

Arctic Biology – at the frontier

Strategy for Arctic Biology (AB) 2017-2021

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, founded upon curiosity driven, high scientific and pedagogic competence, promoting educational and research questions with high societal impact.

Strategic research themes

The department aims to become a leading institution in High Arctic biological research with cutting edge methodology and infrastructure. Our goals embrace advancing fundamental knowledge of the ecology and evolution of Arctic species, formed by the seasonal as well as long-term interactions with the biotic and abiotic components characteristic of the Arctic environment, including human impacts.

Theme 1: Climate change biology

Climate change in the Arctic is fast and severe. Global warming leads to reduced sea ice cover, and on land the timing of melt and amount of snow-cover is altered. Understanding how these changes impact the structure and function of Arctic ecosystems is urgent and of high importance. The theme is intimately linked to understanding seasonality (theme 2) and inter-annual variability as well as the processes (theme 3) that shape the Arctic ecosystem of today, and will provide 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; from complete darkness in winter to 24 hours of sunlight in summer. The theme integrates ecology and evolution and examines the interactions within and between species, and with the environment in which they are embedded. Arctic organisms inhabiting temporally varying environments have evolved life history strategies that optimize timing of resource acquisition and trade-offs between growth, survival and reproduction. Seasonality and biological rhythms are intimately linked with the timing of biological events (phenology), and timing adaptations are in turn tied to life history and population dynamics.

Theme 3: Spatio-temporal dynamics of species and systems

Space and time, and their many scales, are fundamental dimensions of ecology and evolution. The theme revolves around phenotypic as well as genotypic variability, single-species and consumer-resource interactions, in addition to multi-species diversity. The underlying processes behind the spatio-temporal patterns will be analysed in relation to the characteristics of Arctic environments and selection pressures.

Research objectives

1. AB shall coordinate at least one major project in each of the three strategic research themes
2. AB shall secure relevant infrastructure and methodology for our research themes, both on sea and on land
3. AB shall increase the number of fulltime faculty to 10 positions, technical staff to 2 positions, PhD and postdocs to 10 positions (including 50% externally funded), and adjunct staff to 9 positions
4. AB shall build close research collaborations with a relevant group of national and international partners in each theme

Research action plan (object no. in brackets)

- Arrange scientific workshops in the strategic research theme to facilitate project proposals (1,3,4)
- Develop cross-disciplinary research approaches, e.g. between biology and technology, oceanography and geology (1,2,4)
- Internal strategic funding will primarily be used in concrete actions towards the research objectives (1,2)
- Internal PhDs shall be linked to the strategic research themes (1)
- Secure AB representations on important arenas for research strategies and funding (1)
- Increase the quality of external applications by developing internal research proposal competence (1)
- Develop a terrestrial field station in Adventdalen (2)
- Improve sea water laboratory and other laboratory facilities (2)
- Maintain and further develop long-term time series near Longyearbyen, including the IsA marine station in Isfjorden (2)

Strategic education and learning environment

The department aims to be the preferred study site for learning Arctic biology through authentic experiences. Our educational philosophy is founded in a teaching-research nexus, and should be research-based both in knowledge content and how we teach. Knowledge and skills are best mediated through student centred learning and active learning. Updated curricula, exposure to authentic research settings, and active involvement in ongoing research projects create motivated students and aid deeper learning.

Theme 1: Teaching culture

The department shall develop a collegial and evolving teaching culture where the strengths of the research culture are brought into the educational practice. This should create 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: Active learning

Our education shall be focused towards learning rather than teaching, through the use of student active learning methods. We shall take full advantage of our field based education, aiming to provide courses and course portfolios that are well aligned in terms of learning outcomes, learning methods and assessments. We shall use learning- and assessment methods that promote deeper learning, designed to meet the expected learning outcomes.

Theme 3: Student production and relevant studies

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

Education objectives

1. AB shall continue to utilize the bioCEED Centre for Excellence in Biology Education to develop more reflective teaching
2. AB shall utilize up-to-date learning methods that activate students and facilitate deeper learning
3. AB shall improve the integration of undergraduate and graduate students in our ongoing research
4. AB shall link our courses better to our research themes
5. AB shall develop courses that are well aligned with study programs at mainland universities
6. Courses at AB shall be more visible in the study programs of mainland universities
7. AB shall coordinate our courses and course content better to facilitate longer student stays at UNIS

Education action plan (object no. in brackets)

- Establish a departmental educational forum, including course coordination and course evaluation (1,2,4,5,7)
- Contribute to a merit system for good teaching (1,2,3,4)
- Arrange regular open seminars facilitated by bioCEED, including lectures and educational reviews (1,2)
- All permanent teaching staff at AB shall attend bioCEED teacher course or similar (1,2,3)
- The frequency of lectures should be reduced with 20% from 2015-2020 (2,3,5)
- Increase the educational collaboration with other research groups in biological didactics (1,2)
- All AB courses should have a workload in accordance with the ECTS-system (2)
- Submit a research proposal for a project on field- and research based teaching (2)
- Make a priority list and seek funding for adequate teaching equipment that supports active learning (2)
- Implement emerging learning methods in field, laboratory and classroom settings (2)
- Develop internship course in biology (2,3)
- Incorporate the AB master students better with the department (3)
- Develop new courses in line with the outcome of the Svalbard White Paper (3,4)
- Develop a communication plan to promote our courses nationally and internationally (4,6)
- Establish semester course packages in biology (4,7)
- Establish PhD meetings, e.g. for coordination, teaching load and information (5)
- The adjunct positions should contribute to our bachelor studies (5)
- Establish a scientific contact network in biology at all mainland universities (6)
- Establish student "ambassadors" for biology at UNIS (6)