

ANNUAL REPORT 2016



UNIS

The University Centre in Svalbard

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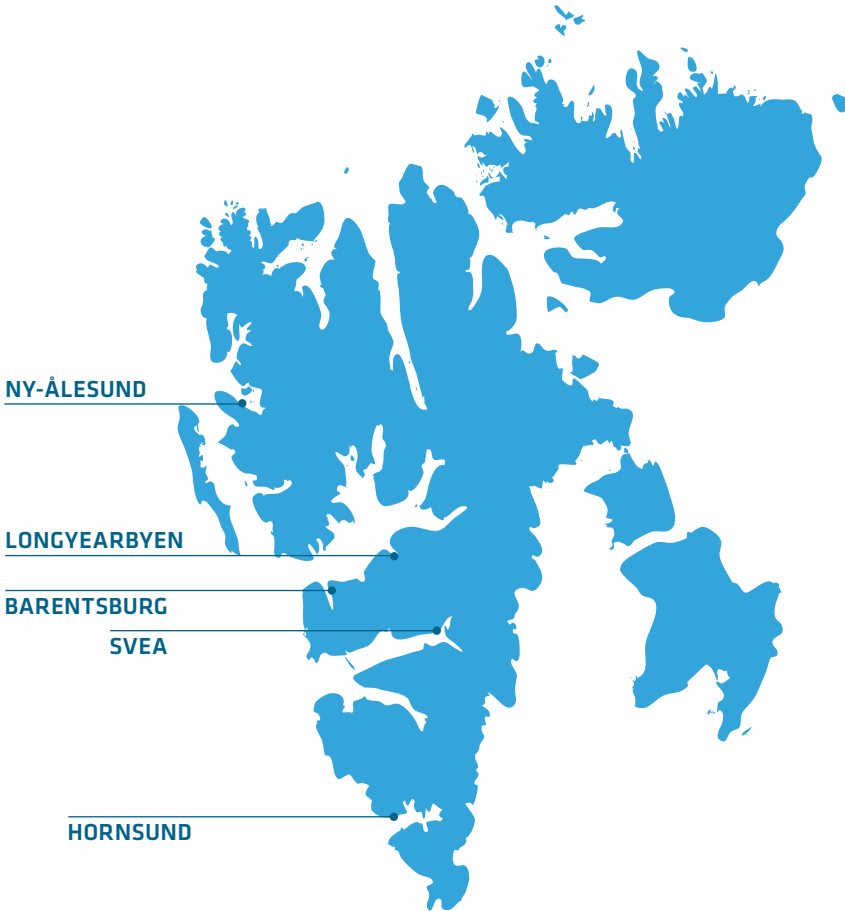
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NY-ÅLESUND

LONGYEARBYEN

BARENTSBURG

SVEA

HORNSUND



SVALBARD

FROM THE DIRECTORS



Frank Nilsen and Harald Ellingsen. Photo: Eva Therese Jenssen/UNIS.

UNIS continues to grow. A total of 759 students from 43 nations were admitted to our 97 courses in 2016. This was an increase of nearly 70 students and resulted in a total production of 214 student-years in 2016, an increase of 12 student-years from 2015. The whole organization is working hard to reach the target of 220 student-years the Ministry of Education and Research has set for UNIS, a target we are within. UNIS is continuously working in close collaboration with all the Norwegian universities to design an Arctic profile within existing study programmes at the mainland universities. This will secure a stable recruitment of students to UNIS and make the Norwegian universities more attractive in times when focus is on the Arctic and climate change.

This year we can report on yet another high publication rate. A total of 147 publications in authorized publication channels and peer-reviewed journals have been registered for UNIS in 2016. UNIS is an attractive partner in research projects and has an important role in three Centres of Excellence within three different departments at UNIS. We are a partner in SAMCoT: Centre for Research-based Innovation in Sustainable Arctic Marine and Coastal Technology (led by NTNU); bioCEED: Centre for Excellence in Biology Education (led by University of Bergen); and the Birkeland Centre of Excellence for Space Science (led by University of Bergen). These Centre partnerships, acquired in public competitions, show that UNIS is recognized as a high quality institution within Arctic science and education.

The Norwegian government's white paper on Svalbard (*Svalbardmeldingen*) and the future development of UNIS were presented and discussed during numerous positive and constructive meetings at UNIS. Our dialogue with the Ministry of Education and Research and many of the parliamentary committees, was very good and helpful in the

development strategy of UNIS. The white paper on Svalbard was presented by the State Secretaries Gjermund Hagesæter and Bjørn Haugstad in Longyearbyen on 11 May 2016. In the white paper, the government indicated that they want to take care of and further develop UNIS as a unique institution for research-based education, with research and education activities that utilize the natural advantages Svalbard provides. During meetings with politicians, advisors and during the hearing in the Norwegian Parliament 29 September 2016, UNIS made it clear that we are ready to take a larger role in Svalbard and in the local community, and that the Norwegian mainland universities need to take a larger responsibility for including our UNIS courses as an Arctic profile in their existing study programmes. The following process in late 2016 and in 2017 has shown that our input has had an impact on the white paper on Svalbard and on the Norwegian mainland universities' UNIS strategy.

During the course of 2016, UNIS has had a change of hands on the helm. Harald Ellingsen replaced interim director Frank Nilsen on 1 October 2016. We are both honoured and proud to have been given the responsibility to lead this great institution in times of new opportunities, and the development of UNIS as a leading centre for Arctic science and higher education will continue.

Frank Nilsen
Acting Managing director
February – September 2016

Harald Ellingsen
Managing director
October 2016 -

EXCERPT FROM THE BOARD OF DIRECTORS' REPORT 2016

The University Centre in Svalbard AS (UNIS) was established as a state-owned limited corporation on 29 November 2002. This company replaced the original foundation established in 1994 by the Norwegian University of Science and Technology (NTNU), the University of Bergen (UiB), the University of Oslo (UiO) and the University of Tromsø (UiT). Since 2011, UNIS AS has had an identical collaboration agreement with the eight universities on the Norwegian mainland. The enterprise's objective is to provide tuition and engage in research of high international quality based on Svalbard's geographic location in the High Arctic and the special advantages this offers. The educational provision shall act as a supplement to the tuition offered at the universities and form part of the ordinary programmes of study that culminate in degrees at Bachelor, Master and PhD level. The educational provision shall have an international profile, and all tuition shall be given in English. There shall be a balance between Norwegian and international students.

The University Centre in Svalbard AS (UNIS) is wholly owned by the Ministry of Education and Research.

INTRODUCTION

The accounts for both 2015 and 2016 show significant deficits. This has necessitated far more rigorous financial control, which will have an influence on operations in 2017.

There is a positive trend in the student production at UNIS, and a further increase of 12 student-labour years was achieved in 2016. The provision of studio apartments for students, which is managed by the Arctic Student Welfare Organisation, no longer meets the requirements during the most intense seasons. Furthermore, there is concern that, per the avalanche hazard report by the Norwegian Water Resources and Energy Directorate (NVE), the student apartments in Nybyen are in an area prone to avalanches. These student apartments must be replaced.

The collaboration with the universities will be of high priority in the future. This will occur in accordance with the collaboration agreement with the universities in mainland Norway through the appurtenant plans of action. To further strengthen this cooperation, UNIS is working to develop the teaching into educational provisions that last a full semester so students can spend full semesters or years at the institution. The Board of Directors has high expectations for this process and believes it will be a win-win situation for all parties.

The teaching at UNIS shall be research based. Consequently, it is essential for UNIS to perform relevant research to support the teaching and for other purposes. UNIS will continue its efforts in the research centres and major research projects in which it participates and seek to participate in new research centres/projects. Moreover, UNIS wishes to strengthen its externally funded component of the research.

While that UNIS will maintain focus on research and education of high quality in the Arctic, the institution is considering developing new programme options such as "Safety in the High Arctic" and "Arctic tourism". UNIS also wishes to further develop its community-sustaining role in Longyearbyen.

Work on further developing UNIS is a continuous process, which will continue in 2017.

The organisational development process has so far resulted in the establishment of three sections in the technical and administrative departments; the Section for economy as part of the administration, the Section for operations and field safety and the Section for property under the technical department.

UNIS is very involved in the process of preparing the basis for the government's strategy for research and education in



7 November 2016: The Governor of Svalbard evacuated the Nybyen student housing due to an expected rainstorm and concern about landslides. The students registered in the UNIS cafeteria and got assigned temporary housing. Photo: Eva Therese Jenssen/UNIS.



February 2016: Panorama image of the Svalbard Science Centre and lower part of Longyearbyen. Photo: Magnus Heide Andreassen/UNIS.

Svalbard. UNIS anticipates that this strategy will guide the further development of the institution in the coming years.

From the Board's perspective, UNIS has taken new steps towards achieving its overall goal of being a leading international centre for Arctic studies.

EDUCATION

Our commission from the Ministry of Education and Research for 2016 has been to “develop an educational provision that represents approximately 220 student-labour years”. UNIS offered 97 different courses 2016. Collectively, this represents an educational provision of 246 student-labour years. A total of 214.4 student-labour years was produced in 2016, which is an increase of 12 student-labour years from 2015. Of this, 19.5 student-labour years constitutes the production by guest Master's students. Consequently, we are very satisfied with the achievement of our goals related to overall student production in 2016.

THE STUDENT MASS

A total of 759 students from 43 countries took courses at UNIS (690 students from 44 countries in 2015). Of the student mass, 51% were women and 49% men. A total of 48 guest Master's students (students with contractual agreements) worked on UNIS-related Master's theses in 2016.

In 2016, there were 339 Norwegian degree students at UNIS. This accounted for 45% of the student mass*. These were divided as follows between the Norwegian universities: 107 from UiT, 92 students from NTNU, 57 from UiB, 34 from UiS, 27 from UiO, 15 from NMBU, 5 from Nord University and 2 from UiA. In addition to the Norwegian degree students listed above, most of the institutions also have students via exchange agreements.

In 2016, a total of 251 Norwegian citizens took courses at UNIS (33%). Moreover, 11% of the student mass came from

the other Nordic countries. Germany, the Netherlands and the United Kingdom had the highest proportion of international students. The proportion of students from Russia has dropped from 6% to 4%, which may be explained by the phasing out of grants from the Norwegian Centre for International Cooperation in Education (SIU) for amongst other Russian students.

COOPERATION WITH THE UNIVERSITIES - THE QUOTA SCHEME

In 2014, a quota scheme was established for students from the universities on the Norwegian mainland. Quotas for UNIS courses were renegotiated in 2016, which is in line with the agreed quota scheme. A new distribution of quotas for 2017-2019 was recommended by the meeting of Deans in August 2016. Overall, the number of quota places increased from 674 to 932. It is anticipated that this, combined with the fact that many UNIS courses chose to offer quota places far beyond 50% of the course's capacity, will be reflected in the statistics for Norwegian degree students in 2017. The experience to date is that this quota scheme has had little negative impact on the admission quality.

RESEARCH AND ACADEMIC INITIATIVES - EXTERNAL FUNDING

UNIS has ambitious goals for its research and is participating in several major initiatives aimed at establishing national and international centres. However, several externally funded initiatives have recently been discontinued or are in the process of being discontinued. Hence, UNIS requires a significant intensification of its efforts to generate new initiatives.

The motivation is both to ensure a high quality research environment, contribute to the knowledge front about Arctic issues, generate innovation and business development both locally and nationally and substantiate research-based education. Collaboration with strong national and

* As of 2014, UNIS is stating the Norwegian proportion based on the student's programme affiliation at the Norwegian universities and not only Norwegian citizenship.



international academic environments through participation in research projects will be an important tool for the further development of the institution.

DISSEMINATION

UNIS remained popular among both the international and national media. In 2016, there were more than 200 media reports in channels such as *National Geographic*, *Australian Broadcasting Corporation*, *El País* (Spain), *The Independent* and *Huffington Post*.

UNIS is popular among the official delegations and groups which visit Longyearbyen. In 2016 UNIS was visited by around 100 national and international groups of various sizes. Several standing committees from the Norwegian parliament and several European ministers, including the French Environment Minister, Ségolène Royal, were among these.

Each winter UNIS, the Norwegian Polar Institute and the Governor of Svalbard organise the popular Svalbard Seminars for the local population of Longyearbyen during the Polar Night. Each seminar evening in 2016 was attended by more than 100 people. In June UNIS participated in UiT's Outreach cruise, and arranged the Svalbard Course and Studietur Nord later in the summer, all of which received positive feedback.

STAFF

As of 31 December 2016, the academic staff at UNIS comprised nine professors, 16 associate professors, two researchers, 10 post docs, 22 PhD candidates and 48 with adjunct professor/associate professor attachments. The technical and administrative staff comprised 45 full-time equivalent work years.

Women accounted for 53% of the technical and administrative positions, 50% of the academic positions and 51% of the students. Seven of the 11 members of the Board of Directors were women. The Board of Directors is not aware of discrimination of any form at UNIS.

STAFF HOUSING AND STUDENT APARTMENTS

At year-end UNIS owned a total of 53 housing units. To cover up the remaining needs, UNIS rents 38 housing units for staff from various businesses in Longyearbyen. The avalanche hazard mapping for Longyearbyen presented in January 2017 shows that UNIS has 21 housing units in areas prone to avalanches and landslides.

In previous years, the Arctic Student Welfare Organisation had 232 studio apartments for students. These were used by both UNIS students and Arctic nature guide students from UiT. A student barrack of 24 apartments was destroyed in the storm in December 2015, leaving a total of 208 studio apartments. These are in Nybyen and adjacent to UNIS in Sjøskrenten.

The avalanche hazard mapping shows that the student housing in Nybyen is in areas avalanche prone areas, and the Student Welfare Organisation has signalled that it wishes to move the entire student housing to Sjøskrenten.

Satisfactory living conditions is essential for UNIS, and the Board of Directors emphasizes a continuation of the good cooperation with the Arctic Student Welfare Organisation. UNIS is in regular contact with the student welfare organisation and is cooperating to contribute to further new studio apartments for students being able to be realised as quickly as possible.

SOCIAL RESPONSIBILITY

UNIS shall be a resource for the local communities in Svalbard. This applies to the staff, students and the knowledge we possess. The staff shall live and work in Longyearbyen and contribute to the development of the institution and the community. Everyone shall engage themselves in the community's social and cultural life rather than starting their own clubs or societies.

UNIS employees are also significant resource persons in evaluating the avalanche danger in and around Longyearbyen as well as contributing actively to local events such as the music festival Polarjazz, the Svalbard Ski Marathon, etc.



March 2016: Arctic geology students at Festningen, at the mouth of Grønfjorden.
Photo: Øystein Grasdal/UNIS.



February 2016: A couple of reindeer eating lunch in front of

HEALTH, SAFETY AND ENVIRONMENT

Absence due to illness at UNIS in 2016 was 3.86%. The institution has an agreement with Longyearbyen Hospital regarding occupational health services and is certified as an IA enterprise. HSE at UNIS is systemised to implement all activities for students and staff in a safe manner. We have special focus on implementing fieldwork and cruise activities in Arctic areas with small margins in a manner that is as safe as possible. UNIS has had special focus on the psychosocial working environment throughout 2016. External expertise has been used to run several seminars on stress management and communication. These seminars have among other things resulted in a code of conduct that will form part of the basic values at UNIS.

The regulations concerning access to firearms through UNIS were revised in 2016. As of 1 January 2017 users will require formal documentation from the Police authorities to gain access to firearms.

UNIS' location in the High Arctic provides special challenges in the entire HSE spectrum. It is particularly important to take a proactive approach in our responsibility for the safety of our students and staff when travelling in the Svalbard nature. Safety is the number one priority at UNIS. Quality assurance of the planning and implementation of field-based projects is

implemented in a structured manner with strict requirements for work procedures and methods.

Work at UNIS' laboratories is subject to the same quality assurance principles as work in the field. UNIS cooperates closely with the local authorities at the Office of the Governor of Svalbard and the Longyearbyen Community Council to find good solutions, particularly concerning UNIS' activity in the field.

UNIS' internal regulations are based on the formulation of objectives from the Svalbard Environmental Protection Act, which states that in the event of conflict between the activity and the environment priority must be given to environmental considerations. UNIS is working in a purposeful manner to ensure that the special safety aspects associated with laboratory and field activities shall be governing for all activities.

UNIS is unaware of contamination of the wider environment to any significant degree due to the company's operations. UNIS is working continually to limit the environmental impact of its activities.

ECONOMIC DEVELOPMENT

Funds for operation and investments at UNIS are appropriated in the budget of the Ministry of Education and Research.



the Svalbard Science Centre. Photo: Anja Strømme/UNIS.



August 2016: The French Minister for Environment, Energy and International Climate, Ségolène Royal, visited UNIS and met with our French students. From left: Dorota Jazwicki; Aurelie Gourdon, Royal, Amélie Roche and Guillaume Mercier. Photo: Eva Therese Jenssen/UNIS.

In 2016 appropriations from the Ministry totalled NOK 125,360,000, of which NOK 97.5 million constituted base funding, NOK 2.6 million investments in equipment and NOK 25.2 million rent/operation of the Science Centre and KHO.

Income over and above the appropriations from the Ministry of NOK 60.5 million comprises NOK 45 million in external project income for research and NOK 15.5 million in income from consultancy services and rentals.

The annual accounts for UNIS for 2016 show an operating deficit of NOK 5.9 million. We had a similar operating deficit in 2015. The reason for the deficit in 2015 is primarily due to an excessive cost level, especially related to boat rental, pension insurance and housing for employees. For 2016, the deficit is primarily linked to optimistic budgeted revenues. This applies to both financial income, rental income and other operating income.

Climate change in recent years has also meant that many homes, which were previously thought to be safe for landslides and floods, are now in vulnerable areas. This has resulted in increased housing costs for both employees and students.

The annual accounts have been prepared on the basis of continued operations. The basis for the assessment is the budget

for 2017 with the measures taken. It is for 2017 budgeted with a zero result. This is based on the fact that some vacant positions are not yet replaced, that we delay investments and that we have established procedures that ensure that we get the right price for the services we provide externally. We will build up a solid equity in the coming years.

BOARD OF DIRECTORS AND ANNUAL GENERAL MEETING

The Board of Directors held four meetings in 2016, one of which was in Longyearbyen. A total of 61 items were officially discussed. The Annual General Meeting was held in Oslo on 15 June 2016.

LONGYEARBYEN, 3 APRIL 2017:

Chair Berit Kjeldstad (NTNU); Deputy chair Jarle Nygard (University of Oslo); Morten Hald (University of Tromsø); Lise Øvreås (University of Bergen); Eva Falleth (Norwegian University of Life Sciences); Nina Frisak; Arild Olsen (Longyearbyen Community Council); Elise Strømseng, Pernille Bronken Eidesen and Eli Anne Ersdal (staff representatives); and Natalie Forseth (student representative).

EDUCATIONAL QUALITY

By Ane H. Bjørsvik, Head of Department of Academic Affairs

In 2016, the process of revising the UNIS quality assurance system for educational activities continued throughout the year (finally approved in February 2017). The quality system is built upon the basis of the quality systems at the Norwegian universities and is anchored at these institutions through hearings during systems revisions. This ensures that UNIS has a quality system recognizable for- and accepted by our cooperating Norwegian universities. The intent is that we in the future will have clear overall goals for educational quality that will also be quantitatively measured through revised course evaluations and through formal notice systems.

The quality assurance system for educational activities at UNIS shall secure high quality and continuous focus on improvements in all educational activities. The UNIS strategy emphasizes that UNIS shall offer research- and field-based courses of high quality where students are actively involved, with a high standard learning environment and a close follow-up of students. The system has a clear definition of roles, responsibilities, tasks and processes that contribute to the fulfilment of these goals. The quality system also includes links to administrative routines and regulations at UNIS.

The UNIS Education Committee (ECom) is responsible for the work on educational quality. The Board of Directors has the overall responsibility for education and educational quality

at UNIS and receives an annual report on educational quality. The report is based on findings in student evaluations, input from different parts of UNIS which has direct influence on the education quality and the educational setting, as well as student statistics. For 2016, both the level of admission and examination results among UNIS students were high, and the percentage of failed exams were lower than in 2015. The feedback UNIS receives from the students show that they to a high degree experience a good learning environment, but they still voice the need for study rooms and group rooms, and that some infrastructure and facilities are in need of upgrade. The intensity and workload in especially intensive courses (2-6 weeks) are reported to be challenging for some students. In 2016, ECom outlined the first report on teaching capacity at UNIS, showing that scientific staff members in 2015 use more than 40% on teaching. A similar report will be produced for 2016.

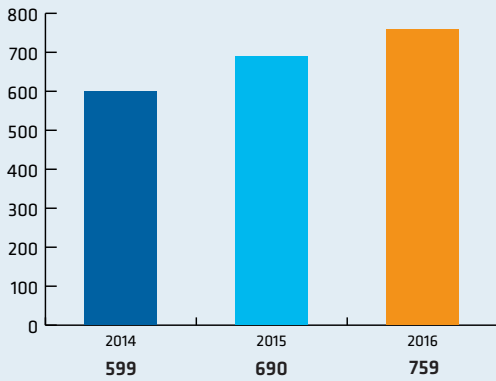
UNIS' participation in the Centre of excellence in education, bioCEED, has contributed to further strengthen the educational quality focus. bioCEED has made available resources and competences in educational quality for our staff, and organizes together with ECom the annual UNIS Learning Forum. In 2016, the Learning Forum had 59 participants for 2 days focusing mainly on course alignment and student active learning.

February 2016: The students in AB-203 Arctic Environmental Management have a role-playing workshop. Photo: Magnus Heide Andreassen/UNIS.

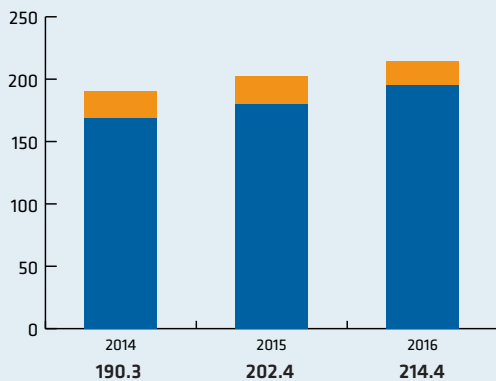


STATISTICS

TOTAL NUMBERS OF STUDENTS



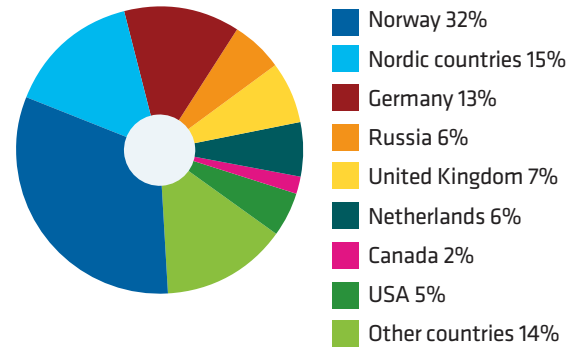
PRODUCTION IN STUDENT-LABOUR YEARS (1 YEAR = 60 ECTS CREDITS)



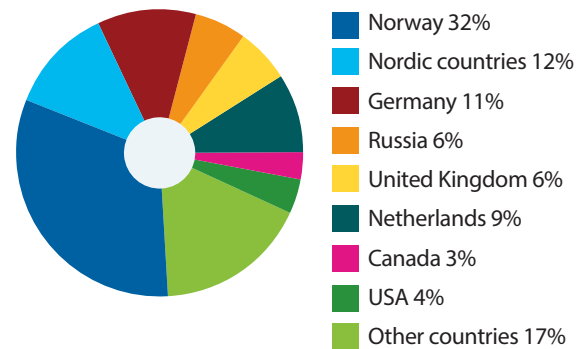
■ Course ECTS ■ Master ECTS

Note: UNIS registers ECTS by 1) course production and 2) master students attendance

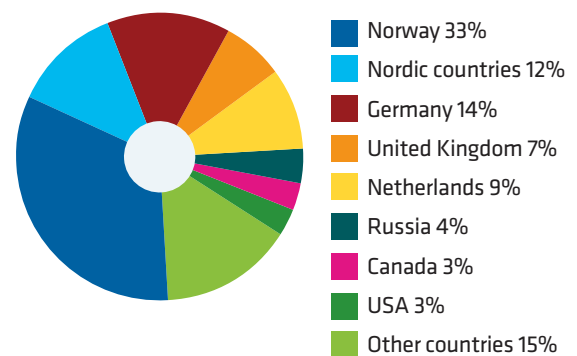
STUDENT NATIONALITY 2014



STUDENT NATIONALITY 2015



STUDENT NATIONALITY 2016



PROFIT AND LOSS ACCOUNT 2016

GROUP*			University Centre in Svalbard AS	
2016	2015		2016	2015
NOK	NOK		NOK	NOK
		OPERATING INCOME		
125 360 000	121 827 000	Operating grant from the Ministry	125 360 000	121 827 000
-2 611 902	-6 220 860	Appropriation for investments	-2 611 902	-6 220 860
122 748 098	115 606 140	Operating grant from the Ministry	122 748 098	115 606 140
44 536 661	48 442 879	External project income	44 993 136	48 467 514
2 173 321	3 741 285	Operating grant from sponsors	0	0
14 515 617	17 650 809	Other incomes	15 515 617	17 650 809
183 973 697	185 441 113	Gross operating income	183 256 851	181 724 463
37 708 244	41 904 593	Direct project expenses	37 708 244	41 994 593
146 265 453	143 536 520	Net operating income	145 548 607	139 729 870
		OPERATING EXPENSES		
76 763 064	71 664 830	Salary and related expenses	76 763 064	71 276 616
10 421 626	10 687 246	Fieldwork and cruise	10 421 626	10 687 246
651 362	3 092 654	Consultancy services	0	0
33 901 623	35 271 046	Buildings	33 901 623	35 271 046
28 510 927	26 095 629	Other operating expenses	28 505 727	25 760 155
1 740 000	1 987 849	Depreciation	1 740 000	1 987 849
151 988 602	148 799 255	Sum operating expenses	151 332 040	144 982 913
-5 723 149	-5 262 735	OPERATING SURPLUS	-5 783 433	-5 253 043
		FINANCIAL INCOME AND EXPENSES		
756 669	916 614	Financial income	753 750	905 148
837 806	1 062 055	Financial expenses	835 758	1 060 281
-81 137	-145 441	Net financial items	-82 008	-155 133
-5 804 286	-5 408 176	Net profit for the year	-5 865 441	-5 408 176
		Information about appropriations to:		
		Transferred from/to other equity	-5 865 441	-5 408 176
		Sum transfers	-5 865 441	-5 408 176

* The UNIS group consists of the University in Svalbard AS and the subsidiary company UNIS CO₂ lab.

BALANCE SHEET 31.12.2016

GROUP*			University Centre in Svalbard AS	
2016	2015		2016	2015
NOK	NOK		NOK	NOK
		FIXED ASSETS		
		Fixed assets (tangible)		
34 641 208	36 381 208	Buildings	34 641 208	36 381 208
34 641 208	36 381 208	Sum tangible fixed assets	34 641 208	36 381 208
		Fixed assets (financial)		
0	0	Investments in subsidiary company	100 000	100 000
0	0	Shares in Svalbardhallen	0	0
0	0	Sum financial fixed assets	100 000	100 000
34 641 208	36 381 208	Sum fixed assets	34 741 208	36 481 208
		CURRENT ASSETS		
0	147 409	Inventory	0	147 409
4 967 149	4 409 852	Accounts receivable	8 047 709	5 977 735
5 374 677	6 687 096	Other short-term receivables	5 374 677	5 642 386
15 278 672	32 517 494	Cash and bank deposits	12 036 956	31 840 668
25 620 498	43 761 851	Sum current assets	25 459 342	43 608 198
60 261 706	80 143 059	SUM ASSETS	60 200 550	80 089 406
		EQUITY		
		Accumulated equity		
100 000	100 000	Share capital	100 000	100 000
1 954 025	1 954 025	Other accumulated equity	1 954 025	1 954 025
2 054 025	2 054 025	Sum accumulated equity	2 054 025	2 054 025
		Retained equity		
8 304 978	14 109 262	Other equity	8 243 822	14 109 262
8 304 978	14 109 262	Sum retained equity	8 243 822	14 109 262
10 359 003	16 163 287	Sum equity	10 297 847	16 163 287
		LIABILITIES		
		Allowances for liabilities		
0	1 132 898	Deferred income	0	1 132 898
0	1 132 898	Sum allowances for liabilities	0	1 132 898
		Other long-term liabilities		
18 368 356	21 633 305	Housing loan	18 368 356	21 633 305
18 368 356	21 633 305	Sum other long-term liabilities	18 368 356	21 633 305
		Short-term liabilities		
3 761 672	3 964 165	Trade creditors	3 761 672	3 910 512
2 437 503	6 080 987	Public fees and duties	2 437 503	6 080 987
25 335 171	31 168 418	Other short-term liabilities	25 335 171	31 168 418
31 534 346	41 213 570	Sum short-term liabilities	31 534 346	41 159 917
49 902 702	63 979 772	Sum liabilities	49 902 702	63 926 119
60 261 705	80 143 059	SUM EQUITY AND LIABILITIES	60 261 705	80 089 406

* The UNIS group consists of the University in Svalbard AS and the subsidiary company UNIS CO₂ lab.

ARCTIC BIOLOGY

The Arctic Biology (AB) department provides a full one-year curriculum of undergraduate studies, including a summer course on identification of Arctic species, as well as a range of Master and PhD level courses in biology. The department conducts research in climate change biology, seasonal ecology and spatio-temporal dynamics of species and systems. Our strategy will strengthen our local, national and international scientific role, founded upon curiosity-driven, high scientific competence and year-round presence in Svalbard.





By [Børge Damsgård, Head of Department](#)

PEOPLE

At the end of 2016, the AB department consisted of three professors, five associate professors, two support positions, six PhD students and nine adjunct professors.

Børge Damsgård from UiT The Arctic University of Norway was appointed as professor in marine biology and head of department from 1 January 2016. Øystein Varpe completed his Fulbright Arctic Initiative in October 2016. Tove M. Gabrielsen finished her sabbatical year at the Université Laval, Quebec City, Canada, in August. Anna Vader was appointed associate professor from 1 October 2016. Professor Ingibjörg Svala Jónsdóttir and adjunct professor Kevin Newsham ended their contract with UNIS 31 December 2016, and Jónsdóttir started a two-year contract as adjunct professor.

EDUCATION

A new course, *AB-207 Research Project in Arctic Biology* (15 ECTS), was given for the first time in 2016. The course provides bachelor students with a hands-on insight to cutting edge biological research, and gives them an opportunity to conduct their own defined research project, in close collaboration with the research staff at the department.

The bioCEED Centre for Excellence in Biology Education is now well established with a range of educational research and development projects. Locally the department has organized a range of forums for teaching and educational development and several of our teaching staff has during the year attended the collegial teaching course given by bioCEED. The bioCEED student representatives are well involved in bioCEED and are an important link between the ongoing bioCEED activities and our biology students. In 2016 the student representatives participated at the ISSOTL (*Annual Conference of the Society of Scholarship of Teaching and Learning*) in Los Angeles, USA, and later shared the highlights from the conference with UNIS staff and students at an open seminar.

Developing and testing new teaching and learning methods and technologies is at the core of the bioCEED student centred educational development programme, and several methods have been tried out during 2016. The department has continued the development of the online statistical tool bioSTAT, and is continuously working on implementing this into our bachelor courses. Another important teaching project is *Teach to Learn* (TE2LE) which aims to stimulate students' creativity and develop their collaborative, communicative and pedagogical skills. Students create video tutorials to teach their peers key scientific concepts such as laboratory practices, fieldwork methods, statistic, scientific writing and health, safety and environment (HSE). Team-based learning is another pedagogical method that is tested out in some of

our courses. Based on a bioCEED initiative, the *National Forum for Educational Leadership in Biology* had its first regular meeting back-to-back with Biofagrådet in March 2016. The Forum is an arena for exchange of leadership ideas and experiences on current practices and trends in educational leadership relevant to all biology departments at Norwegian universities. In June 2016 two of the UNIS bioCEED team members attended the RIVA meeting at Virginia Tech, USA, (*Global Conversation on Assessment, Evaluation, and Quality in Higher Education*), to discuss teaching and education and to learn more about the flipped classroom concept.

RESEARCH

The project MicroFun (*Unveiling the hidden communities of the Arctic – new methodology opens a black box of knowledge about arctic microorganisms; their diversity, function, and potential use*), that encompassed both terrestrial and marine research, ended in 2016. So far the project has resulted in two PhD degrees, six master degrees, numerous presentations at international conferences, a book chapter and 13 scientific papers. Results from MicroFun show immense diversity of Arctic microbial eukaryotes, with surprisingly high species richness in winter. Many novel species were discovered, some abundant, suggesting important ecological functions. Disclosure of unknown widespread gene activities suggests that many functions remain to be discovered. Large community variation at temporal and spatial scales was found, with much of the variation remaining unexplained. To fully untangle temporal drivers of microbial communities, and to disentangle natural variation from changes induced by climate change, long-term monitoring studies are required.

The Isfjorden Adventfjorden (IsA) high-resolution marine time series station was established as part of the MicroFun project. The time series has now run for six years, providing weekly to monthly data on hydrography as well as diversity and community composition of microbial eukaryotes and larger plankton. In autumn 2016 an online underwater observatory was deployed by UNIS at Vestpynten in the Adventfjorden entrance. This mooring provides real time data on oceanographic conditions, light and photosynthetic biomass; important background information for understanding biological alterations within the Arctic marine ecosystem.

UNIS has as part of Isfjorden Marine Observatory System (RCN, 2015-2018) continued its seasonal plankton time series in Isfjorden with four cruises in 2016 (January, May, August and October). Meroplankton is an important component of the Isfjorden zooplankton community in spring and summer and continued research on this poorly known group was secured by new funding from the Fram Centre, Tromsø. These larvae may also be found in sea ice using sea ice as a nursery area. In parallel with plankton sampling in the year-round sea ice free Isfjorden, studies of the plankton and sympagic (=ice associated)

August 2016: During the AB-201 field cruise students help scientists in Ny-Ålesund take samples of Barnacle geese. Photo: Marie Westvik/UNIS.





meiofauna was conducted in the seasonal ice covered Van Mijenfjorden. Comparative plankton studies in Isfjorden and Van Mijenfjorden will provide important knowledge for predicting potential impacts of climate change on Arctic coastal ecosystems.

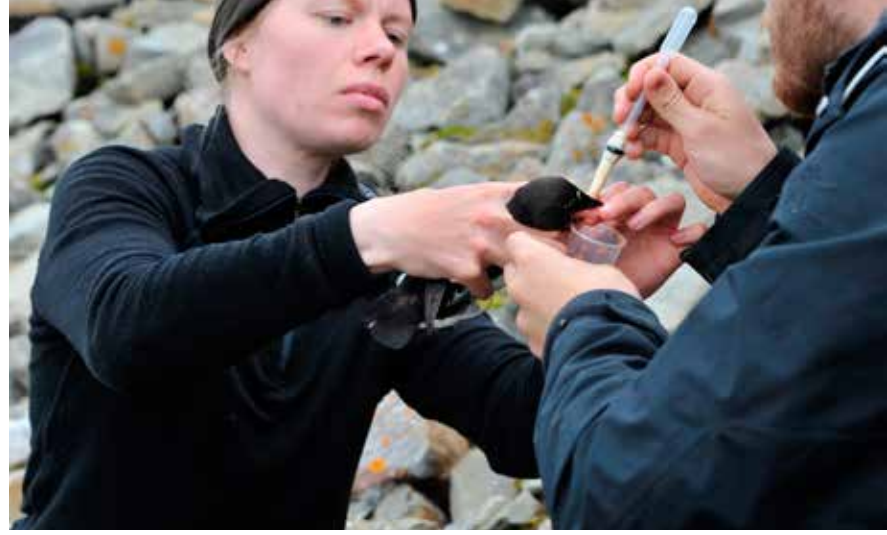
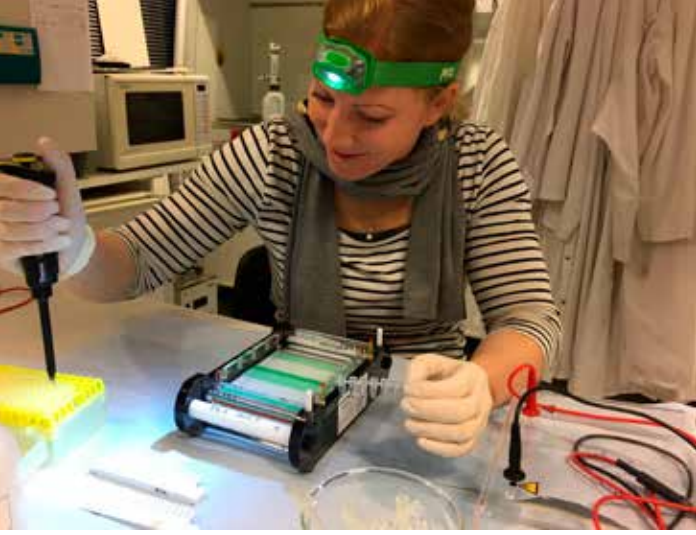
In the FAABulous project (*Future Arctic Algae Blooms - and their role in the context of climate change*; RCN 2015-2019) we have followed the phytoplankton development in Kongsfjorden and van Mijenfjorden from autumn 2015, using a combination of autonomous water samplers and ordinary sampling. Although sea ice formation in van Mijenfjorden in 2016 was record low, which led us to postpone our main sea ice work; we documented strong differences between the two fjord systems, based on the difference in advection of Atlantic water. We expect this to be reflected in phytoplankton species composition as well.

As part of the ongoing research on the structure and function of terrestrial ecosystems, AB has been part of developing suitable analytical tools for investigating biological systems characterised by multiple consumer-resource interactions where ecological mismatches may arise due to uneven responses to climate change. For such biological network analyses, structural equation models proved to be particular useful and was successfully tested on long-term data from a high Arctic tri-trophic system of plants, insects and waders. Our terrestrial research platform *Advendalen Integrated Research Operations* (ANCHOR) embraces such multidimensional approaches to better understand the spatio-temporal changes in the population dynamics of Arctic species and how they interact in an environment under a warming climate.

Together with other departments at UNIS, AB heads a new interdisciplinary project SVALGREEN to enable Svalbard and Greenland-based researchers to identify and develop research and education possibilities that embrace the entire climate gradient across the Fram Strait between Svalbard and northern Greenland.

AB continued to solve biological puzzles related to drivers of spatial and temporal variation of plant and fungal biodiversity. Recent investigations show that large scale plant-pollinator interactions affect colonisation efficiency in the Arctic, and that less pollinator dependency due to alternative reproduction modes may explain the high abundance of white-coloured flowers in Arctic regions, as pigment production without the benefit of pollination to offset the energy cost may reduce fitness under marginal Arctic conditions.

Studies of the seasonal ecology of Arctic ecosystems and organisms form a core part of the research efforts of the department. Studies published in 2016 include reports on large scale studies of phenology and distributions of seabirds, both in the Arctic and the Antarctic; effects of experimental winter-icing of tundra vegetation on plant life history traits;



and the seasonal migrations and predator-prey relationships in a high-Arctic zooplankton community. The Fram Centre awarded funding to the project SEATIME for continued work on the phenology of seabirds and the lower trophic levels of the North-East Atlantic ecosystems.

In October 2016 Miriam Marquardt defended her PhD thesis addressing the seasonality of marine microbial eukaryotes, how they are influenced by the water masses they inhabit and their contribution to the vertical flux. Using genetic methods she unravelled high diversity during the polar night when also phototrophic species were present in an active state, and also found that small cells contribute greatly to vertical flux during autumn and winter. Although light and nutrients were the main drivers of changes in community composition, also hydrography, e.g. inflow of warm Atlantic Water, plays an important role.

In December 2016, Eike I. Stübner defended her PhD thesis, composed of two first-author papers and one co-author paper,

with novel knowledge on meroplankton dynamics and the ecological role of this poorly known group in Arctic marine coastal ecosystems. Meroplankton is mainly comprised of larvae of benthic invertebrates that only temporarily inhabit the pelagic environment. The PhD work included extensive field sampling, molecular identification and feeding experiments.

APPOINTMENTS

Mads Forchhammer was appointed to represent UNIS in the trans-continental programme COAT, Climate-Ecological Observatory for the Arctic Tundra.

Børge Damsgård was appointed to represent UNIS in the Fram Centre Leader Group, on the board of the SFU bioCEED, on the advisory board of Arctos (*Arctic Marine Ecosystem Research Network*), and as vice-member of the board of *The Nansen Legacy (Arven etter Nansen)*.

GRADUATES 2016

PHD DEGREE:

MIRIAM MARQUARDT

Marine microbial eukaryotes in Svalbard waters.

EIKE INGRID STÜBNER

Seasonality of meroplankton in Svalbard waters.

MASTER DEGREE:

VINCENT CARRIER

Pelagic communities of nano- and picoeukaryotes around the archipelago of Svalbard and their biogeography.

SOLVEI BØRVE HOVDAL

Effects of Experimental Winter Icing and Summer Warming on High Arctic Plant Phenology.

MARINE L. J. CUSA

The effect of seasonality on polar cod (*Boreogadus saida*) dietary habits and temporal feeding strategies in Svalbard waters.

MAEVE MCGOVERN

Hyperbenthic Food-Web Structure in Kongsfjord: A Two-Season Comparison using Stable Isotopes and Fatty Acids.

PREBEN DANIELSEN

Climate trends, weather fluctuations and calving phenology in Svalbard reindeer (*Rangifer tarandus platyrhynchus*).

ROSS WETHERBEE

Ectoparasite (*Ceratophyllus vagabundus vagabundus*) infestations reduce hatching success in precocial birds (*Branta leucopsis*) nesting in the High Arctic.

BENEDIKT EHRENFELS

Life history, feeding strategy, and grazing impact of the Arctic peropod *Limacina helicina*.

Top left:

November 2016: A student attending AB-332/832 (marine molecular ecology) working in the lab. Photo: Anna Vader/UNIS.

Middle:

August 2016: AB-201 field cruise in Fjortende julibukta, Krossfjorden. Photo: Silje Marie Kristiansen/UNIS.

Bottom right:

April 2016: AB-330/830 fieldwork in Van Mijenfjorden. Photo: Ane Cecilie Kvernvik/UNIS.

Top right:

July 2016: AB-322 fieldwork in Bjørndalen, where students sample food from the little auk (*Alle alle*). Photo: Silje Marie Kristiansen/UNIS.

Bottom left:

July 2016: Atlantic puffin (*Fratercula arctica*). Photo: Geir Wing Gabrielsen/UNIS.

ARCTIC GEOLOGY



The Arctic Geology (AG) department's research and education is focused on the geological evolution of Svalbard as recorded in spectacular geological sequences spanning the Precambrian to the Cenozoic, and overlain by Quaternary glacial and interglacial deposits. Easily accessible outcrops make it possible to do research in the interplay of continental drift with tectonic, glacial, periglacial, coastal, fluvial and marine sedimentary processes. The close proximity of present-day geological, glacial, periglacial, marine and terrestrial processes provides an exciting field laboratory as the basis for our research and education.



By Hanne H. Christiansen, Head of Department

PEOPLE

During 2016 the department had nine full time faculty positions, which were filled by three professors, five associate professors, and we had a vacant glaciology position. Lena Håkansson started working as an associate professor in Quaternary geology from 1 January. During 2016, Ólafur Ingólfsson reduced his full time position to an adjunct position. We had sixteen adjunct positions, five of these were externally funded, six were from Norwegian universities and two from the Geological Survey of Norway. Also adjunct associate professor Sverre Ohm was hired in 2016. Three externally funded postdocs and 10 internally and externally funded PhD students worked full time in our department. Tyler Appleyard and Holt Hancock started as PhD students in 2016.

EDUCATION

Six bachelor courses, nine master courses and 11 PhD courses were taught in AG in 2016. We had quite large numbers of qualified applicants for most of our courses, and thus operated with waiting lists for several courses. However, many of our courses were not completely full as many students dropped out of the courses right before start. Thus, the courses were on average filled to 83%. 25 guest master students worked on their master theses.

During 2016 we got the approval of a new full-year bachelor study for third-year geology students and a physical geography bachelor study for the summer and autumn (fifth) semester for physical geography students. This expansion of our bachelor course portfolio has been done in collaboration with the Norwegian universities, who have requested more field practise for their geology and physical geography students, which we are now accommodating.

In 2016 we participated in the application for a new Center for Excellence in Education (SFU) called iEarth “Centre for integrated Earth System education” led by the University of Bergen, together with Oslo and Tromsø as well. Unfortunately iEarth was not funded, but we are in a national working group to further develop this application. Several staff members participated in developing natural science courses in the Arctic Safety Centre and in the development of a local awareness society in Longyearbyen, also part of the Arctic Safety Centre.

Kim Senger and Maria Jensen secured funding from the UArctic for a one-year project entitled “Circum-Arctic Geology for Everyone”, which aims at making virtual outcrops and digital tools available both in UNIS research and teaching of bedrock geology as well as using the technology to make virtual field trips and class materials, which can be shared across the Arctic. Part of the funds have been used to purchase modern field equipment for the new BSc-level course AG-222 “Integrated Geological Methods: from outcrop to geomodel” to be run at UNIS from spring semester 2018. The project will result in enhanced UNIS involvement within UArctic’s Arctic Geology Thematic Network.

The AG-218/219 “International Bachelor Summer Field School”, which was held twice earlier with funding through UArctic Thematic Network on Permafrost, was taken over by UNIS in 2016 with Ole Humlum as course leader. The bachelor summer field course AG-220 “Environmental Change in the High Arctic Landscape of Svalbard”, was run for the first time by Mike Retelle, and had a very high number of applicants. This course is developed from the US REU Svalbard programme, which has been running for more than 10 years in Svalbard. Mike Retelle has been the leader of this work, enabling us to build on the experience, infrastructure, data and collaboration to turn this into an UNIS course. At master level Ólafur Ingólfsson and Riko Noormets led the new course AG-348/848 “Arctic Late Quaternary Glacial and Marine Environmental History” successfully for the first time in summer 2016.

RESEARCH

Basin studies

Three new PhD positions were recruited within the UNIS co-led R&D project “Lower Cretaceous clastic wedges in the Northernmost Atlantic” (LOCRA – www.locra.uv.uio.no). Two postdoc and 7 PhD positions have been recruited in total in this large-scale research project with significant industry support. Two of the PhDs are at UNIS; Hanna Hjálmsdóttir and Mads Jelby. Professor Snorre Olaussen and co-workers are compiling all onshore data. Three papers were published in 2016. Several papers have been submitted.

The Petromaks2 project “Triassic North” (2014-2017), coordinated by the University of Oslo with Bergen and UNIS as key research partners, carried out a combined industrial-academic fieldwork on Edgeøya and in Hornsund. Focus was to improve the knowledge of the Upper Triassic basin fill in Southern Svalbard and its offshore link.

Snorre Olaussen and Kim Senger lead the WP2 Petroleum Systems within the “Centre for Arctic Petroleum Exploration” (ArcEX – www.arcex.no).

Focus on Upper Jurassic shales is one of the main internal R&D activities in the basin research group at present. This is conducted in close cooperation with the universities of Oslo and Stavanger and is a spin-off from the CO₂ drilling in Adventdalen. The dominating shale unit is important for sealing of buoyant fluids (e.g. CO₂ and hydrocarbons). The succession is also comparable to the main source rock in the Barents Sea, the Hekkingen Formation. In addition to the cap rock characterization, the gas discovery in 2013 is further investigated. High resolution stratigraphy of the Upper Jurassic succession was published in 2016.

Snorre Olaussen led the De-Risk project “Improved delineation of an unconventional reservoir in Adventdalen for future CO₂ injection tests”, which was completed in 2016. The immense data set resulting from the eight drill holes are being further analysed, and a special volume in the Norwegian Journal of Geology is planned for 2017. EM investigations of both the target reservoir and the regional geology were published in 2016. The research focus was on the cap rock



March 2016: The AG-209 students enjoy an outdoor lecture on Aldegondabreen close

characterization and further understanding the nature of the natural gas accumulation in Adventdalen. The impact of igneous intrusions on the CO₂ target reservoir is also currently being investigated, and a FRINATEK application has been submitted for a multi-year project on the subject.

Snorre Olaussen and adjunct professor Lars Stemmerik continued to study the Carboniferous and Permian succession in Svalbard and the Barents Sea. Three PhD students are involved in this study, one at UNIS, two in Copenhagen. It is a large part of the R&D field activity of the basin studies group. Fieldwork was carried out with geologists from Lundin Norway and Aker BP. The study concentrated on understanding the complex facies changes in a rift basin linked to fault activities and eustatic sea level changes, response of carbonate facies to palaeoclimatic shifts over time and the effects of exposure and climate on alterations of both evaporates, carbonates and silica-rich sediments. In 2016 cooperation started with a researcher from the University of Oklahoma to use the Upper Carboniferous succession to better understand ancient global wind patterns.

Maria Jensen and adjunct professor William Helland-Hansen continued studying the basin fill of the Central Basin succession. The latest Paleocene Hollendardalen Formation is studied by PhD student Tyler Appleyard and co-supervised by Snorre Olaussen. MSc students were engaged in investigating



to Grønfjorden. Photo: Maria Jensen/UNIS.

the heavily bioturbated Grumantbyen Formation of Paleocene age, the Eocene marine clastic wedges and continental strata at Brogniartfjella, Van Keulenfjorden and the Eocene-Oligocene succession at Renardodden, Bellsund. Helland-Hansen is working on a synthesis of the foreland basin succession in the Central Basin and a more detailed study of the Aspelintoppen Formation, both based on many years of fieldwork and MSC projects.

PhD student Malte Jochmann is working on a comprehensive model of the earliest infill of the basin and is reviewing existing core- and outcrop data and combining this with new field data. He has carried out fieldwork in Ny-Ålesund and the Longyearbyen area to revise earlier investigations and test correlation.

Maria Jensen is leading the RCN funded “Coastal Link – from source to sink project which studies the modern to Holocene sediment transport and storage from land to sea in two fjord basins (Kongsfjorden and Dicksonfjorden). Maria Jensen is also leading the DynaCoast project funded in late 2016, which will map the coastal zone of Isfjorden in collaboration with adjunct Lena Rubensdotter.

Adjunct professor Per Terje Osmundsen with colleagues and students from NGU and UNIS conducted fieldwork and sampling in St. Jonsfjorden and Prins Karls Forland.

The Forlandsundet area appears as a keystone to understand the switch from Paleogene orogeny to subsequent crustal thinning in western Svalbard, likely critical to the formation of sedimentary basins offshore, the onset of oceanic spreading and the formation of Svalbard’s topography. The project was financed by NGU, the ArcEX consortium and UNIS. The study (EMERGE1) is part of an initiative to improve our understanding of rock-column uplift, early landscape formation, erosion and sedimentation in Svalbard.

Cryosphere

Snow and avalanche science, led by Alexander Prokop, established a major snow-monitoring site in the Longyeardalen valley and several hazardous events such as snow avalanches and debris flows were monitored using terrestrial laser scanning. The monitoring technique can also improve the snow avalanche warning system in Longyearbyen. PhD student Holt Hancock will work on monitoring potential dangerous snow processes such as cornice and hard slab avalanche formation using terrestrial laser scanning. The PRISM project (“Permafrost, Rock fall, Ice and Snow Monitoring and Modelling”) surveyed the Austre Lovénbreen glacier basin near Ny-Ålesund by terrestrial laser scanning. Both the German and French Ministers of Environment visited UNIS and were informed about PRISM. An important publication about positioning and dimensioning of snow fences in alpine terrain for avalanche prevention was accomplished, which is also very valuable for the current avalanche hazard situation of Longyearbyen. A project on detecting avalanches using an acoustic fibre optic sensing system in the Alps was continued. Alexander Prokop supervised three PhD students and is co-supervisor of one additional PhD student.

The permafrost and periglacial geomorphology group consisted of Professor Hanne H. Christiansen, adjunct professor Ole Humlum, postdoc Brendan O’Neill, PhD students Graham Gilbert and Stefanie Cable and master student Sarah Strand. The group operated 12 boreholes in the Adventdalen area and around Kapp Linné. The boreholes provide ground thermal information enabling detailed studies of freezing and thawing processes in different landforms. Sarah Strand’s master thesis focused on the thermal effects of winter warm spells in Svalbard. The extraordinary warm autumn 2016 allowed for studies of the control of late freezing for slope stability, as mudflows, slumps and slides occurred in the landscape during two rainstorms in October and November 2016, which caused evacuations of large parts of Longyearbyen. The cryosphere research group was involved in local condition evaluations during these events and provided public lectures immediately after, also a contribution to the Arctic Safety Centre outreach. The entire Cryosphere group is working on scientific analyses of these events using a multimethod approach in collaboration with Norut.

The “LowPerm” project focused on understanding nutrient transport within permafrost landscapes that may lead to changes in greenhouse gas production and fertilization of the Arctic Ocean. Adjunct professor Andy Hodson leads the project and Hanne Christiansen is responsible for the physical permafrost side. Postdoc Brendan O’Neill started working in



August 2016: The tidewater glacier Sveabreen in Nordfjorden. Photo: Sebastian Sikora/UNIS.

August focusing on quantification of the ice content and types in the active layer and top permafrost in the Adventdalen LowPerm study site. In late February two 20 meter cores were drilled in the middle to upper part of Adventdalen, coordinated by PhD student Graham Gilbert.

Hanne Christiansen took over as President for the International Permafrost Association (IPA) in June 2016. The IPA Secretariat was moved to UNIS in autumn 2016 and Sarah Strand is leading the Secretariat in a part time Executive Director position funded by the RCN.

Quaternary geology

The marine geology team consisted of associate professor Riko Noormets, adjunct professor Martin Jakobsson, postdoc Martin Liira, PhD students Anne Flink and Oscar Fransner, and several MSc students. The team studied ice sheet dynamics and deglaciation history in the Barents Sea and Svalbard fjords, geological imprint of surging glaciers, geochemistry of seafloor hydrocarbon seeps, high-resolution glacier calving processes and formation of modern ice-proximal fans.

Oscar Fransner continued his work on the ice sheet processes and deglaciation history on the northern Svalbard continental shelf and slope. He plans to defend his thesis in 2017. Anne Flink's research into the glacial evolution of the fjords in eastern Svalbard resulted in two new publications shedding light on the glacier dynamics and, in particular, surge history in these poorly-known areas. Martin Liira studied the geochemistry of sediments in the pockmarked areas in fjords in Svalbard.

During a survey campaign in August ca. 1700 km² previously unmapped seafloor was covered in Kongsfjorden, Isfjorden and at Sjuøyane. In addition to providing new information on

the glacial history, these data contribute to the assessment of natural hazards and improve navigational safety. A number of buoys measuring temperature and salinity were deployed in the fjords and on the shelf for 1-2 years. These data will contribute to ongoing studies on the calving glacier margins and on the palaeoceanographic evolution of the northern Svalbard margin in collaboration with the Bolin Centre for Climate Research, Stockholm University. New, high-resolution and high-accuracy surveys were conducted in Adventfjorden and Sassenfjorden to study the evolution of glacially-fed river fans as a part of a new collaboration between Noormets and colleagues at the universities of Durham and Cambridge, UK. We also mapped over 11 km² of newly exposed seafloor in Kongsfjorden and acquired for the first time high-resolution surface scans of the submerged cliff of the Kronebreen margin as part of RCN-funded CalvingSEIS experiment, which is a collaboration between the University of Oslo, NPI, Norsar, Norut, UNIS and several international partners, investigating the glacier calving processes.

In June, Jakobsson and Noormets attended the GEBCO-organized "*Forum for Future Ocean Floor Mapping*" in Monaco. The most important outcome was a plan to develop a roadmap for Future Ocean Floor Mapping "*Seabed 2030*", aiming to map the global ocean floor by 2030. In a subsequent Arctic and Antarctic mapping meeting it was decided to commence work on the regional Svalbard-Barents Sea bathymetric compilation as part of the 4th edition of the International Bathymetric Chart of Arctic Ocean (IBCAO). This work will be carried out at Stockholm University and UNIS. Multibeam data collected by UNIS and partners in the northern Barents Sea will form a core basis for this new map.

The terrestrial Quaternary research group consisted of Professor Ólafur Ingólfsson, associate professor Lena

M. Håkansson, PhD student Wesley Farnsworth and several master students. They studied the morphological fingerprinting of glacial oscillations as expressed by glacial landforms and sediments both in the terrestrial and marine environments and continued working at Harrietbreen and Kjerulfbreen (Trygghamna). The focus was on the subglacial land system with studies of sediments and landforms exposed by the retreating glaciers.

Lena M. Håkansson initiated the project "Holocene Precipitation Seasonality in Svalbard" (HOPS) to test the seasonality of leaf wax hydrogen isotopes in Svalbard by analyzing modern lake sediment from sediment traps and to reconstruct precipitation through the Holocene by analyzing

leaf wax hydrogen isotopes in lake sediment cores. Analyses will be carried out at the University at Buffalo in spring 2017. She has also been working on a project using lake sediment records to reconstruct vegetation in the Ringhornalden and Flatøyrdalen, working in collaboration with the Arctic Biology department at UNIS.

Wesley Farnsworth collected data during several field campaigns, including trips to Sjuøyane, central Wijdefjorden and Grønfjorden to highlight Holocene glacial oscillations, focusing on meltwater signals in threshold lakes, glacial morphology and raised beaches. Regions are being mapped and lake cores and field samples will be used to better understand Holocene glacial fluctuations and relative sea level.

GRADUATES 2016

PHD DEGREE:

JACOB UGUNA

Maturity, Oil Source Rock and retorting potential of perhydrous coals in the Central tertiary Basin, Spitsbergen.

MASTER DEGREE:

LIS ALLAART

Combining terrestrial and marine glacial archives: A geomorphological map of the Nordenskiöldbreen forefield, Svalbard.

LUCA BLAZIC

Development and sedimentology of Upper Triassic growth-basins, south Edgeøya, Svalbard.

WILLIAM L. CABLE

The role of environmental factors in regional and local scale variability in permafrost thermal regime.

HOLT HANCOCK

Snow drift and avalanche activity in a high Arctic maritime snow climate.

TROND S. HARSTAD

Sandstone Provenance of the De Geerdalen Formation, Svalbard: Emphasis on Petrography and Chromium Spinel Compositions.

TURID HAUGEN

A sedimentological study of the De Geerdalen Formation with focus on the Isfjorden Member and palaeosols.

MONICA HULTIN

Sedimentation environment during deglaciation and Holocene in Southern Sentralbanken, Barents Sea.

PETER HILL

Glacial dynamics in Mohnbukta, eastern Spitsbergen, inferred from submarine morphology and marine sediment cores.

SONDRE KROGH JOHANSEN

Sedimentology and facies distribution of the Upper Triassic De Geerdalen Formation in the Storfjorden area and Wilhelmøya, eastern Svalbard.

CHRISTINE LOCKWOOD

Reconstruction of ice stream retreat and palaeoceanographic development during the deglaciation and Holocene in the Storfjorden Trough, Svalbard.

VICTORIA ENGELSCHIØN NASH

Large-sized Ichtyosaurs from the Lower Saurian Bone Bed (Early Triassic) of the Vikinghøgda Fm., Marmierfjellet, Spitsbergen.

INEKE IRENE ROOKUS

Controls on debris-covered glacier fronts in Central and Western Svalbard; A large scale study of Arctic glacier termini.

SARAH MARIE STRAND

Ground temperature response to winter warm events in Svalbard – a periglacial landform comparison.

SIMEN JENVIN STØEN

Late Triassic sedimentology and diagenesis of Barentsøya, Wilhelmøya and eastern Spitsbergen.

HILKE DE TIMMERMANN

Fluid flow in the dual porosity system of the Longyearbyen CO₂ Lab

ÅSA CECILIA WALLIN

Investigating methods for identifying paleo surge-type glaciers or highly dynamical ice flows in Trygghamna, West Spitsbergen.

ØRJAN BERGE ØYGARD

A study of ichnology, lithology and reservoir quality of the Paleogene Grumantbyen Formation on Svalbard.

ARCTIC GEOPHYSICS

The Arctic Geophysics (AGF) department performs research within and introduces students to the entire geophysical, vertical column; from the deep of the oceans up to the outermost boundary of the atmosphere, as a dynamic system with a large variety of processes taking place within each layer as well as interactions between them.



By [Frank Nilsen, Head of Department](#)

PEOPLE

The department has in total eight full time faculty positions, and conducts research within physical oceanography, chemical oceanography, cryosphere (snow, glacier and sea ice), meteorology and middle- and upper polar atmosphere. The department also consists of eleven adjunct professors, as well as one researcher (oceanography), two postdocs (middle and upper polar atmosphere) and five PhD students (upper polar atmosphere, middle polar atmosphere, physical oceanography, chemical oceanography and meteorology). To assist in scientific instrument calibration, instrument maintenance and fieldwork operation, two technicians are linked to the department within our two research groups.

EDUCATION

Teaching was conducted at both the undergraduate and graduate level, with seven courses at the undergraduate level and 11 at the graduate level. Fieldwork is a central part of all courses; it allows the students to actively carry out research in the field. During 2016 the department carried out several courses with teaching of field methods on glaciers, in the surface boundary layer over land and sea ice, at the Kjell Henriksen Observatory (KHO) and on three scientific cruises around Svalbard. The data collected are typically used in course reports, giving the students valuable experience in analysing and presenting scientific data in a coherent manner.

RESEARCH

In order to offer relevant full-term combinations of courses, and to strengthen the research strategies, we have two dedicated research groups within the department: The Space Physics Group (SP) and the Air-Cryosphere-Sea Interaction Group (ACSI).

THE SPACE PHYSICS (SP) GROUP

The Space Physics Group is part of the Birkeland Centre for Space Science (BCSS), which is a Centre of Excellence. In 2016, we welcomed two new members to the group: Dr. Emma Bland as a postdoc and Erkka Heino as a PhD candidate, both within the field of Middle Atmospheric Physics.

The SP group is the leading experimental research group in auroral physics in Norway, and owns and operates two world class research facilities, the Kjell Henriksen Observatory (KHO) and the SuperDARN (Super Dual Auroral Radar Network) facility. There are currently 41 instruments operating at the KHO from 21 different institutions across 13 nations. Two new research groups from Indonesia (The National Institute for Aeronautics and Space) and Korea (The Korean Polar Research Institute) have installed instruments at KHO in 2016. A list of all instrumentation can be found at kho.unis.no.

The SuperDARN radar was officially opened on 19 October 2016 and data distribution commenced on the 1 November. The facility provides continuous monitoring of the upper atmospheric particle flow over an area of 3 million square km to the North East of Svalbard and over the polar cap. Real-time data are available online (<http://kho.unis.no/SD/Sd.htm>) and the data are being transferred to a central SuperDARN network database at the British Antarctic Survey. The data will be combined with other radars from the network to produce real-time global maps of the particle flow in addition to being made available to scientists from around the world. Data from all instrumentation at the KHO and SuperDARN are also now stored on NORSTORE (Norwegian Research Data Archive) where we currently have over 25TB of data.

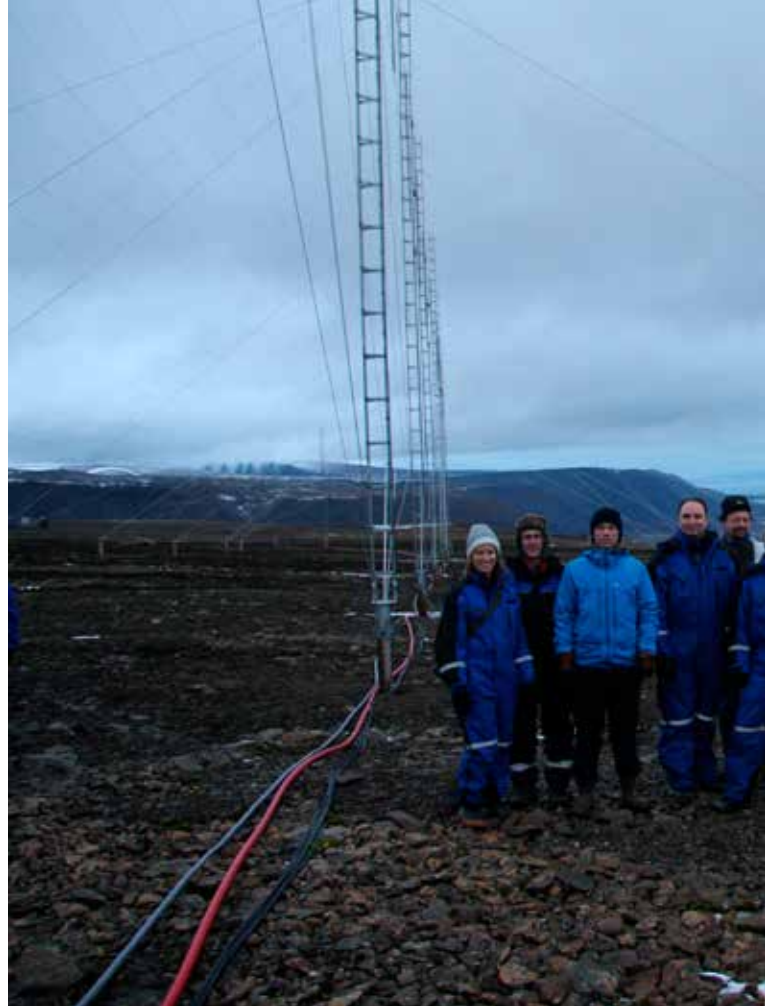
Silje Eriksen Holmen defended her PhD thesis in December on trends and variability of polar mesopause region temperatures. Her publications report one of the longest time series of high-latitude mesospheric temperatures from hydroxyl airglow measurements. A large variability in the mesopause temperatures with periods of about nine days up to a year was associated with general circulation in the atmosphere as well as planetary and gravity wave activity. These results are important in understanding the coupling through the atmospheric layers and their drivers in dynamical processes and solar forcing, all particularly pronounced in the polar region mesosphere.

The new Auroral 3D mobile device app was released and as of December 2016 had logged over 1K downloads. A large number of presentations, visits and interviews have been conducted at the KHO and SuperDARN, particular highlights including the Studietur Nord group and a public open day organized through LySEF (Longyearbyen Science and Education Forum), the latter attracting over 100 visitors. In addition, Dr. Pål Ellingsen has given a series of talks to the local kindergartens, introducing the new generation to the stars and planets.

THE AIR-CRYOSPHERE-SEA INTERACTION (ACSI) GROUP

The ACSI group treats the three most dominant geophysical components in the Arctic climate system in Svalbard. The Arctic is characterized by extremes in both weather and climate, and significant interactions between the atmosphere, ocean, sea ice, glaciers, and land ice take place in the region that affect the weather, not only regionally, but also on a global scale. These types of interaction studies are conducted through field-based research projects.

The archipelago of Svalbard is dominated by rugged terrain in the form of mountains, fjords, valleys and narrow straits. Such terrain features are known to potentially significantly modify winds, typically strongly reducing or increasing them on a regional to local scale and forming phenomena such as jets, downslope wind storms and wakes. In a new master thesis at UNIS and the University of Mainz, Philipp Franzen studied related terrain induced wind phenomena, with a main focus on



October 2016: Happy UNIS space physics scientists at the official opening of the Super
Photo: Eva Therese Jenssen/UNIS.

the area around Isfjorden in western Spitsbergen. Through the last few decades, sea ice has been diminishing to the east of Spitsbergen, thus exposing the lowest part of the atmosphere in the area to an increasing portion of open water. This open water, in turn, heats the atmosphere more than would be the case if the ocean was covered by sea ice. The trend has been that an increasing portion of the wind impinging on the east coast of Spitsbergen is now flowing over the terrain, rather than around it. The results of this study have potentially important implications to air-sea-ice interactions in the area, which are critically dependent on the local and regional wind conditions.

Research on ice shelf mechanics helps us better understand the processes of ice fracturing more generally, and the influence of fractures (crevasses, ice shelf rifts, hydrofractures) on the dynamics of glaciers and ice sheets including important climate-related feedbacks (e.g. meltwater routing into crevasses, ocean-induced iceberg calving, ice shelf collapse). Specifically, the work of Borstad et al. (2016) paves the way for improved physical models of crevassing and iceberg calving that can be applied to outlet glaciers in Svalbard, Greenland, and Antarctica.

The Greenland ice sheet is the largest ice mass in the Northern Hemisphere and has experienced accelerating mass loss in recent decades. An increase in surface melt is the major cause for the loss of mass. According to satellite data and ground observations, parts of the ice sheet are darkening since 1996 at a rate of about 2% per decade. The darker surface leads to more melt and ultimately to a rising sea level. In



northward in the Fram Strait were observed from the sea using underwater moorings and satellite altimeter from space. The aim is to improve transport estimates of heat, mass and freshwater into the Arctic Ocean in order to explain the effect this has on the ice cover in the Arctic. The warm Atlantic Ocean waters north of Svalbard melt the ice that is transported towards the northern coast of Svalbard and limit the freezing of sea ice in the winter.

A numerical model is developed in Nilsen et al. (2016), motivated by a long-term ocean monitoring programme on the west coast of Spitsbergen, to study the linkage between atmospheric forcing and inflow of warm Atlantic Water (AW) to the cold shelf and fjord areas around Svalbard. The model gives a good approximation of the dynamical processes on the West Spitsbergen Shelf (WSS) and shows that the West Spitsbergen Current (WSC), the main gateway of AW toward the Arctic, connects more easily to the Isfjorden Trough than anywhere else along the shelf. The circulation of AW in the troughs along the WSS is here named the Spitsbergen Trough Current (STC). The STC represents a slower route of AW toward the Arctic Ocean and a large heat transport toward the West Spitsbergen fjords during winter (0.2–0.4TW toward Isfjorden). This knowledge is important in order to understand and to forecast the presence of sea ice/fjord ice and fish species in the area.

An online cabled ocean observatory was deployed in Isfjorden in autumn 2016 in connection to the Svalbard Environmental Protection Fund project “Blir det is på Isfjorden i år?”, led by UNIS and the AGF department. The observatory measures ocean current throughout the 80 meter deep water column with temperature, salinity, oxygen and fluorescence measurements in selected depths. The main objective is to monitor and inform the general public and authorities about intrusion of warm Atlantic Water in connection to risk assessment for operations on sea ice, but also to indicate when there is a good chance to catch some Atlantic cod or salmon.

In his PhD thesis, Thomas Gölles developed tools to study the interplay of particle accumulation, ice flow and ice melt. Melt-out of particles depends strongly on air temperature; therefore under warmer climatic conditions the darkening effect is stronger.

Through the UNIS-led project “Remote Sensing of Ocean Circulation and Environmental Mass Change” (REOCIRC) and other collaborative projects (AWAKE2, “Arctic Ocean Under Melting Ice”), the warm and cold currents flowing

GRADUATES 2016

PHD DEGREE:

THOMAS GÖLLES

Impurities of glacier ice: accumulation, transport and albedo.

SILJE ERIKSEN HOLMEN

Trends and variability of polar mesopause region temperatures attributed to atmospheric dynamics and solar activity.

CHRISTER VAN DER MEEHREN

Mesoscale ionospheric plasma irregularities and scintillation over Svalbard. (Birkeland Centre for Space Science).

MASTER DEGREE:

FRANZ CZECH

Spatial variability of hard snow slab properties and implications for avalanche triggering.

PHILIPP FRANZEN

Local wind patterns in Isfjorden and their relation to large-scale flow conditions over Svalbard.

DOROTA JOZWICKA

Energy input to atmosphere during pulsating aurora.

ARCTIC TECHNOLOGY

The Arctic Technology department offers courses and research opportunities in Arctic Engineering as well as in Arctic Environmental Technology and Chemistry.

Arctic Engineering concentrates on engineering problems to be tackled when settling in the Arctic environment: designing and maintaining infrastructure needed for building and living on frozen ground, potable water supply, and challenges caused by a warmer climate, risks and predictions of landslides and avalanches. Other topics are Arctic offshore oil and gas exploitation, involving ice mechanics and ice and structure interactions, and forces from currents and waves.

Arctic Environmental Technology and Chemistry concentrates on current and potential pollution problems, environmental impacts and feasible remediation techniques in Arctic areas.

August 2016: The students in AT-209 Arctic Hydrology and Climate Change course perform water flow measurements, using trace elements (salt), to check turbulence and mixing. The dye disintegrates after a few hundred meters. Photo: Nils Roar Sælthun/UNIS.



[By Arne Aalberg, Head of Department](#)

PEOPLE

In 2016 the department consisted of two professors, one associate professor, one research associate, two postdocs, three PhD candidates, six adjunct professors, one staff engineer and one adjunct senior engineer.

EDUCATION

The research activities generate material for courses offered in all areas given at all levels, giving students a good opportunity to study both the theoretical and practical aspects of Arctic technology and engineering. In 2016, the department offered altogether 25 courses at the Bachelor, Master and PhD level.

RESEARCH

The Arctic Technology Department had a wide portfolio of research activities in 2016, within ice mechanics and offshore engineering; marine technology, geotechnics, environmental chemistry, rock mechanics and hydrology/hydromechanics.

Ice mechanics and offshore engineering

This research group consisted of one full time professor and two adjunct professors. In addition, one research associate, one postdoc and one PhD candidate were part of the group through external projects. There was one master student in 2016.

The group conducted fieldwork and data collection at various sites around Svalbard; Van Mijenfjorden (Svea, Kapp Amsterdam) and in the Olga Basin of the Barents Sea, focusing on ice strength properties, ice drift patterns, ice rubble structure, and iceberg studies. Experiments on freezing melt ponds were conducted in Sveabukta. Lab studies focused on strength and thermo-mechanical properties of ice.

Adjunct professor Sveinung Løset is the director of the Centre for Excellence in Innovation project "Sustainable Arctic Marine and Coastal Technology (SAMCOT)". Professor Aleksey Marchenko is leader of work package 1; "Data collection and process modelling" while postdoc Aleksey Shestov is deputy leader.

The research group performed modelling and numerical simulations of icebergs drift, thermodynamic consolidation of ice rubble and passive motion of anchored vessels in icy conditions. The presence of sea ice constitutes considerable challenges for marine operations in the Arctic. Ships and platforms performing drilling or production of hydrocarbons in the Arctic will need protection through ice management (IM), such as a fleet of ice breakers that plough the ice upstream, first into big ice floes and later into smaller pieces in the area in front of the ship or platform. The aim is to reduce the ice impact on the structures by actively manipulate the ice conditions.

Another SAMCoT activity was laboratory testing performed to better understand how ice behaves under cyclic loading. Ice can be loaded cyclically due to, for instance, interaction between an ice floe and a structure, waves in ice, thermal expansion and water-level fluctuations. The inherent frequency-dependent ice strength is not entirely understood, and therefore we put effort to improve the UNIS laboratory to handle cyclic loading control. This work was mainly conducted by Per Østensen (NTNU) and Torodd S. Nord (UNIS).

One of the researchers with the most experience in this type of testing, Dr. David M. Cole, helped TU Delft/UNIS master student Niek Heijkoop during the fall of 2016 to conduct his cyclic loading experiment. Heijkoop is supervised by Professor Andrei Metrikine, Associate Professor Jeroen Hoving, TU Delft and Torodd S. Nord, UNIS. Hopefully Heijkoop's study will give us answers to inherent differences in the results from the two fundamental approaches of testing. The results have direct influence on how we interpret and model ice subject to periodic loads.

In addition, large scale sea ice fracture tests have been conducted successfully in March 2016. This is a three-year campaign (2015-2017) with the aim of studying the fracture properties of sea ice via splitting large ice floes of various sizes and by different loading rates. In this test campaign, joint efforts from NTNU (Professor Løset and postdoc Wenjun Lu), UNIS (postdoc Shestov and UNIS MSc students), Aalto University of Finland (Professor Jukka Tuhkuri), and Clarkson University, USA (Professor John Dempsey) were made to ensure the success of the tests. Among many potential conclusions, the test results will shed light on the decade-long controversies regarding the fracture toughness of sea ice.

Other international research and education projects:

FIMA (2015-2017) in partnership with NTNU, State Research Oceanographic Institute (Moscow, Russia), and VNIIGAZ Gazprom (Moscow, Russia).

Petromaks2 Waves in Oil and Ice (WOICE) (2015-2017) in collaboration with the University of Oslo.

SITRA (2015-2018) in cooperation with Memorial University of Newfoundland (Canada), Dartmouth College (USA), University of Alaska (USA), and Moscow University of Physics and Technology (Russia).

MarPart (Maritime Preparedness and International Partnership in the High North) in collaboration with Nord University (Norway), University of Greenland, University of Iceland, Northern (Arctic) Federal University Arkhangelsk and Murmansk State Technical University (Russia).

Geotechnics

This research group consists of one full time professor, one adjunct professor, one technician in addition to one master student.

Planning of and building up a Norwegian Geo Test Site (NGTS) was started in 2016, as part of a RCN supported infrastructure project where five test sites are established in Norway. In Svalbard, the permafrost is the main research focus. The permafrost test site is located in Adventdalen, with an extension to a slope near Longyearbyen. The soil and ground conditions are monitored and investigated, and soil samples analyzed for mechanical and thermal properties. The intention is to provide accurate and high-quality information on material properties and subsurface structure of the test site, which will facilitate future testing of geotechnical field investigation instruments and innovative foundation solutions.

Environmental chemistry

The research group consisted of one full time associate professor, three adjunct professors, one postdoc, one PhD candidate and two master students in 2016.

The group performed investigations of contaminants in local air and high-elevation glaciers. Air samplers on the UNIS roof have been used to measure concentrations of brominated and organo-phosphorus flame retardants in Longyearbyen air.

Since 2000, ice cores have been drilled at Holtedahlfonna, Lomonosovfonna, and Austfonna, and analyzed for ~330 different organic contaminants in 5 classes. Most concentrated contaminants include Chlorpyrifos, a pesticide, and Hexabromo-cyclododecane (HBCD), a brominated flame retardant. Both are still in use.

As follow-up of the FluorosImpact project (2015) and commissioned by Kings Bay, a first local source evaluation for environmental levels of 25 per- and polyfluorinated substances (PFAS) was performed in Ny-Ålesund. The local firefighting training facilities were identified as a potential environmental contamination source. Two MSc projects on the presence of PFASs in Svalbard were completed in Environmental Technology in collaboration with NMBU.

Environmental Waste Management (EWMA) is a project that examines the effect of food waste on organisms in the environment. Scientific experiments are planned in order to understand the effects of mining waste disposal in fjords on the early life of cod. Focus will be on the finer particles of copper-enriched waste, and one object will be to evaluate the cod's reproductive success, development and molecular toxicology in cod eggs and larvae. The project is in cooperation with the University of Tromsø and Akvaplan-Niva.

Large volumes of aqueous firefighting foam (AFFF) containing potential toxic PFAS compounds have been used at Svalbard Airport. In a MSc project, uptake, accumulation and effects of PFASs in snow buntings in Longyearbyen and Adventdalen have been investigated, using their eggs as matrix. The project is a collaboration between UNIS, NTNU and the Norwegian Polar Institute.

Rock mechanics

This research group had one full time professor and one PhD candidate.

Scientific investigations focused on the impact of blasting on resource recovery, economy, safety and the environment; the effect of water and temperature on rock fracture in rock engineering such as the Svea mines; field investigations of the cuttability in Lunckefjell; blasting tests with rock blocks and measuring shock waves in the blocks.

A comprehensive study on the theories and applications of rock fracture and blasting was also performed. A new book entitled "Rock Fracture and Blasting: Theory and Applications" was published by Elsevier Science in May 2016.

Hydromechanics and Hydrology

This research group consists of one adjunct professor, with activity supported by part of a full professor.

The group performed field investigations of the hydrology in Braganzavågen and in the waters near Paulabreen during the sea ice season. In Isfjorden, the surface sea currents were monitored, and sediment transport and content was investigated around the Longyearbyen harbor in October-November 2016. Measurements of characteristics of surface waves propagating below solid ice were performed in the Olga Basin (Barents Sea) in May. Data were analyzed and wave damping due to water-ice friction estimated. Wave damping due to viscous and inelastic deformations of ice, ice-water friction and brine migration through the ice was also estimated.

Measurements of sea current in Akselsundet were performed from November 2015 to March 2016, on the request by the Port Captain in Svea. Data were analyzed and slack water periods were calculated depending on tide height. The construction of a wave tank for the UNIS cold laboratory was completed, and experiments on wave damping by slush were performed in October 2016.

The group represented UNIS in two international networking projects:

Water Management in Cold Climates ("Water Magic"): This is a "High North" programme funded by the Norwegian

Ministry of Foreign Affairs. Participating institutions are the Norwegian University of Life Sciences (lead); Qingdao Technological University (China); Seoul National University (South Korea); Hokkaido University (Japan), University of British Columbia (Canada), University of Washington (USA), and UNIS. The project period is 2016-2017. The main activities in 2016 have been project meetings and student seminars. An important spin-off was the arrangement of an EWA conference on Water Management in Cold Climates at UNIS 25-27 June 2016, with 109 participants from 18 countries.

Polar Hydrology field course: The EEA funded project, with participating institutions University of South Bohemia (Czech Republic) and UNIS, was finalized in September 2016. The activities in 2016 consisted of a field course with Norwegian and Czech students and teachers in Petuniabukta in August, and a conference on Polar Ecology at the University of South Bohemia in České Budějovice. The field course was integrated in the UNIS bachelor course "AT-209 Arctic Hydrology and Climate Change".

Marine technology

There is one adjunct professor position (20%), shared by two persons. The activity is closely linked to the Centre of Excellence AMOS at NTNU, and working with autonomous vehicles underwater, on the surface and in the air. As part of the Polar Night Cruise in January 2016, an Unmanned Surface Vehicle (USV) was deployed to investigate the Diel Vertical Migration (DVM) together with biologists from UNIS, the University of Tromsø and NTNU. Acoustic and optic measurements were performed from the vehicle to document distribution of zooplankton and the processes that regulate their migration. During the same cruise an Autonomous Underwater Vehicle (AUV) was deployed searching for cultural heritage in the area around Smeerenburg using side scan sonar. In Trygghamna in Isfjorden a ROV (Remotely Operated Vehicle) operation collected images for a photogrammetry model of the shipwreck "Figaro".

These operations are examples of how robotic vehicles can be useful in Arctic science. To further advance this technology, topics like path planning, underwater navigation and image processing are addressed.

GRADUATES 2016

MASTER DEGREE:

XIAOOU LIU

Numerical Modelling of Laterally Loaded Piles in PLAXIS 3D - A study on embedded pile and soil response in PLAXIS 3D under lateral load.

STIG MAGNUS LUNDE

Selected perfluorinated compounds in the sediment of an Arctic freshwater lake: A case study at Kapp Linné.

ANDRII MURDZA

Investigation of sea ice strength properties: Meso-scale tests and numerical modelling.

JØRAN SOLNES SKAAR

Occurrence of Selected Poly- and Perfluoroalkyl Substances (PFAS) in Arctic Freshwater: A Case Study from Svalbard.

STUDENT COUNCIL



By Andreas Alexander, Student Council Leader 2016

The UNIS Student Council (SC) consists of 13 elected members which form the local student democracy. Student representatives are elected at the beginning of every semester by the student body. The SC has four main responsibilities: To represent the UNIS students in the UNIS Leader group, the Educational Committee (ECom) and on the UNIS board. This also includes collaboration with the student parliament in Tromsø, the Norwegian Student Association and the Arctic Welfare Organization in Tromsø. The second task is supporting the students' social life by running activity groups and organizing social events like the Friday Gatherings. Students are also encouraged to engage within the Longyearbyen society and several events organized by the SC are open to the Longyearbyen community. The third role is administering the student welfare: Students are provided with different kinds of equipment and service offers. Finally, the SC works on improving the living situation for students in Svalbard. This is achieved by close cooperation with Samskipnaden, helping new students getting started in town and running the free second-hand shop "Bruktikken".

In 2016 the SC worked hard to strengthen its role and visibility within and outside UNIS. The biggest achievement was the establishment of a Student Council constitution in the spring semester and a revision in the autumn semester. The SC election system was revised, we got an official logo (designed by student Jamie Rodgers), a SC Facebook page, and a presentation on the UNIS webpage. In the autumn semester a thorough FAQ for new students was produced and published on the SC Facebook page.

The SC became part of ECom and the newly established Arctic Safety Center. An official written cooperation agreement between UNIS and the SC was initiated in 2016 and is in process. The students get to give UNIS feedback on a range of matters through mid-term evaluations, safety course evaluations and a semester evaluation. In addition, the guest master programme was evaluated. When the student housing in Nybyen had to be evacuated in November 2016 due to risk of landslides, the SC performed an evaluation among the students which gave useful input for the establishment of new routines.



2016 snapshots: from student life in Svalbard throughout the seasons. Photos (from left): Magnus Heide Andreasen, Nils Roar Sælthun (top), Marie Westvik (bottom), Magnus Heide Andreasen.

In 2016, the SC and the Samskipnaden team in Svalbard started having monthly meetings to solve current issues. Regular meetings with the Samskipnaden management in Tromsø were initiated in 2016 as well. Many topics were discussed and solved. One outstanding question is why the SC is not represented on the board of Samskipnaden. Another discussion point is a fair semester fee distribution. This discussion led to the establishment of a meeting place with the student parliament in Tromsø in the form of several Skype and in-person meetings throughout the year. Cooperation was also initiated with the other mainland student democracies and the Norwegian Student Association. This resulted in a first meeting between the UNIS SC and the student parliaments from Tromsø, Oslo, Bergen, Trondheim and Ås in December 2016.

In 2016 a student sauna was installed in Nybyen. Also a student bike workshop was set up in Sjøskrenten where students can repair their bikes and other things for free. This project received NOK 10.000 from the Svalbard Environmental Fund.

Student life in Svalbard wouldn't be the same without the social activities. The students engage in many different activity groups. Students organized the biannual icebreaker and kitchen-to-kitchen parties as well as the Friday gatherings. Some international students felt very inspired and organized a Russian and a Dutch Friday Gathering to introduce the other students to their culture. The students also organized "Ta Sjansen" (a sledge competition), an Easter ski race, a Friday Gathering cruise to Barentsburg and a gingerbread baking competition for students and staff.

All in all 2016 was an intense and busy year, which would not have been possible without all the committed students who made this year and the study experience to what it was: Awesome and special. Tusen takk to all of them!



January 2016: View towards UNIS, Svalbard Science Centre and Adventdalen from Skjæringa. Photo: Eva Therese Jenssen/UNIS.



SCIENTIFIC PUBLICATIONS 2016

Scientific publications (NVI level 1 and 2) published with UNIS as author address in journals accepted by the Norwegian Association of Higher Education Institutions (UHR)

- Aaron-Morrison, A. P., Ackerman, S. A., Adams, N. G., Adler, R. F., Albanil, A., Alfaro, E., Allan, R., Alves, L. M., Amador, J. A., Andreassen, L. M., Arendt, A., Arevalo, J., Arndt, D. S., Arzhanova, N., Aschan, M., Azorin-Molina, C., Banzon, V., Bardin, M., Barichivich, J., Baringer, M. O., Barreira, S., Baxter, S., Bazo, J., Becker, A., Bedka, K. M., Behrenfeld, M. J., Bell, G. D., Belmont, M., Benedetti, A., Bernhard, G., Berrisford, P., Berry, D. I., Bettolli, M. L., Bhatt, U., Bidegain, M., Bill, B. D., Billheimer, S., Bissolli, P., Blake, E. S., Blunden, J., Bosilovich, M. G., Boucher, O., Boudet, D., Box, J., Boyer, T., Braathen, G. O., Bromwich, D. H., Brown, R., Bulygina, O. N., Burgess, D., Calderon, B., Camargo, S. J., Campbell, J. D., Cappelen, J., Carrasco, G., Carter, B. R., Chambers, D. P., Chandler, E., Christiansen, H. H., Christy, J. R., Chung, D., Chung, E., Cinque, K., Clem, K. R., Coelho, C. A., Cogley, J., Coldevey-Egbers, M., Colwell, S., Cooper, O. R., Copland, L., Cosca, C. E., Cross, J. N., Crotwell, M. J., Crouch, J., Davis, S. M., De Eyto, E., De Jeu, R. A. M., De Laat, J., Degasperi, C. L., Degenstein, D., Demircan, M., Derksen, C., Destin, D., Di Girolamo, L., Di Giuseppe, F., Diamond, H. J., Dlugokencky, E. J., Dohan, K., Dokulil, M. T., Dolgov, A., Dolman, A. J., Domingues, C. M., Donat, M. G., Dong, S., Dorigo, W. A., Dortch, Q., Doucette, G., Drozdov, D., Ducklow, H., Dunn, R. J. H., Duran-Quesada, A. M., Dutton, G. S., Ebrahim, A., Elkharrim, M., Elkins, J. W., Espinoza, J. C., Etienne-Leblanc, S., Evans, T. E., Famiglietti, J. S., Farrell, S., Fateh, S., Fausto, R. S., Fedaeff, N., Feely, R. A., Feng, Z., Fenimore, C., Fettweis, X., Fioletov, V. E., Flemming, J., Fogarty, C. T., Fogt, R. L., Folland, C., Fonseca, C., Fossheim, M., Foster, M. J., Fountain, A., Francis, S., Franz, B. A., Frey, R. A., Frith, S. M., Froidevaux, L., Ganter, C., Garzoli, S., Gerland, S., Gobron, N., Goldenberg, S. B., Gomez, R. S., Goni, G., Goto, A., Grooß, J., Gruber, A., Guard, C. C., Gugliemin, M., Gupta, S., Gutierrez, J., Hagos, S., Hahn, S., Haimberger, L., Hakkarainen, J., Hall, B. D., Halpert, M. S., Hamlington, B. D., Hanna, E., Hansen, K., Hanssen-Bauer, I., Harris, I., Heidinger, A. K., Heikkilä, A., Heil, A., Heim, R. R., Hendricks, S., Hernandez, M., Hidalgo, H. G., Hilburn, K., Ho, S.-P. B., Holmes, R., Hu, Z.-Z., Huang, B., Huelsing, H. K., Huffman, G. J., Hughes, C., Hurst, D. F., Ialongo, I., Ijampy, J., Ingvaldsen, R. B., Inness, A., Isaksen, K., Ishii, M., Jevrejeva, S., Jimenez, C., Jin, X., Johannesen, E., John, V., Johnsen, B., Johnson, B., Johnson, G. C., Jones, P. D., Joseph, A. C., Jumaux, G., Kabidi, K., Kaiser, J. W., Kato, S., Kazemi, A., Keller, L. M., Kendon, M., Kennedy, J., Kerr, K., Kholodov, A., Khoshkam, M., Killick, R., Kim, H., Kim, S., Kimberlain, T. B., Klotzbach, P. J., Knaff, J. A., Kobayashi, S., Kohler, J., Korhonen, J., Korshunova, N. 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August 2016: A polar bear (*Ursus maritimus*) relaxing in Billefjorden. Photo: Nils Roar Sælthun/UNIS.

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