialogue facilitates the transdisciplinary synthesis across all other parts of FACE-IT and the long-term systems thinking that is essential for adaptive co-management and for developing salient, legitimate and relevant policies and management practices for adaptation in fisheries and the tourism industry.

Other means of FACE-IT outreach are scientific publications, media and popular science outreach, as well as our website and social media channels.

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# FROM SCIENCE TO ADAPTIVE CO-MANAGEMENT

The European Union does not have formal jurisdiction over the entire Arctic region, but it nevertheless has opportunities to implement policy with broader impacts and to set trends. EU's interest in the region has increased in recent years, with a focus on developing relations with Norway, Iceland and Greenland (see the timeline next page). The creation of the Arctic Council in 1996 strengthened cooperations between the Arctic countries. Although the EU does not have an official observer status in this intergovernmental organisation, it is de facto an active contributor.

Traditional EU focus areas in the Arctic include research, fisher-

ies, climate change, and sustainability. The last update of the EU Arctic policy in 2021 emphasises the importance to apply the EU's Green Deal strategy to the Arctic region and, for the first time, sets a strong focus on geopolitics and security issues. More recently, the Russian invasion of Ukraine has led to new political challenges affecting circumpolar cooperations.

The EU has ambitions to become a geopolitical actor in the North, but contradictions can be identified in its goals. Today, there is a clear interest for Arctic natural resources, but also to develop trade relations and strengthen its presence in the region. This may harm EU's long-term goals of pro-

moting the protection of Arctic ecosystems, reducing pollution, and maintaining a peaceful environment.

The plan of the EU to open an office in Nuuk in 2023 illustrates a strong will to foster dialogue with Greenland. Moreover, the inclusion of Indigenous groups in the whole Arctic region is considered a prerequisite to implement effective co-management schemes. Local inhabitants have valuable knowledges about ongoing climate and environmental changes in the fjord systems, but they are also vulnerable to these evolutions. The concept of "prior and informed consent" from local stakeholders also constitutes an

essential step when local environments are impacted by new projects regarding natural resources exploitation or tourism development for example.

The scope of EU policies needs to simultaneously take into account the interactions between different geographical scales whilst also considering long time series that register important evolutions within the Arctic fjord systems. Preliminary findings from FACE-IT highlight strong local variations in the ongoing changes in the North, which can be challenging to address when designing EU policies that have a global impact.

# TIMELINE: THE EU AND THE ARCTIC



- Svalbard / Greenland
- International - Arctic
- European Union (EU)
- Other

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## WHY SHOULD WE CARE AT ALL?



**Dr Simon Jungblut**  
Scientific project manager

The impact of climate change in the Arctic is not just staying in the Arctic. It's effective globally. So far, we have missed the human dimension. We have to acknowledge that Arctic climate change is directly and indirectly to our lives in the lower latitudes. If recommendations of FACE-IT find their way into policies or legislation for better protection of the Arctic fjord ecosystem, this would be a meaningful contribution.



**Prof Dr Kai Bischof**  
Scientific coordinator

We are researching on an ecosystem that's most likely lost in the future or at least will be a significantly different one. If the glaciers are lost also people will have to adapt to the new system of the Arctic. Even though FACE-IT still is a new project, it might already have a big indirect influence on the Arctic and its preservation. The European Commission relies on us to deliver research-based management options and provide solutions on how to deal with the challenges ahead.

## THE EU POLAR CLUSTER

*FACE-IT is a member of the EU Polar Cluster*

The cluster is a collaboration of Arctic and Antarctic projects that are funded by the European Commission. The Cluster merges a broad spectrum of research and coordination activities – ranging from the most up-to-date findings on permafrost and sea ice, from enhancing observation to improving predictions, and from networking research stations to coordinating access to icebreakers. The vision of the cluster is to form a strong, well-connected ecosystem of European Polar projects and organisations that operate together to substantially increase their combined impact and legacy.



*Homepage: [EU Polar Cluster](#)*

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# SUPPORTING LOCAL COMMUNITIES TO MAKE THE DIFFERENCE



## *Anna G. Sveinsdottir - a portrait*

Picture this: you're sitting on an inflatable boat as the ice-cold Arctic wind brings tears to your eyes. Still, you cannot keep your eyes from the breath-taking view in front of you: monumental glaciers, white giants, that tower before you. The waves softly rock the boat back and forth as you make your way across the water. You feel tiny, like an ant crawling in between big rocks. The view literally takes your breath away as you marvel at nature's beauty. Just in that moment, a sunray peeks out behind the clouds, bathing the scenery in a glittering shimmer. You know you will remember this moment for the rest of your life.

Anna G. Sveinsdottir knows this moment all too well. Perhaps it is precisely this existential feeling that has triggered her passionate urge to explore. As a researcher who wants to know how this fragile nature, which is literally melting away, can be preserved. Who wants to know how climate change can be managed, if not stopped, at least in such a way that the Arctic ecosystem as a whole is not destroyed and thus keeps the climate in balance in the rest of the world.

Anna is a Senior Researcher at the Nordland Research Institute with a focus on environment and sustainable development. She is also part of FACE-IT.

## *Nature becomes the product*

One of the aspects Anna and her colleagues research about is nature-based tourism: Arctic expeditions around glaciers in West Greenland and in Svalbard have become extremely popular in recent years. Tourists get the opportunity to fully immerse themselves in nature and wilderness – no phone, no air pollution, no overcrowded places.

"It's not about mass consumption of sights or culinary specialties," Anna explains. "People really want to experience the wilderness - they want to see animals, ride snowmobiles or go dog sledding. It's tourism where the products are the environment and nature. And that's not a bad thing per se."

She and her colleagues investigate the impact of tourism on the Arctic ecosystems so that policymakers have scientific information to make informed management deci-

sions. The idea of adaptive co-management is a trans-disciplinary approach which includes a scientific-knowledge basis while taking into account the needs and aspirations of the local community. This approach tries to fill the gap between scientific research and effective policy making regarding environmental protection.

"We don't all need to be like Greta Thunberg. You can create a community of care with your friends and family. I think part of the problem is that we are so individualistic - returning to acting within our communities can be a first step."

Anna Sveinsdóttir has already found her community, her fellow researchers with whom she contributes her part in tackling a fundamental global challenge, the melting of the Arctic glaciers.

*Jennifer Oroilidis*

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# CLIMATE COMMUNICATION

## *Bremen media students meet polar scientists*

Can the Arctic still be saved? For more than two years, the EU research project FACE-IT, led by marine biologists from the University of Bremen, has been exploring this question. What exactly are the researchers investigating? And what solutions are they arriving at? In the winter semester 2022/23, around 20 media students from Bremen were able to find out directly from the source and develop a comprehensive FACE-IT media package from interviews, photos and research videos.

The annual FACE-IT project meeting was held in Bremen at the end of November in the Haus der Wissenschaft (house of science), for the first time in person after two pandemic years. For the international students in the English-language Digital Media and Society master's programme the meeting offered an ideal opportunity to listen to lectures, meet researchers and conduct interviews. Later, the students viewed hundreds of photos and videos that had already been made by the polar researchers. Fascinating images from the Arctic, which the media students combined with their interviews to create several short videos, five articles and a complete social media toolbox.



*Pablo Vila*



*Pablo de la Serna*



*Ignacio Blanco*

As an additional contribution, three Erasmus students from Spain also created this brochure using the project's existing brand identity. "The theoretical concept for our work is based on constructive journalism, which in times of often alarmist crisis reporting focuses on solutions and actors looking for solutions," explains seminar leader Christoph Sodemann. "It was all a lot of effort," says a course participant from Mexico, "but for us it was great that we had direct contact with the scientists and could produce something that is now actually being used by FACE-IT."







@FACEITArctic



@FACEITArctic



@face\_it\_arctic



The FACE-IT-Project

**Follow the #FACEITProject on Social Media  
and sign up to our newsletter!**

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