

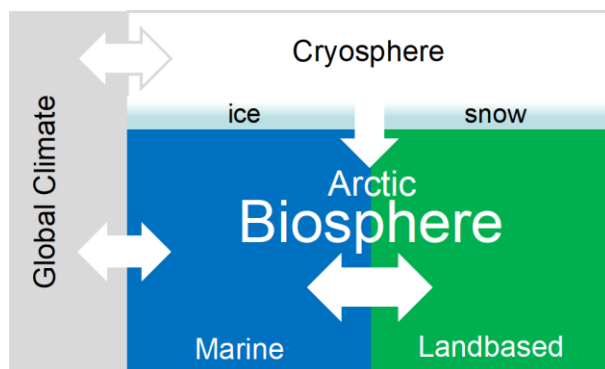
Arctic Biology – at the frontier

Strategy for the Department of Arctic Biology (AB) 2023-2027

The Department of Arctic Biology provides undergraduate and graduate education and covers a wide range of biological research areas related to our year-round presence in the High Arctic. Our strategy aims to strengthen our local, national and international role in research and education. It is founded upon curiosity-driven research, high scientific and pedagogic competence, and the urgent need to answer educational and research questions with high societal importance. The Green Strategy of UNIS is a key component and the impact of our activities on the environment is closely monitored with a view to minimizing detrimental actions while delivering high quality research and the Arctic experts of tomorrow.

Strategic research themes

The department aims to remain a leading institution in High Arctic biological research with cutting-edge methodology and infrastructure. Our goals embrace advancing the fundamental knowledge of the ecology,



adaptations, and diversity of Arctic species, formed by seasonal as well as long-term interactions with the biotic and abiotic characteristics of the Arctic environment. This includes human impacts. The strategy and special geographic opportunities that a permanent presence in the High Arctic affords.

Theme 1: Climate change biology

Climate change in the Arctic is rapid, especially so in the Svalbard region. Global warming and Atlantification leads to reduced sea ice cover in the

sea while on land the timing of the melt and distribution, form and quantity of snow-cover is altered. Capitalizing on the unique locality of UNIS, we aim to closely monitor these rapid changes and study how they impact the structure and function of Arctic ecosystems. This theme is intimately linked to understanding seasonality and inter-annual variability as well as the processes shaping Arctic ecosystems of today and tomorrow. This theme also provides an arena for cross-disciplinary excellence in collaboration with other UNIS departments.

Theme 2: Seasonal ecology

The Arctic is characterized by extreme annual variations in light and temperature; from complete darkness and sub-zero temperatures in winter to 24 hours of sunlight and above zero temperatures in summer. Arctic organisms inhabiting these extremely dynamic environments have evolved life history strategies that optimize timing of resource acquisition and trade-offs between growth, survival and reproduction. Seasonality and biological rhythms govern the timing of biological events (phenology), and timing adaptations are in turn tied to life history and population dynamics. In particular we aim to exploit our permanent presence in the High Arctic to understand the poorly studied Arctic winter. This theme integrates ecology and evolution/ adaptations and examines the interactions within, and between, species and their environment.

Theme 3: Biodiversity

This theme revolves around species and community diversity and includes consumer-resource interactions. Research questions include how communities vary in time, optimal utilization of resources, effects of species-environment interactions on population sizes and change, and the role of biodiversity in ecosystem functioning and resilience. The underlying processes behind these patterns are considered in relation to the characteristics of Arctic environments and the role of biodiversity in these processes.

Research objectives

AB shall:

1. coordinate at least one major project in each of the three strategic research themes.
2. obtain funding to secure long-term data series and move away from short term temporary and *ad hoc* funding solutions for time series data collection. Data will be properly archived and accessible according to FAIR principles.
3. secure relevant infrastructure and methodology for our research themes, both on land and sea.
4. increase the number of full-time faculty to 10 positions, technical staff to 2 positions, Ph.D. and post-doctoral to 10 positions (including 50% externally funded), and adjunct staff to 9 positions.
5. build close research collaborations with relevant groups of national and international partners in each theme.
6. advance scientific knowledge in each of the strategic research themes, as reflected by scientific publications.

Research action plan

(objective number in parentheses)

- arrange scientific workshops in the strategic research themes to facilitate project proposals (1, 3, 5)
- maintain and further develop long-term monitoring time series near Longyearbyen, including the ISA (Isfjorden Adventfjorden) marine station in Isfjorden, BIG (Bjørndalen Integrated Gradients), and the International Tundra Experiment (ITEX) sites in Endalen. Secure long-term funding for time series data collection (2, 3)
- work towards ensuring UNIS contributes to securing the continuation of important long-term data series and open access data archiving (2)
- determine the data series that belong to the Department rather than individuals (for example BIG, ISA) and assign coordinating responsibility to positions in the Department (2, 3, 4, 5)
- continue regular Collegium meetings to develop large research project applications from the department (all objectives)
- develop cross-disciplinary research approaches such as, but not limited to, biology and technology, oceanography and geology (1, 5)
- internal strategic funding will primarily be used in concrete actions towards the research objectives (1,2)
- internal Ph.D.s shall be linked to the strategic research themes (1)
- assess if the department is visible on appropriate committees and secure AB representation on important arenas for research strategies and funding including one representative on the funding committees of the RCN, and the committees of the Arctic Council (for example CAFF) and Framsenderet (1, 5)
- increase the quality of external applications by developing internal research proposal competence. Arrange an externally led course on application writing (1)
- examine the potential of developing the Gamle Nordlysstasjon or the UiT MAB hut as a terrestrial field station in Adventdalen and exploit opportunities afforded by the new Svea station in Van Mijenfjord (3)
- evaluate the future direction of the BIG initiative and integrate BIG with other field sites/stations (2, 3, 5)
- acquire and maintain adequate laboratory facilities for all staff including the experimental sea water laboratory, molecular and microscope laboratories. Ensure laboratory organisation is optimal and fit for purpose (3)
- assess the role of adjuncts in the Department and aim to expand involvement beyond teaching delivery and into departmental research activities (1, 5)

Strategic education and the learning environment

The department aims to strengthen its role as the preferred academic institution for learning Arctic biology through authentic experiences based on sustainable approach to the environment. Our educational philosophy is founded in a teaching-research nexus and should be research-based both in knowledge content and how we teach. Fieldwork and field activities are the core focus element around which all our courses are organized. Knowledge and skills are best mediated through student centered learning and active learning. Up-to-date curricula, innovative teaching methods, exposure to genuine research settings, and active involvement in ongoing research projects create motivated students and aid deeper learning.

Theme 1: Teaching culture

The department shall capitalize on, and continue to further develop, the established collegial teaching culture into educational practice. This will continue to sustain and expand arenas for sharing ideas, cooperation and peer review in order to develop knowledgeable and skilled educators with a scientific and reflective view on educational practice.

Theme 2: Field-based and Active learning

Our education shall be focused towards learning rather than teaching, using student active learning methods wherever possible. We shall take full advantage of our field-based education opportunity, anchoring all courses in field studies. Our course portfolios will continue to be well aligned with clearly defined learning outcomes, methods, and assessments. We shall use learning- and assessment methods that promote deeper learning, designed to meet the expected learning outcomes.

Theme 3: Relevant studies and skilled students; the next generation of Arctic expert

Our biology education shall be relevant and fulfil societal and scientific needs by connecting scientific knowledge, practical proficiency, transferable skills, and societal applications throughout the course portfolio. The department shall develop student production with an optimal use of resources such as field sites and field equipment, laboratory facilities and teaching capacities.

Education objectives

AB shall:

1. continue to utilize activities and tools created as part of the bioCEED Centre for Excellence in Biology Education to develop more reflective teaching and FieldPass projects. Anchor these activities in the teaching culture of the Department beyond the funding period of bioCEED and FieldPass initiatives
2. utilize cutting-edge, innovative learning methods that activate students and facilitate deeper learning
3. ensure adequate access to appropriate infrastructure including hotel ships and Ny-Ålesund
4. increase collaboration with international education actors in Svalbard, for example the Czech and Polish stations
5. work towards the UNIS goal of equal numbers of Norwegian and international students on all our courses
6. embed time-series data collection and data management/archiving (according to the FAIR principles) in appropriate courses and continue to develop the integration of undergraduate and graduate students in our ongoing research
7. develop a departmental course policy to guide new course development
8. develop courses that are well aligned with study programs at mainland universities
9. ensure that our courses are clearly visible in the study programs of mainland universities
10. coordinate our courses and course content to better facilitate longer student stays at UNIS
11. ensure teaching workloads are not excessive and equitably divided

Education action plan

(objective number in parentheses)

- continue to develop the Canvas Toolkit and implement on all AB courses (1, 2, 7, 11)
- all permanent teaching staff at AB shall attend bioCEED teacher course or similar. There shall be a focus on pedagogical competence (1, 2)
- develop and encourage the Ph.D. students to attend the TA course as part of their duty work to enhance teaching competence (1,2)
- initiatives developed during bioCEED shall be anchored in the teaching and philosophy of the department (1,2)
- Department staff shall actively contribute to the UNIS Learning Forum (1,2)
- teaching load should be arranged around the 1+1 policy of UNIS. Teaching load calculations should also take into account work load differences of course leaders amongst courses (2,11)
- assess the apparent over-proportion of Norwegian students on the Department's bachelor courses and the impact on student learning and experiences with BioCEED. Evaluate the quota system (including how we link to international institutions, for example the Scottish Association of Marine Sciences, SAMS). Determine if the Department attracts the correct students (5)
- Evaluate courses; in particular in accordance with the ECTS-system, formulate a priority inventory and seek funding for adequate teaching facilities and equipment that supports learning, and redesign course homepage to highlight course packages and package learning outcomes (2,3,5,6,8,9,10,11)
- implement emerging learning methods, for example certification, in field, laboratory and classroom settings (1,2,6)
- evaluate our current course portfolio and resources including establishing semester course packages in biology (2,7,8,9,10,11)
- develop a Department communication plan to promote our courses nationally and internationally (4,6) encouraging AB staff and students to use UNIS outreach channels to showcase AB work with the goal to attract semester students (4, 6)
- anchor the use of Duty Work planning in regard to course delivery and Ph.D. student teaching experience (5,8,9)
- develop the concept of student "ambassadors" for biology at UNIS (1,5,9,10)