Preface

Arctic Frontiers 2020 is now part of the rich history of Arctic Frontiers conferences. Our 14th edition was aptly titled “The Power of Knowledge” and set out to examine climate change and the oceans in the Arctic, asked tough questions about resilience and the adaptability of Arctic communities and provided a space to discuss best practices for business, technology and policy development. With knowledge – our most valuable resource – at the center of every session and event at Arctic Frontiers 2020 we were able to dig deep and explore the ways we cooperate to ensure both political stability and sustainability in the North.

These conference proceedings summarize the Arctic Frontiers 2020 policy and science plenary sessions and highlight the themes covered in a multitude of side events. We have provided you with a handy reminder of our panelists, memorable quotes and outstanding questions that we will need to be address in future Arctic Frontiers conferences. We encourage you to use this as a guide to the full conference proceedings which can be viewed on the Arctic Frontiers YouTube channel.

And, of course, we look forward to seeing you next year 1-4 February for Arctic Frontiers 2021.

Patti Bruns, Alexey Pavlov and Ole Øvretveit
Conference Summary Authors
Welcome from the Director of Arctic Frontiers

Friends of the Arctic,

Greetings from Tromsø and welcome to our conference summary for Arctic Frontiers 2020 – The Power of Knowledge. This was my eighth and final year as Arctic Frontiers Director and I am incredibly pleased with the level of engagement and enthusiasm from all our participants.

Arctic Frontiers has long been the preeminent place for policy makers, scientists, youth representatives, indigenous peoples and Arctic businesses to meet and engage over the topics that are nearest to our hearts, minds and bottom lines. This year, we sought out to explore the vast depth and breadth of our most valuable resource in the Arctic – the power of knowledge – highlighting the importance of facts in a time when experts are being challenged and levels of distrust are rising.

The dichotomy of increasing access to knowledge and science is erupting right alongside the age of “tweetocracy” where we actively see the undermining of science and facts to score in the poles and in social media. And while it is important to acknowledge different views – a key tenant of democracy – the purposeful creation of distrust has no place in fruitful discussions. The Arctic remains a peaceful part of the world and it is only through the application of the various knowledge systems that its stability can continue.

Investment in soft diplomacy and trust-based mechanisms have served the Arctic well for over three decades, but the challenges of climate change and increased outside interest have thrown up a number of paradoxes that threaten the ability of the region to lead its own development. Tradition versus modernity, urban versus rural, connected versus disconnected, protection versus development.

Addressing these paradoxes will require the use of multiple knowledge systems, and as Aili Keskitalo (President of the Sámi Parliament of Norway) eloquently stated, indigenous knowledge or “inherited knowledge” offers a practical approach of tying the past, present and future together. The voices of our youngest members of society must also be heard and acknowledged, and as Markus Haraldsvik (Troms Youth Council) noted, Arctic decision makers need to view investments into high quality education as key to the retention of young people connected to the sustainable development of the region they call home.

This year Arctic Frontiers welcomed a host of high-level speakers, with 2500 participants from 35 countries. Ranging in age from kindergarten to distinguished emeritus’ in over 70 panels and side events. Without them, and our dedicated partners, we would not be able to gather each year to have fruitful discussions, gain new insights and make new Arctic friends.

Finally, a heartfelt thank you to my family at Arctic Frontiers for making my time with you one that I will cherish forever. See you at Arctic Frontiers 2021.

Ole Øvretveit
Director, Arctic Frontiers (2013-2020)
Plenary session 1 - The State of the Arctic. From left to right: Mat Collins, Joint Met Office Chair in Climate Change, College of Engineering, Mathematics and Physical Sciences, University of Exeter; Ine Eriksen Søreide, Minister of Foreign Affairs, Norway; Stephen Sackur, Moderator; Ville Skinnari, Minister for Development Cooperation and Foreign Trade, Finland; Bobo Lo, International relations analyst; Mike Shoga, Director, Wilson Center’s Global Risk and Resilience Program and Polar Institute.

Photo: Alberto Grohovaz/Arctic Frontiers 2020.
Plenary Session 1 – The State of the Arctic

SPEAKERS: Ine Eriksen Søreide, Minister of Foreign Affairs, Norway; Ville Skinnari, Minister for Development Cooperation and Foreign Trade, Finland; Mat Collins, Joint Met Office Chair in Climate Change, College of Engineering, Mathematics and Physical Sciences, University of Exeter, Bobo Lo, International relations analyst

In preparing for this session our speakers and panelists were given the following text and set of questions to shape their remarks and presentations:

Arctic relations have been characterized by shared interests and a commitment to governing the region peacefully and jointly across borders. International institutions – the Arctic Council and many others – have been central in maintaining this and have enhanced our understanding of the Arctic. Is the situation changing? What is the current state of international cooperation in the Arctic? Do Arctic governments act on the knowledge for the doubling and this will continue as permafrost melts. “The Arctic is melting twice as fast as the global average and this is entirely attributable to human activity. Polar amplification is responsible for the doubling and this will continue as permafrost thaw releases sinks of carbon and methane into the atmosphere. Action must be taken to keep warming to 1.5 degrees.

Moderator Stephen Sackur (BBC HARDtalk) welcomed speakers, panelists and participants to Arctic Frontiers 2020 – The Power of Knowledge. The first speaker to take the stage was Ine Eriksen Søreide, Norway’s Minister of Foreign Affairs, who underlined that the peace and stability characteristic of the Arctic region is no coincidence but rather the outcome of “hard and difficult and sustainable political choices.” Current national law and international mechanisms already in place address questions of ownership and sustainable management of resources in the region, negating any need for new foreign and security policies. The Arctic Council has been the primary arena for addressing circumpolar issues for more than 20 years and it continues to provide a viable platform to discuss otherwise difficult topics. For Norway, the Arctic is not a remote place, but place where people live and need to thrive. Minister Søreide concluded her remarks by noting, “We will continue to utilize ocean resources. And we will continue to strike a balance between protection and production.” Ville Skinnari, Finland’s Minister for Development Cooperation and Foreign Trade took the podium to deliver four key messages centered around the need for greater collaboration now and in the future to meet the challenges faces the Arctic. The global importance of the Arctic is growing, and the Arctic Council is at the core of ensuring continued cooperation. However, it is no longer viable to work in silos and increased attention should be paid to working with the EU and the global community. Economic prosperity and protecting the Arctic environment are not at odds, evidence of sustainable development exists and will continue to be part of the narrative. Finally, education and know-how are necessary to meet the future needs of the Arctic.

Arctic States don’t necessarily agree on all issues, for example climate change, but current mechanisms are viable and sufficient to keep working on common ground. Mike Sfraga responded first to questions by noting, “The emerging Arctic has emerged” and now the Arctic Treaty. “Do nothing”, Bobo Lo concluded, “and we risk sleep-walking into conflict.”

For the panel discussion, Mike Sfraga, joined the speakers on the Arctic Frontiers stage. This year, we also welcomed “Brief Outlooks” from two Arctic Emerging Leaders, Kim Mathieu (Canada) and Solfrid Henriksen (Norway) who each provided short interventions on the importance of deep and meaningful youth engagement. Stephen Sackur moderated a lively discussion with the panel that focused largely on the emerging role that the Arctic plays geo-politically. Mike Sfraga responded first to questions by noting that “the emerging Arctic has emerged” and now Arctic States have to come to terms with the roles that are being played. Contrary to what was suggested by Bobo Lo, this does not require the creation of new mechanisms, but rather greater efforts to strengthen the ones that already exist. Minister Søreide strongly agreed with this position and noted that there is nothing to suggest that peaceful cooperation in the Arctic will not continue.

Mat Collins participated as a Contributing Lead Author to that report and shared some main conclusions, including a take-home message for the audience, “The more we warm, the more we melt.” The Arctic is melting twice as fast as the global average and this is entirely attributable to human activity. Polar amplification is responsible for the doubling and this will continue as permafrost thaw releases sinks of carbon and methane into the atmosphere. Action must be taken to keep warming to 1.5 degrees.

The final speaker to take the podium in the first session was International relations analyst Bobo Lo, who challenged the concept that the Arctic will remain a region of peace and security. Climate change fuels the geo-politization of the Arctic bringing into sharp focus deteriorating relations between some Arctic and non-Arctic states. The status quo of soft diplomacy and reliance on existing mechanisms is no longer sufficient to deal with the increasing global profile of the Arctic, and he suggested that work begin on a legally binding Arctic Treaty. “Do nothing”, Bobo Lo concluded, “and we risk sleep-walking into conflict.”

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Stepen Sackur moderated a lively discussion with the panel that focused largely on the emerging role that the Arctic plays geo-politically. Mike Sfraga responded first to questions by noting that “the emerging Arctic has emerged” and now Arctic States have to come to terms with the roles that are being played. Contrary to what was suggested by Bobo Lo, this does not require the creation of new mechanisms, but rather greater efforts to strengthen the ones that already exist. Minister Søreide strongly agreed with this position and noted that there is nothing to suggest that peaceful cooperation in the Arctic will not continue. Arctic States don’t necessarily agree on all issues, for example climate change, but current mechanisms are viable and sufficient to keep working on common ground. Bobo Lo advocated for a brave approach and need for radical change encouraging leaders to move the Arctic into the global sphere and not just “tinker at the edges.”

To watch the full proceedings of the Plenary Session 1 – The State of the Arctic, please visit the Arctic Frontiers YouTube channel.
Plenary Session 2 – Powered by Knowledge

SPEAKERS: Matilda Ernkrans, Minister of Higher Education and Research, Sweden. Geir Håøy, President and Chief Executive Officer, KONGSBERG.

PANELISTS: Outi Snellman, Vice-President, Organization, University of the Arctic and Director of International Relations, University of Lapland, Rovaniemi, Finland. Dorte Dahl-Jensen, Niels Bohr Institute, University of Copenhagen. Anita Parlow, Principal, A.L Parlow and Associates, LLC.

In preparing for this session our speakers and panelists were given the following text and set of questions to shape their remarks and presentations:

Sustainable development in the Arctic requires extensive knowledge and understanding of the region. How can science and technology advance the green transition and sustainable development of the region? What role does science play in economic development? How do we ensure co-production of knowledge, and inclusion of indigenous and local knowledge into decision-making processes? Interest in the Arctic is growing, and with it the research activity and output. Are these research activities fit-for-purpose? Do they provide the policy community with input relevant and adequate for decision-making?

Arctic Frontiers Moderator Stephen Sackur introduced the session Powered by Knowledge as an opportunity to discuss ways in which the Arctic can stay true to the idea of putting knowledge front and center to its future.

The first speaker to address the topic was Matilda Ernkrans, Sweden’s Minister for Higher Education and Research, who focused her remarks around the central tenant that knowledge, research and innovation go beyond new technologies and societal approaches, but rather are the cornerstone that knowledge brings together science and indigenous knowledge. Dorothe Dahl-Jensen, a self-confessed Arctic veteran picked up on this last theme by stating that, “indigenous knowledge is more important than ever.” The climate crisis necessitates now more than ever the need for meaningful communication and collaboration between scientists and northern communities to really make a difference in the Arctic. Taking it one step further, there needs to be a shift in current norms by putting communities in the lead for driving research and that data should be owned by the communities. Anita Parlow supported this approach noting that “indigenous voices are getting louder, more powerful and more profound.” These voices should not be included as afterthoughts, but rather as an integral part of knowledge creation.

This will be reflected in the new Arctic strategy that Sweden will be presenting to Parliament this autumn.

The second speaker for this session was Geir Håøy, President and CEO of KONGSBERG who brought to the forefront the decisive and important role that technology will play in ensuring sustainable development in the Arctic. For example, KONGSBERG has built K-Lander, a modular seabed observatory that is sensor-loaded to suit the needs of a variety of sectors, including environmental monitoring. The opportunities that lie in collecting, sharing and securing data is huge and it is high time that we start looking at data as a common resource.

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Business has a central role to play in sustainable development, but in order to do so, there needs to be a more tangible understanding of the contribution of the private sector in the process.

This session welcomed three panelists who provided some thoughts before the discussion. Outi Snellman, a self-confessed Arctic veteran and optimist has seen three main trends in higher education develop over the last thirty years – greater interdisciplinarity to address the unique challenges facing the Arctic, a concerted push for open collaboration, science, data and knowledge, and recognition of the need for co-production of knowledge will help to ensure the necessary push away from fossil fuels does not produce negative effects on sustainable development locally in the long run. Technology and cross-sector cooperation, including indigenous peoples, is critical to improve the existing knowledge and technological means to encourage sustainable development in the Arctic region.

To watch the full proceedings of the Plenary Session 2 – Powered by Knowledge, please visit the Arctic Frontiers YouTube channel.

“We have a chance here in the Arctic to actually try to create something that the rest of the world can lean on and learn from.”

Matilda Ernkrans, Minister of Higher Education and Research, Sweden.
Plenary Session 3 – Resilient Arctic Communities – Part 1


PANELISTS: Magdalena Andersson, Governor of Västerbotten and Chair, Barents Regional Council. Shirley Tagalik, Aqqumivik Society. Joel Clement, Arctic Initiative Senior Fellow, Harvard Kennedy School’s Belfer Center for Science and International Affairs.

In preparing for this session our speakers and panelists were given the following text and set of questions to shape their remarks and presentations:

Arctic communities are facing challenges posed by economic development, demographic change and a new climate. Are Arctic communities prepared for these changes and how can they adapt? How can new knowledge and communication technologies shape the future? And what are the benefits of combining scientific, local and indigenous knowledge to develop options to mitigate climate change risks and enhance resilience? How can new workplaces become more competitive and attractive?

The third plenary session of Arctic Frontiers 2020, Resilient Arctic Communities was split into two parts to allow for a range of speakers and ample time for discussion. Part 1 began with Aileen Campbell, Scottish Cabinet Secretary for Communities and Local Government, who noted that Scotland and the Arctic share many things including remote, rural and resilient communities. Scotland’s first Arctic policy framework, Arctic Connections, puts communities at the heart of the dialogue by celebrating common interests while enhancing opportunities for regional cooperation aiming to improve the resilience of communities. Since 2008, Scotland’s Climate Challenge fund has launched 1,150 projects empowering 32 local authorities to drive their own solutions to reducing carbon emissions, cut waste, grow local foods and lower energy.

Next on the Arctic Frontiers stage was Mikhail Pogodaev, Vice-minister for Arctic Development and Indigenous Peoples’ Issues in the Sakha Republic. Mikhail painted a vivid picture of the Sakha as the Arctic’s “fourth pole” with extreme climate, enormous distances, vast natural resources, five indigenous peoples and fragile Arctic environment. Indigenous knowledge is what has allowed people to live in the Sakha. As Mikhail stated, “Communities have been resilience despite government interference, not because of it.” “The people of the region are keen to improve their quality of life, but this means they must face the challenge of balancing economic development of natural resources, mainly minerals, and the conservation of nature and indigenous peoples’ rights and livelihoods. This includes the preservation of indigenous peoples’ languages and knowledge. Cooperation and the use of best available technologies obtained from science and indigenous knowledge would provide a comprehensive understanding towards addressing the challenges of real sustainable development.

Moderator Stephen Sackur invited three additional experts to join the discussion. Shirley Tagalik spoke of the importance of revitalizing indigenous peoples’ rights, language and culture to foster resilience in challenging times. Central to the Inuit concept of knowledge is the ability to take something and use it to improve the lives of people around you. Intrinsic in this concept is adaptability and resilience. Knowledge transfer from elders to youth is crucial so that future generations can move forward. Magdalena Andersson echoed this idea from a municipality’s perspective, that in order to thrive young women must be empowered to settle within communities by offering the necessary support and opportunities for success. Joel Clement added that while local empowerment is key for pursuing resilience, it requires that governments “take off the handcuffs that restrain resilience” including allocation of funds to facilitate the means for implementing actions according to the specific needs of the community. Autonomy and empowerment, especially for women and youth, coupled with necessary funding will go a long way to enhancing the resilience and adaptability necessary to face the rapid changes currently taking place in the Arctic.

To watch the full proceedings of the Plenary Session 3 – Resilience Arctic Communities (Part 1), please visit the Arctic Frontiers YouTube channel.

“Experts are the people who live there.”

— Aileen Campbell, Cabinet Secretary for Communities and Local Government, Scottish Government.

Photo: Terje Mortensen/Arctic Frontiers 2020
In preparing for this session our speakers and panelists were given the following text and set of questions to shape their remarks and presentations:

Arctic communities are facing challenges posed by economic development, demographic change and a new climate. Are Arctic communities prepared for these changes and how can they adapt? How can new knowledge and communication technologies shape the future? And what are the benefits of combining scientific, local and indigenous knowledge to develop options to mitigate climate change risks and enhance resilience?

A pan arctic trend is a shrinking and aging population. How can Arctic communities and workplaces become more competitive and attractive?

Peter Schweitzer opened Part 2 of the Resilient Arctic Communities session to discuss the importance of planning, construction and transportation in fostering resilience in Arctic communities. In a changing and more open Arctic, indigenous peoples and communities need to be involved in all stages of infrastructure projects. Implementing the precautionary principle, and up-front inclusion of indigenous knowledge, is crucial for informed decision making of the potential adverse effects of project on local communities.

Moderator Stephen Sackur welcomed three panelists to the stage and challenged them to address whether investment decisions in the Arctic are outpacing the knowledge, and resilience communities need to deal with increased activity in sectors like tourism, fisheries and oil and gas. Marianne Sivertsen Naess, Mayor of Hammerfest, spoke about Snøhvit (an offshore Equinor LNG installation) as an example of how investment can be done right by a community. A comprehensive strategy was put in place by the municipality to recruit people and keep people in Hammerfest. This has resulted in a huge improvement in the economy thanks to cooperation between local, regional and national authorities, as well as employer organizations and support of the people of the region.

Turning to Norway’s fishing industry, Ørjan Nergaard noted that unlike other “new” industries that historical knowledge lies with the fishermen doing the job and making the money for the owners who may or may not be in the North. New technology and more skilled workers are needed to increase profit margins. Teaching children the importance of fishing along coastal communities is imperative to the survival and continued resilience of northern coastal communities.

Abbie Tingstad added that while it is true that historically Arctic communities have dealt with vulnerabilities, including climate change, but there is a need to keep in check vulnerabilities associated with economic development, which can ultimately threaten resilience. Emergencies from cruise ships and oil and gas installations will put communities in the position of first responders, and in many cases the infrastructure is not in place for them to do so. Current infrastructure in the Arctic needs to be reviewed and future investing should meet and anticipate new challenges.

To watch the full proceedings of the Plenary Session 3 – Resilient Arctic Communities (Part 2), please visit the Arctic Frontiers YouTube channel.
Plenary Session 4 – Sustainable Arctic Ocean

SPEAKERS: Jens Frølich Holte, State Secretary, Ministry of Foreign Affairs, Norway, Manuel Barange, Director of Fisheries and Aquaculture Policy, United Nations, Speak for the Ocean, Sissel Rogne, Director of Fisheries, U.S. State Department, Evan T Bloom, Acting Deputy Assistant Secretary for State for Oceans and Fisheries, U.S. State Department, Sissel Rogne, Director, Institute of Marine Research, Norway

In preparing for this session our speakers and panelists were given the following text and set of questions to shape their remarks and presentations:

The Arctic Ocean and the seas surrounding it are changing. As the sea ice recedes, a new Arctic opens up. This brings challenges and opportunities, such as shifts in the distribution of fish stocks and new shipping routes. The latest IPCC Special Report on the Ocean and Cryosphere in a Changing Climate highlights the urgency of prioritizing timely, ambitious, and coordinated action to address unprecedented and enduring changes in the oceans and cryosphere. How can we ensure the continued value creation from the oceans and at the same time maintain the integrity of marine ecosystems? Do we have the knowledge, regulations, international cooperation, and political will necessary to reconcile use and protection of the Arctic seas?

Arctic Frontiers Moderator Stephan Sackur kicked off day two by introducing the Sustainable Arctic Oceans session as an opportunity to discuss the nexus between ocean economy and the importance of the oceans to the Arctic and globally. Norway has made an effort to be a leader of the discussion, with the Prime Minister launching the High Level Panel on Sustainable Ocean Economy in (SOE) in 2018.

To discuss Norway’s vision on sustainable oceans, Jens Frølich Holte, Norway’s State Secretary, took the stage opening by saying “Norwegians have saltwater in our veins, the ocean is really part of our DNA.” Having a sustainable ocean economy is a key priority and given that 8% of Norway’s seas are north of Arctic circle – Arctic seas are an important as a source of food, energy production, transport, and also, potentially, of minerals.

In recognition of the need to find balance between production and protection of marine living resources the SOE will present a “Roadmap to Sustainable Ocean Economy” at the UN meeting in Lisbon. A roadmap that is, in essence, a to-do list for the ocean. Developing a healthy and sustainable ocean economy will be crucial to achieving many SDGs, such as ending poverty, eradicating hunger, ensuring well-being and combating climate change.

In order to get there, we need sustainable management – and in order to achieve it, we need integrated ocean management that includes the best available science.

Manuel Barange provided important context to the session, noting that for the first time in history we are both uniquely able to predict our future and also aware of the impact of the human species on the planet. This often means that we exaggerate our differences, rather than highlights our common approaches and solutions. In the context of sustainable use of ocean resources, Arctic nations have by and large exploited their resources sustainably and cooperatively.

In the era of climate change two things will have relatively large impact on the Arctic, the first is that species distribution will shift and secondly, species productivity will change, benefiting some while harming others. This will require three societal responses, adaptations to our institutions, adaptation to management and education of consumers. In an era of greater knowledge about our futures, but uneasiness within the political climate skeptical of multilateralism, there needs to be a recommitment to working together to solve global problems.

Hide Sakaguchi, from JAMSTEC noted that Japan is committed to being more vocal in the Arctic, especially concerning science, due to the urgency of climate change. Science has no borders, and it is a tool for open communication and enhancing mutual understand which eventually brings peace and friendship.

“Global problems require multilateral mechanisms and institutions to discuss options and trade-offs. Without them, we will continue to hope to solve problems by pointing fingers and I have not seen any problem being truly solved in that way, no matter how much knowledge we have at our disposal.”

- Manuel Barange, Director of Fisheries and Aquaculture Policy, United Nations, Food and Agriculture Organization of the United Nations
The panel discussion included the addition of four Arctic experts who offered perspectives from Arctic States (the U.S and Norway), UNESCO and Singapore. When asked what that U.S. government’s take on future economic development is, Evan Bloom stated that sustainability, use of a precautionary approach and working in tandem with science is vital for sound ocean policy. The Central Arctic Ocean Fisheries Agreement is an excellent example of this type of international collaboration. Vladimir Ryabinin supported this approach, noting that solutions for global issues like climate change require a wider approach that involves not only governments, but decision makers and the private sector. Regarding climate change, there is a need to shift away from fossil fuel to ensure our long-term longevity since, “the ocean’s capacity to absorb carbon is diminishing.” Sea level rise is a major concern for Singapore, which is why, as Sam Tan explained, Singapore is taking strong regulatory measures to reduce carbon emissions as well as spending $100 billion SGD for infrastructure projects to combat the predicted 1 meter of sea level rise by 2100.

The Brief Outlook for this panel was given by Sofia Farina a student from University of Bologna and a member of the Arctic Student Forum. She noted that the purpose of the Arctic Student Forum is to bring students from around the world to analyze issues that may seem “Arctic” but are global issues. They discuss not only the issues related to climate change – social, political, economic and microbiological consequences of melting sea ice, but also plastics, microplastics, black carbon and pollution. To that end the message from Arctic Student Forum was a plea for “…concrete and unselfish cooperation between the policy-makers of the world. A cooperation, where the primary interest is the wellbeing of the planet and of the people, not of the markets and economies.”

The panel was asked to address this call to action, specifically the idea of protection versus production. Sissel Rogne joined the panel at this point, calling Integrated Ocean Management (IOM) key to addressing the total picture of sustainable oceans. Scientists have given clear advice that “…you cannot do everything at one spot and still claim it is sustainable.” To achieve a viable blue economy, you have to discuss risks and consequences when something fails. IOM dictates that there are areas where the priority must be on the blue biomas, which will ensure that future generations have healthy and clean food. Vladimir Ryabinin added that now is the time to expand the knowledge and science needed to better understand the world’s oceans. “We know around 10% of the composition of ocean ecosystems. We know the surface of Mars better than we know the topography of the ocean.” Every word matters in the title “Ocean Science Decade for Sustainable Development” – sustainable development and science, and a decade is the time we need for it.

To watch the full proceedings of the Plenary Session 4 – Sustainable Arctic Ocean, see the Arctic Frontiers YouTube channel.

**Plenary Session 5 – Future Arctic Business (Part 1)**

**SPEAKERS:** Heidar Gudjonsson, Chairman, Arctic Economic Council; Scott A. Buschman, Vice Admiral, United State Coast Guard; Geir Seljsesteh, Head of Europe Office, Industri Energi

**ANELIST:** Wenche Granbakk, Head of Sustainable Development, Cermaq Group; Annika Olsen, Mayor, Torshavn, Faroe Islands

**In preparing for this session our speakers and panelists were given the following text and set of questions to shape their remarks and presentations:**

The Arctic contains resources that may provide a growing global population with energy, minerals, proteins and medicines. What are the main business and industry opportunities in the Arctic today? Are the national and international management regimes adequate for industries? New technologies and cross-sector partnerships could lead to significant and sustainable growth. Who will invest in the growth? And how can business development be achieved without adverse impacts on the climate and environment?

Heidar Gudjonsson took to the Arctic Frontiers stage to highlight that transport is the foundation of business. The opening of the Arctic has created new pressures on transportation, for example in wintertime necessitating huge investments. This rubs up against the need to sustain traditional cultures. Sustainable Arctic development is the only way to connect the region with the rest of the world. Diversification of traditional industries, for example fisheries in Iceland, provide exciting opportunities for the future.

**Vice-Admiral Scott Buschman** spoke to the relevance of Coast Guards in the role of marine transportation in the Arctic from both an operations and governance perspective. Coast Guards are often on the front lines of stewardship which at its core respects local and traditional cultures. The U.S. will be increasing their ice-breaking fleet by six new icebreakers, which will serve in prevention and response operations, but also for use by scientists. Cooperation in both marine environmental response and search and rescue are addressed in two legally binding agreements among the Arctic States. This collaboration is bolstered by the work undertaken by the Arctic Coast Guard Forum. A strong focus on prevention, and cooperation will help to ensure that the Arctic remains a region characterized by “low tension and high attention.”

The final keynote speaker was Geir Seljsesteh who presented the idea that the only way to build thriving societies is through business. The Arctic is many things and there is no “one-size-fits-all” solutions for all sectors and all challenges. Along with climate challenges, the Arctic also faces a demographic challenge since (aside from the Faroe Islands) there is a population decline in the region. To have an active Arctic there must be people and healthy societies in which they can live and work.

“There is no seafood industry in a dead ocean. Sustainability and business development go hand-in-hand.”

— Wenche Granbakk, Head of Sustainable Development, Cermaq Group

Two additional panelists joined the speakers for the discussion. Annika Olsen, Mayor of Torshavn spoke passionately about the expansion of population in a number of sectors that depend on key infrastructure, education and innovation. Sustainable tourism is an expanding sector and inclusion of local people is integral to this strategy. Wenche Granbakk, noted that business, alongside governments and civil society have a shared responsibility in driving changes towards a green economy. Transparency and partnership drive performance. Developing common solutions and sharing knowledge and technologies is key to success.

To watch the full proceedings of the Plenary Session 5 – Future Arctic Business (Part 1), please visit the Arctic Frontiers YouTube channel.
In preparing for this session our speakers and panelists were given the following text and set of questions to shape their remarks and presentations:

The Arctic contains resources that may provide a growing global population with energy, minerals, proteins and medicines. What are the main business and industry opportunities in the Arctic today? Are the national and international management regimes adequate for industries? New technologies and cross-sector partnerships could lead to significant and sustainable growth. Who will invest in the growth? And how can business development be achieved without adverse impacts on the climate and environment?

The final plenary session welcomed three speakers and three panelists to the discussion. The first keynote speaker was Nicolaus Hanowski who spoke about the European Space Agency (ESA) and how earth observation infrastructure contributes to the knowledge base in the Arctic. Three paradigm shifts that are re-defining earth observation: 1) open data policy, 2) managing big data for use in science and business in the Arctic, and 3) a strong shift in use of earth observation from science to business applications.

The next speaker was Vadim Ulanov, who provided a case study showcasing the first wind power plant in Murmansk, Russia which will begin construction in 2021. Italian company Enel has developed the project in cooperation with the Russian Federation, sharing best practices and lessons learned. This means is new markets and investments and innovation in the Russian Federation.

Thina Margrethe Saltvedt provided a review of the European Union “Green Deal” vis-à-vis Norway and expertise in the key policy areas including a focus on green energy, clean and healthy food and green transport. Multilateral agreements such as the Paris Climate Accord and the EU Green New Deal are making it attractive for investors to invest in green energy, and not just to divest away from fossil fuels. The focus for Arctic communities should be to make it attractive to settle in the Arctic, not just for the business itself for their families, too.

The panel was joined by three additional experts, including Oleg Soliakov who spoke of the national regulations in the Russian Federation that provide suitable economic conditional for sustainable business development. Karoline Andaur spoke about the need to focus on preserving nature, as part of any and all Arctic development plans. Anders Oskal provided examples of how climate change is reality for reindeer herders, but that the main challenge is not the climate itself, since indigenous peoples have experience with variability and the resilient capacity to adapt. The biggest challenge is land encroachment and the fragmentation of land and loss of grazing lands. The combination of change drivers is real for subsistence economies.

To watch the full proceedings of the Plenary Session 5 – Future Arctic Business (Part 2), please visit the Arctic Frontiers YouTube channel.
ARCTIC FRONTIERS SCIENCE

The Arctic Frontiers Science Plenary was moderated by Dr. Kikki Kleiven, Associate Professor at the University of Bergen and Bjarke Centre for Climate Research. She was joined by four speakers who also formed the panel: Tracey Galloway, Assistant Professor, University of Toronto; Renuka Badhe, Executive Secretary, European Polar Board; Asgeir Sørensen, Professor, Norwegian University of Science and Technology (NTNU); and Florian Stammler, Professor of Arctic Anthropology, Arctic Centre, University. Link to the presentation abstracts and speaker bios can be found on the Arctic Frontiers website under the Past Conferences menu item.

Science Plenary

Alexey Pavlov, Head of Science at Arctic Frontiers opened the Science Plenary with a warm welcome and thanks. His message was clear, “We are the power of knowledge.” Informed decision making takes different types of knowledge. In the Arctic we need best practices and technologies for local food production, we need reliable weather forecasts and meteorological information for work at sea, and Governments need up-to-date reports and assessments for management of the Arctic ocean. We have the power to co-produce this knowledge and provide solutions to address the growing societal challenges in a rapidly changing arctic.

To see Alexey’s remark, please visit the Arctic Frontiers YouTube channel.

The first speaker was University of Toronto’s Tracey Galloway who spoke about Indigenous-led, interdisciplinary research advances used to further understanding on the climate-related impacts on food security and well-being in Arctic communities, specifically in northern Canada. Using the principles stated in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), Canada is undertaking a model of research to address food security. The model for collaborative scholarly practice for food security research ensures that research is indigenous led and controlled, emphasizes indigenous knowledge, is interdisciplinary and policy relevant. This multi-disciplinary, multi-jurisdictional approach reflects not only the challenges intrinsic in addressing food security, but also the interconnectivity and complexity of living in the Arctic. Applying and using the knowledge gained from this model are still imperfect but go further towards mainstreaming a two-eyed seeing approach to research that can interact and build understanding.
The third speaker was Professor Asgeir Sørensen (NTNU) who provided an overview of the AMOS Center of Excellence and the step change in ocean and Arctic research capabilities using autonomous marine robots. In partnership with The Research Council of Norway, DNV-GL, SINTEF and Equinor, the goal of AMOS is to be a world-leading research center for autonomous marine operation and systems. Autonomy motivates an interdisciplinary approach, bringing together technology, science, human behavior, risk and ethics. Since AMOS began in 2013 there has been rapid technology developments in the field of marine robotics, including in the Arctic seas, which provide new opportunities for research. Surprisingly, it was not the environmental agencies, but Equinor (and other oil-related companies) who has pushed the technology development to ensure safe operations and better control over areas of operation. These same technologies can be used for science applications. The key advantage is that autonomous and remote assets can cover a wide range of temporal and spatial scales of processes in the ocean. The next challenge is how to handle, store and analyze big data.

The final speaker during the Arctic Frontiers Science Plenary was Professor of Arctic Anthropology Florian Stammier (Arctic Center, University of Lapland) who spoke about “Arctic amplification” and the need for adaptation to preserve the cultural diversity of reindeer herders on the Yamal Peninsula, Russia. Local and global aspects of the Arctic come together in many scenarios, and in Yamal, this is obvious in the co-existence of the reindeer herders and huge Yamal LNG gas installation. Arctic amplification, and the subsequent warming, provide business opportunities, increasing extraction industries and transportation routes. Extreme climate related events are becoming more frequent – huge temperature swings, rain on snow events, and thawing active layers of permafrost that release previously stored hazards like anthrax and methane. Local reindeer herders in the Yamal (meaning “end of the land”) coexist with industry, continuing to use the longest migration in the Arctic, over 1000 km. Twenty years ago, the herders were feeding the gas workers since the food supply for workers was often interrupted. The starting point of change for the locals is informed by experiences from 20-30 years ago and this is the perspective from which they are making decisions today. Herders in Yamal have successfully taken proceeds from the LNG gas plant at Sabetta to get EU certification for their meat, meaning that they get better prices for meat. These successes must not be overshadowed by the societal impacts of life with industrialization where mental health, suicide and other vulnerabilities are prevalent.

During the discussion, the panelists discussed the impact of technology on Arctic communities. While there are both positive and negative impacts, it is important to focus on the positive elements. Technology provides a great potential for mixing experts from different backgrounds to address challenges and opportunities. For example, the Nenets people of Yamal peninsula, have willingly adapted to new technologies like drones. Similar examples exist in Norway, where reindeer herders and ship owners cooperate on the use of remote and autonomous robots to reduce the footprint of shipping activities on traditional herding activities.

Tracey highlighted a model in which Indigenous/ local communities have the funding, open a call for projects and decide in review panels which research they need. This method helps to build technology fit for purpose from the scratch, without a need for adapting from other areas/industries. An important part is education and capacity building with a possibility of learning the technology for local youth.

To watch the full proceedings of the Science Plenary, please visit the Arctic Frontiers YouTube channel.

“Will indigenous peoples master the spiral of amplification or become its victims? I say this not because these people are in desperate need of our help because they are poor, they are autonomous, and they are incredibly adaptive to these changes. But when we mess up their environment, we have a moral responsibility to create a space for them to be self-confident.”

— Florian Stammier, Professor of Arctic Anthropology, Arctic Centre, University of Lapland
Themes of the Arctic Frontiers Science Conference

Theme 1: Arctic Food Security

Climate changes in the Arctic have complex ecosystem impacts on human food security and health, both locally and globally. It is important to trace these impacts from their sources in Arctic lands and waters throughout the food web, taking both climate-related policy and human-environment interactions into consideration to know how these changes affect food security, nutrition and health.

People living in Arctic regions rely on both wild-caught and cultivated marine and terrestrial resources for their subsistence and livelihoods. This theme brings together scholars from circum-polar regions whose work examines the impacts of marine and other food sources on the food security and health of people living in Arctic communities and across the globe. As many communities face climate- and socially-mediated constraints on their capacity for self-sufficiency, innovative and resourceful approaches – many of them rooted in Indigenous identity and knowledge – are emerging to solve the crisis of food insecurity.

Lead by Tracey Galloway (University of Toronto, Canada) and Marian Kjellvold (Institute of Marine Research, Norway) the science committee chose presentations addressing issues such as climate-mediated impacts on food security, human nutrition and ecosystem health, comparisons of sustainable harvest and policy approaches, aquaculture safety and sustainability, innovative product development involving Arctic food systems, seaweed harvesting and aquaculture in the Arctic.

Links to the presentation abstracts and speaker bios can be found on the Arctic Frontiers website under the Past Conferences menu item.

Theme 2: Knowledge-based development in the Arctic

Scientific knowledge is considered to be a critical component of decision-making in addressing fundamental challenges such as climate change and sustainable development, in the Arctic as well as other parts of the world. Science can provide information and insights into the nature of current and future changes in biophysical and social systems, contribute to the generation of new and innovative policies and technologies, and facilitate the evaluation and assessment of plans and policies. It is important to emphasize that science represents only one form of such organized knowledge and Indigenous knowledge and local knowledge can play an important role in decision-making in the Arctic.

Translating scientific and other types of knowledge into meaningful actions to capitalize on opportunities and counteract problems has proven to be a far more demanding task. These problems and issues span across a ‘continuum of urgencies’: from security time scales (mitigating risks of political, economic and cultural instabilities that are immediate) to sustainability time scales (balancing economic prosperity, environmental protection and societal well-being across generations). There is an ongoing need to bridge the gaps between science, Indigenous Knowledge, policy making and other forms of decision making to enhance trust, communication, collaboration, and to pursue knowledge-based development in the Arctic.

Lead by Gosia Smieszek (Arctic Centre, University of Lapland, Finland) and Kim Holmen (Norwegian Polar Institute, Norway) the science committee chose presentations addressing science to policy and science to science gaps, communication, education and training, case studies and knowledge co-production.

Links to the presentation abstracts and speaker bios can be found on the Arctic Frontiers website under the Past Conferences menu item.

Theme 3: Disruptive Technologies

New technologies have the power to change the way we think, the way we live and perform, and have proven to give the way for new concepts and businesses. Since the first digital products were developed, digitalization has leapt forward and we are now facing a step-change in performance and utilization of digital products in research, businesses and society.

Lead by Morten Dalskmo (SINTEF Digital, Norway) and Harry R. Kolar (IBM Research, USA) the science committee choose presentations addressing “disruptive technologies” developed and/or applied for the Arctic including: digitalization, telecommunication in the Arctic, autonomy (mobile platforms), sensors, integrated monitoring, and modelling and decision support.

Links to the presentation abstracts and speaker bios can be found on the Arctic Frontiers website under the Past Conferences menu item.

Theme 4: Local or Global Arctic? Multi-scaled considerations of connections and remoteness in climate-impacted communities

Societal, political, and scientific challenges are converging in the Arctic as temperatures rise, sea ice and glaciers retreat, and permafrost thaws. There remains an urgent need to document, understand and to respond to the causes of change to the Arctic environment. Given the inability of the world’s carbon-intensive societies to significantly reduce their emissions in the near future, there is an urgent need for Arctic communities to consider how they may need to adapt to a warming planet while at the same time looking for whether there might be synergies for social or economic transformation within these ongoing shifts in the international community.

Lead by Mia Bennett (The University of Hong Kong) and Jostein Bakke (University of Bergen, Norway) the science committee choose presentations addressing the urgency of Arctic climate change and its impacts on communities alongside individuals focused on questions of adaptation and political, sociocultural, environmental, and economic transformations related to a changing Arctic.

Links to the presentation abstracts and speaker bios can be found on the Arctic Frontiers website under the Past Conferences menu item.
Each year Arctic Frontiers gathers more than 2500 delegates from 35 countries. This international gathering of diverse knowledge provides the opportunity to arrange a large number of side events alongside the main Arctic Frontiers conference program. Side events and breakout sessions offer a closer look into the topics covered at the main program.

Arctic Frontiers 2020 was focused along four thematic lines, and the side events reflected these including:

**Smart Arctic**
Including the sub-topics of resilient societies, innovation, technology transfer, smart infrastructure, connectivity

**Arctic Resilience Side Event and Panel**
- Convened by Joel Clement and Alf Håkon Hoel
The purpose of this panel discussion was to take stock of implementation status of the recommendations in the ARR and AACA reports and identify pathways towards further implementation. University of Tromsø Rector Anne Husebekk made the announcement of future collaboration aimed at strengthening our understanding of the conditions for successful implementation of adaptive measures, thus enhancing the transformative capacity of Arctic communities.

**Smart specialisation in the Arctic - experiences and next steps**
- Organised by European Commission’s Joint Research Centre and NORCE
This session brought European Arctic regions together to share their approaches and developments of smart specialisation. Arctic regions working on similar and interconnected priorities such as digitalisation, circular economy, sustainable utilization of natural resources, and experience industries discussed how to explore and connect smart specialization knowledge nodes for cross-regional networking in search for joint investment solutions. The session will proposed further discussion on strengthening emerging and already established joint S3 initiatives towards a sustainable, innovative Arctic Region.

**Next generation Arctic field courses: sharing best practices from the UK, Norway and Russia**
- Organised by UK Science and Innovation Network and NERC Arctic Office
This session, following the PechaKucha method, featured a line-up of the next generation of Arctic researchers and organisations involved in organising field courses in the Arctic. Speakers shared best practices in planning and running Arctic field courses. Panelist and participants then discussed what future Arctic field courses might need to look like to empower new generations of Arctic researchers and how international cooperation in this area could aid knowledge transfer.

**KEPLER project: Evolving the EU Copernicus programme for the Polar Regions**
- Organised by Norwegian Meteorological Institute, with Lund University
This side session presented the findings of the project in its first year and explored how Copernicus data and services can better support the development of information and knowledge needed for a smart Arctic. These included how Earth Observation technologies can lead to innovations resulting in more resilient societies through improved infrastructures and connectivity, both on land and in the maritime domain. In the Arctic seas enhancing information provision will result in a more sustainable, and healthy Blue Future so that communities throughout the Arctic can benefit.
Side events

The Arctic Five – Knowledge Production in the Arctic for the Arctic
- Organised by Umeå University (SE), The Arctic University of Norway – UIT (NO), Luleå University of Technology (SE), University of Lapland, and University of Oulu

The starting-point of this side-event was the innovative work of five northern Nordic universities (The Arctic Five) that aims for a consortium that utilizes the complementary capacities of the universities in order to accomplish added value, and to facilitate society relevant projects and networks. The science production of Arctic Five has a strong focus on resilient societies, innovation, and connectivity, including the plans for a virtual blended campus.

Blue Future
Including healthy and productive oceans, sustainable ocean economy, balanced approach to use and protection of marine resource.

Blue Bioeconomy and Arctic Tourism
- Organised by High North Atlantic Business Alliance, Troms and Finnmark County Council, Arctic 365, Brim Explorer and Arctic Frontiers

Tourism is one of the fastest growing sectors of the world’s economy. The Arctic attracts visitors who wish to experience its wildlife, pristine landscapes and local cultures. Tourism is most often seen as an economical opportunity, especially for local communities, and with increased tourism follows opportunities, but also challenges. This session discussed the development of future Arctic tourism and the role Arctic regions take as hubs in this development.

Aquaculture unveiled – the power of facts and transparency
- Organised by Cermaq, SINTEF and BarentsWatch

Aquaculture meets many of the global challenges connected to a growing world population and is expected to grow significantly. Aquaculture has a great potential for growth and value creation in the Arctic, but growth requires social licence to operate. There are many concerns related to ocean farms. The only way to earn social licence is to be transparent about the business. This side event shared information that is publicly available about every salmon farm in Norway, how this information contributes to knowledge-based discussions, and how to navigate to find what you are looking for.

Enforcement beyond national jurisdiction
- Organised by the Ministry of Foreign Affairs of Japan, Norwegian Centre for the Law of the Sea and the Scandinavian Institute of Maritime Law

Areas beyond national jurisdiction were until recently neither much exploited nor regulated. This session explored the issues of deep sea fishing, search for genetic resources, deep sea mining, counterterrorism and the calls for effective regulation and effective enforcement of the rules. limit the regulatory ambitions?

A source for Arctic optimism: The Blue Bioeconomy
- Organised by Arctic Council, Icelandic Ministry for Foreign Affairs, Sustainable Development Working Group

The blue bioeconomy has the potential to be a major contributor to achieving sustainable development in the Arctic and beyond. It is a source for great optimism for the circumpolar region. This session included an expert panel and an interactive workshop which allowed participants to provide direct input into the Blue Bioeconomy in the Arctic Region project.

The New Frontier of Marine Minerals – Possibilities and Challenges for a Norwegian Industry Adventure
- Organised by NTNU UiB, Equinor, DNV GL, TechnipFMC, GCE Ocean Technology, mfl.

Norway has found mineral deposits on the deep-sea floor and has an advanced underwater industry that can extract such deposits on an industrial scale. The need for these minerals is increasing rapidly, as the green shift’s batteries and electronics are dependent on them. Existing deposits are limited to a few countries, with China sitting on the largest resources by far. This session discussed the means that these minerals, and the access to them, has regarding strategic, industrial, and trade policy implications on a global scale.

The Copernicus marine service: extracting value from satellite Earth Observation data
- Organised by Nansen Centre, Meteorological Institute of Norway, Mercator Ocean International, Institute of Marine Research and the Norwegian Polar Institute

Monitoring climate change in the Arctic is at the very heart of the Copernicus services and their evolution. Among these, the Copernicus Marine Environment Monitoring Services (CMEMS) provide the largest source of multi-disciplinary environmental data covering the whole Arctic. This event provided fresh news from the Arctic data providers in CMEMS and discussed suggestions towards the necessary future evolutions of the service.

Moving toward an HFO ban in the Arctic
- Organised by Clean Arctic Alliance and Bellona Foundation

The use and carriage of heavy fuel oil (HFO) in Arctic shipping is a continuous threat throughout the Arctic, to the wildlife, ecology and the people. A ban on HFO for all ships operating in the Arctic is an efficient measure to reduce the impact of oil spills and reduce emissions of black carbon. This session featured policies of the operators, governments and NGOs and their commitment to find solutions for a more sustainable Arctic.

Trend-spotting: The emerging bioeconomy and the Arctic region
- Organised by Nordic Council of Ministers in close cooperation with Nordic Sustainability

During this side event recent findings from trends within the bioeconomy were presented and tested amongst the participants. Discussion focused on trends that are of particular relevance the Arctic region. Participants were also invited to submit a survey that will contribute to the final report from the project.
Side events

**Sustainable Fisheries Management**
- Organised by Marit Reigstad and Alf Hakon Hoel, SIT – the Arctic University of Norway

Drawing on experiences from Arctic shelf seas, this panel addressed the critical elements of modern fisheries management. This included the scientific work to understand and monitor marine ecosystems and how they are changing, the provision of scientific advice, cooperation between governments on management of transboundary fish stocks, domestic resource management regimes, and robust enforcement practices are important here. The panel also discussed the new central Arctic Ocean fisheries agreement.

**Arctic Ocean Decade Workshop: Policy-Business-Science-Discourse**
- Organised by The Research Council of Norway, Arctic Frontiers and IDC of UNESCO

The UN Decade of Ocean Science for Sustainable Development 2021-2030 presents a once-in-a-lifetime opportunity to deliver scientific knowledge and ensure that ocean science can fully support countries’ actions to sustainably manage the ocean and to achieve the 2030 Agenda for Sustainable Development. This workshop, as part of a global consultation process, provided delegates the opportunity to further discuss, prioritize and formulate proposals for initiatives to be framed under the UN Decade. A report from the workshop can be obtained from The Research Council of Norway.

**Bringing the Arctic Ocean into United Nations Decade of Ocean Science**
- Organised by The Research Council of Norway, Arctic Frontiers, UN Intergovernmental Oceanographic Commission of UNESCO (IOC)

This side event offered a continued dialogue based on results from the Arctic Ocean Decade workshop: Policy-Business-Science-Discourse held earlier that day.

**The Value of Kelp**
- Organised by Norwegian Blue Forests Network (Institute for Marine Research, GRID-Arendal, Norwegian Institute for Water Research)

The high-level panel for a Sustainable Ocean Economy presented a call for accelerated progress on five key ocean-based climate actions. The first of these was to invest in nature-based climate solutions by restoring, protecting and managing coastal and marine ecosystems to enhance their ability to sequester and store carbon, adapt to the effects of climate change, and improve coastal resilience. This side event addressed what this climate action means in an Arctic context, by examining the Arctic blue forest ecosystems and their value from a global climate perspective. Participants also discussed their value to coastal fisheries, eco-tourism, artisanal product development from a local and regional Arctic perspective.

**Arctic Cities and New Partnerships For Sustainable Development**
- Organised by Business Oulu, Norinnova, Region Norrbotten, Region Västerbotten and the Regional Council of Lapland

This side event convened mayors from the Arctic, global stakeholders and civil society to highlight some of the challenges and opportunities in the Arctic seen from the point of view of mayors. The purpose was also to facilitate dialog and possible future cooperation between the UN Human Settlements programme (UN Habitat), the Arctic Council and the Arctic Mayors’ Forum.

**Brighter Future Arctic Investment Opportunities**
- Organised by Business Oulu, Norinnova, Region Norrbotten, Region Västerbotten and the Regional Council of Lapland

This side-event presented some of the most promising projects by private investors, national and regional authorities as well as institutions of higher education, in their effort to highlight and promote a brighter future for investments in the Arctic. During the event, audience members provided input and learnt more about how the projects are expected to create a better future for business development in the Arctic.

**Renewable energy in the maritime sector**
- Organised by organised by Energiklynget Nord, Maritimes Forum Nord and Arctic Frontiers

Looking at topics related to use of new energy sources in the maritime sector, panelists and participants discussed renewable energy opportunities to reduce airborne pollution, carbon emissions and fossil fuel consumption on a global scale.

**From Space to Earth - New space – new business opportunities**
- Organised by Troms and Finnmark Fylkeskommune, Norrbottens län, KSAT and Arctic Frontiers

There is a strong tradition of cooperation within the Scandinavian Arctic, and this side event examined how cooperation within the space industry can be further developed and prioritized to create new business opportunities.

**The post-petroleum transition: Implications for local sustainability**
- Organised by Resource Extraction and Sustainable Arctic Communities – A Nordic Centre of Excellence and Nordland Research Institute

This side event inspired discussions around the implications for sustainable development locally in Arctic communities that in the coming decades will face a transition away from petroleum-based energy systems at a time when they also have to navigate other pressures, including the impacts of a warming and more unpredictable climate as well as rapid social changes. Participants explored the paradoxes of climate mitigation efforts coming into conflict with other political goals related to sustainable development and discussed the implications for policy making and knowledge production.
Side events

Connecting scientific research and entrepreneurship
- Organised by UiT The Arctic University of Norway and Nord University Business School
During this event, findings from the research project ‘Developing research-entrepreneurship linkages: Co-creating new business activity in Northern Norway’ were presented. Finding and discussions illustrated how industry actors in the Norwegian mineral and mining industry relate to research organizations in sustainable open innovation processes.

Cross-border cooperation to promote innovation and business development in the Arctic
- Organised by EU’s Arctic Ambassador and INTERREG NORD
This side event focused on sharing experiences and lessons learnt from the INTERREG Nord program and discussed the challenges of sustainable business development and innovation in the Arctic. Presentations and discussion focused on how cross-border cooperation can provide better possibilities for sustainable development in a local, regional and Arctic perspective.

Security issues in large-scale foreign investments
- Organised by The Arctic delegation in the Danish parliament
Investments in infrastructure is critical in securing economic prosperity in the Arctic. Economic growth is dependent on trade, fisheries and logistics – for which a smart infrastructure is crucial. This side event focused on three cases where large-scale foreign investments and the potential national security issues pose a dilemma.

Science to Policy

Youth: A shared vision for the North
- Organised by the Government of Canada
No one can dispute the importance of engaging youth in Arctic forums. Both Indigenous and non-Indigenous views and perspectives can lead to an improved understanding of circumpolar realities. With a variety of speakers from different backgrounds, including leaders and champions advocating for youth in the circumpolar discourse, the audience came away from this session with some refreshed ideas and inspiration.

From Nansen Legacy science to useful knowledge for society
- Organised by The Nansen Legacy
The Nansen Legacy project is a joint effort from the Norwegian Arctic and marine science community to produce basic knowledge for society through a sustainable future Barents Sea. The focus is the changing climate and ecosystem in the northern Barents Sea region. This side event focused on science results, knowledge needs and dialog on topics related to weather, ecosystems, ecotoxicology, the ice edge and future conditions in the Barents Sea.

Arctic-Himalaya Futures: Improving Scientific and Political Coordination and Cooperation
- Organised by International Centre for Integrated Mountain Development (ICIMOD), UIT – The Arctic University of Norway, the Norwegian Scientific Academy for Polar Research (NVP) and GRID-Arendal
The Arctic and Hindu Kush Himalayan regions face similar environmental threats. The purpose of this two session side event was to facilitate dialogue to 1) establish a baseline describing the current situation and establishing collaborative linkages and interdependencies between the Arctic and the HKH, and 2) explore ways in which complex pathways informed by scientific findings can strengthen recommendations and political decisions at various levels to create effective avenues for inter-regional communication and coordination at levels unprecedented in the past.

Science advice for policy: who asks, who gives, and who listens?
- Organised by University of Bergen, Academia Europaea Bergen Knowledge Hub, Bjerknes Center for Climate Research, SEx Bergen, The Norwegian Academy of Science and Letters, UiT The Arctic University of Norway
This panel debated the challenges and knowledge gaps relevant to the radical changes needed in order to meet the UN Sustainable Development Goals (SDGs) and what systems need to be in place for policy to be anchored in scientific evidence and scientific thinking.

GoNorth – exploring the Arctic Ocean
- Organised by 12 Norwegian education and research organizations: Univ. of Bergen, Univ. of Oslo, Univ. of Tromsø, NTNU, UNIS, Akvaplan-niva, NERSC, NORCE, NORDAR, NPI, NGU, SINTEF
Twelve Norwegian research and education organizations have promoted a comprehensive, cross-disciplinary programme designed to investigate the Arctic sea areas from Svalbard in the south to the mid-ocean spreading ridge (the Gakkel Ridge) in the north. The aim is to acquire new knowledge as a foundation for establishing Norway as one of the leaders in terms of knowledge development in the Arctic Ocean. This side event provided an overview of the GoNorth initiative.

The Use of Arctic Science – The Case of the Arctic Council
- Organised by The Fridtjof Nansen Institute
This side event discussed the use and implementation of recommendations of science-based, policy-relevant assessments from the Arctic Council working groups.
**Side events**

**The Barents cooperation - a successstory for international collaboration across borders in the Arctic**  
Organized by Ministry of Foreign Affairs, Norway  
This side event was held in two session and explored the Barents cooperation, highlighting that it is a cornerstone of peaceful regional cooperation involving nations, regions, encouraging resilience in communities and people in the most populated part of the Arctic.

**Academic (un)employment and mobility in the Arctic**  
Organized by Ulf Arctic University of Norway, LTU – Luleå University of Technology and UOulu – University of Oulu  
The Academic North-project promotes academic cross-border work-related mobility in socially sustainable and knowledge-based way in northern Finland, Sweden and Norway. The aim of the project is to further the employment of university graduates for the Nordic labor market and to support the remigration of academically educated people to the region. This side event aimed to further the interaction between the academic workforce, university graduates as well as labor markets and companies.

Organized by Prof. Gunhild Hoogensen Gjørv and Dr Marc Lanteigne (UIT The Arctic University of Norway)  
This event, a panel discussion on emerging Arctic security questions, launched the Routledge Handbook of Arctic Security, a compilation volume which examines several facets of regional security from numerous geographic and thematic angles, offering a comprehensive examination of security in the region and reflecting debates about changes in climate, environment, economies, and societies.

**Informed Decisionmaking for Sustainability book series dialogue**  
Organized by Arctic Frontiers, Science Diplomacy Center. The Fletcher School. Tufts University. and Springer  
This event launched the new first of three of a Springer book series that is being produced in collaboration with Arctic Frontiers, applying science diplomacy as an international, interdisciplinary and inclusive process to balance national interests and common interests for the benefit of all on Earth across generations.

**Indigenous Leaders’ Vision for the Arctic**  
Organized by the Indigenous Peoples’ Secretariat and the Arctic Council Permanent Participants  
The side event presented a summary of the 6th Arctic Leaders’ Summit (ALS), including a panel of Indigenous leaders who introduced their vision for the future of the Arctic.

**Entangling Arctic Knowledge Systems**  
Organized by the Centre for Sami Studies  
This side event inquired into the complex entanglements of knowledge systems. Indigenous knowledges are adaptive and changing, evidenced for example, by Sámi reindeer herders’ use of technologies. In addition the side event presented Cumulative assessments and community-based impact assessments highlight challenges of establishing a coherent knowledge base of impact assessments by presenting the impact assessments process of the well known Nussir case in Norway.

**The force of Youth in tomorrow’s Arctic**  
Organized by Barents Regional Youth Council  
Organized in two session, this event explored the ways in which youth cooperation a tool for peaceful relations when things are complicated between capitals, including an examination of the key challenges and opportunities for the future Arctic generation.

**Art in, and for the future Arctic**  
Organized by the University of Lapland & Anchorage Museum  
This World Café event highlighted that Arctic artists have a strong voice in politically tensed discussions. Artist and designers tackle challenging social, cultural or environmental issues. Climate change, extractivism, national state politics and regional interests are circumstances for artists in Arctic. Participants were invited to explore how art and artists will play a role in the Arctic 20 years from now, how artists in the Arctic today influence the Arctic of tomorrow and where do the ideas of tomorrows arctic grow.
Arctic Frontiers has long been a meeting place for all segments of society to meet and discuss the most pressing issues facing the Arctic region. Decision makers, leading scientists, indigenous peoples, students, business and creative industries have always found a place and a voice in Tromsø at the end of January each year.

The success of Arctic Frontiers is built on the willingness to remain cutting edge – to listen to feedback on what is working and what is not and to be brave in both format and content. Next year, we plan to do just that, standing on the shoulders of Arctic Frontiers 2020 – The Power of Knowledge we plan to shine a bright light on provocative topics in a new format designed to demonstrate the inextricable link between science, business and policy.

The title Building Bridges is a nod to the strength that is gained by preserving the Arctic as a region of peace and global example of cooperation. It is also a symbol representing the need for open, honest discussions on difficult topics to ensure that polarization of positions do not creep in to create further isolation for indigenous peoples, youth, women and small and micro businesses. We will not only explore important connections within the Arctic, but also distant connections with political, economic and natural forces outside the region that have a profound effect on the Arctic and the other way around. How can innovation and concrete collaboration lead to practical solutions now and in the future? Our objective in 2021 is to create a conference that puts these voices first.

We invite you to join us to listen and more importantly to participate in the discussions to bolster the bridges on the pathway to a bright Arctic future.
“Diversity of insight and knowledge have been on the Arctic Frontiers stage for two days. The present and the future state of this region has given us much to think about. Arctic issues are being discussed, debated and decided by all the stakeholders, and our duty is to keep a close eye as to how it develops.”

– Stephen Sackur