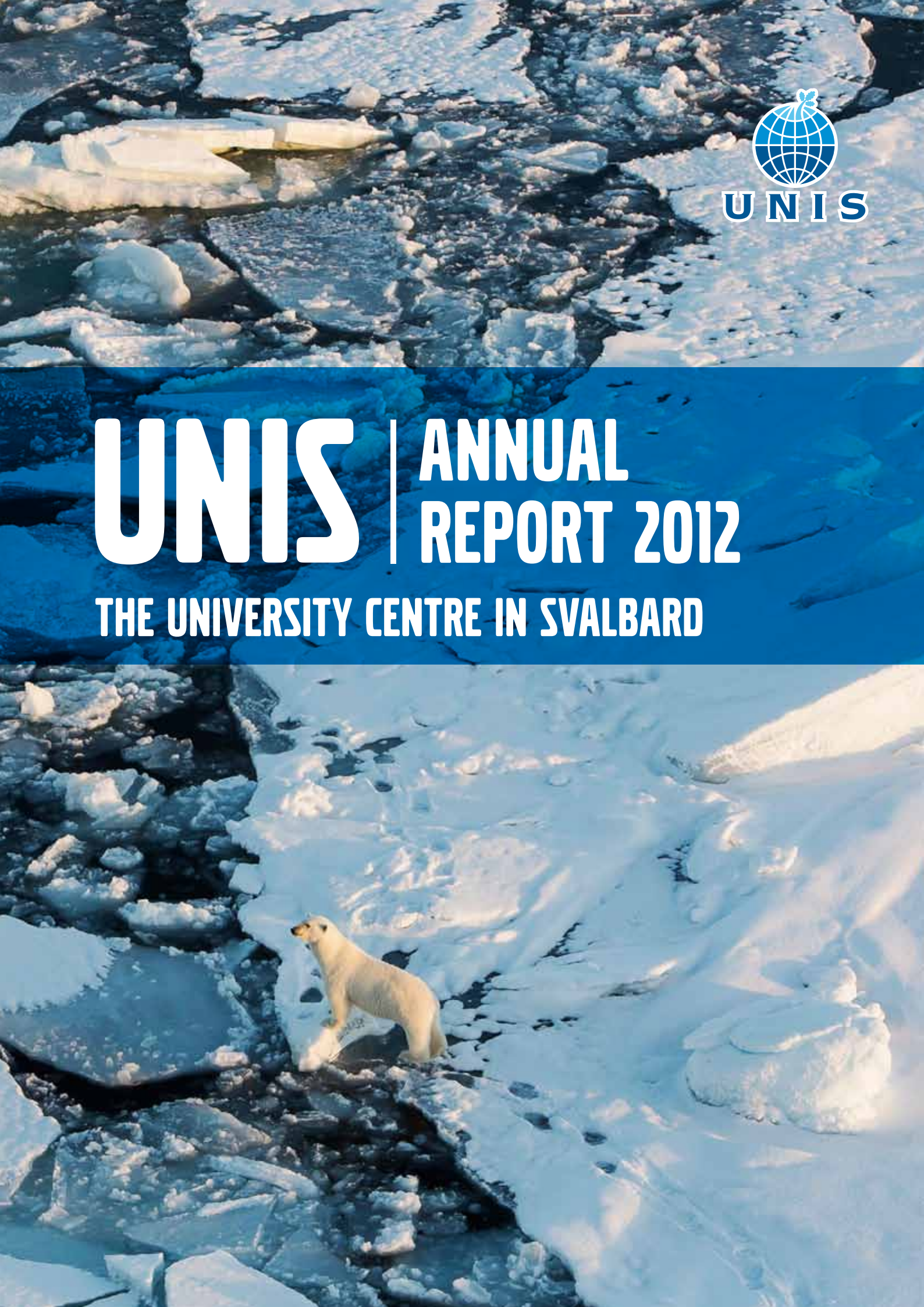


UNIS | ANNUAL REPORT 2012

THE UNIVERSITY CENTRE IN SVALBARD

MAP OVER SVALBARD

FRONTPAGE

OCTOBER 2012: A polar bear on an ice flow in the Fram Straight spotted on the AGF-311 cruise.

Photo: Extreme Ice Survey

APRIL 2012
Glaciologist field party on Knoppbreen.
Photo: Heidi Sevestre/UNIS

MARCH 2012
UNIS and the Svalbard Science Centre.
Photo: Hanne H. Christiansen/UNIS.

MARCH 2012
The sun has finally returned.
Photo: Nataly Marchenko/UNIS

SEPTEMBER 2012
Rainbow over UNIS the Svalbard Science Centre.
Photo: Prasad Rao/UNIS

FROM THE DIRECTOR

After nineteen years, the world's northernmost institution for higher education and research is maturing into a leading international centre for arctic studies and world-leading research – which has been the long term goal for UNIS. A total of467 students attended our courses in 2012. The field-based educational concept proves its unique attractiveness and the Norwegian government keeps increasing the funding, allowing us to expand our programs. Our students, who origins from 23 countries perform very well, and in fact we contribute to the development of the arctic experts of tomorrow.

The research portfolio secures research-based education, and in 2012 external funding amounts to 35 % of the total income; NOK 105 million from the Ministry of Education and Research, and NOK 57.4 million from the Research Council of Norway/private/industry sources.

Since 2011 UNIS has been a partner in a Centre of Research-based Innovation studying sustainable arctic marine and coastal technology (SAMCoT). In 2012 the Research Council of Norway granted Centre of Excellence status to the Birkeland Centre for Space Science led by the University of Bergen, with UNIS and NTNU as partners. The academic departments at UNIS have been granted new and important research projects from the Research Council of Norway, but we also acknowledge the contribution from the ConocoPhillips Arctic Program to five new research projects with a total value of NOK 46 million over a four-year period. UNIS has a strong scientific foundation and a further development of the strategy is underway as a guide to the challenges ahead.

UNIS is an active partner in the Svalbard Integrated Arctic Earth Observing System - SIOS. The preparatory phase has, in cooperation with all other nations having research activities in and around Svalbard, produced guiding principles for how cooperation is done best for increased added value. UNIS has the responsibility for the concept and implementation plan for a new unit - SIOS knowledge centre - in the Svalbard Science Centre. The preliminary principles and structures suggested by SIOS have an excellent fit with the development plans for UNIS.

2012 was a very active year for our subsidiary company, the UNIS CO2 Lab AS, when two new wells were drilled down to the upper part (670 -700 m) of the identified reservoir (670-970m) and an extensive test programme for water injection and data collection was established. In addition a shorter well (to 61 m) for permafrost was drilled. There has been remarkable outreach activity from the UNIS CO2-lab and the work is attracting interest and visitors from a worldwide CCS community. Data are very promising in terms of storage capacity for CO2 - which is not only of a scientific value, but may be of importance to the local community.

UNIS is a unique institution within the international family of academic institutions. Our vision, *Arctic science for global challenges*, proves that we see our work in a holistic context. I am thankful to all my colleagues at UNIS and for having the privilege to take part in realizing the potential of this unique institution. It is our responsibility that UNIS matures as a leading centre for arctic science and higher education.

Ole Arve Misund

EXCERPTS FROM THE BOARD OF DIRECTORS REPORT 2012

In 2012 the flow of students to UNIS increased, there were more externally financed research projects and UNIS became part of the Birkeland Centre for Space Science. The collaboration between UNIS and the eight universities in mainland Norway was strengthened through action plans to operationalize the collaboration agreements. The Board of Directors notes that the financial situation is in good shape, with strengthened shareholder equity and a good system for managing the company's values. Focus on a quality assurance system for education activities ensures that we live up to NOKUT's requirements. This is accompanied by good research results in several areas. The Ministry of Education and Research allocated UNIS funds for increased student production. There has been significant field activity and considerable media attention about the UNIS Co2 Lab AS.

The University Centre in Svalbard AS (UNIS) was established as a state-owned limited corporation on November 29, 2002, replacing the original foundation established in 1994 by the Norwegian University of Science and Technology (NTNU), the University of Bergen (UiB), University of Oslo (UiO) and University of Tromsø (UiT). As of 2011 UNIS AS has an identical collaboration agreement with the eight universities on the Norwegian mainland, and five members of the Board of Directors come from NTNU, UiB, UiO, UiT and the Norwegian University of Life Sciences (UMB).

The company's objective is to provide research and field-based teaching and engage in research 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 or PhD level. The educational provision shall have an international profile, and all tuition is given in English.

EDUCATION

In 2012, UNIS continued the four fields of study: Arctic Biology, Arctic Geology, Arctic Geophysics and Arctic Technology. In 2012, UNIS had 1487 applicants, an increase of 21 % from the previous year. A total of 61 courses were offered, of which 25 were at Bachelor's level and the remainder at Master's or PhD level. UNIS has produced 160.3 student-labour years in 2012, in addition to 11.75 student-labour years from Master's students who worked on their Master's theses at UNIS during the year.

A total of 467 students from 23 countries took courses at UNIS (459 students from 31 countries in 2011), of which 36 Master's students worked on UNIS-related Master's theses during the year (students with contractual agreements).
The proportion of Norwegian students at UNIS in 2012 was 47 %, of which 70 students were from NTNU (33 %), 54 from UiB (25 %), 42 from UiO (20 %), 26 from UiT (12 %), 12 from UiS (6 %), 9 from UMB (4%), 1 from UiN (0.5 %) and 1 from UiA (0.5 %).

Of the international students, the largest groups were from the United Kingdom (20 %), Germany (20 %), Denmark and Sweden (10 %), Russia and the Netherlands (9 %), followed by Canada and USA (6 %). The Nordic students comprised 18 % of the student mass in 2012.

The allocations from the Ministry of Foreign Affairs and the Norwegian Centre for International Cooperation in Education (SIU) have contributed to the development through good scholarship schemes for Russian, Canadian and American students.
The international aspect in IPY Field School has been the course with the most nationalities represented and which also to a large extent contributes to the diversity of nationalities among UNIS's students.

The Norwegian qualifications framework (KR) describes the anticipated learning outcome for candidates that have successfully completed the relevant programme of study. The learning outcome for the three main levels in higher education – Bachelor, Master and PhD – is described as skills, knowledge and general competence. In 2012, UNIS has worked actively with the introduction of KR at course level, so that the course provision meets the requirements from the autumn semester of 2013.

A student survey was implemented in the autumn semester of 2012, which showed that the students have a high level of satisfaction at UNIS and on Svalbard. Potential areas of improvement were also identified, especially concerning the coordination of guest lecturers, in order to ensure a minimum of overlapping and a clear recurrent theme in the course.

RESEARCH

The research activity at UNIS continues to grow. Examples of central projects from the departments follow below:

New DNA studies indicate that polar bears evolved into a distinct species 4 – 5 million years ago. Climate changes and mating with the brown bear over millions of years has formed the polar bear as the species we know today. This study has been carried out by researchers at UiO, the Norwegian Polar Institute, UNIS and an international group led by Pennsylvania State University and University of Buffalo, USA.

Through studies in the fjords and waters round Svalbard, it has been demonstrated that Calanus glacialis (Arctic feed) is a copepod considered to be a keystone species in the Arctic marine ecosystem. It contains up to 80 % fat, and may be compared with an avocado as it is adapted to an environment that is undergoing major change. Estimations show that the bowhead whale previously consumed up to 4 million tonnes of Arctic feed around Svalbard alone. The Little Auk and fish are now the main predators.

Warmer oceans mean that cod and haddock have migrated further north in the Arctic waters and have become a potential threat to polar cod, which is an important species in Arctic ecosystems. However, systematic studies in the fjords and waters round Svalbard show little overlap in the prey of these species. The polar cod grazes mainly on krill and crustaceans such as Calanus and Themisto. Cod and haddock also graze on these species, but the diet similarity was less than 40 %, even in areas in which the three fish species were found together. The low diet similarity was also confirmed by isotope analyses of muscle tissue that indicates relatively stable diet differences between these fish species.

Based on studies of benthic communities in Kongsfjorden and Smeerenburgfjorden over a 30-year period, researchers from UiT, UNIS, Akvaplan-Niva and the University of Cambridge have documented dramatic changes. Arctic cold water species have been displaced by more thermopholic, light demanding species. Macro algae (brown algae) now cover up to 40% of the seabed. The change to more thermopholic species came in approx. 1995 in Kongsfjorden and in 2000 in Smeerenburgfjorden, which is further north. Prof. Bjørn Gulliksen, who has been attached to UNIS since 1994, has had a central role in these studies.

The Space Physics group at the Department of Arctic Geophysics has become a partner in the Birkeland Centre for Space Science, which is led by the University of Bergen. This is a major recognition for the group's research in the fields of optics, the Northern Lights and radar applications, and will result in increased resources and use of the Space Physics group's instruments and infrastructure, such as the Kjell Henriksen Observatory (KHO) and the SPEAR (Space Plasma Exploration by Active Radar) facility.
The research group has developed a sought-after Northern Lights forecast, which may easily be downloaded on all smart phones. Important studies concerning weather forecasting and understanding of atmospheric boundary layers in Arctic fjords, studies of heat exchanges between warm sea currents, sea ice and cold polar air masses have been published. Work has taken place to get in satellite-based earth observations in projects and the Research Council of Norway allocated funding for the four-year project Remote Sensing of Ocean Circulation and Environmental Mass Changes (REOCIRC).

The Department of Arctic Geology has made major progress. Several large, externally-funded projects are in place (e.g. the ConocoPhillips programme), and the department has been successful in recruiting the next generation of researchers through new, competent PhD candidates and post docs. The department's visibility has also been advanced through major seminars, including in Arctic hydrology and UNIS CO2 lab.

Sea ice is the major challenge for the development of the oil and gas industry and shipping in the High Arctic. Ships and safe structures should be designed by taking into account sea ice concentration, thickness and strength. In a PhD thesis based on measurements in the fjords and waters round Svalbard, an importantfinding was that the variability of the uniaxial compressive strength is related to the localization of the brine (pockets and channels) in the sea ice. A statistical distribution was established for the uniaxial compressive strength by using more than 1000 samples. She also studied ice ridges and it was observed that the water below the level is involved in the desalination process and that small ridges of land-fast ice should erode faster in tidal currents than larger ridges. Knowledge on the morphology of first-year sea ice ridges was improved and a catalogue and review of the morphological properties of first-year floating ice ridges was established.

During 2012 UNIS researchers published 101 articles in international refereed journals, of which 26 were at the highest level. Corresponding figures for 2011 were 73 articles, of which 16 were at the highest level.

DISSEMINATION

There was also a strong focus on dissemination work in 2012. Around 200 Norwegian and international media reports were logged. Part of this was based on self-produced articles about research projects that reached beyond Norway's borders thanks to our collaboration with forskning.no, Science Nordic and Alpha Galileo. UNIS research was reported in the New York Times, Wall Street Journal and on NBC News and Discovery Channel, amongst others. BBC produced a documentary about our atmospheric research, which screened in October.

UNIS is popular among the delegations which visit Longyearbyen and 2012 was no exception. Nearly 100 groups from within Norway and abroad visited UNIS, including the EU's High Representative for Foreign Affairs and Security Policy, Lady Catherine Ashton, and Jonas Gahr Støre.

The Svalbard Seminars, which are offered to the local population of Longyearbyen during the Polar Night, attracted a record attendance in 2012. The Svalbard Course and Studietur Nord were run during the summer of 2012 and received good feedback. An Open Day was arranged in September in conjunction with LySEF.

Our website was updated regularly and our Facebook page doubled in popularity. The website and social media will be prioritized in 2013, in addition to the production of news articles for forskning.no and other dissemination channels. The Board of Directors is extremely satisfied with the dissemination activities.

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 both the institution and the community.
All shall engage themselves in the community's social and cultural life rather than starting their own clubs or societies. The relationship with the Russians in Barentsburg is being developed through regular contact, increased scientific collaboration and due to the fact that the number of Russian students and staff is increasing. The transition to permanent positions is making UNIS an even more stable institution for the local communities. Through the establishment of UNIS Co2 Lab AS, UNIS is contributing to the public debate by participating actively in the discussion about the power supply in Longyearbyen and cooperating closely with the Longyearbyen Local Board on this matter. The annual account shows that in 2012 a total of 51 % of goods and services were purchased locally in Longyearbyen.

STAFF

As of December 31, 2012, the scientific staff at UNIS comprised nine professors, 15 associate professors, eight post docs, 16 PhD candidates, four project positions and 28 with adjunct professor/associate professor attachments. The technical and administrative staff comprised 13 and 19.1 labour years respectively. Women accounted for 55 % of the technical and administrative positions, 43 % of the scientific positions and 48 % of the students. Four of the nine members of the Board of Directors were women. The Board of Directors is not aware of discrimination of any form taking place at UNIS.

Gunnar Sand left the position of Managing Director of UNIS on 31.12.2011. The new Managing Director, Ole Arve Misund, started in the position on March 1, 2012.

The following positions are externally funded in full or part: one professor (Statkraft), one associate professor (SNSK), eight post docs (four funded by the Research Council of Norway (NFR) and one each by SVALI, Lundin, Conoco-Philips and Samcot), 7 PhD candidates (five funded by NFR and one each by the EU and SAMCoT) and six adjunct professorships (one each by NFR, NGU, Svalbard Museum, Lundin, NERSC and ARS/NAROM). The Board of Directors would like to thank these institutions for their contribution to UNIS.

HEALTH, SAFETY AND ENVIRONMENT

Absence due to illness at UNIS in 2012 was 1.4 percent. The institution has an agreement with Longyearbyen Hospital regarding occupational health services and is certified as an IA enterprise. During 2012 there were no reports of staff members being injured or serious occupational accident or injuries. UNIS is unaware of contamination of the wider environment to any significant degree as a result of the institution's operations. UNIS is working continually to limit the environmental impact of its activities. In the course of 2012 the institution has worked to incorporate regulations and routines to be able to prevent or if necessary deal with a serious criminal or terrorist attack aimed at staff or students at UNIS. This work has been carried out in cooperation with the Governor of Svalbard and will continue into 2013.

ECONOMIC DEVELOPMENT

Funds for operation and investment at UNIS are appropriated in the budget of the Ministry of Education and Research. In 2012 appropriations from the Ministry totalled NOK 105,272,000, of which NOK 72.3 million constituted base funding, NOK 4.4 million was for investments in equipment and NOK 23.6 million rent for the Svalbard Science Centre and KHO. Of the allocation, a sum of NOK 5 million has been set aside as postponed income; NOK 4.5 million for the purchase of housing and NOK 0.5 million to a strategic pot for the development of new courses. Income over and above the appropriations from the Ministry of NOK 57.4 million comprises NOK 44.3 million from external project income for research and NOK 13.1 million in income from consultancy services and rentals. UNIS has also experienced an increase in external funding for research from 8 % of its gross income in 2001 to 37.4 % in 2012. The Board of Directors is extremely satisfied with the increase in external income.

UNIS has gross operating income of NOK 153.3 million and direct project expenses and other operating expenses constitute NOK 150.1 million. As of the 2012 financial year, group accounts will be kept as UNIS CO2 Lab As is fully owned by UNIS AS. Operating subsidies to UNIS CO2 Lab AS from sponsors constitute NOK 19.7 million and give the group a gross operating income of NOK 170.7 million. Direct project expenses and other operating expenses constitute NOK 168.1 million for the group.

The annual accounts for the UNIS Group for 2012 show an operating surplus of NOK 2,674,656. After financial items, a figure of NOK 2,191,391was transferred to other equity. The group's result is identical, as the subsidiary company's unused funds for the operation of the CO2 project are adjusted as postponed income. UNIS's total capital as of 31.12.12 were NOK 89,034,230, of which NOK 39,567,016 comprises institutional buildings. The company's total shareholder equity amounts to NOK 16,625,913. The company's non-distributable equity amounts to NOK 14,571,888. The group's total capital as of 31.12.12 was NOK 92,967,991. The group's shareholder equity amounts to NOK 16,625,913.

In 2012, a salary of NOK 721,596 was paid to the Managing Director in the period March-December. The Chairperson of the Board of Directors received a fee of NOK 55,000, the Deputy Chairperson NOK 33,000 and the other members of the Board of Directors each received a fee of NOK 22,000.

The accounts were audited by PricewaterhouseCoopers A/S.

INFRASTRUCTURE AND HOUSING

At year-end 2012, UNIS owned a total of 50 apartments. In addition, UNIS rents a new building, UNIS Guest House, for guest lecturers and guest researchers. The new complex was completed in September 2011 and comprises a total of 52 small studio apartments, each of which is less than 30 m^2. UNIS has contracted rental for all the units for a period of 10 years. At year-end 2012, UNIS' combined housing loans total NOK 28.6 million. Interest and instalments on the loan as well as inventory for the apartments must be financed from the operational budget.

The Student Welfare Organisation in Tromsø (SiTø) offers a total of 142 studio apartments to students. It is decisive for UNIS that the students have satisfactory living conditions, and the Board of Directors emphasises continuing the good cooperation with SiTø. At the start of 2012, SiTø has received funding for 40 new studio apartments for students, which will contribute to more easily being able to realise the goal of increased student numbers at UNIS. UNIS is in continual contact with and co-operates with SiTø in order to contribute to the new studio apartments for students being able to be realised as quickly as possible. Further, SiTø has signalled that it wishes to move all the student accommodation closer to UNIS. This will mean the building of new student accommodation, which will be conditional on the sale of the existing housing stock in Nybyen. UNIS will contribute in every way possible to ensure this plan is realized.

SHAREHOLDER EQUITY AND FINANCIAL RISK

The housing loan has been reduced by NOK 2.4 million in the course of the year. Since 2008, UNIS has repaid NOK 12.5 million of the loan. In addition to a small increase in the shareholder equity, NOK 5 million has been set aside for the development of new courses and the purchase of apartments in 2014. However, strengthening of the shareholder equity is still necessary in order to strengthen the solidarity in the company. The conditions for the loan raised in the autumn of 2008 included a requirement from the bank that the shareholder equity ratio shall be 20 % of the account balance. The bank has dropped this requirement for 2012.

Of the liquidity reserves at year-end of NOK 37.6 million, a total of NOK 19 million comprises advance payments to UNIS belonging to external projects. The cash flow shows a net increase in the liquidity reserves of NOK 17 million for UNIS and NOK 18.5 million for the group. may be attributed to the fact that UNID has pre-paid expenses of NOK 8.2 million for 2012 and that the debtors' applicable externally-financed projects of NOK 10 million is not received until mid-January 2012. The appropriation from the Ministry of Education and Research ensures that the cash flow from operational activities to cover financial and investment activities such as equipment and housing. The working capital (current assets minus short-term debt) has gone in recent years from minus NOK 1.2 million in 2009 to a positive figure of NOK 11.6 million in 2012. The working capital for the UNIS Group is NOK 12.9 million.

INTERNAL FINANCIAL CONTROL

UNIS has established simple and good systems for financial follow-ups and reporting. In the light of proposals for appropriation frameworks from the Ministry in October, preparations are being made for a thorough budgeting process for all departments linked to this activity. Detailed budgets are prepared for each individual course. Financial reporting to the Board of Directors comparing the accounts with the adopted budget is a regular item on the agenda for board meetings and includes reviewing each discrepancy.

RISK AND INTERNAL CONTROL IN RELATION TO FIELDWORK, EXCURSIONS AND LABORATORY ACTIVITIES

UNIS has been established on Svalbard and in Longyearbyen to benefit from the direct access to the Arctic environment. UNIS has a special responsibility to ensure that all activities in the natural environment are implemented in the safest and most gentle manner possible. At UNIS the safety of students and staff shall always be the top priority.
Safe and secure implementation of fieldwork in a high Arctic area makes major demands on the knowledge, skills and attitudes of the students and staff. UNIS makes the necessary arrangements to ensure that everyone who implements studies in the field have the necessary qualities to take care of their own safety and to ensure that the natural environment is not damaged or exposed to unnecessary strain. UNIS attends to this by arranging field safety courses before the field party departs, in addition to comprehensive HSE analyses of potential risk and vulnerability connected to the project. During implementation of the fieldwork, the field party is followed up continually through daily contact with UNIS. Work at UNIS's laboratories is subject to the same quality assurance as work 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.

In a period of strong growth at the institution, it is particularly important that we manage to keep pace with the development as seen from an HSE perspective. UNIS is working in a determined manner to ensure that the particular safety aspects associated with lab and field activities shall be governing for all activities.

THE PATH FORWARD

The financial position of UNIS has experienced positive development in 2012. The expenses are under control and the institution is operating in line with the budget. The level of debt is significantly reduced and the shareholder equity ratio is approaching 20 %. The Ministry expects continued growth in the student production, and has expectations that course provisions are developed that provide 210 student-labour years. The student places are well financed and take into account the additional expenses for field-based activities on Svalbard. The provision of studio apartments for students, which is managed by the Sitø, no longer meets the requirements during the most intense seasons.

THE UNIS BOARD OF DIRECTORS 2012:

Rear row from left: Jarle Nygard (Vice Chair - UiO); ØrjanTotland (deputy, UMB); Lise Øverås (deputy, UiB) and Ole Jørgen Lønne (staff representative).
Mid row from left: Martin Indreiten (staff representative); Morten Hald (UiT); Ole Arve Misund (director), and Erlend Damm Søby (student observer).
Front row from left: Berit Kjeldstad (Chair – NTNU); Anita Johansen (Longyearbyen Local Council) and Johannes P. Lorentzen (student representative).

Photo: Helen Flå/UNIS

Sitø has now received the green light from the Ministry for 40 new student apartments at Elvesletta, and construction is expected to begin in the autumn of 2013.

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 action plans. The Board of Directors has high expectations for this process and believes it will be a win-win situation for all the parties.

From the Board of Directors' perspective, UNIS has taken new steps towards achieving its overall goal of being a leading international centre for Arctic studies. The Board of Directors would like to thank all staff at UNIS for their good contributions in 2012.

TROMSØ 25.02.2013

Berit Kjeldstad | Styreleder

Jarle Nygard | Nestleder

Morten Hald

for Geir Anton Johansen

Anita Johansen

Ole Jørgen Lønne

Martin Indreiten

for Eva Falleth

Erlend Damm Søby

Ole Arve Misund

MARCH 2012
UNIS performs teaching in all kinds of weather. Here students in AGF-212 get instructions out in the field.
Photo: Jacob Abermann/UNIS

THE NATIONAL QUALIFICATIONS FRAMEWORK

BY IBEN N. ANDERSEN, DEPARTMENT OF ACADEMIC AFFAIRS

UNIS have worked systematically with quality assurance since 2010 to increasing the quality in courses. The goal is to enhance students' learning outcomes and attract more qualified applicants. One of the means that were used throughout 2012 was the Ministry of Education and Research's commitment to the National Qualifications Framework (NRK). NRK describes the learning outcomes it is expected that all candidates who have completed education at that level should have at graduation. The grading of the performance is done using the grading scale.

The learning outcomes for the three main levels of higher education - bachelor, master and PhD - described in:

Knowledge - An understanding of theories, facts, principles, procedures in subject areas and/or occupations

Skills – The ability to utilise knowledge to solve problems or tasks (cognitive, practical, creative and communication skills)

General Competence – The ability to utilise knowledge and skills in an independent manner in different situations

QUALITY IN COURSE PLANS AND DEVELOPMENT

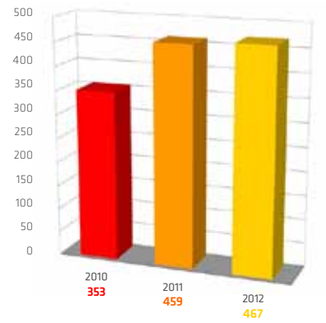
The purpose of UNIS' quality assurance system is to secure and develop the quality of UNIS' course offer at all levels: bachelor's, master's and PhD's. Quality assurance comprises all the processes and activities that affect the quality of courses, from information provided to potential applicants to the completion of their courses. The effort to improve UNIS' courses is a continual process. Internal evaluations of all courses are being conducted electronically by students and course responsible.

LEARNING ENVIRONMENT SURVEYS

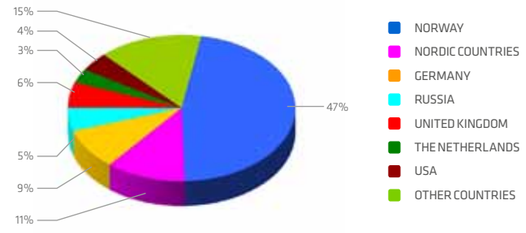
They include the students' physical learning environment and aim to detect shortcomings concerning all the facilities the students use in an academic context, as well as the services they receive from the UNIS support functions. An annual student survey (arranged by the students themselves) also includes learning environment topics and is important in order to assess the overall quality of UNIS.

STATISTICS

NUMBER OF STUDENTS COMPLETING UNIS COURSES 2010-2012

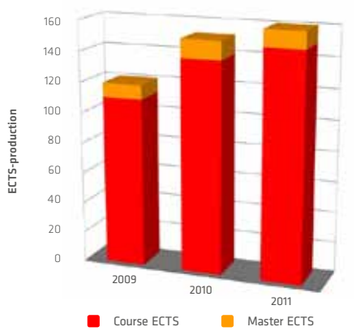


UNIS STUDENTS' NATIONALITY 2010

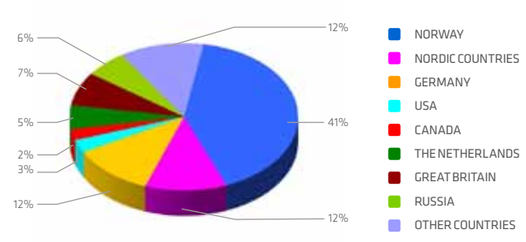


UNIS STUDENTS' NATIONALITY 2011

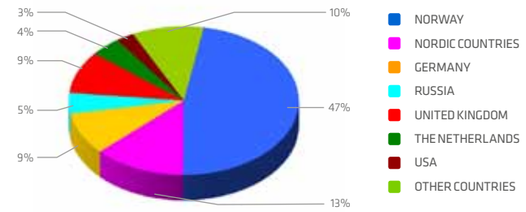
PRODUCTION IN STUDENT-LABOUR YEARS (1 YEAR = 60 ECTS CREDITS)



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



UNIS STUDENTS' NATIONALITY 2012



RESULTATREGNSKAP 2012

KONSERN 2012	KONSERN 2011		UNIVERISTETSSENTERET PÅ SVALBARD AS 2012	UNIVERISTETSSENTERET PÅ SVALBARD AS 2011
		DRIFTSINNTEKTER		
100 272 000	97 217 000	Driftstilskudd fra KD	100 272 000	97 217 000
-4 380 860	-4 520 209	Avsatt til investeringstilskudd	-4 380 860	-4 520 209
95 891 140	**92 696 791**	**Årets driftstilskudd fra KD**	**95 891 140**	**92 696 791**
42 991 203	37 885 264	Eksterne prosjektinntekter	44 313 247	37 885 264
19 736 988	0	Driftstilskudd sponsorer	0	0
12 126 821	10 375 556	Øvrige inntekter	13 111 321	10 375 556
170 746 152	**140 957 611**	**Brutto driftsinntekter**	**153 315 708**	**140 957 611**
39 218 865	32 903 730	Direkte prosjektkostnader	39 218 865	32 903 730
131 527 287	**108 053 881**	**Netto driftsinntekter**	**114 096 843**	**108 053 881**
		DRIFTSKOSTNADER		
51 992 188	45 654 157	Lønn og sosiale kostnader	48 494 103	45 654 157
10 678 162	9 893 389	Felt- og toktkostnader	10 678 162	9 893 389
11 610 152	0	Konsulenttjenester	0	0
31 625 932	29 545 485	Kostnader lokaler	31 625 932	29 545 485
20 508 464	17 956 679	Øvrige driftskostnader	18 116 996	17 956 679
2 437 734	2 401 731	Avskrivninger	2 437 734	2 401 731
128 852 631	**105 451 441**	**Sum driftskostnader**	**111 352 927**	**105 451 441**
2 674 656	**2 602 440**	**DRIFTSRESULTAT**	**2 743 916**	**2 602 440**
		FINANSINNTEKTER OG -KOSTNADER		
1 075 606	1 124 600	Finansinntekter	1 005 889	1 124 600
1 558 871	1 726 656	Finanskostnader	1 558 414	1 726 656
-483 265	-602 056	Netto finanskostnader	-552 525	-602 056
2 191 391	**2 000 384**	**Årsresultat**	**2 191 391**	**2 000 384**
		DISPONERINGER		
		Overført til annen egenkapital	2 191 391	2 000 384
		Sum overføringer	**2 191 391**	**2 000 384**

BALANSE 31.12.2012

KONSERN 2012	KONSERN 2011		UNIVERISTETSSENTERET PÅ SVALBARD AS 2012	UNIVERISTETSSENTERET PÅ SVALBARD AS 2011
		EIENDELER		
		ANLEGGSMIDLER		
39 567 016	42 004 750	Bygninger	39 567 016	42 004 750
39 567 016	42 004 750	Sum varige driftsmidler	39 567 016	42 004 750
		Finansielle anleggsmidler		
0	0	Investeringer i datterselskap	100 000	100 000
1	1	Andeler Svalbardhallen	1	1
1	1	**Sum finansielle anleggsmidler**	100 001	100 000
39 567 017	**42 004 751**	**Sum anleggsmidler**	**39 667 017**	**42 104 751**
		OMLØPSMIDLER		
0	270 389	Varebeholdning	0	270 389
11 439 322	11 959 742	Debitorer	8 943 393	11 959 742
2 864 341	8 256 775	Andre kortsiktige fordringer	2 864 341	8 256 775
39 097 311	20 615 808	Kontanter og bankinnskudd	37 559 479	20 515 808
53 400 974	**41 102 714**	**Sum omløpsmidler**	**49 367 213**	**41 002 714**
92 967 991	**83 107 465**	**Sum eiendeler**	**89 034 230**	**83 107 465**
		EGENKAPITAL OG GJELD		
		EGENKAPITAL		
		Innskutt egenkapital		
2 054 025	2 054 025	Aksjekapital	2 054 025	2 054 025
0	0	Annen innskutt egenkapital	0	0
2 054 025	2 054 025	Sum innskutt egenkapital	2 054 025	2 054 025
		Opptjent egenkapital		
20 676 473	12 380 496	Annen egenkapital	19 571 888	12 380 496
20 676 473	12 380 496	Sum opptjent egenkapital	19 571 888	12 380 496
22 730 498	**14 434 521**	**Sum egenkapital**	**21 625 913**	**14 434 521**
		GJELD		
		Avsetning for forpliktelser		
1 089 863	1 240 000	Utsatt inntektsføring	1 089 863	1 240 000
1 089 863	1 240 000	Sum avsetning for forpliktelser	1 089 863	1 240 000
		Annen langsiktig gjeld		
28 621 048	31 058 782	Boliglån	28 621 048	31 058 782
28 621 048	31 058 782	Sum annen langsiktig gjeld	28 621 048	31 058 782
		Kortsiktig gjeld		
11 285 761	13 404 797	Leverandørgjeld	8 468 017	13 404 797
4 880 169	3 899 926	Skyldige off.trekk og avgifter	4 880 169	3 899 926
24 360 652	19 069 439	Annen kortsiktig gjeld	24 349 220	19 069 439
40 526 582	36 374 162	Sum kortsiktig gjeld	37 697 406	36 374 162
70 237 493	**68 672 944**	**Sum gjeld**	**67 408 317**	**68 672 944**
92 967 991	**83 107 465**	**SUM EGENKAPITAL OG GJELD**	**89 034 230**	**83 107 465**

MARCH 2012

Investigating an ice portal near Tellbreen.

Photo: Eva Therese Jenssen/UNIS

ARCTIC BIOLOGY

BY TOVE M. GABRIELSEN

The department conducts research in arctic ecology and provides a full one-year curriculum of undergraduate studies including a seminar series on the impact of climate change on arctic ecosystems and a summer course on identification of arctic terrestrial species as well as nine PhD/Master's level courses. The department pursues the strategy to have two research groups, one in marine arctic ecology and one in terrestrial arctic ecology. The similarity in many research questions regarding e.g. seasonality, biodiversity, winter ecology, metagenomics and metatranscriptomics encourage collaboration and sharing of competence as well as laboratory facilities between the two research groups.

MARINE ECOLOGY RESEARCH GROUP

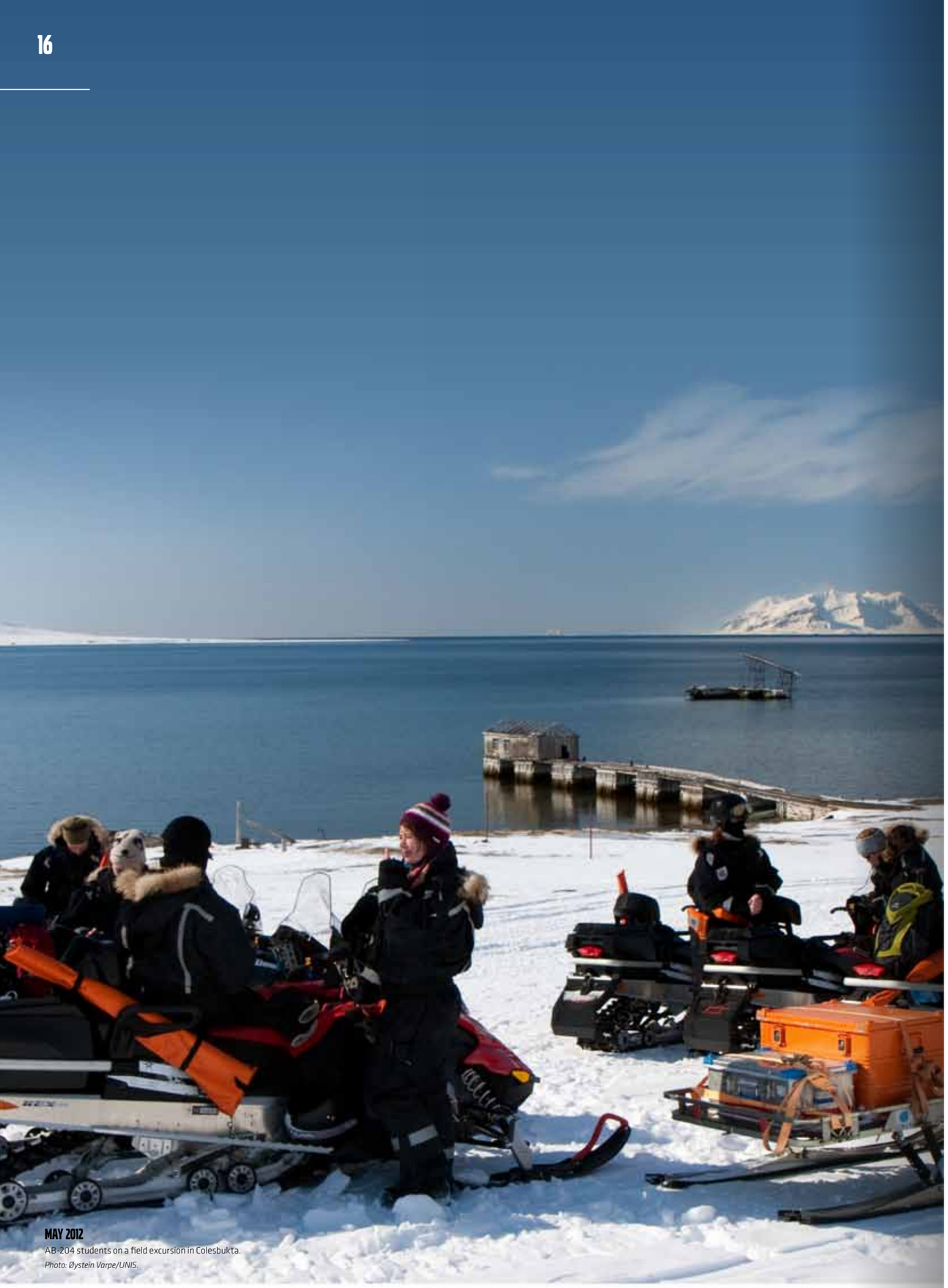
The marine ecology research group consisted of one full professor, two associate professors, two researchers and five PhD students. 2012 marked the beginning of a large and significant focus on the polar night as a main prioritized research area within the research group. Three new projects were funded, two from the Research Council of Norway (RCN) and one from ConocoPhillips, all three lead by UNIS researchers and all three focusing at least partly on processes during the polar night.

Arctic ecosystem processes are direct consequences of the complex behaviours and interactions between organisms, many of which are driven by the physical environment. Accordingly, a classical paradigm in Arctic marine ecology suggests that most biological processes stop during the polar night at high latitudes due to low food availability and the lack of light. Recently, new research in the department has challenged this assumption by presenting evidence of both diel vertical migration (DVM) of zooplankton as well as bioluminescence levels indicative of biotic activity hitherto assumed to be absent during the polar night. Although the polar night at high latitudes is perceived as total darkness, new data indicate that Arctic organisms nevertheless may respond to light levels undetectable by the human eye.

Winter ecology of Arctic marine systems is a largely new field of science with the potential for radically altering our fundamental perception of basic Arctic ecosystems processes, current state of the ecosystem and connections between the biosphere, hydrosphere and cryosphere within the Polar Region. Among the three new projects starting in 2012, Circa (FriMedBio from RCN, 2012-2015) will focus on the patterns of diel vertical migrating zooplankton in the polar night period, and how this behavior ultimately affects the withdrawal / release of CO2 from the ocean interior and onto the atmosphere.

CLEOPATRA II (RCN PolProg, 2012-2015) is a follow-up of one of UNIS' two IPY projects, and will focus on overwintering strategies of one of the most important species in the high Arctic – the small but massively dominant *Calanus glacialis*. Field and laboratory investigations are combined with model development to ultimately arrive at an improved understanding of the physiological and life history adaptations of Arctic zooplankton. A central element of our approach is to move towards individual-based zooplankton ecology where states, such as lipid reserves, are measured at the level of individuals. Long-term data-series acquired through previous projects are continued in CLEOPATRA II and will allow the inclusion of inter-annual variability and different ice-cover scenarios in the investigations. 2012 has seen an intensive field and laboratory activity.

The last of the three new projects lead from the department, MicroFun (ConocoPhilips, 2012-2016), is co-lead by both marine and terrestrial researchers in the department and as such enhances the collaboration between the established research groups. The project utilizes modern high-throughput sequencing technology to enable a new understanding of the diversity and function of microbial Arctic organisms and the environmental drivers that influence the changes in microbial diversity and processes. Six new positions were funded by the three new projects, and three of these were filled in 2012.



MAY 2012
AB-204 students on a field excursion in Colesbukta.
Photo: Øystein Varpe/UNIS.

APRIL 2012
Staff and students in AB-330 working on the sea ice north of Nordaustlandet.
Photo: Eike Ingrid Stübner/UNIS.

Among benthic projects, the long term investigations of rocky bottom communities continued in 2012, and a new project based carried out in Hinlopen was initiated with the aim to develop data collection techniques based Remotely operated vehicles (ROV's). This is to secure the continuation, and data compatibility, to the benthic research and monitoring carried out in Svalbard for more than 30 years under the leadership of prof. Gulliksen, who finished his contract with UNIS in 2012. An ongoing mapping of the benthic macroalge in Isfjorden was finalized, and distribution maps are for the first time being prepared also for the marine flora of Svalbard.

Several joint field campaigns were conducted in 2012, the most comprehensive involved sampling in a newly established field station in Adventfjorden allowing weekly collection of biological samples of the lower trophic levels from microbes to zooplankton. Environmental parameters were also sampled weekly as well as from automated sensors established on a moored ocean observatory positioned at the field station. See also the field blog: **www.unis.no/20_RESEARCH/2020_Arctic_Biology/AFC_blog.htm**

TERRESTRIAL ECOLOGY RESEARCH GROUP

The terrestrial ecology research group consisted of one PhD student and three associate professors, of which Coulson started his sabbatical year in midsummer. The terrestrial part of the MicroFun project undertook fieldwork around Longyearbyen for temporal sampling and spatial sampling in the western and northern coast of Spitsbergen as well as in natural oil seep sites at the East coast of Spitsbergen.

Colonisation of Svalbard by the diverse invertebrate fauna of Svalbard continued to be a focus area of terrestrial research with the RCN funded AVIFauna project in its second year. This Norway-Russia collaboration project is investigating whether migrating birds may introduce invertebrates to Arctic islands. Related projects investigating recent human introduction of alien invertebrate species resulted in several publications. The RCN funded project *"Predicting effects of climate change on Svalbard reindeer population dynamics: a mechanistic"* approach lead from NTNU continued in 2012 and undertook initial fieldwork.

UNIS is a member of the RCN funded Nordic network BIOCOLD (Biotic response to climate change in cold climates) which is a Nordic network designed to bring together research groups within different research fields to better understand biotic responses at the end of the last ice age, species response patterns, migration processes, and extinctions leading to the present day distribution of biota. In June 2012, the network gathered at UNIS in Longyearbyen for a workshop on biotic response on climate change.

HATEG (High Arctic Terrestrial Ecology Group at the Fram Centre) was initiated in 2011, and the project "Svalbard's terrestrial ecosystem - climate impacts and trophic interactions", got further incentive funding from the Fram Centre to continue the pilot project initiated to fulfill and expand on the studies based on the promising results from 2011 that included surveys of herbivore feces, goose grubbing and the *Bistorta vivipara plant*. The first publications from this project were also accepted in 2012.

GRADUATES 2012

PHD DEGREE:

ANJA MORVEN CARLSSON:
Survival through the Arctic winter: How gastrointestinal nematodes influence fitness in reindeer.

MASTER DEGREE:

ELEN BELSETH:
Eco-physiology of the Arctic kelp *Laminaria solidungula* - using divers, Remotely Operated Vehicle and Pulse Amplitude Modulated fluorometry.

MERLE BOLLEN:
Feeding ecology of the Arctic chaetognath *Parasagitta elegans*.

LENE CHRISTENSEN:
Temporal variation of arctic marine picophytoplankton focusing on *Micromonas pusilla* (Mamiellophyceae).

ROGER COLUMNIAS:
Harbour seal diet in a changing Arctic (Svalbard, Norway).

MASTER DEGREE:

LIUBOV DUMAREVSKAYA:
Population structure of *Puccinellia phryganodes*: the interaction between genotypes and environment.

MARIE KRISTINE FØREID:
Migration history and dispersal potential of *Puccinellia phryganodes*.

ERICA NÄSLUND:
Revegetation of tracks made by off-road vehicles on Svalbard.

JAAP VAN RIJCKEVORSEL:
The heat is on - The effects of OTC warming on *Empetrum nigrum* at its Northern and Southern latitudinal margin of distribution.

MAY 2012
UNIS scientist Anna Vader sets up a sediment trap in Adventfjorden.
Photo: UNIS

ARCTIC GEOLOGY

BY RIKO NOORMETS

2012 saw a reorganization of the department to an integrated Arctic geology department with long-term research themes replacing the previous structure of three small research groups. This change resulted from the Earth Science evaluation conducted by the Research Council of Norway in 2011. The new model where various expertises of the full-time and adjunct staff as well as post-doctoral researchers, PhD and MSc students contribute to the common research and educational goals facilitates interaction between staff across disciplines and promotes innovation through integration in the Arctic Earth Science. These ideas have already started to materialize and synergies between different research fields have generated promising results in the form new research projects.

Several new people joined the department during 2012: a new adjunct professor, Professor Lars Stemmerik (University of Copenhagen, carbonate sedimentology) and a new post-doctoral researcher Dr. Sten Andreas Grundvåg (Lower Cretaceous Arctic Basin studies) are both externally funded positions. In addition, two new PhD students began their studies at the department as well.

2012 was a year of considerable research and teaching activity for the department. 2 new large research programs started in 2012 where the staff members of the department play leading roles:

The ConocoPhillips Arctic Research Program 2012-2016, a four-year research program involving 11 projects on various Arctic issues, such as environment, ship operations, biology, glaciology, geology etc. includes three projects lead by the members of the department: Hydrocarbon seeps and geochemistry of the potential source rocks in the Northern Barents Sea, Calving Rates and Impact on Sea Level (CRIOS), and Neogene tectonic uplift of Svalbard. These projects tackle the questions on geological evolution of the organic-rich Mesozoic rocks, the effect of glaciations on the geological history of the Northern Barents Sea as well as modern processes of gas/fluid seeps and glacier dynamics in Svalbard and the northern Barents Sea. In addition to the individual project goals, this program emphasises collaboration between different projects, including those led by the researchers at the departments of biology and geophysics, to promote innovation and added value for the entire program.

PAST Gateways (Palaeo-Arctic Spatial and Temporal Gateways) is an international program continuing the research on the glaciated continental margins started by the PONAM (Polar North Atlantic Margins), and continued by the QUEEN (Quaternary Environment of the Eurasian North) and APEX (Arctic Palaeoclimate and its Extremes) networks. PAST Gateways is an International Arctic Science Committee (IASC) endorsed network research programme for understanding Arctic environmental change during the period preceding instrumental records and across decadal to millennial timescales. The focus of the six year programme is on the nature and significance of Arctic gateways, both spatial and temporal, with an emphasis on the transitions between major Late Cenozoic climate events such as interglacials to full glacials and full glacial to deglacial states, as well as more recent Holocene fluctuations. There are three major themes to the programme: (1) Growth and decay of Arctic Ice Sheets; (2) Arctic sea-ice and ocean changes, and (3) Non-glaciated Arctic environments.

In addition to these new initiatives, our staff continued activities within on-going large international research programs such as the Nordic Centres of Excellence (NCoE) **SVALI** (Spatial variations of the Arctic Land Ice) and **Defrost** (Depicting ecosystem-climate feedbacks from permafrost, snow and ice), Centre for Environmentally Friendly Energy Research (FME) **SUCCESS** (Subsurface CO2 Storage – Critical Elements and Superior Strategy), and **Page21**, an EU-funded program titled 'Changing permafrost in the Arctic and its Global Effects in the 21st Century'. As part of SVALI, the department organized a 5 ECTS PhD-level summer school on the Dynamics of Calving Glaciers. Based on the success of this course, the department is planning to establish a full UNIS graduate course on the calving glaciers. As part of the FME SUCCESS activities, the UNIS CO2 Lab's marine baseline studies were equipped with a new state-of-the-art sub bottom profiler/side scan sonar system, and the Page21 program had a successful permafrost coring campaigns in the Adventdalen, Spitsbergen and in the Zackenberg valley in Greenland. The department is also a partner in a new EU 7th Framework Program funded Marie Curie Initial Training Network **GLANAM** (Glaciated North Atlantic Margins) providing opportunities for 15 young researchers to conduct research on glacially influenced continental margins in Norway, Denmark and United Kingdom that will have an official start in early 2013.

AUGUST 2012
AG-210 students on Nordenskiöldbreen.
Photo: Anne Hormes/UNIS.

The UNIS CO2 Lab drilled additional wells in the Adventdalen well-park in 2012 providing new data on the reservoir and cap rock properties as well as for full-thickness permafrost studies. The drilling of planned configuration of exploration wells was completed but the testing and analysis of the rock and soil properties will continue. Surprisingly, two of the wells in the well-park started to produce large quantities of methane gas. Seabed studies in the surrounding fjords continued with a goal to establish the geological and geophysical baselines. The UNIS CO2 Lab has attracted significant international media attention and received high-level visitors from the government, industry as well as public organizations.

The department hosted two international workshops in 2012: The UNIS CO2 lab International Workshop focused on the current CO2 storage issues in Longyearbyen and worldwide and the Longyearbyen CO2 Lab's datasets. The first Svalbard Science Forum (SSF) funded workshop on the permafrost hydrology "Hydro-Perm" addressed the issues of groundwater hydrology and permafrost. Participants from 20+ institutions worldwide participated in these workshops.

The department's research in glacial- and climate research was featured in the Norwegian national television in the scientific program of NRK2 where our PhD student Endre Før Gjermundsen was followed by a NRK crew to his field work to northern Spitsbergen. This research will shed new light on the thickness and configuration of the palaeo-ice sheets in Svalbard and is the topic of Endre's PhD project.

The department also marked 10 years of successful international cooperation between the US REU (Research for Undergraduates) Svalbard program and UNIS. This collaboration has provided opportunities for students from US REU Svalbard Program and UNIS to engage in various research topics on modern Arctic environments and processes.

In addition to the above-mentioned activities, our staff was involved in the release of the new version of the International Bathymetric Chart of the Arctic Ocean (IBCAO) v.3 - a portrayal of the Arctic Ocean Basin and its surrounding epicontinental seas and we actively participated in the ResClim (National Research School in Climate Dynamics) activities.

To support its growing field research and educational activities, the department acquired several new state-of the-art instruments with significant funding from external sources: a new multibeam echo sounder system coupled with a positioning and motion reference unit and a side scan sonar/sub bottom profiler combined systems were installed aboard the UNIS small research vessel Viking Explorer. A mobile drill rig for shallow soil and permafrost coring and a hot-water drill for penetrating glaciers were purchased as well. These instruments will serve our staff and students well by producing valuable new research material from land, glaciers and sea for many years to come.

MAY 2012
Master student Evangeline Sessford (left) and Ole Patrick Larsen drilling into the permafrost at Fredheim, Tempelfjorden.
Photo: Anne Hormes/UNIS

JANUARY 2012
The new permafrost drill rig is transported out to Adventdalen, where scientists from the PAGE21 project will collect samples.
Photo: Ulli Neumann/UNIS

AUGUST 2012
Dr. Faezeh Nick (front) and professor Doug Benn are deploying a crevasse-monitoring unit on Tunabreen.
Photo: Griet Scheldeman/UNIS

GRADUATES 2012

PHD DEGREE:

LILJA RUN BJARNADOTTIR:
Processes and dynamics during deglaciation of a polar continental shelf. Examples from the marine-based Barents Sea Ice Sheet

MASTER DEGREE:

ANITA BJERKVIK:
Seismic analysis of Carboniferous rift basin and Triassic growth-fault basins of Svalbard; analysis of seismic facies patterns with bearing on basin geometry and growth-strata successions

MARTHE FLATAKER GUNDERSEN:
Sedimentære facies av nedre/midtre jura Realgrunnen-undergruppe og øvre trias De Geerdalenformasjonen

BO HAUGAN:
Sedimentological facies models and correlation of the Kobbe Formation in the Goliat Field compared with outcrops at Sørkapp-Land, Spitsbergen

MAURA FERREIRA DA SILVA LOUSADA:
Geometric and topologic characterization of thermal contraction polygonal networks in the Artic, Svalbard, Norway 78°

BJARTE RISMYHR:
Sedimentological facies models of the lower part of the Realgrunnen Subgroup in the Goliat Field compared with outcrops

RITA SANDE RØD:
Spatial occurrences of selected sandstone bodies in the De Geerdalen Formation, Svalbard, and their relation to depositional facies

ARCTIC GEOPHYSICS

BY FRANK NILSEN

The department has in total seven full time faculty positions, and has established research within physical oceanography, chemical oceanography, cryosphere, meteorology, middle- and upper polar atmosphere. The department also consists of six adjunct professors, as well as one researcher (oceanography), one Post Doc (middle polar atmosphere) and three PhD students (upper polar atmosphere, middle polar atmosphere and cryosphere). In order to offer relevant full term combinations of courses within the department, and to strengthen the research strategies, we have established two dedicated research groups within the department: The Space Physics Group and the Air-Cryosphere-Ocean Interaction Group.

Teaching was conducted at both the undergraduate and graduate level, with six courses in each level. An important part of all courses is the fieldwork, which allows the students to actively carry out research in the field. During 2012 the department has carried out several courses with teaching of field method on glacier, 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 then typically used in course reports, giving the students valuable experience in analysing and presenting scientific data in a coherent manner.

THE SPACE PHYSICS (SP) GROUP

In fall 2012, the SP Group at UNIS became part of a Centre of Excellence – the Birkeland Centre for Space Science hosted by the University of Bergen. This is the first Centre of Excellence in space physics in Norway. One of the main science goals of the centre is to study how the Earth is coupled to space. This will be achieved by studying – among other things - particle precipitation from space, current systems, the aurora, as well as terrestrial gamma-ray bursts. With a ten-year time span, the Centre is important for the SP Group in terms of long-term science focus, new research positions, and increased international recognition.

In March 2012 the SP group started a project to build a new ionospheric radar system on Svalbard. The project is funded jointly by Conoco-Phillips and Lundin as part of their arctic research program. The radar will make continuous measurements of the plasma flow patterns in the upper atmosphere which are controlled by the interaction of the Sun's magnetic field with that of the Earth. It will form part of a global network of 32 radar systems operated by institutions from nine countries and will make Norway part of this international radar community. The plans were officially presented at the international SuperDARN conference in Shanghai in June 2012.

Several experimental campaigns were carried out with the SPEAR system, investigating a variety of ionospheric processes. SPEAR allows scientists to perturb the ionosphere artificially to study processes that occur naturally through interaction with the Sun. Collaborative experiments with researchers from France, Norway the UK and Russia were undertaken. Scientists from the Arctic and Antarctic Research Institute in St. Petersburg also visited the facility to conduct several experiments in collaboration with both UNIS and colleagues at the Polar Geophysical Institute in Barentsburg.

Post Doc Margit Dyrland spent 10 months as a visiting scientist at Center of Atmospheric and Space Sciences, Utah State University, Logan, Utah, USA. While there she co-organized the workshop 'MLTI waves and dynamics at polar latitudes' which had 31 participants from USA, Norway, Canada and Japan.

The activity at the Kjell Henriksen Observatory (**kho.unis.no)** has been high in 2012. Our NORUSCA II camera made the headline news at the Optical Society of America (OSA) as first-ever instrument to capture hyperspectral images of Earth's Auroras. The press release is a result of our paper published in Optics Express. Another highlight was the visit from the celebrity science editor David Shukman from BBC News. Exclusive interviews with members of the SP group concerning solar storms and satellite navigation went nationwide on UK media. The Auroral forecast at KHO is now available for all smart phone platforms including Android, iPhone and Windows. The apps were released on Andøya Rocket Range 50 years anniversary, to honour their contribution to space physics and cooperation with UNIS.

OCTOBER 2012

A curious polar bear inspects the instruments left behind by AGF-311 staff and students as they hurried aboard RV Lance. Reportedly, the polar bear did not touch any of the instruments.

Photo: Juni Vaardal-Lunde/UNIS

THE AIR-CRYOSPHERE-OCEAN INTERACTION (ACSI) GROUP

The ACSI group conduct fieldwork and model parameterization-studies in the boundary layers above and below sea ice, above different land surfaces and glaciers. The heat flux between the hydrosphere and cryosphere and the atmosphere, and how a sea ice cover, a glacier and a snow cover influence the heat exchange between these spheres are among many important research topics within the ACSI group.

During 2012, work on exchange processes between the atmospheric boundary layer and the surface in Arctic fjords continued, both with modelling and observational studies. Different meteorological numerical models were tested and compared to measurements. The results show that although the models are improving, there are still some issues that need to be addressed in order to improve weather and climate models in the Arctic.

A new three year project started in 2012, Bridging Models for the Terrestrial Cryosphere and the Atmosphere (CRYOMET), funded by the Research Council of Norway. The project is focusing on, among other things, up- and down scaling of numerical models in the Arctic and exchange processes with the terrestrial cryosphere. The project is coordinated by the University of Oslo with UNIS as an active partner.

A special issue on Svalbard Meteorology was published in the scientific journal "Advances in Meteorology", and Associate Professor Anna Sjöblom was one of the guest editors. Anna Sjöblom also started her sabbatical leave in July, which will continue until July 2013. During the autumn, she had two longer research stays at the British Antarctic Survey and at Uppsala University. Future publications and joint research campaigns in Svalbard in 2013 were planned.

In the field of snow- and ice processes, research on quantification of aerosols impact on surface albedo was carried out. The mass of aerosols and solar reflectivity is quantified as part of a research project in collaboration with several international research institutions focusing on the impact of glaciers near the coast of Greenland. The Greenland Ice Sheet reacts to the warming that Greenland has been subject to the last 10 years. The melt has increased and the glacier fronts have retreated. The melt has both global and local impact. Globally the increased melt results in sea level rise, change of the ocean currents and the atmospheric circulation over Greenland. Locally the position of the glacier front and the fresh water production is vital for fishery and transport. There are big gaps in our knowledge on the amount of freshwater produced each year and on how and where the water melts. The project investigate these processes with focus on the Nuuk area and the UNIS contribution was research on the impact of aerosols on glacier ice melt.

MARCH 2012

AGF-212 students take shelter from the wind behind the scooters.

Photo: Johannes P. Lorentzen/UNIS

OCTOBER 2012

A view from the top of RV Lance in the Fram Straight, where AGF-311 staff and students perform field work on the sea ice.

Photo: Extreme Ice Survey

Both atmospheric and oceanic processes affect glacier mass balance and dynamics. Submarine melting at frontal region of tidewater glaciers can trigger dynamical changes and may be the dominant factor for the observed recent glacier retreats in Greenland. Hence, the ACSI group has been involved in research projects related to oceanographic- and sea ice data collection in fjord and shelf areas around Svalbard, in the Greenland Sea, Eurasian basin and the Barents Sea ("CRYOSAT Sea Ice", ESA-Prodex, and "Arctic Climate and Environment of the Nordic Seas and the Svalbard - Greenland Area (AWAKE)", Polish-Norwegian Research Fund).

Oceanographic data have been used to study the dynamic of the West Spitsbergen Current and its effect on the water mass and sea ice distribution in Fram Strait and the Arctic Ocean. Based on the long-time hydrographic monitoring program conducted in selected Arctic fjords in Svalbard by UNIS, new knowledge on shelf-fjord exchange processes in Arctic fjords was presented at conferences and workshops. The second stage of the Polish-Norwegian collaboration is now secured through AWAKE-2, and the dedicated ocean monitoring program will continue along the western Spitsbergen.

A new four-year project, Remote Sensing of Ocean Circulation and Environmental Mass Changes (REOCIRC), led by the ACSI group at UNIS, received funding from the Research Council of Norway. Nansen Environmental and Remote Sensing Center and Polar Science Center, University of Washington, USA are partners in the project. The main objective in REOCIRC is to study the Absolute Dynamic Topography (ADT) of the West Spitsbergen Current (WSC) by taking advantage of advances in satellite gravimetry (GOCE) and altimetry, and provide ground truth observations for satellite gravity solutions (GRACE) from in situ ocean bottom pressure measurements.

We will recruit a PhD candidate interested in satellite gravity and altimetry and in the area of ice/freshwater changes in relation to in situ and ground truth observations. The project deliverables is to initiate an oceanography from space program with remote sensed time series of ocean volume- and heat fluxes towards the Arctic Ocean, and density/freshwater content changes in the ocean linked to the accelerating melting rates of the Svalbard glaciers.

MARCH 2012
Arctic Technology staff take a well-deserved coffee break from field work in Van Mijen fjorden.
Photo: David Wrangborg/UNIS

ARCTIC TECHNOLOGY

BY JAN OTTO LARSEN

The Department of Arctic Technology conducts research in:

- The mechanics of ice and its influence on offshore structures related to oil and gas exploitation.
- Environmental chemistry related to current and potential pollution problems and impact on the environment;
- Geotechnical engineering related to foundation of infra-structures in frozen ground and the expected effects of climate change. Coastal erosion processes concerning infrastructures as harbours, pipelines and buildings located at shoreline is also essential part of the research together with impact of Natural hazards on Arctic infrastructures;
- Arctic Hydrology in studying water discharge in rivers connected to retreating glaciers;

These research activities generate material for courses offered in all four areas given at the Bachelor, Master's and PhD levels, giving students a good opportunity to study both the theoretical and practical aspects of Arctic technology.

ICE MECHANICS

The ice mechanics section had three full-time researchers during 2012: Professor Aleksey Marchenko, Post Doc Anatoly Sinitsyn, and PhD candidates Aleksey Shestov, David Wrangborg, Renat Yulmetov and Lucie Strub-Klein. Professor Sveinung Løset at NTNU had an adjunct professor position.

Aleksey Marchenko is leader of work package 1 in the project "Sustainable Arctic Marine and Coastal Technology" (SAMCoT) entitled "Data collection and process modelling" (2011-2019). In 2012 main research works were related to the study of floating ice and icebergs properties, ice loads on shoreline and coastal structures, and hydrological characteristics of Spitsbergen fjords and North-West Barents Sea. Field studies were performed in Adventfjorden, Tempelfjorden, Sveabukta, Kapp Amsterdam, Edgeøya and in the Greenland Sea. Deformations of coal quays in Longyearbyen and Svea were studied with 3D laser scanner. Laboratory work was focused on the investigation of thermal expansion of saline ice, and thermodynamic properties of saline ice in the water with varying salinity. Experiments on thermal expansion were performed with novel Fibre Bragg Grating sensors for the measurements of strain and temperature.

Hydrological measurements included CTD profiling and ADCP profiling of water below drifting ice, land fast ice and around icebergs. Seabed erosion, drag forces on drifting ice and icebergs perform some of problems which are important for the industrial development of Arctic offshore and coastal zones. Mathematical modelling and numerical simulations were performed for the estimates of sea current speed in narrow channel in Svea Bay, description of physical mechanisms of thermodynamic consolidation of ice ridge keels, parametric excitation of flexural-gravity waves by periodically varying compression of floating ice, and calculation of loads on cofferdams due to thermal expansion of ice. A new method for estimating elastic modulus of floating ice by the records of water pressure during an event of flexural-gravity wave propagation was elaborated and tested using collected field data in the Tempelfjorden. Research sites for the monitoring of the temperature and pore pressure of soils in coastal zone near a pipeline crossing was organized in Longyearbyen near power plant pipeline. The research work was supported by "Physical-mechanical properties of sea ice and influence of ice cover on hydrology of Svalbard fjords" (POLRES, RCN), SAMCoT (SFI, RCN) and VNIIGAZ Gazprom (Russia). Research and educational cooperation with four Russian universities (State University Moscow Institute of Physics and Technology, St.-Petersburg State Polytechnic University, Moscow State University and St.-Petersburg State Marine Technical University) was supported by the project Sustainable Marine and Industrial Development of Arctic Regions (SMIDA, SIU). Two new courses, AT-211 and AT-332/832 were established and included in UNIS the study program.

Dr. Anatoly Sinitsyn participated in organizing the expedition with the ice breaker "Oden" for ice studies in Fram straight between Spitsbergen and Greenland in August/September 2012 (OATREC 2012).

In the framework of the SAMCoT project special Geographical Information System (GIS) was developed and ArcGIS 10.1 software has been used. The GIS is important for arctic technology issues such as coastal erosion, sea currents, sea ice properties; field investigation sites and installations. The GIS has five hierarchical levels from overview of all western Arctic till key sites detailed plots with high resolution 3D models based on Laser Scanner point clouds. The GIS gives the possibility to run mathematical models on real maps, taking natural condition and processes into consideration.

GEOTECHNICAL ENGINEERING

The Geotechnical engineering section was staffed by two full-time researchers during 2011; Associate Professor Jan Otto Larsen and PhD candidate Louis Delmas. Professor Lars Grande at NTNU had an adjunct professor position and Dr. Anatoly Sinitsyn participated in courses and research work on coastal erosion processes.

Jan Otto Larsen is co-leader in WP 1 in SAMCoT, and together with Anatoly Sinitsyn responsible for the Geotechnical part in WP 1 and cooperation with WP 6 Coastal Technology in SAMCoT. The cooperation between WP 1 and WP 6 cover research on coastal erosion processes at Vestpynten research area near Longyearbyen in Svalbard and Varandey in northern Russia.

As part of the SAMCoT project Sinitsyn was deputy leader of an expedition to the Varandey area in the summer of 2012. Larsen worked as a consultant for Store Norske Spitsbergen Grubekompani (SNSG), regarding avalanche risk in the opening of the new Lunckefjell coal mine. During 2012 Larsen was a member of the Engineering Geology Committee of the Transportation Research Board of the National Academies (USA). As a member of this committee, he is responsible for review of submitted papers and consults with other committee members regarding meetings and presentations for the TRB.

Louis Delmas finished his PhD thesis: "Spontaneous Avalanche triggering in Svalbard, Influence of Climate parameters on snow mechanical properties". He is scheduled to defend his PhD in 2013.

ENVIRONMENTAL CHEMISTRY

The Environmental chemistry section was staffed by 2 full-time researchers during 2012; Associate Professor Mark Hermanson and external graduate student Pernilla Carlsson. Professor Roland Kallenborn at UMB and Professor Bjørn Munro Jenssen were adjunct professors.

Mark Hermanson presented research results at three conferences/ workshops and completed work on one grant: Atmospheric PCB Input History at Lomonosovfonna, Svalbard (funding by the Svalbard Environmental Fund). He also had research connections with Environment Canada, Vrije Universiteit Amsterdam, the Norwegian Polar Institute and Paul Scherrer Institute, Switzerland.

During 2012, Pernilla Carlsson continued her work regarding selective uptake processes of chiral pesticides in marine food webs.
The outreach project "POPjakt i skolen" finished in 2012 as well. Pernilla taught pupils from Longyearbyen School about environmental issues such as contaminants in food. The project investigated the levels of perfluorinated alkylated substances (PFAS) in Svalbard reindeers and used the data for lectures in the local school as well as for poster presentation at the IPY conference in Montreal. Carlsson has published two papers and been supervisor for two master students together with Roland Kallenborn (UMB/UNIS).

ARCTIC HYDROLOGY

Arctic Hydrology course and research activity has been conducted of Associate Professor Carl Bøggild at Department of Geophysics in cooperation with Professor Nils Roar Sælthun at the University of Oslo. The main task for Arctic hydrology has been the course AT-209 Arctic Hydrology and Climate Change.

GRADUATES 2012

PHD DEGREE:

LUCIE STRUB-KLEIN:
Field measurements and analysis of the morphological, physical and mechanical properties of level ice and sea ice ridges.

MASTER DEGREE:

CHRISTIAN ENGELKE:
Empirical and dynamical modelling of debris flow events close to Longyearbyen and Svea, Svalbard.

JOAR APENES JUSTAD:
The UNIS Borehole Jack; Description, Fieldwork and new classification system

SOLVEIG LØTVEIT:
The Landfill in Adventdalen. Investigation of Spreading of Pollution and Sustainability of Permafrost as Bottom Liner

MARCH 2012
PhD candidate David Wrangborg with a laser scanner in front of Paulabreen.
Photo: Nataly Marchenko/UNIS

MARCH 2012
Scientists from the SAMCoT project performing tests on the sea ice in van Mijen fjorden.
Photo: Anatoly Sinitsyn/UNIS

STUDENT COUNCIL

BY VINCENT CARRIER (SC LEADER SPRING 2012)
AND RUNA SOLVANG (VP AUTUMN 2012)

The student environment at UNIS is special and unique in many ways. Students from all over the world come to Svalbard to experience the high Arctic. The small community makes everybody know everybody and there is a close bond between students, staff and the local community. This relationship along with the astounding surroundings, the magic light and the unforgettable excursions make students come back year after year.

The Student Council (SC) members are elected in the beginning of each semester. The number of people with specific responsibilities within the SC is:

President (1); Vice-President (1); Board members (4); Treasurer (1); Vice-Treasurer (1); Kitchen Equipment group (3): Student Equipment group (4); Yearbook group (4); Friday Gathering group (4); Movie Night group (2); Lifeguard group (3); Icebreaker Party group (4), and Environmental group (4). One representative from each group is present in the SC meetings.

In autumn 2012 the lifeguard group was removed, on account that UNIS now pays Svalbardhallen, the local sports hall, for having life-guards at the free morning swimming sessions for the students.

Social activities are arranged throughout the year, with Friday Gathering every week, movie nights, dinners and so on.
The Ice-Breaker party is arranged at the start of each semester to let new and old students get to know each other. The students also have access to two cabins and a multitude of hiking and safety equipment, free of charge. The SC is the main funding source for new outdoor gear, kitchen supplies, material for the annual yearbook and more. The students are able to get involved with the local community on numerous different levels. At Svalbardhallen many students participate in sports teams with the locals. UNIS has also paid for student memberships to the snow scooter club "To-Taktern", so that the students have a garage to do repairs to scooters and sledges.

The Environmental group students run the community thrift store known as "Bruktikken". Here you can donate your stuff that you don't need anymore, and get additions to your closet or bookshelf by taking something home with you. In autumn 2012 this group also arranged the annual Longyearbyen charity flea market at UNIS together with people from the Local Council. As in the past years, the event was a great success.

During both the light and dark period students are involved with the organization of the Dark Season Blues festival in October, the Polar-jazz festival in February and the Sun Festival in March. In this way they not only aid the community but also have a chance to socialize more with the local people. Students also volunteer at happenings like Trappers Trail and the ski marathon in April. A lot of students also participated in the Quadrathlon in September.

The Student Council exists to support the UNIS students and to ensure that the student welfare is maintained. The students have representatives on the UNIS Board (board representative and observer) and in the UNIS leader group. These representatives discuss topics that affect the students most and topics concerning the student view of UNIS as an institution. Student surveys are undertaken to get a more clear picture of the opinions about different aspects of the student life and a chance to contribute to the further growth and development of UNIS.

As a student representative you get an inside view of how UNIS is run and get to participate on most levels. Because of the interaction of past student representatives UNIS has become what it is today, from a student point of view. And it is the reason why close to 100% of the students rate the UNIS experience as AWESOME!

PHOTOS, PAGE 32:

Top: Reindeer spotting!
Photo: Larissa Beurmer

Mid-left: Sushi party in Nybyen.
Photo: Mathilde Hauge Skarsjø

Mid-right: Igloo party.
Photo: Runa Solvang

Bottom: Dogsledding!
Photo: Runa Solvang

SCIENTIFIC PUBLICATIONS 2012

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

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