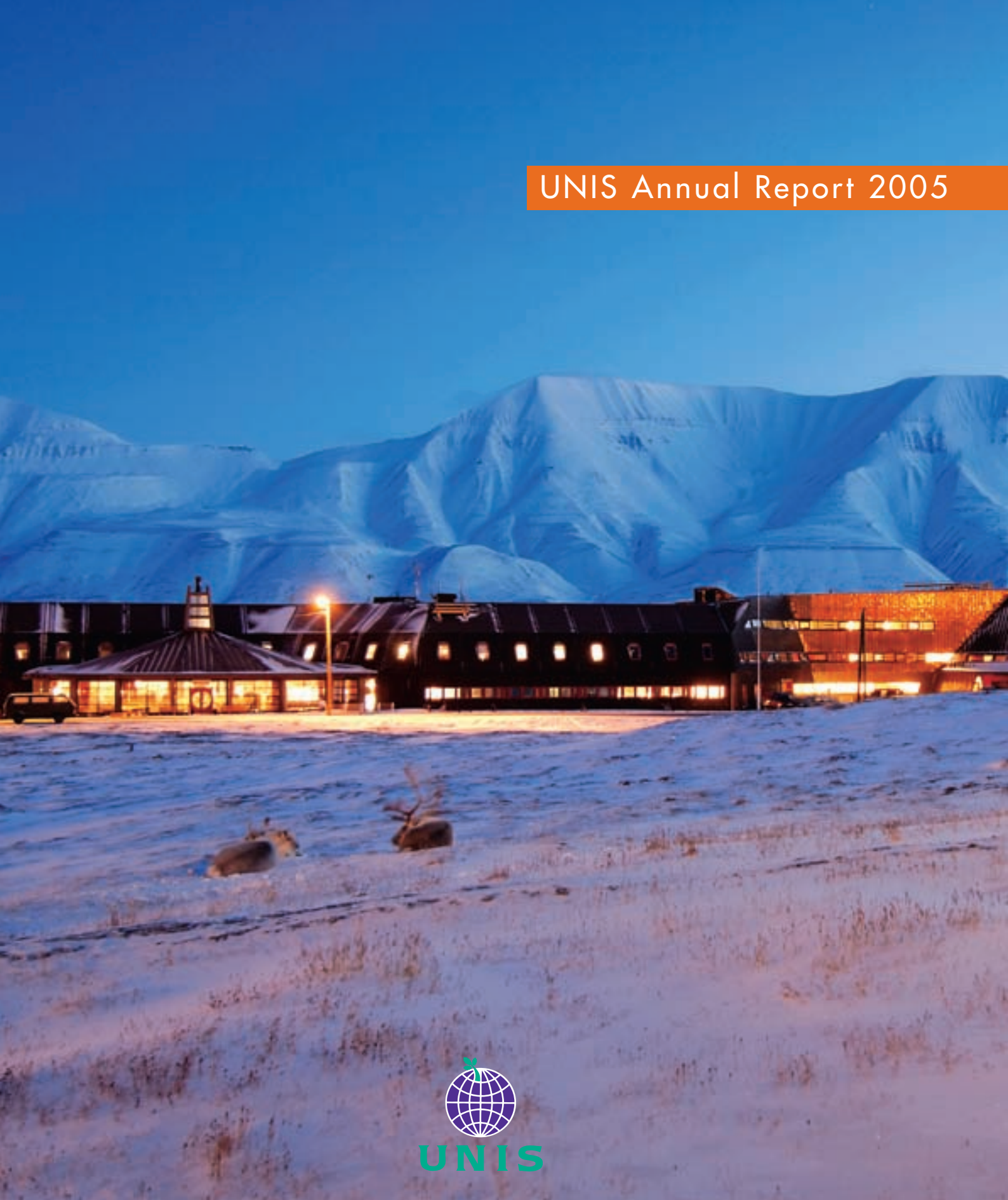


UNIS Annual Report 2005



UNIS



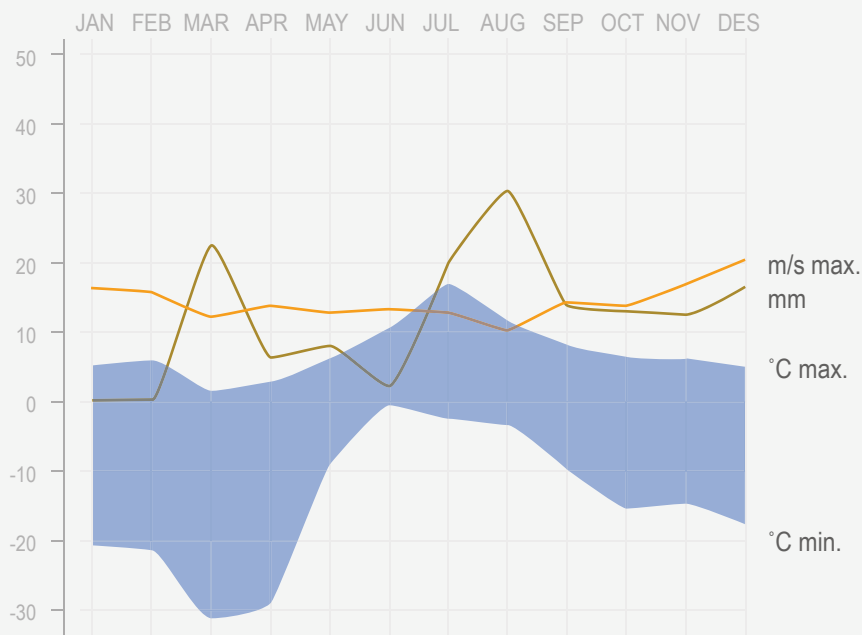
Svalbard Science Centre was fully operational in November 2005. Combined with the old UNIS building Svalbard Science Centre is now the biggest building in Svalbard with a total of 12 000 m².

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Wind, precipitation and temperature in Longyearbyen in 2005

Vind, nedbør og temperatur i Longyearbyen i 2005



Lisensnr. 241 672



Innflytting

Året 2005 var preget av ferdigstillingen av Svalbard Forskningspark og ombygginger i "gammelbygget". 8. november begynte vi innflyttingen i Forskningsparken. Med rekorddrask byggetid var praktbygget på 8 500 m² endelig ferdig. Fem år med planlegging, prosjektering og gjennomføring var over. Prosjektet har vært komplisert og krevende, men samarbeidet både i prosjektgruppen og blant brukerne har vært svært godt og har bidratt til at vi kom i mål til slutt. UNIS har fått en indre campus med nærhet mellom avdelingene og de øvrige institusjonene. Her kan vi videreutvikle forskning og utdanning i et inspirerende og internasjonalt miljø.

Vi er stolte av dette praktbygget som nå er base for UNIS, Svalbard Museum, Norsk Polarinstitutt og Sysselmannens kulturhistoriske magasin. Forskningsparken er et resultat av et samarbeid mellom Kunnskapsdepartementet, Justisdepartementet og Miljøverndepartementet. Alle er viktige Svalbard-departementer som gir et signal om at forskning, utdanning, formidling og forvaltning er viktige elementer i nordområdesatsingen fremover.

Studenter fra 25 nasjoner, 331 i tallet, hadde studieopphold ved UNIS i 2005. Dette er igjen ny rekord og gir håp om at vi innen 2010 skal kunne ha 500 studenter ved UNIS, som nybygget er dimensjonert for. Studentene gir oss utfordringer på mange plan og er med på å vitalisere institusjonen. Kvalitetsreformen

som ble innført ved universitetene i 2003 gir UNIS spesielle utfordringer. Det må arbeides langsiktig og målbevisst for at våre studier skal synliggjøres i universitetenes studieprogrammer.

Forskningen ved UNIS holder fortsatt høy kvalitet. I 2005 ble det igjen satt ny rekord med 74 publikasjoner i tidsskrifter med peer review-ordning. Det innebærer et gjennomsnitt på over 3 publikasjoner per ansatt og er svært høyt.

Samarbeidet med TOTAL E&P ble videreført med en ny treårsavtale, denne gangen innen arktisk teknologi. Vi forventer at tilsvarende avtaler inngås med Statoil og ConocoPhillips Norge kommende år.

Det internasjonale polaråret – IPY starter 1. mars neste år. Dette byr på store muligheter for UNIS og forventningene er store.

Jeg vil med dette rette en takk til alle ansatte for en stor arbeidsinnsats i året som gikk. Uten energiske ansatte på alle nivå i organisasjonen kunne UNIS ikke vært der vi er i dag.

Mai 2006

Lasse Lønnum
direktør



The big move

The year 2005 was very much influenced by the completion of the Svalbard Science Centre and the renovation of the Old Building. On 8th November the move started. Following a remarkably short building process, a magnificent 8500 square metres of new space was finally ready. Five years of planning, design and execution were behind us. The project may have been both complex and demanding, but cooperation within the project team and among users was excellent, ensuring that we finally attained our intended target. UNIS now boasts an inner campus with close links between and among our specialist faculties and the other local institutions. Here we can develop our research and education in an inspirational and international setting.

We are proud of this fine building which now serves as the home of UNIS, the Svalbard Museum, the Norwegian Polar Institute and the Governor's Heritage Magazine. The Science Centre came about as the result of a partnership between the Ministry of Education and Research, the Ministry of Justice and the Ministry of the Environment. All are key Svalbard offices, and their partnership sends a clear message that research, education, communication and custodianship remain central elements of Norway's Polar commitments in the future.

Students from 25 nations, 331 in number, did research or studies at UNIS in 2005. Again, this is a new record and offers hope that by 2010 we may have 500 students at UNIS, the design capacity of the new centre. Our students challenge us on so many levels and bring real vitality to the institution. The Quality Reform undertaken at Norwegian universities in 2003 was another, special challenge. We must work with dedication and perseverance to give UNIS studies a high and attractive profile among university study programs.

Research at UNIS retains its high quality. In 2005, again, a new record of 74 peer-review publications was achieved. This is more than three publications per member of staff, in itself a quite remarkable achievement. Our collaboration with Total Exploration and Production continued on a new three-year contract, this time in Arctic Technology. We expect to sign similar contracts with Statoil and ConocoPhillips Norge in the coming year.

The International Polar Year, IPY, due to start on 1st March 2007, will bring great opportunities for UNIS and our expectations are high.

Let me take this opportunity to thank all our staff for magnificent efforts in the year now past. Without the energy of our colleagues at all levels in the organisation, UNIS would not be the institution that it is today.



I november 2005 flyttet avdeling for arktisk biologi inn i nye lokaler i den grønne flyen i Forskningsparken. Foto: Nils Petter Dale



Styrets beretning 2005

Universitetssenteret på Svalbard AS (UNIS) ble opprettet som statlig aksjeselskap den 29. november 2002. Selskapet avløste stiftelsen Universitetsstudiene på Svalbard (UNIS), som ble opprettet av Norges teknisk- naturvitenskapelige universitet, Universitetet i Bergen, Universitetet i Oslo og Universitetet i Tromsø i 1994.

Selskapets formål er å gi studietilbud og drive forskning med utgangspunkt i Svalbards geografiske plassering i et høyarktisk område, og de spesielle fortrinn dette gir gjennom bruk av naturen som laboratorium og arena for observasjoner og innsamling og analyse av data. Studietilbudet skal være på universitetsnivå og fremstå som et supplement til den undervisning som gis ved universitetene på fastlandet, og inngå i et ordinært studieløp som fører frem til eksamener og grader på bachelor-, master- og doktorgradsnivå.

Kursomfanget har i 2005 vært på samme nivå som foregående år, men antallet studenter var det høyeste noensinne. Forskningsaktiviteten har vært høy, noe som gjenspeiles i økte eksterne bevilgninger, initiering og deltakelse i prosjekter og antall vitenskapelige publikasjoner. UNIS har deltatt aktivt i forberedelsene til det internasjonale polaråret (IPY) som finner sted i 2007/08.

UTVIKLING AV STUDIETILBUDET

Studietilbudet ved UNIS har en internasjonal profil, og all undervisning foregår på engelsk.

UNIS har fire studieretninger: Arktisk biologi, Arktisk geologi, Arktisk geofysikk og Arktisk teknologi. I 2005 ble studietilbudet innen de fire studieretningene konsolidert. Det ble gitt undervisning i totalt 40 emner, inkludert et kurstilbud i Svalbards historie. 20 av kursene er på hovedfags- og doktorgradsnivå. Studentene ved UNIS oppnår gode resultater og har mindre enn en prosent stryk til eksamen. Semesterstudentene tok i 2005 i gjennomsnitt 32 studiepoeng og strykprosenten om lag 1 %. Frem mot 2008 ønsker UNIS å videreutvikle aktiviteten med hovedvekt på mastergrads- og doktorgradsnivå. Samtidig er det viktig at kvaliteten på studietilbudet på lavere grad vedlikeholdes.

UNIS deltar aktivt i utviklingen av The University of the Arctic (Uarctic) og har ansvar for å koordinere aktiviteten "Field School".

STUDENTTALL

Til sammen 331 studenter fulgte undervisning, eller arbeidet med mastergrads- og doktorgradsoppgaver i 2005. Dette tilsvarer en studentaktivitet på 126 studentårsverk mens måltallet er 115 studentårsverk. Av årsverkene var 62 på lavere grad, 35 på mastergrads- og doktorgradsemner og 28 i forbindelse med mastergrads- og doktorgradsoppgaver. Ved UNIS er det et stort innslag av utenlandske studenter, og denne studentgruppen utgjorde i alt 54 % av studentmassen. Omtrent halvparten av de utenlandske studentene kom fra Norden, og i alt 25 nasjoner var representert i 2005. Kvinneandelen blant studentene lå i 2005 rundt 50 %.

FORSKNINGSAKTIVITET

I 2005 var det 39 studenter som arbeidet med sin mastergradsoppgave i samarbeid med UNIS, og 31 doktorgradsstudenter var registrert ved UNIS. Dette skjer i samarbeid med et universitet i Norge eller i utlandet. Studentene får oppnevnt en veileder ved UNIS og har i tillegg en veileder ved sitt hjemmeuniversitet.

I løpet av 2005 tok 22 mastergradsstudenter sin mastergradsoppgave ved UNIS, mens 3 doktorgradsstudenter ble uteksaminert. Utvikling og videreføring av forskningssamarbeidet med de norske universitetene og andre norske og utenlandske forskningsinstitusjoner er en prioritert oppgave.

I 2005 var UNIS fulltidsansatte medforfatter på 74 artikler i tidsskrifter med peer review-ordning mot 51 i 2004. Det innebærer en økning på 45 % og gir en gjennomsnitt på 3,9 artikler pr ansatt. Styret er svært fornøyd med denne positive utviklingen. Flere forskere er sentrale i EU-prosjekter og flere prosjekter er finansiert/delfinansiert av Norges forskningsråd. ▶

▶ ANNEN VIRKSOMHET

Styret ser det som viktig at det fortsatt arbeides aktivt med formidling ved UNIS. I januar/februar ble det såkalte "Svalbardseminaret" arrangert i samarbeid med Norsk Polarinstitutt og Sysselemannen på Svalbard. Oppslutningen var som vanlig meget god. Forskningsresultater formidles bl.a. ved en nettbasert publikasjonsserie. For å bidra til en god forskningsformidling i den kommende Forskningsparken deltar UNIS i planarbeid for den nye utstillingen ved museet. UNIS tiltrekker seg mange faglige konferanser og seminarer, og i 2005 ble det i alt avholdt 6 slike, derav tre med internasjonal deltakelse, blant annet et NORDU-net seminar med 250 deltager fra hele Norden. I tillegg ble det gitt en rekke presentasjoner for gjestende grupper fra inn- og utland.

ORGANISERING

UNIS er organisert med fire fagavdelinger, en teknisk avdeling og en administrativ avdeling. Avdelingslederne utgjør sammen med direktøren institusjonens lederteam. Fagutvalgene for hver av de fire studieretningene med representasjon fra universitetene møtes en gang i året og skal fungere som rådgivende organ for avdelingene.

STABEN

Per 31. desember 2005 utgjorde den vitenskapelige staben 26 personer på full tid, samt 20 med professor II/førsteamanuensis II tilknytning. Det var en teknisk stab på 9 personer og en administrativ stab på 10 personer. I tillegg har UNIS 7 eksternt finansierte stillinger.

Styret ser at andelen av kvinner i II-stilling er lav og ønsker å fokusere på dette i fremtiden. Styret vil likevel fremhev at UNIS har en høy studentkvinnandel på bachelor- og masternivå, og også blant stipendiater.

Fordelingen mellom kjønnene er som følger:

	Kvinner	Menn	Antall personer	Årsverk
Administrasjonen	6	4	10	8,5
Teknisk avdeling	2	7	9	9
Vitenskapelig stab	4	12	16	16
Stipendiater	5	5	10	10
II-stillinger	1	19	20	4
Eksternt finansierte	6	1	7	7

Regnskapet revideres av PriceWaterhouse Coopers A/S.



UNIS-BYGGET, BOLIGER OG STUDENTHYBLER

UNIS-bygget stod ferdig i 1995 og inneholder laboratorier, undervisningsrom, et stort auditorium, bibliotek, kantine, 30 kontorer samt lesesalsplasser for 100 studenter. Det har gjennom flere år vært stor knapphet på laboratorier, kontorer til ansatte, gjesteforelesere, gjesteforskere og stipendiater. I november 2005 ble lokalene i Svalbard Forskningspark tatt i bruk.

Ved utgangen av 2005 disponerte UNIS 28 familieboliger og 20 hybelleiligheter til sine ansatte. Med økende forskningsaktivitet ser styret det som viktig at det fortsatt bevilges midler til investeringer i boliger.

Studentsamskipnaden i Tromsø har ansvaret for hybler til UNIS-studenter og har pusset opp fire gamle gruvearbeiderbrakker i Nybyen og bygd ett nybygg slik at de i dag kan tilby til sammen 144 hybler. For UNIS' virksomhet er det helt avgjørende å kunne gi studentene tilfredsstillende boforhold, og styret legger stor vekt på å videreføre det gode samarbeidet med Studentsamskipnaden i Tromsø. ▶



ØKONOMI

Midler til drift og investeringer for UNIS bevilges over budsjettet til Kunnskapsdepartementet. I 2005 var bevilgningen på totalt kr 77.668.000, hvorav kr 48.934.000 gikk til drift. 27.000.000 av bevilgningen var øremerket til utstyr og inventar i Svalbard Forskningspark. Regnskapet for 2005 viser at 40 % av varer og tjenester kjøpes lokalt. Driftsresultatet på årsregnskapet for 2005 viser et driftsresultat på kr 4.531 461. Etter finansinntekter /finanskostnader viser regnskapet et overskudd på 4.554.615. Selskapets total kapital pr 31.12.05 var på kr 37.758.398 hvorav kr 7.932.954 utgjør institusjonens bygningsmasse og kr 7.176 148 utgjøres av aksjekapital og annen egenkapital. I 2005 er lønn til direktøren utbetalt med kr 764.645. Styrehonorar er i 2005 utbetalt med kr 35 000 til styrets leder og kr 20 000 til styrets øvrige medlemmer.

FORTSATT DRIFT

Årsoppgjøret er avlagt under forutsetning om fortsatt drift. Til grunn for antagelsen ligger resultatprognoser for 2006 og UNIS langsiktige strategiske plan for 2001-2010.

ARBEIDSMILJØ OG PERSONALE

Sykefraværet var i 2005 på 0,85 %. Institusjonen har avtale med Longyearbyen Sykehus om bedriftshelsetjeneste og har vedtatt å søke status som IA-bedrift. Det er ikke forekommet skader eller rapportert om alvorlige arbeidsuhell eller ulykker i 2005 som har resultert i store materielle skader eller personskader.

I UNIS-bygget, som ble oppført i 1995, og i Svalbard Forskningspark som ble oppført i 2005, er det stilt store krav til innemiljøet. Moderne byggemetoder, materialvalg og tekniske løsninger gir et godt inneklima.

UNIS kjenner ikke til at selskapets drift forurensrer det ytre miljø.

STYRETS VIRKSOMHET

I 2005 har styret for UNIS avholdt 5 møter, hvorav 2 i Longyearbyen. Det ble i alt behandlet 75 saker. Viktige saker som ble behandlet i 2005 var årsplan, løpende gjennomgang av planene for Forskningsparken og nytt Nordlysobservatorium og budsjett.

GENERALFORSAMLING

Generalforsamlingen ble avholdt i Oslo den 23. mai 2005.

VEIEN VIDERE

UNIS's areal i Forskningsparken ble tatt i bruk i november 2005 og innebærer en ny æra for institusjonen. Styrets utviklingsplan for perioden 2004-2008 som innebærer en konsolidering og videreutvikling av selskapets virksomhet med en vekst på i alt 16 stillinger og økning av studenttallet med 50 %, må nå fullføres slik at institusjonen står rustet til å møte fremtidige utfordringer. I regjeringens nordområdesatsing skal Svalbard spille en fremtredende rolle, der UNIS kan være et viktig element spesielt under det internasjonale polaråret i 2007-08.

Kjell A. Sælen
Leder

Annik Myhre
Nestleder

Berit Kjeldstad

Else Nøst Hegseth

Viva Mørk Kvellø

Simon Jessen

Hanne H. Christiansen

Lasse Lønnum
Direktør

Report of the Board of Directors

The University Centre in Svalbard (UNIS), is a state owned limited corporation. The institution offers studies and engages in research based on Svalbard's geographical location in the High Arctic, and the special advantages this confers in terms of using the natural environment as our laboratory and arena for observation, data acquisition and analysis.

UNIS offers four study faculties: Arctic Biology, Arctic Geology, Arctic Geophysics and Arctic Technology. In 2005 the offerings within each faculty were consolidated. Tuition was given in 40 subjects including a package on History of Svalbard. Exactly half the number of courses were for Masters and Doctoral students. Studies at UNIS are very much international in flavour, and all tuition is given in English.

A total of 331 students took courses or worked on their Masters or Doctoral theses in 2005. The total activity of 126 student years comfortably exceeded the target of 115. A breakdown shows that 62 student years were for a lower degree, 35 for Masters or Doctoral research, and 28 for the Masters or Doctoral dissertation. At UNIS there is a high complement of international students, counting for no less than 54 per cent of the student body. There were 25 nationalities at the institution, including Norwegian.

During the year, 39 students did a Masters in association with UNIS, while 31 postgraduates were registered at the institution doing a Doctorate. Such programs are conducted in consultation with a university in Norway or abroad, and students are nominated a tutor at UNIS in addition to their home university tutor. In 2005 the number of researchers doing a Masters at UNIS was 22, and there were three candidates who completed their Doctorates.

In 2005 UNIS full-time staff contributed to 74 articles in peer-review journals, well above the 2004 figure of 51. The increase of 45 per cent corresponds to an average contribution per member of staff of 3.9 articles. The Directors are extremely satisfied with this positive trend.

As of 31st December 2005 the scientific staff comprised 26 persons in full-time employment, plus 20 associate professors and fellows. There was a technical staff of nine persons and an administrative staff of ten. UNIS also hosts seven externally-funded positions.

The UNIS building was completed in 1995 and contains the laboratories, class rooms, a large auditorium, library, canteen, 30 offices and reading booths for 100 students. In November 2005 the premises at Svalbard Science Centre were inaugurated.

Funds for operations and investment at UNIS are appropriated over the budget of the Ministry of Education and Research. In 2005 these appropriations totalled NOK 77,668,000, of which NOK 48,934,000 were spent on operation, and NOK 27,000,000 were ear-marked for equipment and facilities in the Science Centre. After allowing for financial incomes and expenses the accounts show a net income of NOK 4,554,615. The institution's total assets at year-end 2005 were NOK 37,758,398, comprising NOK 7,932,954 in the institutional buildings, and NOK 7,176,148 in shareholder capital and other equity.

During the year the UNIS Directors held five meetings, two in Longyearbyen. Seventy-five matters were officially discussed. Key matters included the timetable for the year, current reviews of the Science Centre activity, a new Northern Lights Observatory, and the institution budget.

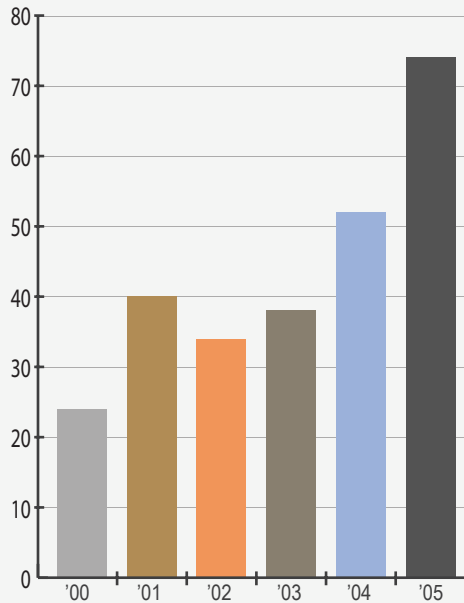
The Annual General Meeting was held in Oslo on 23rd May 2005.

The UNIS spaces in the Science Centre were opened for use in November 2005 and mark a new era for the institution. The Board's Development Plan for the period 2004-08, involving consolidation and development of the institution's activities, a growth of 16 members of staff and a rise in student numbers of 50 per cent, must now be taken forward, so that the institution is equipped to meet future challenges. In the Government's Arctic Region commitments, Svalbard will play a leading role, where UNIS can be a key element, in particular during the upcoming International Polar Year in 2007-08.

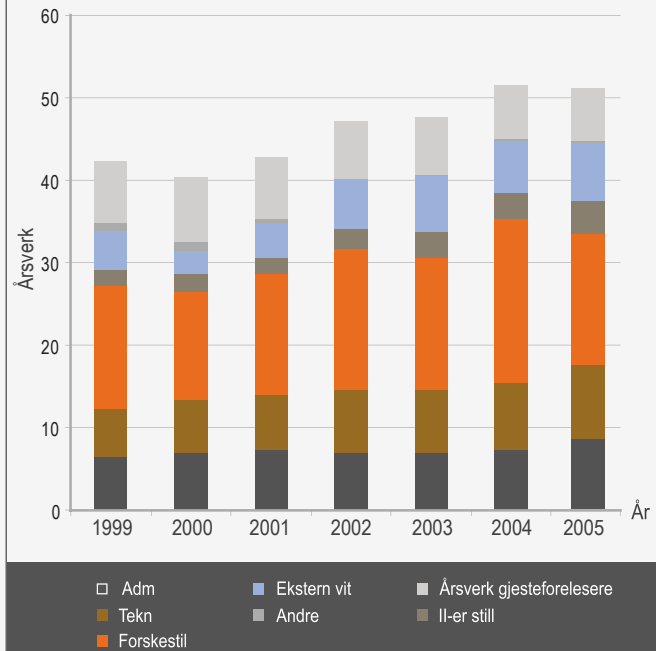


Statistics / Statistikk

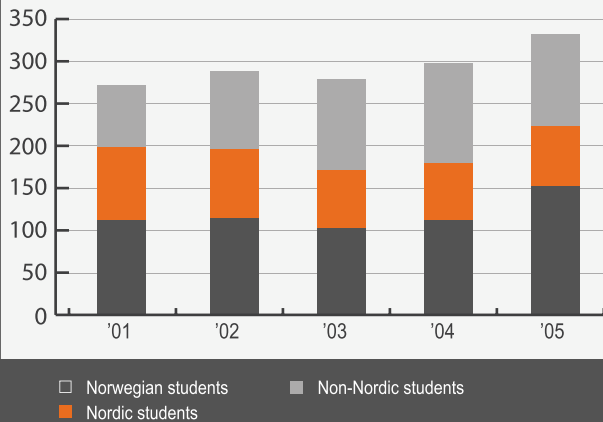
Publications at UNIS 2000–2005
Publikasjoner ved UNIS 2000–2005



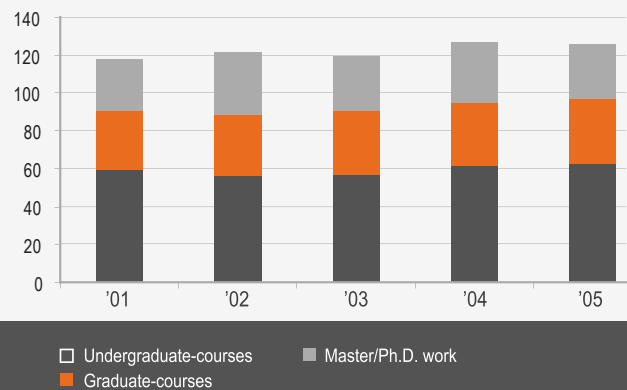
Workforce in man-labour years according to occupational category at UNIS 1999–2005.
Årsverk ved UNIS 1999–2005 fordelt på stillingskategori.



Number of students categorised as Norwegian Nordic and non-Nordic students 2000–2005.
Totalt antall studenter ved UNIS 2000–2005 fordelt på norske, nordiske og ikke-nordiske.



Production in Student-labour years (1 year equals 60 ECTS credits) categorised on teaching levels.
Produksjon av studentårsverk (ett årsverk = 60 studiepoeng) ved UNIS 2000–2005, fordelt på undervisningsnivå.





Resultatregnskap per 31.12.2005

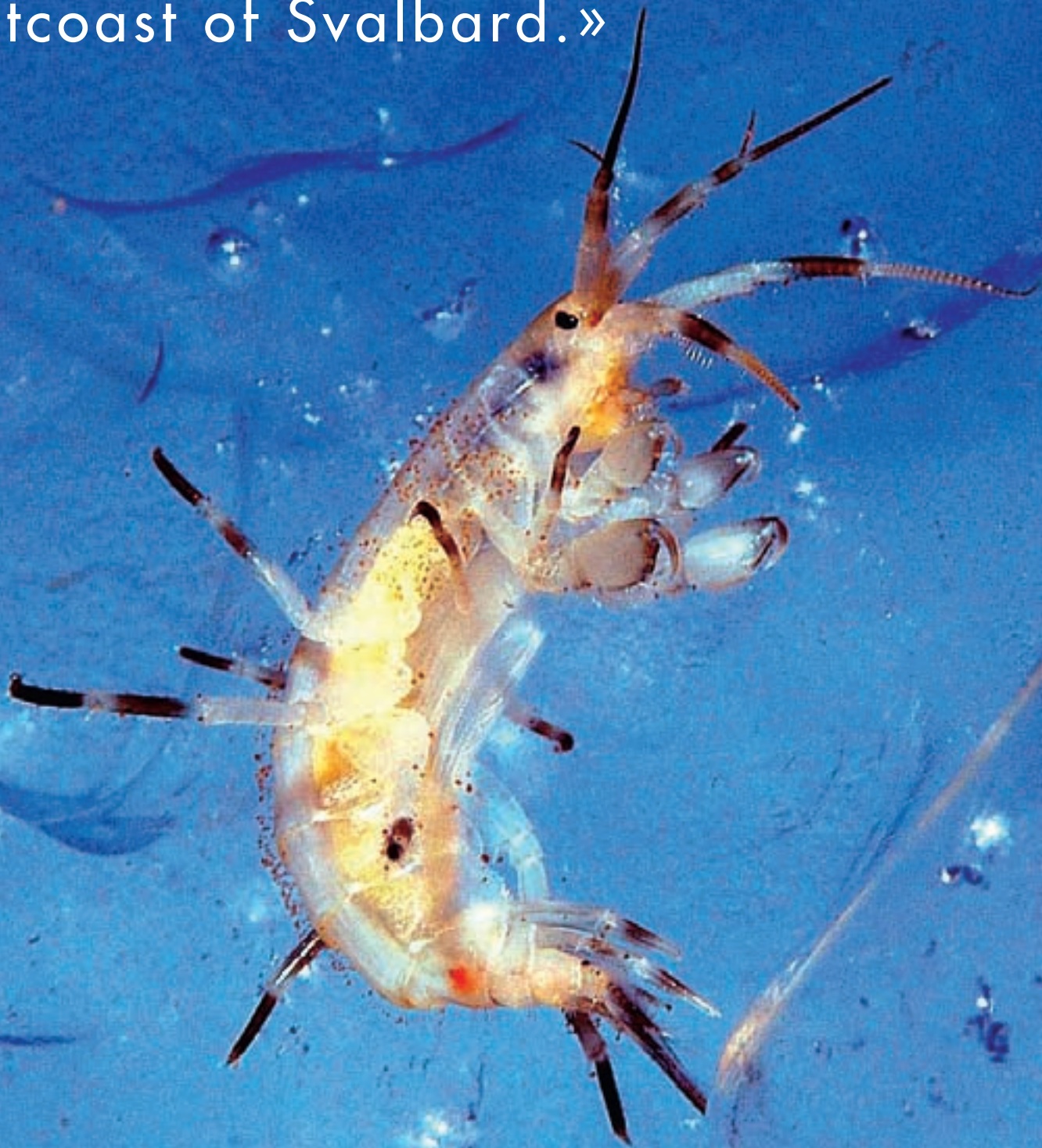
	Note	2005	2004
Driftsinntekter og driftskostnader			
Driftstilskudd fra KD	1	48 934 000	43 562 904
Utsatt inntektsføring av tilskudd			135 100
Eksterne prosjektinntekter	0	7 714 877	8 730 286
Øvrige inntekter	2	4 078 409	1 810 588
Brutto driftsinntekter		60 727 286	54 238 878
Eksterne prosjektkostnader	0	7 056 843	8 048 798
Netto driftsinntekter		53 670 443	46 190 080
Lønn og sosiale kostnader	6,11	27 963 032	24 105 303
Avskrivninger			
Felt- og toktkostnader		6 832 775	6 980 050
Øvrige driftskostnader	3	14 343 175	14 334 094
Sum driftskostnader		49 138 982	45 464 447
DRIFTSRESULTAT		4 531 461	725 633
Finansinntekter og finanskostnader			
Finansinntekter		257 300	71 333
Finanskostnader		234 146	98 012
Netto finansinntekter		23 154	-26 679
Ordinært resultat		4 554 615	698 953
Ekstraordinære inntekter			1 580 000
Årsresultat		4 554 615	2 278 953
Disponeringer:			
Til annen egenkapital		4 554 615	2 278 953



Balanse per 31.12.2005

	Note	2005	2004
EIENDELER			
Anleggsmidler:			
Bygninger	4	7 932 953	7 932 953
Andeler Svalbardhallen	5	1	1
Sum anleggsmidler		7 932 954	7 932 954
Omløpsmidler			
Varebeholdning		28 045	33 023
Debitorer		3 310 192	2 371 814
Andre kortsiktige fordringer	7	936 832	883 971
Betalingsmidler		25 550 376	5 300 565
Sum omløpsmidler		29 825 445	8 589 373
SUM EIENDELER		37 758 398	16 522 327
GJELD OG EGENKAPITAL			
Aksjekapital		100 000	100 000
Annen egenkapital	9	7 076 148	2 521 533
Sum egenkapital		7 176 148	2 621 533
Avsetninger for forpliktelse:			
Ubenyttet invester.tilsk.,utstyr	1	5 620 603	
Ubenyttet tilskudd til husleie Forskningsparken	1	1 734 000	
Utsatt inntektsføring tilskudd stipendiat		535 000	535 000
Sum avsetninger med forpliktelse		7 889 603	535 000
LANGSIKTIG GJELD:			
Boliglån SparebankEN Nord- Norge	8	4 725 000	5 250 000
Sum langsiktig gjeld		4 725 000	5 250 000
Kortsiktig gjeld:			
Leverandørgjeld		9 875 394	1 543 813
Skyldige offentlige trekk og avgifter		2 370 645	2 016 594
Annen kortsiktig gjeld	10	5 721 607	4 555 387
Sum kortsiktig gjeld		17 967 646	8 115 794
SUM GJELD OG EGENKAPITAL		37 758 398	16 522 327

«Ectoparasites on *Gammarus wilkitzkii* as a indication of recolonisation of the ice in shallow waters on the eastcoast of Svalbard.»





Arctic Biology

The Department of Arctic Biology conducts research in Arctic biology and ecology as well as providing a full one-year curriculum of undergraduate course and an extensive course calendar for graduate studies. The strategic plan of the department is to build up two active research groups, one in terrestrial and one in marine ecology. In 2005, the department consisted of four full-time staff members, five adjunct professors, two postdocs, and 5 PhD students. In addition, the department have a number of associated MSc and PhD students.

THE MARINE ECOLOGY RESEARCH GROUP

By: Ketil Eiane and Jørgen Berge

The marine research group consisted in 2005 of 2 associate professors, 1 postdoc and 3 PhD students. The main focus of this research group is on the ecology of pelagic (free living in the water masses) and sympagic (connected to the sea ice) invertebrates.

In March 2005 Carolin Arndt defended her PhD thesis entitled “Ecosystem dynamics in Arctic sea ice: the impact of physical and biological processes on the occurrence and distribution of sympagic amphipods”. During her project Arndt carried out research to gain insight into ecosystem dynamics by focussing on the spatiotemporal variability in sympagic communities, and the physical and biological processes that drive such variability. Eventually, the project resulted in 5 published scientific papers that have contributed to our understanding of the biology, distribution and adaptations of the sympagic fauna. Of the important results from her project, we will highlight both her novel study of the relationship between ectoparasites and lifecycle of the sympagic *Gammarus wilkitzkii* as well as a study of the origin and fate of the sympagic fauna in relation to the influence of the trans-polar drift. The project will be followed up by a new externally funded PhD project (2006-2009) focusing on combined ecological and ecotoxicological studies of the ice edge ecosystem. The project will be part of UNIS’s involvement in ARCTOS (network of Arctic marine ecosystem researchers).

During 2005 we had two PhD students and 1 postdoc working on Arctic zooplankton. Malin Daase is working on a PhD project entitled “Effects of variations in ocean climate on arctic pelagic ecosystems”. This project studies the response of the zooplankton community towards variations in ocean climate. Main focus is on copepods of the genus *Calanus*, the Atlantic *Calanus finmarchicus* and the arctic *C. glacialis* and *C. hyperboreus*. These three species co-occur in the waters around Svalbard and together dominate the zooplankton biomass in Arctic and Atlantic waters. Data obtained from extensive sampling of zooplankton accompanied by measurements of physical properties of the water masses are used to analyze the relationship between abundance and species composition and the physical environment. Preliminary results demonstrate the existence of simple relationships between zooplankton composition and variability in ocean climate suggesting that ecological effects of climatic variability in this region are mediated primarily through transport and mixing of water masses.

PhD student Daniel Vogedes is working on the same organisms, but with a focus more geographically restricted to Isfjorden. His project, which only was initiated in September 2005 is entitled “biosystematics, biomass and population structure of zooplankton as a function of hydrologic variability on spatio-temporal scales in an Arctic fjord ecosystem”. Postdoc Claudia Halsband-Lenk (2005-2008) is engaged on a project that will explore how closely related planktonic populations, living in such contrasting ecosystems as the Arctic Ocean and the warmer, boreal Baltic and North Sea, have adapted to their different environments. What is the genetic basis of these adaptations – and thus the result of natural selection – and how much can be attributed to phenotypic plasticity? In order to answer these and other related questions, plankton populations are compared in Svalbard waters and the Kattegat with regard to their variability in selected life history traits such as body size, development time, etc., both within and between populations. ▶



Vegetation analysis in arctic desert in Kinnvika.

► THE TERRESTRIAL RESEARCH GROUP

By Ingibjörg S. Jónsdóttir, Elisabeth Cooper and Steve Coulson

Last year was in many aspects an important turning point for the terrestrial research group at UNIS, a group with a common focus on plant animal interactions and impacts of climate change, and it was paved by high field activity. First of all, this was the final year of the EU funded project, FRAGILE (www.fragile-eu.net) which addressed the connectivity of fragile arctic goose habitats with European land use and conservation measures through the migration of fast-increasing, arctic breeding goose populations in a changing climate. The work package that the UNIS group primarily participated in was based on an experimental approach to understanding the impact of goose grazing on tundra ecosystems in combination with climate warming, aiming at providing empirical data to test model predictions on carrying capacity for geese on Svalbard. This experiment involved several partners, each focusing on different aspects of ecosystem responses. In addition to providing extensive logistic support, the UNIS group was responsible for measuring various plant responses to the experimental treatments at different levels (i.e. individual plant, population, community), such as production, biomass,

resource allocation, shoot density, flowering frequency and community composition. In addition, the group supported population and life cycle studies within the experimental plots of the rare aphid *Acyrtosiphon calvulus*, which is endemic to Svalbard. The project has produced a wealth of data and several master students (Astrid Pahud and Res Isler graduated in 2005). Preliminary data analyses provide evidence for ecosystem resilience to heavy goose grazing in the short term (few years), but that continuous intensive grazing may become detrimental to the high arctic tundra ecosystems on Svalbard in longer term (decades).

Another milestone was that the NERC funded PhD student, Jemma Gornall, finished her thesis on the role of mosses in Svalbard ecosystems and that the NFR funded PhD student Christiane Hübner had her third and final intensive early-spring field season in Vårsolbukta, an important pre-breeding area for geese on Svalbard. Both these projects link nicely with the FRAGILE project and both emphasised the importance of mosses, but in slightly different contexts. Gornall demonstrated how they govern various soil processes, while Hübner's preliminary data shows the importance of mosses as goose forage during the critical pre-breeding period and how moss forage quality can be influenced by sea birds.



Finally, Professor Rolf Langvatn, who has led research projects on the Svalbard reindeer, left UNIS after nine years of employment. Dr. Steve Coulson was hired in his place in November, a specialist in arctic invertebrate biology and with extensive research experience on Svalbard. Even though this inevitably led to some shift in research focus within the group, research related to the Svalbard reindeer was continued by the UNIS funded PhD student Vebjørn Veiberg. His research addresses the role of tooth wear on reindeer life history in comparison with temperate ungulates and involves regularly harvesting one of the populations on Svalbard. One master student graduated within the reindeer project in 2005 (Joris Timmerman).

Other terrestrial projects, funded by UNIS, such as the ITEX (www.geog.ubc.ca/itex) related Winter Ecology project, proceeded as well, additionally producing two master theses within the department of biology (Inger Moe, Rebecca Rose Barlak). One master thesis was produced jointly with the department of Geology (Lea Bjerre Schmidt and Louise Askær Jensen).

By the end of the year the group consisted of one full professor, one associate professor, one post doc, two PhD students and a few master students.

GRADUATES 2005:

PHD DEGREE

Arndt, C.E. Ecosystem dynamics in Arctic Sea Ice: the impact of physical and biological processes on the occurrence and distribution of sympagic amphipods. UNIS – UiTø.

Gornall, J. The role of mosses in high arctic vegetation: competition, facilitation, herbivory and diversity. UNIS, Centre for Ecology & Hydrology, Scotland and University of Aberdeen.

CAND. SCIENT/ MASTER DEGREE

Barlak, R.R. 2005. Germinable seed bank diversity at high altitudes on Svalbard and implications to vegetation population dynamics with climate change. UNIS and UiTø

Islar, R., 2005. The effects of goose grazing on the growth and biomass allocation of *Alopecurus borealis*. UNIS-Oxford University, UK.

Moe, I., 2005. Winter-climate related variations in structure and diversity of arctic tundra vegetation. UNIS and UMB, Ås

Pahud, A., 2005. Ecology and productivity of dominant species of contrasting growth forms in High Arctic plant communities. UNIS- University of Geneva.

Nygård, H., 2005. Kopplingar mellan botton- och isfauna på ett grunt område på Svalbard, Norge. UNIS-Åbo.

Timmerman, J. 2005. Tooth eruption patterns in Svalbard reindeer. UNIS and Wageningen University.

2 MSc together with AG (H. Christiansen and I. Jonsdottir) Lea Bjerre Schmidt and Louise Askær Jensen. 2005. The effect of AMD resulting from oxidation of coal mine waste on the Arctic tundra ecosystem. UNIS (jointly with Department of Geology) and University of Copenhagen

«Bedrock polished
by drifting snow at
the northern end of
Linnévatnet.»





Arctic Geology

By **HANNE H. CHRISTIANSEN**

The Department in 2005 had four main research areas within Geology and Physical Geography: sedimentology, marine geology, Quaternary geology, and permafrost/periglacial geomorphology. The research vision of the Department focuses on Svalbard, its fjords and adjacent shelf that offer an excellent opportunity to study a wide range of landforms, processes and sediments related to the development and infill of sedimentary basins. As an area of terrestrial outcrop on the Barents Shelf, Svalbard provides excellent access to a vast range of basin settings, from the low-latitude infill of the Devonian basins, to the present glacial and periglacial erosion and infill of valleys and fjords.

Twelve courses were offered in Geology and Physical Geography in 2005, five at the undergraduate level and seven at the master and Ph.D. level. A total of 47 students attended the undergraduate courses, while 83 students participated in the master and Ph.D. courses. A total of 1480 ECTS were produced in Geology in 2005. We have had from none up to six guest lecturers on our courses. In total 28 guest lecturers mainly from Norwegian and foreign universities have assisted us in 2005.

Our academic staff in 2005 consisted of 4 full-time faculty and 3 adjunct professors. Additional to that we had 2 UNIS funded Ph.D. students and 5 external Ph.D. students. Our Quaternary geologist Associate Professor Alexander Wolfe, ended his position in August to go back to University of Alberta, Canada. Our first Ph.D. student enrolled at the Department, Lindsay Nicholson graduated from University of St. Andrews in January 2005 with the best grade A for her thesis in the British system. She was supervised by Ole Humlum at UNIS. Associate Professor Hanne H. Christiansen was on sabbatical at the Norwegian Geological Survey from mid September 2005.

We have taken up two new external Ph.D. students in 2005. Håvard Juliussen from University of Oslo started his fieldwork during summer 2005 investigating ground temperatures in coarse-grained materials in Svalbard around Longyearbyen. His



*Fossil foraminifera found outside the west coast of Spitsbergen.
Photo: Tove Nielsen*

UNIS supervisor is Hanne H. Christiansen. Jens Søndergård from University of Copenhagen also started his fieldwork in summer 2005 as part of the Bjørndalen mine waste research programme. His UNIS supervisor was Alexander Wolfe until the autumn, when he was transferred to the Technological Department for supervision there.

2005 was the second year of a research programme on the depositional controls on the coal-bearing strata of the Central Tertiary Basin of Spitsbergen. The programme is funded by Store Norske Spitsbergen Kullkompani, who provides access to data records, drill cores, logistical support and fund the PhD research of Charlotta Lüthje. Her work focussed on interpreting the depositional environment of the coal-bearing Todalen Member of the Palaeocene succession by carrying out detailed analysis of hundreds of metres of core and undertaking fieldwork in the outcrop area. This has resulted in a fundamental re-interpretation of the palaeoenvironment in which the coal formed, with the previous 'deltaic' models now being rejected in favour of a coastal plain model. This new depositional model will have an impact on the future coal exploration strategy because it predicts a very different distribution pattern for the coal measures. Gary Nichols also developed other programmes of study on related themes such as a detailed microstratigraphy of individual coal seams in collaboration with laboratories in London ▶



- ▶ where petrographic, palynological and isotope geochemical analyses are being carried out. Also the development of the basin in relation to its tectonic setting is being investigated, starting with a geometric analysis of the basal unconformity, and continuing with using provenance studies to determine the timing of uplift and supply of sediment to the Central Tertiary Basin. The results of this work indicate that it is a foreland basin supplied from the NE, which contrasts with previous published interpretations.

In arctic marine geology Tove Nielsen started research on the development of glaciated continental margins, focusing on the impact of glaciations on seabed morphology and architecture of glacial deposits on shelves and slopes. She co-operates with Prof. T. Rasmussen, University of Tromsø (UiT), on contourite deposits and paleoceanography, focusing on the Svalbard margins. Tove Nielsen with some UNIS students participated in a Norwegian Polar Institute organised cruise around Svalbard investigating the shallow geology and seabed sediments in the fjords and on the shelf. Further, a project studying the seabed and sediment flux in front of the tidewater glaciers in Kongsfjorden was initiated in collaboration with the Universities of Massachusetts and Northern Illinois, USA. Tove Nielsen is partner in several IPY project proposals concerning research on ice stream affected shelf troughs, the opening of oceanic gateways and Neogene up-lift as trigger for the glaciation of the Northern Hemisphere. A new trainee school in Arctic Marine Geology and Geophysics was established by UiT, the Norwegian Polar Institute, the Norwegian Geological Survey and UNIS, focusing on the geological development of arctic continental margins, in Northern Norway, the Barents Sea, Svalbard and East Greenland. The school is hosted and funded by UiT. The purpose is to ensure high quality education of Ph.D. students from the four institutions, by offering a broad set of university courses and an annual research cruise, arrange national and international workshops, and provide a network of highly qualified scientists within the research topics. Tove Nielsen represents UNIS in the steering committee.

Within permafrost and periglacial geomorphology the research by Hanne H. Christiansen is focused on process measurements of ice-wedge activity, snow cover and ground thermal relationships, active layer - permafrost dynamics and slope processes in the area around Longyearbyen. These activities were extended to the Kapp Linne area on the west coast of Spitsbergen, as an

integrated part of the new UNIS course AG-327 Holocene and recent climate changes in the high arctic Svalbard landscape, given for the first time in summer 2005. A new cooperation research project on solifluction with Prof. C. Harris, University of Cardiff, UK was initiated by installing a measuring station in Endalen registering continuously the movement of the ground surface. The cooperation on monitoring of different periglacial processes with Prof. N. Matsuoka, University of Tsukuba, Japan and adjunct Prof. O. Humlum, was extended with the establishment of a fully instrumented 15 m deep borehole in the rock glacier above Huset in Longyeardalen. A new local cooperation project on observations of snow avalanches and other slope processes in Svalbard was initiated in cooperation with Longyearbyen Red Cross, with a potential for inclusion of several other local institutions working with avalanches. Monitoring of movement and thermal conditions in unstable rock slopes in Troms and Møre and Romsdal, Norway where started in cooperation with Dr. L.H. Blikra, Norwegian Geological Survey and Hanne H. Christiansen. She is one of two coordinators on the IPY core project Thermal State of Permafrost, and will have the responsibility for coordinating the International University Courses on Permafrost in this and three other permafrost IPY coordination projects.

Ph.D. student Lene Kristensen worked on the relation between climate and ground temperatures. In the Adventdalen next to the Auroral Station she studied energy balance, and at the ice-cored Crednermorene at Sveagruba the focus was on spatial monitoring and modelling of the local variation of snow cover and vegetation on ground temperatures. In April 2005 an ongoing surge of Paulabreen in innermost Van Mijenfjorden was observed, and an automatic camera was installed taking daily pictures, thus creating a film of the glacier surge. This was done in corporation with the Technological Department at UNIS and Store Norske.

In 2005 four master students graduated, and we enrolled three new master students. We have 8 master students working on the following topics: Ice-wedges and their climatic control, the mass balance of Bogerbreen, the thermohaline ocean circulation and its control on sedimentation in the sea, marine sedimentation in a sediment core from the Svalbard area, the cyclicity of Carboniferous shallow marine carbonate sedimentation, snow distribution in the landscape and its relation to the distribution of glaciers, glacier hydrology of Longyearbreen using isotope ▶



- ▶ geochemistry, the interior of Tellbreen examined by georadar, and the thermal conditions of the mine waste in Bjørndalen.

The International Permafrost Secretariat, hosted by the department and led by Hanne H. Christiansen, was funded by the Norwegian Research Council from March 2005. Dr. Angélique Prick is operating the Secretariat.

GRADUATES 2005:

PHD DEGREE

Lindsey Nicholson: Mass balance characteristics of debris mantled glaciers.

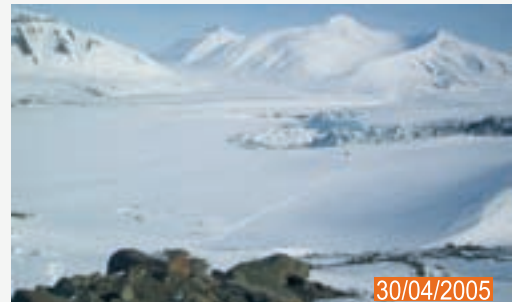
CAND. SCIENT/ MASTER DEGREE

Torger Natvig Holen: Mapping of winter-wind patterns and glacier mass balance characteristics on central Spitsbergen, Svalbard.

Louise Askær Jensen: The Environmental Impact of Acid Mine Drainage on an Arctic Soil-plant System.

Simon Jessen: Dansgaard / Oeschger cykler på Svalbardmarginen. En sand historie.

Lea Bjerre Schmidt: The Environmental Impact of Acid Mine Drainage on an Arctic Soil-plant System.



Pictures right:

In early spring 2005, UNIS received a tip from a local tour operator that Paulabreen south of Sveagruba had started to surge. From April to August the glacier front advanced 600 meters into the fjord. From August to November the front moved further 400 meters, but since then the surge appears to have stopped.

Photos: Lene Kristensen

«Aurora over Endalen,
viewed from the Auroral
Station in Adventdalen.»





Arctic Geophysics

By ANNA SJÖBLOM

The Arctic Geophysics Department focused on four teaching and research areas in 2005: Upper Polar Atmosphere, Middle Polar Atmosphere, Meteorology and Oceanography. We therefore cover aspects of physical phenomena from high up in the atmosphere all the way down into the ocean.

Seven courses at 200-level and five at 300-level were offered. All our courses emphasises a combination of theory and experimental work in the field. Field work is a very important tool in understanding the physical processes that are special for the Polar environment. It also gives the student a chance to be familiar with geophysical instrumentation and methods for data analysis.

The Department had four full time faculty staff members in 2005, four Adjunct Professors and two Adjunct Associate Professors.

Associate Professor Lars Robert Hole left his position in Meteorology in February, and is now working at the Norwegian Institute for Air Research in Tromsø, Norway. Associate Professor Anna Sjöblom, previously working at Bjerknes Centre for Climate Research in Bergen, Norway, took over this position in April. Associate Professor Dag Lorentzen left his position in Upper Polar Atmosphere in August for a sabbatical year at the University of Oslo. Dr. Tom Grydeland from University of Tromsø substitutes during his absence. The Department also had two new Adjunct Associate Professors in 2005: Kim Holmén from the Norwegian Institute for Air Research, Tromsø, Norway (from November, Norwegian Polar Institute) in Meteorology and Ole Anders Nøst (Norwegian Polar Institute, Tromsø, Norway) in Oceanography. During 2005 it was also decided to expand the Department and a new full-time faculty position in Snow and Ice Physics was announced. Dr. Carl Egede Bøggild will start at UNIS in 2006.

Magne A. Drage defended his Dr. Scient. thesis “Atmospheric icing and meteorological variables – Full scale experiment and testing of models” in April. The thesis focused on studies of accretion and precipitation icing on structures located in complex terrain. It also deals with Arctic coastal climatic impact on design constructions.

In mid August Margit Dyrland was employed as a PhD-student in Middle Polar Atmosphere. Her main focus is on measuring mesopause temperatures by spectral analysis of the OH airglow layer at 87 km. These temperature records from the Auroral Station are important for understanding of the interaction between the upper and middle atmosphere and also in a global context. Mesospheric temperature logs have been kept at the Auroral Station for almost 30 years, constituting of one of the longest time series in the world.

Eight Master students completed their theses in 2005. Studies were made on areas such as mercury depletion events in Ny Ålesund, ice formation on Isfjorden, air-ice-sea interactions and physical phenomena in the polar atmosphere. Ongoing Master student projects also include studies of physical oceanographic processes in Svalbard fjord systems and attitude estimation by use of Kalman filtering on low cost inertial measurements.

The department supervises the daily operations of the Auroral Station in Adventdalen. The station has 25 instruments and engages 18 collaborating institutions from eight different countries. Since beginning operations in 1978, activity at the station has been high. But the Auroral Station suffers from increased light pollution, an outdated building, and limited space to accommodate new instrumentation. Finally in May 2005, after a 12 year struggle for a new station, the Norwegian Ministry of Education and Research announced that a new auroral station will be built at Breinosa (78.15°N, 16.04°E), close ▶

Picture left:

◀ This type of activity is typical for low to moderately disturbed conditions. Mountains in the foreground are illuminated by the full moon. While images acquired with commercially available color cameras have little scientific value themselves, UNIS geophysics researchers take them continuously during the auroral season to document cloudcover and light pollution from nearby Longyearbyen. Photo: Jeffrey M. Holmes, UNIS, 2006.



Svalbard Science Centre as seen from above. This airborne raw image together with GPS and Gyro data (attitude) is used to construct orthophotos. They are also used as background log information for our hyperspectral images. Photo: Fred Sigernes

- ▶ to the EISCAT Svalbard Radar. The construction will be carried out by the Norwegian Directorate of Public Construction and Property and will be finished in time for the auroral season 2006/2007. Airborne photographs and sky view panoramas show that the location of the new site is ideal for future low light photon detection work during the boreal seasons.

Our project on dual site measurements of dayside auroral Hydrogen Doppler profiles from the Auroral Station and the NP station in Ny-Ålesund is now headed by our PhD student Jeff Holmes. Two identical Ebert - Fastie spectrometers were installed in 2002 at each site looking up the magnetic field line to look for signatures of magnetospheric merging. The project is on track and the results are promising.

In December 2005 and January 2006 UNIS played a crucial part of a large international observational campaign coordinating radar observations using the EISCAT Svalbard Radar and a number of narrow field of view optical instruments to observe fine-scale structure in the auroral ionosphere. The campaign involved scientists from universities in The United Kingdom, Sweden and Norway, and almost 100 hours of radar run time during early morning hours in new moon periods. The campaign saw the first deployment of a multi-wavelength optical imager and a new setup for the radar where a small passive antenna was used to obtain resolution within the radar beam, adapting techniques from radio astronomy.

A new series of light weight airborne spectral imagers has been developed in the department. These instruments detect spectral signatures of any target at high spectral and spatial resolution. ▶



- ▶ Co-operation with NORUT-IT in Tromsø on launching the CryoWing drone program and the SVALBIRD micro satellite proposal together with Technical University of Berlin and the Norwegian Space Agency has initiated further research projects.

The meteorological research in the department is focused on experimental boundary layer studies, both over land and over the ocean. Special emphasis is made on local scale phenomena typical for the Arctic and air-ice-sea interactions. The new assessment report on arctic haze and acidification and eutrophication in the Arctic was coordinated and edited by the department. The Arctic Monitoring and Assessment Programme (AMAP) sponsors the work and the report will be published in the summer of 2006. Cooperation with the Norwegian Institute for Air Research was continued in 2005.

Wind data from the ERS-2 and ENVISAT satellites has been compared with in-situ data by our PhD-student Alexei Stuijly. The study uses turbulence characteristics derived from microwave space borne satellite imagery over water with turbulence measurements made on the ground at a site close to the water outside Longyearbyen.

The department takes part in studies of variability and exchanges in the North Atlantic, Fram Strait and the Arctic Ocean. The oceanography group at UNIS focus on how much heat the Atlantic Water core loses on its northward path along west Spitsbergen, and therefore also how this warm and saline water is guided into our fjord systems around Svalbard. Discovery of blue mussels in Isfjorden in 2004 resulted in larger activity in the interdisciplinary ecology research community at UNIS, on the topic 'Atlantic water in Spitsbergen fjords', but also in a verification that our oceanographic models are doing a good job.

Our Polar Ocean Climate Processes (ProClim) Post Doc in oceanography, Dr. Ragnheid Skogseth, have mainly focused on brine-enriched water resulting from sea-ice formation in coastal polynyas and along topographically influenced fronts and ice edges, and used Storfjorden as a laboratory for both observations and modelling. Results from Storfjorden related studies were presented at the 'International Symposium on Sea Ice' arrange by the International Glaciological Society in Dunedin, New Zealand.

GRADUATES 2005:

PHD DEGREE

Magne A. Drage: Atmospheric icing and meteorological variables – Full scale experiment and testing of models.

CAND. SCIENT/ MASTER DEGREE

Lasse Clausen: Conjoint measurements of ULF pulsations - a case study

Margit E. Dyrland: A multi-instrument analysis of postnoon auroral morphology and lobe reconnection events during southeast IMF orientation.

Lucas Girard: Investigation of mercury depletion events recorded during early and late spring 2003 at Zeppelin / Ny-Ålesund, Svalbard, Norway

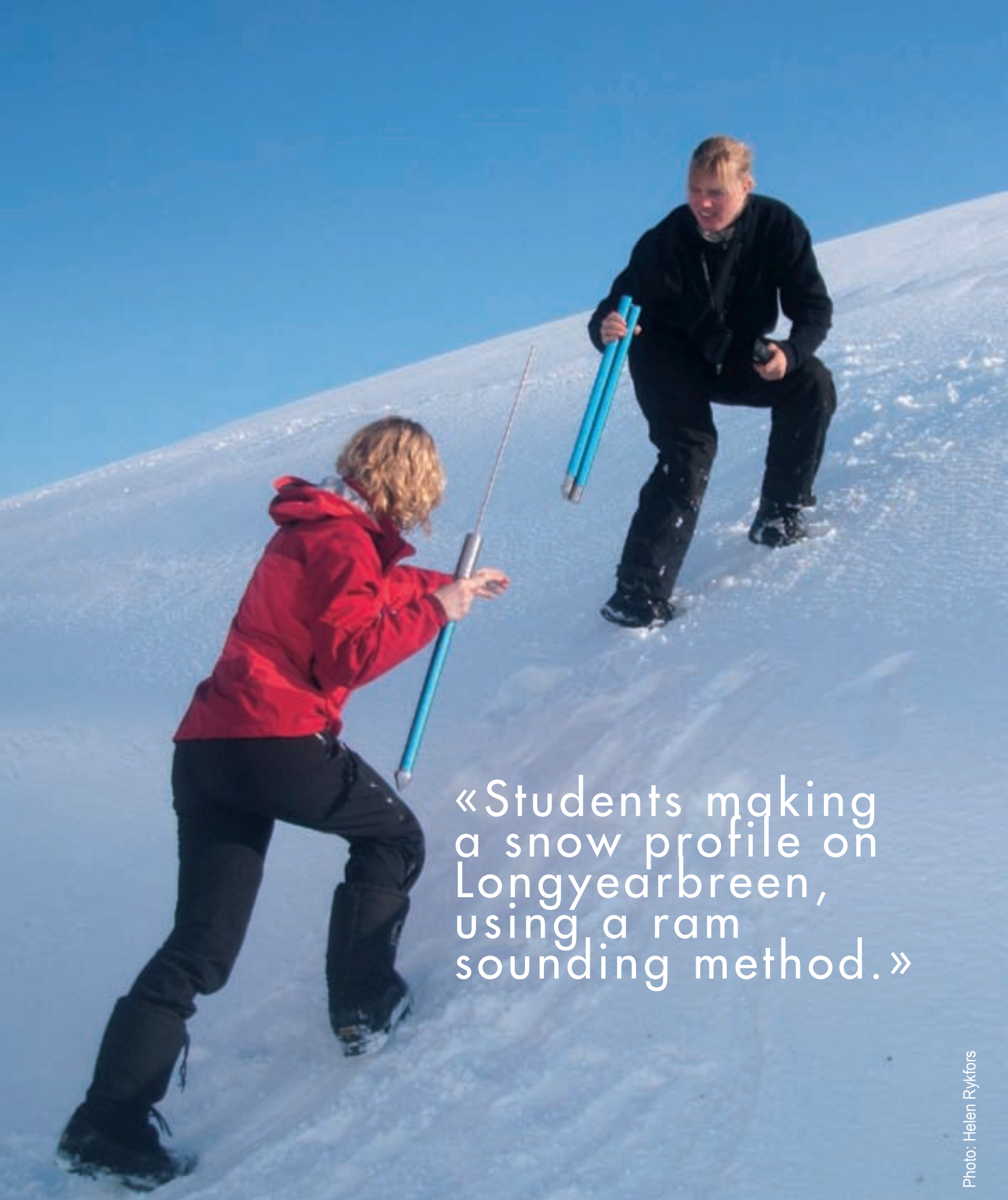
Johnny Grøneng Aase: Electron density measurements in the polar cusp

Sara Mattsson: Why is there no ice on Isfjorden?

Åsmund Skjæveland: Analyse av ein konveksjonskanal og rekonstruksjon av den ionosfæriske storskalakonveksjon observert med incoherent spredningsradar

Kristian Snekvik: CLUSTER satellite studies

Katja Weigel: On the wind stress and air-ice interactions over the Barents Sea



«Students making a snow profile on Longyearbreen, using a ram sounding method.»



Arctic Technology

By **ROLAND KALLENBORN**

The Arctic Technology Department offers education 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: living and building on frozen ground that may be subject to landslides and avalanches (Geotechnics), Arctic offshore oil and gas exploitation (Ice Mechanics, Geotechnics), and potable water supply (Hydrology). Arctic Environmental Technology and Chemistry concentrates on current and potential pollution problems, environmental impacts and feasible remediation techniques in Arctic areas.

ARCTIC ENGINEERING

The Department offers a full-time program in Arctic Engineering, offering level 200 courses in the spring (AT-205 and AT-208) and level 300 courses in the autumn (AT-323, AT-327 and AT-329). Students may combine their studies with courses from AETC and the other UNIS departments.

ARCTIC ENVIRONMENTAL TECHNOLOGY AND CHEMISTRY

The Department also offers a full-time program in Arctic Environmental Technology and Chemistry, focusing on pollution in the Arctic. The courses making up the program can be heavily technology oriented. We also encourage students from other Departments to include offerings, in order to form an interdisciplinary Arctic Environment program. Many students from the other Departments at UNIS are very interested to include our AT Environmental Technology courses in their course plans.

Picture right:

Specified instruments are frozen in the ice from February until late April - beginning of May in order to log stresses induced by seasonal temperature variations. Frequent visits at site are done to retrieve data, collect ice cores and check possible polar bear damages. Photo: Ketil Rønning

RESEARCH

The technological challenges springing from increased human activity in the northern marine environments, as well as locally here on Svalbard, continue to be our main focus. The faculty staff continued to work on established research programs at UNIS and new studies were initiated. The projects are detailed later in this section.

Key topics of interest within Environmental Technology include: The fate of oil spills in an Arctic environment and possible countermeasure techniques; levels and spreading of persistent organic pollutants (PCB pesticides in reindeer, Arctic fox, Polar cod, lake sediment and seaweed); and spreading and effects of pollution from local mining industry. Oil spills in an Arctic environment, for instance the waters around Svalbard, can be expected to behave significantly differently than oil spills in warmer waters, like the North Sea. The differences in spreading, evaporative loss, emulsification, dispersion and other factors add up to important modifications in operational oil spill contingency planning. There is a range of potential sources of oil spills in and around Svalbard, including fishing boats and freighters, tourist ships, and leakage or seepage from oil depots on land. ▶





Arctic Technology has been doing medium scale ice-structure interaction experiments on the sea ice in the Van Mijen fjord. An ice floe was towed so that it crushed against a pile while forces and displacements were measured. Photo: Lars Grande

- ▶ A three-year program funded by the Norwegian Research Council, Statoil and Norsk Hydro focuses on oil spills in an Arctic marine environment. The purpose of this project is to investigate the weathering processes in marine oil spills under Arctic conditions. The focus is on the following processes: weathering of the bulk oil phase (evaporation, emulsification and dispersion), dissolution of water-soluble components, photo-oxidation and biodegradation processes. The PhD program by Liv-Guri Faksness is an integral part of this project.

The key topics within Arctic Engineering are permafrost and ice. We perform measurements and simulations of thermomechanical response in relation to onshore, coastal and offshore infrastructure. The main sites of our investigations are Longyearbyen, the Van Mijenfjord and Svea. We monitor ground temperature profiles down to 10 metres depth in open country, down the supporting piles at the Science Park, and in the waste tip in Adventsdalen. The development of the infrastructure and harbour facilities in Longyearbyen, as indeed in the Svea community, poses important scientific and engineering

tests for our staff and students. The ice cover in the Van Mijenfjord is stable throughout the season, allowing us to perform seasonal studies without risk of losing our equipment.

Several unique medium-scale experiments have been performed on the ice, close to the Svea community, over the last three years. In 2004 two medium-scale ice/vertical structure interaction experiments were performed as part of a PhD program by Per Olav Moslet. These experiments brought together a unique combination of real sea ice with measurements of load-determinants. Ice conditions on the Van Mijenfjord were monitored, as usual, and in-situ ice stresses were monitored. The main focus within this project was on how environmental variables (meteorological and oceanographic) determine ice conditions. In the Barents Sea we did our annual measurements and experiments on first-year sea ice ridges.

In his PhD Fabrice Caline is studying the design of environmentally-friendly shore protection structures. A full-scale test embankment is being built with local masses in Svea and will help understand the



One of the projects in environmental technology measure the migration of small amounts of oil in sea ice in Van Mijenfjorden.
Photo: Ketil Rønning

action of frost and sea ice. The project is supported by the coal mining company Store Norske (SNSG), the Norwegian Research Council and recently obtained the European Eureka innovation label.

ENVIRONMENTAL TECHNOLOGY

A new environmental chemistry laboratory has been established in 2005 for the trace analytical quantification of organic contaminants in Arctic environmental samples. The laboratory consists of gas chromatographic equipment with electron capture, mass selective as well as flame ionisation detection. In addition, a high performance liquid chromatograph with variable wavelength detection (DAD) is available for the investigation of water soluble contaminants. The laboratory will be actively used for post-graduate courses as well as for research purposes.

A new Ph.D. position has been announced for the investigation of dynamic exchange and distribution as well as transformation processes of persistent organic pollutants on ice and snow surfaces under Arctic conditions. In addition, The Environmental Technology department has successfully applied for two research project at

the Research Council of Norway (RCN) for the investigation of pharmaceutical residues in sewage treatment processes under different Climate conditions and the environmental behaviour of perfluorinated flame retardants in off-shore fire fighting foams, respectively. M.Sc and Ph.D. project will be related to this new research projects.

PHD DEGREE

Pavel Liferov, "First-year ice ridge scour and some aspects of mechanical behaviour"

CAND. SCIENT/ MASTER DEGREE

Artem Skorobogatov, "Ice structure interaction program"

Oddrun Angelvik, "Ice vertical structure interaction, numerical simulations and analysis of test data"

Student Body Annual Report

By ANNE GRY JØRGENSEN

There are so many sides to student life on Svalbard. Students at UNIS come from all walks of life and many nationalities are in evidence. This creates a special blend of people, who share a fascination for the Arctic and all its facets.

At the beginning of the semester a General Meeting of the student body was held, where all students elected the members of the Student Council and additional ad hoc groups. The Student Council exists to support the student body at UNIS to ensure that student welfare is maintained. In its basic form it consists of the President, Vice-president, Treasurer, Vice-treasurer, and the student representatives on the UNIS Board of Directors from the four departmental boards. The students also nominate a Student Director on the UNIS Board of Directors, and are thus intimately involved in all the larger decisions concerning UNIS. In addition ad hoc groups are responsible for the two cabins in Bjørndalen and Svea, our outdoor equipment and ongoing activities like the weekly Friday gathering, Wednesday movie and Morning swimming.

Basic financial support for most activities concerning students is provided by UNIS. Additional funding for the Student Council can be achieved by applying to the various Student Unions around Norway, where our students come from. There are especially strong ties with the Tromsø Student Union, who are the owners of the student residence in Nybyen.

STUDENT LIFE

Students throughout the year engage in a huge list of activities. In almost any weather, you will find hardy students escaping from the urban sprawl of Longyearbyen to get physical with the Svalbard wilderness. To support these expeditions the Student Council has two cabins – one in Bjørndalen, near Longyearbyen, and one in Svea – and a growing itinerary of survival equipment, ranging from tents and stoves to skidoo sleds. Regular student gatherings, like the weekly Friday session and the midweek movie on Wednesdays, are organised by students elected at the General meeting.

All in all the student body is very active and visible in Longyearbyen. In addition to their own outdoor pursuits and frequent arrangements in the Sports Hall, they also make an energetic contribution to the social calendar in Longyearbyen. Students devote a lot of energy to volunteer work as for example in the Polar Jazz festival. Additionally the local committee of Solfest uka asks students on a yearly basis to be in charge of several arrangements like „Take a chance”, horseback riding and Morning swimming breakfast.

Yet, despite all these diversions, a word of caution is called for. Many former students cannot stay away, thanks to the intimacy of UNIS, the astounding surroundings, the magical lighting effects, and the unforgettable excursions. In short, be warned: the Svalbard experience will alter you for life!



The 17th of May is celebrated everywhere on Svalbard, even on a fieldtrip to Bellsund. Photo: Eirin Bjørkvoll



Scientific publications 2005

SCIENTIFIC ARTICLES IN REVIEWED JOURNALS BY FULL-TIME FACULTY

The publication list only includes articles in scientific journals. Papers in proceedings, book chapters, talks etc. will be published in a database in the late autumn 2006.

Arndt C.E. & Beuchel, F. (2005). Life history and population dynamics of the arctic sympagic amphipods *Onisimus nanseni* Sars and *O. glacialis* Sars (Gammaridea: Lysianassidae). *Polar Biology*. DOI 10.1007/s00300-005-0045-x

Arndt, C.E. & Pavlova, O. (2005). Origin and fate of ice fauna in the Fram Strait and Svalbard area. *Marine Ecology Progress Series* 301: 55–66.

Arndt, C.E., Berge, J. & Brandt, A. (2005). Mouthpart-atlas of arctic sympagic amphipods: trophic niche separation based on mouthpart morphology and feeding ecology. *Journal of Crustacean Biology* 25 (3): 401–412.

Arndt, C.E., Fernandez-Leborans, G., Seuthe, L., **Berge, J.** & Gulliksen, B. (2005). Ciliated epibionts on the arctic sympagic amphipod *Gammarus wilkitzkii* as indicators for sympago-benthic coupling. *Marine Biology* 147: 643–652. DOI 10.1007/s00227-005-1599-4

Arnkværn, G., **Daase, M.** & **Eiane, K.** (2005). Dynamics of coexisting *Calanus finmarchicus*, *Calanus glacialis* and *Calanus hyperboreus* populations in a high-arctic fjord. *Polar Biology* 28 (7): 528–538. DOI 10.1007/s00300-005-0715-8

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Blixt, E.M., **Grydeland, T.,** Ivchenko, N., Hagfors, T., La Hoz, C., Lanchester, B.S., Løvhaug, U.P., & Trondsen, T.S. (2005). Dynamic rayed aurora and enhanced ion-acoustic radar echoes. *Annales Geophysicae* 23 (1): 3–11. SRef-ID: 1432-0576/ag/2005-23-3

Christiansen, H.H. (2005). Thermal regime of ice-wedge cracking in Adventdalen, Svalbard. *Permafrost and Periglacial Processes* 16 (1): 87–98. DOI 10.1002/ppp.523

Christiansen, H.H., French, H.M. & Humlum, O. (2005). Permafrost in the Gruve-7 mine, Adventdalen, Svalbard. *Norsk geografisk tidsskrift* 59 (2): 109–115. DOI 10.1080/00291950510020592

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Cottier, F., Tverberg, V., Inall, M., Svendsen, H., **Nilsen, F.,** & Griffiths, C. (2005). Water mass modification in an arctic fjord through cross-shelf exchange: the seasonal hydrography of Kongsfjorden, Svalbard. *Journal of Geophysical Research* 110 (C12): C12005. DOI 10.1029/2004JC002757

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Evans, D., Harrison, Z., Shannon, P.M., Laberg, J.S., **Nielsen, T.**, Ayers, S., Holmes, R., Hoult, R.J., Lindberg, B., Hafliðason, H., Long, D., Kuijpers, A., Andersen, E.S. & Bryn, P. (2005). Palaeoslides and other mass failures of Pliocene to Pleistocene age along the Atlantic Continental Margin of NW Europe. *Marine and Petroleum Geology* 22 (9–10): 1131–1148. DOI 10.1016/j.marpetgeo.2005.01.010

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Guest lecturers 2005

Name	Institution	Name	Institution
Albert, Donald	The Cold Regions Research and Engineering Laboratory, USA	Goering, Douglas	University of Alaska, USA
Alm, Göran	Stockholm University, Sweden	Grydeland, Tom	University of Tromsø, Norway
Andresen, Steinar	University of Oslo, Norway	Grøndahl, Kirsti Kolle	Fylkesmannen i Buskerud, Norway
Arndt, Carolin	Freelance	Grønnevet, Martin	Storm Weather Centre, Norway
Austegård, Atle	University of Bergen, Norway	Gudmestad, Ove Tobias	Statoil, Norway
Austrheim, Gunnar	Norwegian University of Science and Technology (NTNU)	Guio, Patrick	University of Oslo, Norway
Bakken, Vidar	University of Oslo, Norway	Hagen, Jon Ove	University of Oslo, Norway
Ballantyne, Colin	School of Geography and Geosciences, University of St. Andrews, Scotland	Hanssen-Bauer, Inger	DNMI, Norway
Beldring, Stein	MVE, Norway	Heia, Karsten	Norwegian Institute of Fisheries and Aquaculture
Benn, Doug	University of St. Andrews, UK	Heinze, Christophe	University of Bergen, Norway
Berggren, Anne-Lise	Geofrost Engineering A/S, Norway	Hik, David	University of Alberta, Canada
Bjørnå, Noralv	University of Tromsø, Norway	Hjøllo, Solfrid	University of Bergen, Norway
Bogen, Jim Jens	Norwegian Water Resources and Energy Directorate (NVE)	Hodkinson, Ian D.	Liverpool John Moores University, UK
Brattegård, Torleiv	University of Bergen, Norway	Hole, Lars Robert	Norwegian Institute for Air Research
Breivik, Knut	Norwegian Institute for Air Research	Hop, Haakon	Norwegian Polar Institute
Brekke, Pål	Norwegian Space Centre	Hovelsrud-Broda, Grete	NAMMCO, Norway
Bråthen, Kari Anne	University of Tromsø, Norway	Howell, John	University of Bergen, Norway
Braathen, Alvar	University of Bergen, Norway	Hyllestad, Robert	Norwegian Post and Telecommunications Authority
Christoffersen, Kirsten	Freshwater Biological Laboratory, Denmark	Høgda, Kjell Arild	NORUT Information Technology Ltd, Norway
De Lange, Tor	University of Bergen, Norway	Haagensen, Per J.	NTNU
Ditlevsen, May Kristin	SINTEF, Norway	Ingolfsson, Ólafur	University of Iceland
Dowdeswell, Julian	University of Cambridge, UK	Instones, Arne	Opticonsult, Norway
Egeland, Alv	University of Oslo, Norway	Jansson, Peter	Stockholm University, Sweden
Eiken, Trond	University of Oslo, Norway	Jensen, Bjørn Munro	NTNU
Elberling, Bo	University of Copenhagen, Denmark	Johansen, Tor Arne	University of Bergen, Norway
Finch, Ivan	Rutherford Appleton Laboratory, UK	Jullum, Rolf	Statsbygg, Norway
Finseth, Jomar	NTNU	Killingtveit, Ånund	NTNU
Forsberg, Carl Fredrik	Geological Survey of Norway	Kjærnet, Torfinn	Directorate of Mining, Norway
Forwick, Matthias	University of Tromsø, Norway	Klanderud, Kari	Norwegian University of Life Sciences
Furevik, Tore	University of Bergen, Norway	Knutsson, Sven	Luleå University of Technology, Sweden
Gabrielsen, Geir Wing	Norwegian Polar Institute	Kohler, Jack	Norwegian Polar Institute
Gabrielsen, Tove	University of Oslo, Norway	Koyi, Hemin	Uppsala University, Sweden
Gjevik, Bjørn	University of Oslo, Norway	Kristensen, Dorthe K.	University of Bergen, Norway
Gjøsæter, Harald	Institute for Marine Research, Norway	Kuhn, Michael	University of Innsbruck, Austria
Glassmaier, Karl-Heinz	Technische Universität Braunschweig, Germany	Kuvaas, Berit	University of Bergen, Norway
		La Hoz, Cesar	University of Tromsø, Norway
		Landvik, Jon	Norwegian University of Life Sciences
		Lemnell, Per Arne	Televilt AB, Sweden



Name	Institution	Name	Institution
Leppäranta, Matti	University of Helsinki, Finland	Skardhamer, Jofrid	Akvaplan NIVA, Norway
Liferov, Pavel	NTNU	Skogseth, Terje	NTNU
Luigino, Vitali	Snamprogetti, Italy	Sneli, Jon Arne	NTNU
Lundén, Bengt	Stockholm University, Sweden	Solheim, Bjørn	University of Tromsø, Norway
Løvhaug, Unni Pia	University of Tromsø, Norway	Solheim, Jan Erik	University of Oslo, Norway
Maattanen, Mauri	Helsinki Technical University, Finland	Sorteberg, Asgeir	University of Bergen, Norway
MacQuaker, Joe	The University of Manchester, UK	Spjelkavik, Sigmund	Freelance
Malyutin, Arkady	Rubin Central Design Bureau for Marine Engineering, Russia	Steffesen, Jørgen Peder	University of Copenhagen, Denmark
Marchenko, Aleksey	Russian Academy Science	Stette, Gunnar	NTNU
McPhee, Miles	McPhee Research Company, USA	Stickler, Morten	NTNU
Mienert, Juergen	University of Tromsø, Norway	Stordal, Frode	University of Oslo, Norway
Mjelde, Rolf	University of Bergen, Norway	Storvold, Rune	NORUT Information Technology Ltd, Norway
Myking, Steinar	University of Bergen, Norway	Strøm, Johan	Stockholm University, Sweden
Mølmann, Truls	Barlindhaug AS, Norway	Strømme, Anja	EISCAT, Norway
Nagy, Jenö	University of Oslo, Norway	Sundet, Jan	Norwegian Institute of Fisheries and Aquaculture
Nilsen, Jan Even Øie	Nansensenteret, Norway	Sundvor, Eirik	University of Bergen, Norway
Notz, Dirk	University of theoretical Geophysics/ DAMTP, University of Cambridge, UK	Svenning, Martin	Norwegian Institute for Nature Research
Nøttvedt, Arvid	Norsk Hydro, Norway	Svenøe, Trond	Norwegian Polar Institute
Oksavik, Kjellmar	NTNU	Sælthun, Nils R.	Norwegian Institute for Water Research
Ottesen, Dag	Geological Survey of Norway	Sæther, Ola Magne	The Geological Survey of Norway
Ovhed, Magnus	DNMI, Norway	Sætra, Øyvind	DNMI, Norway
Presterud, Pål	University of Oslo, Norway	Telebond, Turid	Svalbard Samfunnsdrift, Norway
Prick, Angelique	Freelance	Toudal, Leif	Technical University of Denmark
Rasmussen, Tine	University of Tromsø, Norway	Tverberg, Vigdis	Norwegian Polar Institute
Reed, Mark	SINTEF, Norway	Ulfstein, Geir	University of Oslo, Norway
Reeh, Niels	Technical University of Denmark	Vader, Wim	University of Tromsø, Norway
Rehnström, Emma	University of Oslo, Norway	Vaskinn, Kjetil Arne	Statkraft Grøner AS, Norway
Reymert, Per Kyrre	Tromsø Museum, Norway	Vermeer, Pieter	University of Stuttgart, Germany
Roemer, Stephan	Inst. of Aero- and Astronautics, Germany	von Quillfeldt, Cecilie	Norwegian Polar Institute
Ruud, Bent Ole	University of Bergen, Norway	Hellum	
Rønning, Jan Steinar	Norges Geologiske Undersøkelser, Norway	Walløe, Lars	University of Oslo, Norway
Röttger, Jürgen	Max Plank Institut für Aeronomie, Germany	Widell, Karolina	University of Bergen, Norway
Sand, Knut	Statkraft Grøner AS, Norway	Zolotukhin, Anatoly	Statoil, Norway
Sandven, Rolf	NTNU	Øritsland, Nils A.	Norwegian Institute for Nature Research
Seim, Bjørnar	University of Tromsø, Norway	Østerhus, Svein	University of Bergen, Norway
Shaver, Gus	Marine Biological Laboratory, USA		
Shkhinek, Karl	State Technical University of St. Petersburg, Russia		
Siggerud, Erling I Heintz	PGS Reservoir AS, Norway		



www.unis.no

The University Centre in Svalbard
P.O.Box 156 - N-9171 Longyearbyen - Norway

Tel. +47 7902 3300 - Fax +47 7902 3301
E-mail: post@unis.no