

ARCTOS

Annual Report 2019



Akvaplan
niva



Annual ARCTOS activity report 2019

Rolf Gradinger, Paul Renaud, Ulrike Grote

With the members of the ARCTOS Secretariat

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Executive Summary

2019 was a productive year for ARCTOS. Based on internal evaluations and workshops conducted in 2018, ARCTOS shifted its focus back to cross-institutional research, while maintaining its strength in education. Scientific workshops on four different topics were conducted, and detailed planning on research expeditions under ARCTOS leadership were initiated. Unfortunately, one major expedition planned for Spring 2020 was cancelled due to COVID19. Student success and an enhanced Post-doc support remained cornerstones of ARCTOS also in 2019 through ARCTOS colloquia and the early-career support days at the annual ARCTOS Days retreat. Membership in 2019 increased slightly with no major shifts in the relative membership from different institutions. ARCTOS members (senior and

early career scientists) are heavily involved in the Nansen Legacy project with the November/December 2019 expedition co-lead by two scientists from UNIS and UiT. The ARCTOS SSC remained un-changed in 2019 and continued to focus on strategically enhancing the relevance of ARCTOS for all member institutions.

This initiation of annual reporting to ARCTOS members and the ARCTOS Board is one way of highlighting activity, achievements, and relevance. We hope this Report indicates the important and dynamic role ARCTOS plays for early-career researchers, senior scientists, and the partner institutions in helping to achieve individual and institutional goals for research, training, and outreach.

Mission statement

ARCTOS combines the expertise of north Norwegian and international institutions to achieve an integrated view of Arctic ecosystems, both locally and with a view across the Arctic. Investigations of biological, physical, and chemical drivers provide a holistic approach to marine ecosystems and across the food chain. In this way, we address critical scientific and management questions related to biodiversity, ecological processes, impacts of climate change, human induced and natural

variability, system sensitivity and resilience. State-of-the-art research tools, modelling platforms scaled to a variety of levels and processes, and modern infrastructure provide a strong foundation for basic research and student training. ARCTOS has grown considerably since its foundation. It is now recognized nationally and internationally in the science community, as well as in industry circles, as a source of high-quality basic and applied research in Arctic marine ecology.

Organizational overview

ARCTOS leadership

The ARCTOS leadership consists of the ARCTOS leader group, ARCTOS Secretariat and ARCTOS Board.

The **ARCTOS leader group** is responsible for the day-to-day work, such as the preparation of meetings, agendas, and documents for the Secretariat and Board. It is also responsible for the execution of plans and decisions made by the Secretariat and Board.

ARCTOS leader group 2019	
ARCTOS leader	Jørgen Berge, UiT
ARCTOS co-leader	Paul Renaud, Akvaplan-niva
Secretary	Kristin Heggland (1.1.-7.4.) Ulrike Grote (8.4.-31.12.)

ARCTOS Secretariat 2019	
APN	Kjetil Sagerup
	Eva Leu
IMR	Ulf Lindstrøm
	Benjamin Planque
Nord University	Henning Reiss
NPI	Haakon Hop
	Harald Steen
UiT	Rolf Gradinger
	Camilla Svensen
UNIS	Janne Søreide
	Anna Vader
Student representatives	Estelle Coguiec (UiT)
	Erin Kunisch (UiT)

The **ARCTOS Secretariat** is responsible for the daily operation of the network and for student support. It consists of the leader and co-leader of ARCTOS, the secretary, and two representatives from each ARCTOS institution and two student representatives. The six ARCTOS member institutions are Akvaplan-niva (APN), Institute of Marine Research (IMR), Nord University (Nord), Norwegian Polar Institute (NPI), UiT the Arctic University of Norway (UiT) and The University Centre in Svalbard (UNIS). The Secretariat met approximately monthly and the minutes are mostly available on the ARCTOS website.

The **ARCTOS Board** is responsible for the approval of budgets and financial reports, strategy and action plans, integration with member institutions plans and priorities, and the acceptance of new member institutions. The Board consists of the leaders of the six ARCTOS institutions and the leader group. In addition, the dean and vice-dean of research at

the faculty of Biosciences, Fisheries and Economics at UiT The Arctic University of Norway, as well as the leader of the department of Arctic and Marine Biology, have observer status in the Board. The Board usually meets 1-2 times a year but did not meet in 2019.

ARCTOS Board 2019	
Akvaplan-niva	Salve Dahle
	Anita Evenset
Institute of Marine Research	Sissel Rogne
	Maria Fossheim
Nord University	Bjørn Olsen
	Ketil Eiane
Norwegian Polar Institute	Ole Arve Misund
	Nalân Koç
UiT The Arctic University of Norway	Anne Husebekk
	Kenneth Ruud
The University Center in Svalbard	Harald Ellingsen

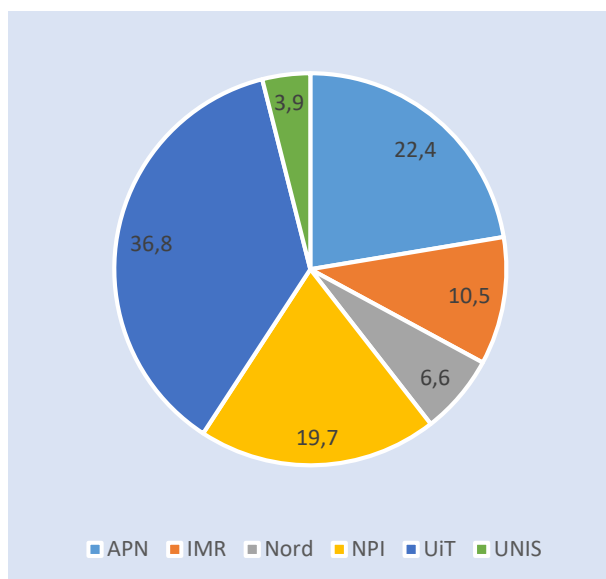
ARCTOS membership

Σ members: 114 ♀ : 58% Post-doc: 16 PhD: 35 MSc: 3

We update membership once a year by asking members if they want to continue their membership (not student members). In 2019, four members ended their membership, due to either long inactivity or retirement.

Membership of six students who successfully defended their thesis, ended as well. Overall, the number of ARCTOS members increased during 2019, as nineteen researchers and students joined the network.

Senior members and post-docs



At most ARCTOS member institutions, the number of members did not change significantly, apart from UiT with a net increase of three senior members in 2019. For more information about some of the new members, see the boxes throughout the report.

Fig. 1 Composition of affiliation of ARCTOS senior members and post-docs (%)

Helena Michelsen – post-doctoral researcher at APN/NIVA



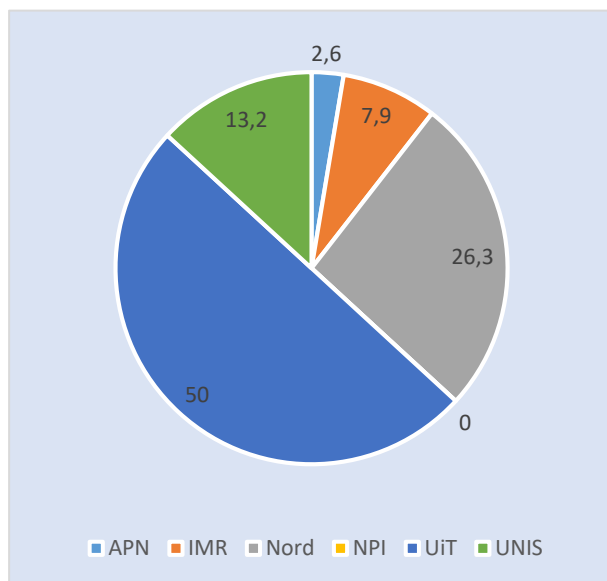
Helena has been a member of the ARCTOS PhD school 2013-2017, while doing her PhD at UiT on seasonal and spatial dynamics of king crab larvae and other benthic invertebrates in Porsangerfjord. After her PhD she has been working as a lab technician at UiT. In 2019 she started her post-doc at Akvaplan-niva within the EISA project (Ecology and management of the invasive snow crab: Predicting expansions, impacts and sustainability in the Arctic under climate change). We are happy to have her back as a member!

Karley Campbell – Associate professor at UiT



Karley also joined the network in late autumn after moving from the UK to Tromsø to start as associate professor in marine botany at UiT. In this position, she will be teaching and conducting research related to the study of Arctic marine microbes, with a particular focus on sea ice biogeochemistry and algal photophysiological response to environmental change.

PhD candidates and master students



2019 highlights:

- 34 student members at the end of 2019
- 3 Master defenses at UiT
- 2 PhD defenses at UNIS
- 1 PhD defense at Nord University
- 10 new student members and therefore slight increase in student members

Fig. 2 Composition of affiliation of ARCTOS students (%)



*Andrea Bozmann (3rd from left) successfully defended her PhD thesis 'The structuring effects of light on the deep-water scyphozoan *Periphylla periphylla*' on February 28, 2019 at Nord University.*

Major activities 2019

ARCTOS organizes a number of meetings, including several colloquia, each year that are open to everyone, and give students and senior members the opportunity to present and discuss their research. External speakers are often invited to participate. In addition, ARCTOS organizes an annual meeting for members only, called ARCTOS Days. ARCTOS is also responsible for a number of PhD courses at UiT. These include two cruise-related courses and the Arctic Frontiers Workshop course.

ARCTOS had in its 2018 internal evaluation decided to focus more strongly on the scientific relevance and recognition of ARCTOS. First, ARCTOS organized and hosted several topical workshops with leading experts from outside the Tromsø area being invited to contribute and discuss with ARCTOS members. This activity also led to a stronger international

recognition of ARCTOS as a key player in Arctic research. On the national level, profiling is enhanced through strong linkages between ARCTOS and Nansen legacy students and researchers as a large number of projects within the Nansen Legacy project are initiated by ARCTOS members, and new PhD students are incorporated into ARCTOS as full and affiliated members.

Another action proposed in the 2018 internal evaluation was improved career development activities for Post-docs from member institution. In 2019, ARCTOS initiated a mentoring system, which links Post-docs with senior scientists in one of the member institutions, and this has been used by several Post-docs already. In summary, ARCTOS is well positioned to succeed in meeting its mission. Further improvements based on the 2018 report are planned and underway for 2020.

ARCTOS colloquia

In 2019, ARCTOS organized five colloquia on a range of topics:

‘Molecular tools’

The first colloquium took place February 19 at UiT, with Owen Wagensteen (post-doc, UiT) and Alison Cleary (post-doc, NPI) as invited speakers as well as ARCTOS members Brandon

Hassett (post-doc, UiT) and Elizaveta Ershova (post-doc, UiT). The topic was the use of different molecular tools in Arctic ecology. Organizer: Kristin Heggland

‘TerrACE project’

The second colloquium took place April 4 at the Fram Centre, with associated ARCTOS member Amanda Poste (senior researcher, NIVA) and ARCTOS students Maeve McGovern (PhD candidate, APN), Nathalie Carrasco (Master student, UiT), and Charlotte Pedersen Ugelstad (Master student, UiT) as presenters. The topic of this colloquium was the TerrACE project,

which is focusing on generating quantitative information about terrestrial inputs to Arctic coastal waters (Svalbard), and how these inputs can directly and indirectly affect concentrations of contaminants such as mercury and PCBs in affected coastal ecosystems. Organizers: Kristin Heggland, Ulrike Grote

‘Ocean acidification’

The third colloquium took place October 30 at UiT, with Victoria Peck (researcher, British Antarctic Survey) as invited speaker and ARCTOS members Claudia Halsband (senior researcher, APN), Allison Bailey (post-doc, NPI)

and Siri Ofstad (PhD candidate, UiT) as presenters. The topic of the colloquium was ocean acidification in Arctic ecosystems. Organizers: Ulrike Grote, Siri Ofstad

‘Freshwater influenced systems’

The fourth colloquium was a 2-day workshop November 12-13 at UiT. The topic of the workshop was ‘Freshwater influenced sub-Arctic and Arctic marine systems – biogeochemistry and marine food webs’. ARCTOS funding secured the contribution of three invited speakers for day 1, Thomas Juul-Pedersen (researcher, Greenland Climate Research Centre), Slawomir Kwasniewski (researcher, Institute of Oceanology of the Polish Academy of Sciences), and Josef Elster (researcher, Centre for Polar Ecology, University of South Bohemia, Czech Republic). In addition, ARCTOS members Amanda Poste (researcher, NIVA), Tobias Vonnahme (PhD

candidate, UiT), Haakon Hop (senior researcher, NPI), Ulrike Dietrich (PhD candidate, UiT), and Camilla Svensen (Associate professor, UiT) contributed oral presentations to this open science session with in total 40 participants in attendance. Day 2 was a closed science meeting with representatives from institutions and the three invited speakers to discuss knowledge gaps, research directions and potential products, and a tentative outline for a peer-reviewed publication. An ARCTOS workshop report is available on request. Organizers: Rolf Gradinger, Ulrike Grote

‘Christmas lunch’

The traditional Christmas lunch took place December 19, with new ARCTOS members Mads Schultz (PhD candidate, Nord University)

and Benjamin Lange (post-doc, NPI) and ARCTOS leader Jørgen Berge as presenters. Organizer: Ulrike Grote



Photo credit: Estelle Coguiec

ARCTOS Days

Every year, ARCTOS invites all its members to its annual meeting called ARCTOS Days. It is a two-part meeting, which includes a 1.5-day

workshop for the students, followed by two days for all members. In 2019, the meeting took place on Sommarøy March 10-13.

Student forum

Seventeen students attended the student forum March 10-11, 2019. The topic of this year's forum was funding opportunities relevant for Master and PhD students. First, students discussed what experiences they already have and what funding they have received. Steinar Paulsen and Theresa Mikalsen from UiT talked about funding opportunities from the Norwegian Research

Council and more local sources, Marie Curie fellowships and ERC grants. Tobias Vonnahme talked about his experience with the Svalbard Field Grant, Sofia Aniceto about the VISTA program and Paul Renaud about funding available from the FRAM flagships. Cooking together, beach volleyball, hiking and a little treasure hunt made up the social part.



Photo credit: Malin Daase

All members

In total, 39 members participated in the annual meeting March 12-13. This year's meeting consisted mainly of scientific talks. Six students presented their PhD projects, while nine senior members presented current research findings

and newly started projects. In addition, we had a poster session and a discussion about ARCTOS relevant issues such as the post-doc support, student feedback, upcoming calls and projects and potential future activities.

Post-doc support

One action plan item in the ARCTOS Future report prepared in 2018 is the establishment of a mentorship program and post-doc platform to increase the post-doc engagement within ARCTOS. As a first step, a mailing list was established already in 2018 including all ARCTOS post-doctoral researchers. ARCTOS post-docs and senior members were informed about the implementation of a mentorship program, where post-docs can approach ARCTOS senior members who are not part of

the post-doc project to help with not only scientific questions but also further career planning, life-work balance and networking. In 2019, this was followed up and the secretary prepared an overview over all post-docs and senior members involved. The secretariat suggested that post-docs should be organized in a similar way as the student support network, with 1-2 representatives in the ARCTOS Secretariat and closer follow-up of the project duration.

In October 2019, the post-docs had an informal meeting with the secretary and Eva Leu, the initiator of the post-doc support network. The post-docs present decided that they would like to have one day prior to the all member part of ARCTOS Days 2020, to socialize and learn more

about e.g. proposal writing or interview skills. Hanna Kauko (NPI) volunteered to help organize this. Sofia Aniceto (UiT) volunteered as post-doc representative for the ARCTOS Secretariat until ARCTOS Days 2020.

Member institution highlights

Akvaplan-niva

The ARCTOS affiliated project FAABulous was funded by the Norwegian Research Council under their OKOSYSTEM program and runs from April 2015 until March 2020 (project nr. 243702), is led by Eva Leu from Akvaplan-niva, and includes collaborators from four ARCTOS institutions (Apn, UNIS, UiT, Nord University). In 2019, the project had its second-last meeting with all national and international collaborators in Oslo to discuss the findings gathered so far and prepare publications. Right afterwards, the PhD candidate Ane Cecilie Kvernvik (UNIS/UiT) defended her thesis entitled “Ecophysiological responses of sea ice algae and phytoplankton to a changing Arctic” on March 29th. She was co-supervised by Eva Leu (Apn), Tove Gabrielsen (UNIS), and Marit Reigstad (UiT). The FAABulous project aims at understanding how Arctic algal blooms in sea ice and water will change under future conditions in a warming environment. To this end, the project participants carried out extensive field studies in two contrasting fjords in Svalbard (Van Mijenfjorden and

Kongsfjorden), combining field sampling, autonomous observatories and modeling. In addition, a number of experimental studies were performed to unravel overwintering strategies in microalgae and to study their physiological responses towards stress.

In total, 8 field grants for students carrying out their field work under FAABulous were funded by the Svalbard Science Forum, and the project contributed in this way to educating the next generation of Polar scientists. Ane's thesis focused primarily on contrasting physiological characteristics of sea ice algae and phytoplankton which is an essential aspect that needs to be understood better to improve projections about future Arctic ecosystem productivity. Her findings suggest that sea ice algae will struggle more with adapting to the expected environmental changes in a future Arctic compared to pelagic algae.



FAABulous field work in Van Mijenfjorden (spring 2017) with several ARCTOS members from Akvaplan-niva, UNIS, and UiT. Photo credit: Thomas Brown.

Publication highlights:

Baho D, Pomati F, Leu E, Hessen DO, Moe SJ, Norberg J, Nizzetto L (2019). A single pulse of diffuse contaminants alters the size distribution of natural phytoplankton communities. *Science of the Total Environment* 683: 578-588. DOI: 10.1016/j.scitotenv.2019.05.229.

Renaud PE, Wallhead P, Kotta J, Wlodarska-Kowalczyk M, Bellerby RGJ, Ratsep M, Slagstad D, Kuklinski P (2019). Arctic Sensitivity? Suitable Habitat for Benthic Taxa Is Surprisingly Robust to Climate Change. *Frontiers in Marine Science* 6. DOI: 10.3389/fmars.2019.00538

Thirteen scientists at IMR were ARCTOS members in 2019: ten scientist, two PhD candidates and one master student.

Sebastian Menze (PhD), who defended his PhD thesis "Monitoring and mapping marine ecosystems using passive and active acoustics" 12 June 2020, published two papers (see below) in 2019. Additionally, he participated on the International Synoptic Krill Survey in the Southern Ocean in January-February 2019.

Elliot Sivel (PhD) started his PhD project (Title: Modelling food web dynamics in the Barents Sea) in 2018. One of the objectives of the project, which is part of the Nansen Legacy project, is to evaluate the impact of climate change and fisheries on the dynamics of the Barents Sea ecosystem using Non-Deterministic Network Dynamic model (NDND). In 2019, Elliot has improved and extended the model in order to run climate and fishery scenarios and started to draft the first manuscript (Title: Chance leads to multiple food web configurations in the Barents Sea). Additionally, Elliot participated on the IMBeR Future Oceans conference in Brest (France) in June, where he gave a presentation (Title: Modelling Chance and Necessity to explore the

possible dynamics of the Barents Sea ecosystem under climate and fishing pressures). He also attended a Nansen Legacy workshop (Title: Best practices for ecological model evaluation) in October and presented a poster at the Nansen Legacy Annual meeting in November.

Elling D. Johannessen (MSc) started his master project entitled 'Counting marine mammals and seabirds in the Scotia Sea (Southern Ocean) in autumn 2019. As mentioned below, his project is part of a larger project which objective it is to develop a risk assessment framework for the Antarctic krill-fishery. To develop sustainable management, the risk assessment will estimate the number of predators reliant on krill as a food source with the aim of setting a quota for the krill-fishery whilst avoiding an inadvertent negative effect on the predator populations. In cooperation with the Hurtigruten, we placed four marine mammal observers onboard MS Fram and MS Midnattsol in November 2019 to count marine mammals and sea birds. Elling participated onboard MS Fram (November 2019-January 2020) on two trips: Ushuaia-Falkland Islands-South Georgia-Antarctic peninsula-Ushuaia.

Publication highlights:

Menze S, Ingvaldsen RB, Haugan P, Beszczynska-Moeller A, Fer I, Sundfjord A, and Falk-Petersen S (2019). Atlantic Water pathways along the north-western Svalbard shelf mapped using vessel-mounted current profilers. *Journal of Geophysical Research: Oceans*, 124(3): 1699–1716.

Menze S, Zitterbart D P, Biuw M, and Boebel O (2019). Estimating the spatial distribution of vocalizing animals from ambient sound spectra using widely spaced recorder arrays and inverse modelling. *The Journal of the Acoustical Society of America*, 146(6): 4699–4717.

Elling D. Johannessen – Master student at IMR/UiT



Elling started his Master project entitled 'Counting marine mammals and seabirds in the Scotia sea: abundance, density and variability through time and space' early in 2019. It is part of a project in collaboration with IMR and NPI, as well as various South American interest groups, to estimate the abundance of predators of Antarctic krill. This is the first Antarctic MSc project within ARCTOS and the tools and knowledge gains are relevant for work in the Arctic as well.

Nord University

The importance of ARCTOS for NORD University is reflected in the high number of early career scientists (10 PhD students and 4 post docs) engaged in ARCTOS. The network provides opportunities especially for these members for career development and networking with experienced senior scientists in the field of Arctic research. Consequently, ARCTOS members from other institutions are co-supervisors in several PhD projects at NORD in 2019 (e.g. see box below: Mads Schultz). Although participation of NORD members in colloquia and workshops is not always possible in person, the remote participation is

increasingly used and NORD is aiming at organizing more ARCTOS arrangements in Bodø in 2020.

The efficient collaboration within ARCTOS is also shown by the publication highlights (see below). Marvin Choquet has studied population genetics of the plankton organisms (i.a. *Calanus* in Arctic Oceans) and Marc Silberberger investigated the benthic communities in the sub-Arctic Lofoten region. Both were ARCTOS PhD students with supervisors from different member institutions.

Publication highlights:

Basedow SL, McKee D, Lefering I, Gislason A, Daase M, Trudnowska E, Skarstad Egeland E, Choquet M, and Falk-Petersen S. (2019) Remote sensing of zooplankton swarms. *Scientific reports* 9/1: 1-10.

Silberberger M, Renaud PE, Buhl-Mortensen L, Ellingsen IH, Reiss H (2019) Spatial patterns in sub-Arctic benthos: multiscale analysis reveals structural differences between community components. *Ecological Monographs* 89(1), e01325

Mads Schultz – PhD candidate at Nord University

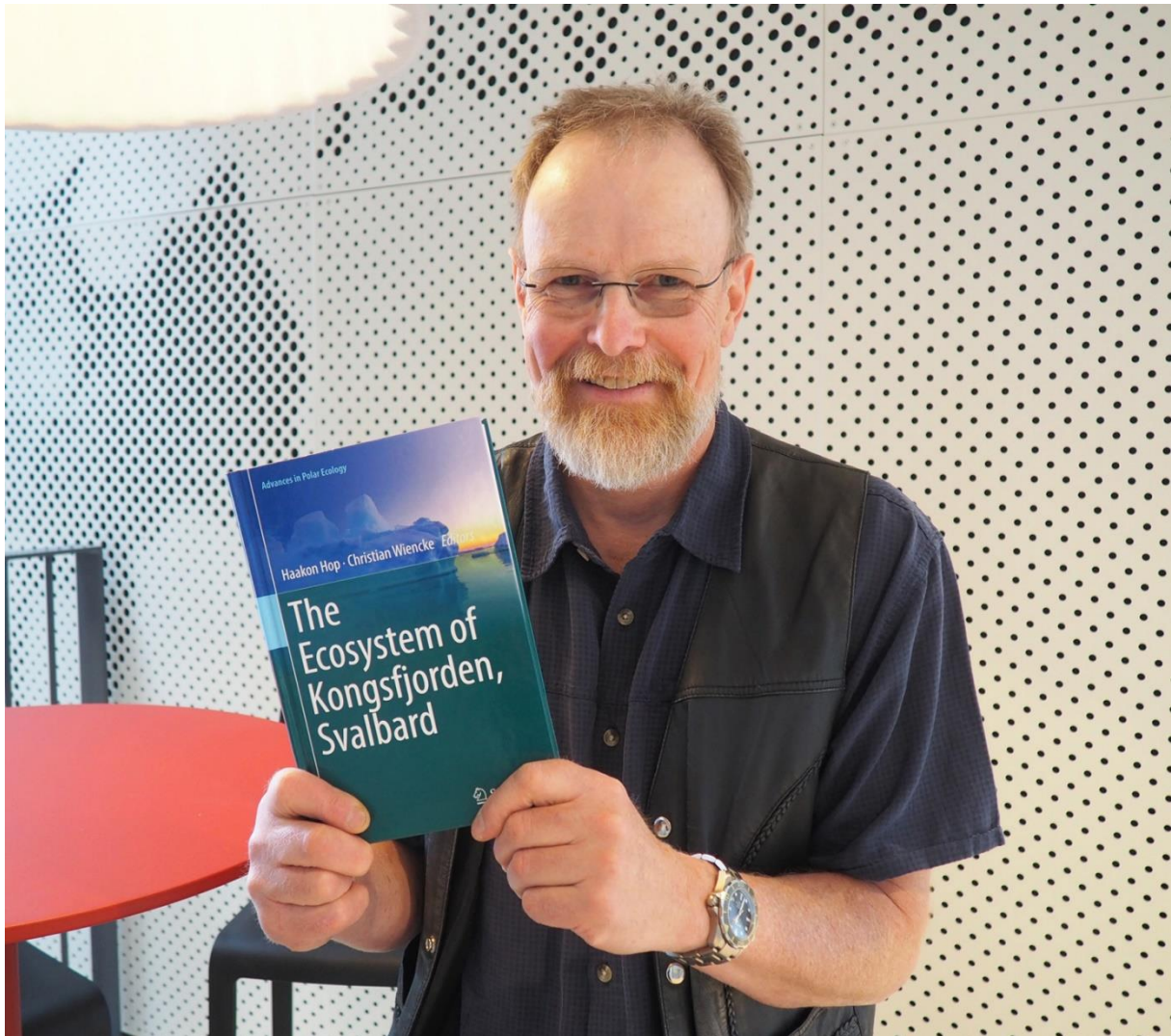


Mads did his Master at Copenhagen University, Denmark concerning diapausing of the Arctic copepod *Calanus hyperboreus*, with a main focus on lipid content and egg production. In 2019 he moved to Bodø for his PhD. In his project, he will be describing the year-round vertical distribution of the *Calanus* species *C. finmarchicus*, *C. helgolandicus*, *C. glacialis* and *C. hyperboreus*, along with the lipid content of the larger stages and the genes expressed at key points in their life cycle.

Norwegian Polar Institute

A book on *The Ecosystem of Kongsfjorden, Svalbard*, edited by Haakon Hop (Norwegian Polar Institute) and Christian Wiencke (Alfred Wegener Institute) was published in *Advances in Polar Ecology* (Springer) in 2019. The book highlights ecological aspects of the Kongsfjorden system, from the marine to the atmospheric environment, including long-term monitoring, the ecophysiology of various species, the ecosystem's structure and function, ecological processes, and biological communities, both in the water masses and on the seabed. ARCTOS members from different institutions have contributed to several chapters in the book.

Kongsfjorden's rising temperatures have altered the composition of the biomass found in the fjord. Over the past decades, increasing numbers of Atlantic zooplankton have flowed in from the south. They are typically smaller and contain less lipids than Arctic zooplankton. Arctic species still reside in the fjord, but may be less numerous than before. Even though the Arctic ecosystem has the ability to maintain and repair itself, extensive changes in the relationship between Arctic and Atlantic species of zooplankton can have major consequences for predators.



Haakon Hop with the book The Ecosystem of Kongsfjorden, Svalbard. Photo credit: Elin Vinje Jenssen /Norwegian Polar Institute

Publication highlights:

Griffith GP, Hop H, Vihtakari M, Wold A, Kalhagen K, and Gabrielsen GW (2019). Ecological resilience of Arctic marine food-webs to climate change. *Nature Climate Change* 9:868-872.

Hop H, Assmy P, Wold A, Sundfjord A, Daase M, Duarte P, Kwasniewski S, Gluchowska M, Wiktor JM, Tatarek A, Wiktor Jr J, Kristiansen S, Fransson A, Chierici M, and Vihtakari M (2019). Pelagic ecosystem characteristics across the Atlantic Water Boundary Current from Rijpfjorden, Svalbard, to the Arctic Ocean during summer (2010-2014). *Frontiers in Marine Science* 6:181. Doi: 10.3389/fmars.2019.00181.

UiT The Arctic University of Norway

ARCTOS remains to be an important academic and research framework for UiT. UiT senior and early career scientists contributed the largest fractions to total ARCTOS membership. Successful thesis defenses and new membership by e.g. several AeN related PhD students document the success and relevance of ARCTOS for the UiT MSc and PhD students.

UiT scientists were leading and involved in e.g. planning of ARCTOS workshops held on the UiT campus (e.g. fjord workshop), and were heavily involved in shaping planned Arctic research activities during 2020 (e.g. TUNU cruise, joint ARCTOS/AeN Barents Sea cruises), which however unfortunately were cancelled due to COVID19 outbreak.

Publication highlights:

Basedow SL, McKee D, Lefering I, Gislason A, Daase M, Trudnowska E, Falk-Petersen S (2019). Remote sensing of zooplankton swarms. *Scientific Reports*, 9(686). <https://doi.org/10.1038/s41598-018-37129-x>

Zhulay I, Iken K, Renaud P, Bluhm B (2019). Epifaunal communities across marine landscapes of the deep Chukchi Borderland (Pacific Arctic). *Deep Sea Research Part I: Oceanographic Research Papers*. 2019;151

The University Centre in Svalbard

2019 was a fruitful year for ARCTOS members at UNIS. Two ARCTOS PhDs successfully defended their theses and two new PhD students became ARCTOS members. Main scientific activities for UNIS faculty and student members were the project Nansen Legacy and participation in Q3 (August) and Q4 cruises

(December). There was also a strong ARCTOS involvement in the UNIS courses AB-330/830 Arctic Ecosystems in Ice Covered Waters (10 ECTS), AB-321/821 Ecology of Arctic Benthos (10 ECTS) and AB-310 Arctic Marine Molecular Ecology (10 ECTS).

Cheshtaa Chitkara – PhD candidate at UNIS



Cheshtaa has a master in marine environment and resources from a joint program between universities in France, Spain, Belgium and the UK. She moved from India to Norway in 2018 to work as a research assistant at UiT and in summer 2019 she started her PhD project at UNIS in Svalbard. She will study the diversity and gene expressions of certain genes of protists around Svalbard and at the IsA time series station in Isfjorden, by estimating the change in their diversity with respect to changing environmental conditions.

Publications highlights:

Marquardt M, Skogseth R, Wiedmann I, Vader A, Reigstad M, Cottier F, and Gabrielsen TM (2019). Vertical export of marine pelagic protists in an ice-free high-Arctic fjord (Adventfjorden, West Spitsbergen) throughout 2011-2012. *Aquatic Microbial Ecology* 83, 65-82. Doi 10.3354/ame01904.

Hatlebakk M, Graeve M, Boissonnot L, and Søreide JE (2019). Lipid storage consumption and feeding ability of *Calanus glacialis* Jaschnov, 1955 males. *Journal of Experimental Marine Biology and Ecology* 521, 151226. Doi. 10.1016/j.jembe.2019.151226.



Forskningsdagene 2019. Photo credit: Christine Dybwad

Stakeholder engagement

Forskningsdagene (research days)

Forskningsdagene is a national research festival with many different activities aimed at communicating research to the broad public. UiT has among other activities an open day for schools and an open day for the public. Both attract very many people and ARCTOS has been active on both days in 2019. The topic of the activities organized at the department of Arctic and Marine Biology was 'Polar night in the Ocean'. Visitors could find out why and how we do research in the polar night, and how different organisms find food and partners in

the darkness using bioluminescence, smell and sound by trying the different methods themselves. These popular activities were all created and overseen by ARCTOS members Coralie Barth-Jensen, Malin Daase, Morgan Bender, Christine Dybwad, Estelle Coguiac, Christine Gawinski, Ulrike Dietrich, Martí Arumí, Erin Kunisch, Tobias Vonnahme, Bernhard Schartmüller, and ARCTOS secretary Ulrike Grote, with the help of Master student Cassandra Granlund.



Teaching sea ice ecology on the ice of Van Mijenfjorden in Svalbard. One of the most liked posts on Facebook in 2019. From left to right: Ingrid Wiedmann, Janne Søreide, Jozef Wiktor, Rolf Gradinger, Malin Daase. Photo credit: Malin Daase

Social media

ARCTOS is present on Facebook (Arctos Research Network), Twitter (@ARCTOSnetwork) and Instagram (ARCTOS Research Network). However, activities on Twitter and Instagram were rather low in 2019,

probably also due to low activities on these channels among ARCTOS members. On Facebook, ARCTOS is quite active, with 28 posts in 2019, of which some have reached >800 people.

Arctic Futures 2050 conference

The Arctic Futures 2050 conference took place September 4-6, 2019 in Washington DC. ARCTOS was invited to contribute to the poster session that wanted to help policy makers and others understand how individual Arctic

organizations inform Arctic policy. ARCTOS member Paul Wassmann attended the conference as invited speaker and presented the poster.



ARCTOS: Creating synergies for research, training, and dissemination to end-users at the cutting edge of Arctic marine ecosystem studies

/ WHAT IS ARCTOS?

ARCTOS is a research network combining the expertise of educational, governmental and private research institutions from northern Norway (●) and beyond (○) to achieve an integrated view of Arctic marine ecosystems.

Unique access to and possibilities for Arctic marine research infrastructure



Important initiator of the Arctic Frontiers conferences:



ARCTOS member students and post-docs receive training, funding and mentoring via our Student Support Network



Coupling research with decision makers from government and business and

Cross-disciplinary workshops for early career scientists



Find out more about ARCTOS:



<http://arctos.uit.no>

More than 17 years of support from the six member institutions, and dedication of network members, have made ARCTOS a provider of cutting-edge and relevant research, and help foster a new generation of high-level ecosystem scientists for science and society.



Presented by:
Paul Wassmann
on behalf of ARCTOS



Benjamin Lange – post-doctoral researcher at NPI



Ben joined the network in late autumn after moving with his family from Canada to Tromsø. He is doing his research within the HAVOC project (Ridges – Safe HAVens for ice-associated Flora and Fauna in a Seasonally ice-covered Arctic Ocean, which is part of the MOSAiC expedition. Ben's research focusses on bio-physical interactions at multiple spatial scales using various approaches such as ground based measurements, autonomous instruments, underwater systems, airborne systems and satellite remote sensing.

Outlook 2020

Based on the successful year 2019, ARCTOS started with a flurry of activities into 2020 including the Young Scientist Forum, ARCTOS Days, and planning for a joint Arven etter Nansen / ARCTOS research expedition into the Barents Sea, tied to a UiT PhD level course. ARCTOS Days 2020 marked the planned leadership change in ARCTOS with Rolf Gradinger (UiT) being the new lead for ARCTOS after many successful years with Jørgen Berge guiding ARCTOS. The COVID-19 outbreak heavily impacted ARCTOS negatively with

cancellation of the planned ARCTOS research cruise and PhD course, hiatus on many research activities in the field and lab, and reduction of in-person meetings. ARCTOS adjusted fast and online seminar presentations started as well as regular Secretariat meetings. One science highlight this year is the participation of ARCTOS members on the international MOSAiC ice drift study with e.g. Ben Lange heading towards RV Polarstern for cruise leg 4 as this report is written.

ARCTOS will pick up the open tasks with a combination of online- and in-person meetings, renewed focus on the joint AeN/ARCTOS expedition planning for 2021, enhanced focus on career development for

early career scientists, ARCTOS seminars, and strengthening links among institutions and people. We also plan an outreach exhibit at Forskningsdagene in the autumn.



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