INNKALLING TIL MØTE I FORSKNINGSNEMNDA

DATO 10.03.2009

STED S257, Sørhellinga
MØTESTART 10:15

UNIVERSITETET FOR MILJØ- OG BIOVITENSKAP

FORSKNINGSNEMNDA

INNKALLING TIL MØTE I FORSKNINGSNEMNDA
10.03.2009

Saksliste

	Velkommen v/ Hans Fredrik Hoen – instituttleder ved INA
14/2009	Godkjenning av dagens saksliste og møtebok fra 13.02.2009
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20/2009	Eventuelt

Forfall meldes til Åshild Ergon på e-post ashild.ergon@umb.no

UMB, 03.03.2009
Ragnhild Solheim
Forskningsdirektør

Godkjenning av møtebok fra 13.02.2009 og saksliste for dagens møte

Dokumenter:

Vedlegg 1: Utkast til møtebok fra 13.02.2009.

Forslag til vedtak

1. Møtebok fra 13.02.2009 godkjennes
2. Dagens saksliste godkjennes

Ås, 03.03.2009

Ragnhild Solheim
Forskningsdirektør

Utkast til MØTEBOK

Møte i Forskningsnemnda 13.02.2009

Til stede:	Dag Austbø – forskningsleder ved IHA Tor Arve Benjaminsen – representant fra Noragric Nils Bjugstad – forskningsleder ved IMT Andreas Brunner – forskningsleder ved INA Irene Eriksen Dahl – representant for tekn./adm. ansatte Eva Falleth – instituttleder ved ILP, møtte i stedet for forskningsleder som ikke kunne komme (ikke tilstede under sak 8/2009 og 9/2009) Atle Guttormsen – forskningsleder ved IØR Vegard Martinsen – representant for stipendiatene Jan Mulder – vara for forskningsleder ved IPM Ole Steien– vara for studentrepresentant Morten Sørlie – forskningsleder ved IKBM
Forfall:	John Wirkola Dirksen – studentrepresentant, erstattet av Ole Steien Gary Fry - forskningsleder ved ILP Ruth Haug – prorektor for forskning og leder av forskningsnemnda Sverre Reikvam – studentrepresentant Anne Marte Tronsmo – forskningsleder ved IPM
Fra sentraladministrasjonen:	Ragnhild Solheim - forskningsdirektør Åshild Ergon, forskningsavdelingen Knut Hove – rektor, tilstede under sak 9/2009 Monica Holthe, forskningsavdelingen, tilstede under sak 10/2009 og 11/2009
Møteleder:	Morten Sørlie
Møtebok/referent:	Åshild Ergon

Sak 8/2009 Godkjenning av dagens saksliste og møtebok fra 27.01.2009

Dokumenter:

1. Utkast til møtebok

Vedtak:

1. Møtebok fra 27.01.2009 godkjennes.
2. Dagen saksliste godkjennes.

Sak 9/2008 Behandling av skisser til søknader om midler fra Forskningsrådets program INFRASTRUKTUR

Dokumenter:

a) Saksframlegg
b) Vedlegg:
    1. Forskningsrådets utlysning av midler på programmet INFRASTRUKTUR
    2. Forskningsrådets mal for skisser
    3. Forskningsrådets vurderingskriterier (ettersendt 12. februar)
    4. Innkomne skisser (ettersendt 12. februar)

Det var kommet inn 13 skisser. I tillegg ble en skisse til "Laboratory for Conversion of Bioenergy" delt ut på møtet. Eva Falleth meldte at ILP ønsker å lage en skisse til et digitalt arkiv over historiske tegninger.

Skissene ble gjennomgått en for en. Forskningslederne tar med seg kommentarer til søkerne. Skisser som må revideres sendes til forskningsavdelingen senest 17. februar kl. 1600. Rektor og forskningsdirektøren vil ha en dialog med de andre Campus-institusjonene om eventuelt samarbeid om skisser. Forskningsnemnda forutsetter at kostnader til drift av ev. forskningsinfrastruktur som innvilges dekkes av de respektive instituttene.

Sak 10/2009 Fordeling av stipendiatstillinger øremerket matematisk-, naturvitenskapelige og teknologiske fag

Dokumenter:

a) Saksframlegg

Det forelå et konkret forslag til fordeling i saksframlegget - en stipendiat til hvert av instituttene IHA, IKBM, IMT, INA, IPM (alternativ a)). Nils Bjugstad meldte i forkant av møte inn et alternativt forslag til fordeling - 3 stipendiater til IMT og 2 til IKBM, med en begrunnelse for dette (e-post til FONs medlemmer den 10.02.09). Andreas Brunner meldte i forkant av møtet inn forslag til en alternativ og mer MNT-spesifikk fordelingsnøkkel (e-post til FONs medlemmer den 11.02.09). Når forskningsavdelingen beregnet fordelingen av stipendiatstillingene etter denne fordelingsnøkkelen ble resultatet det samme som alternativ a) i saksframlegget. Forskningsdirektøren la på møtet fram et forslag til fordeling - 2 stipendiater til IMT (hvorav en øremerket lærerutdanningen i realfag) og en stipendiat til hvert av instituttene IKBM, INA og IPM.

Etter drøftingen trakk Nils Bjugstad sitt forslag til fordel for forskningsdirektørens forslag. Andreas Brunner trakk sitt forslag da fordelingen ville blitt den samme som den foreslått i saksframlegget.

Det ble stemt over de to gjenstående alternativene.
Antall stemmer for forskningsdirektørens forslag: 1
Antall stemmer for Alternativ a) i saksframlegget: 9

Det ble påpekt at det er nødvendig å påse at stillingene benyttes til MNT-fag intern på instituttene. Det ble foreslått at utlysningstekstene skal sendes til forskningsavdelingen for godkjenning før utlysning, og at forskningsavdelingen rapporterer til FON. Det var enighet om dette.

Vedtak:

1. Forskningsnemnda anbefaler at de fem nye stipendiatstillingene øremerket MNT-fag fordeles mellom IHA, IKBM, IMT, INA og IPM med en stipendiat til hver.
2. Forskningsnemnda anbefaler at instituttene må sende utlysningstekstene til forskningsavdelingen for godkjenning før utlysning.

Sak 11/2009 Drøftingssak: Midtveisrapport fra Helse UMB

Dokumenter:

a) Midtveisrapport fra Helse UMB datert 05.02.09

Rapporten ble drøftet.

Vedtak:

1. Forskningsnemnda anbefaler at midtveisrapporten gjennomgår en ekstern evaluering hvor det spesielt legges vekt på merverdien av satsingen.
2. Forskningsnemnda uttrykker bekymring for at deler av rapporten kan misforstås; det kan være rapportert en del prosjekter og publikasjoner som er resultat av de ulike gruppenes arbeid, men ikke et resultat av selve satsingen.

Sak 12/2009 Informasjon

- UMBs nye forskningsdirektør, Ragnhild Solheim, presenterte seg.

Sak 13/2009 Eventuelt

Forskningsdirektøren informerte om innspillsmøte som Matprogrammet i Forskningsrådet arrangerer den 25. februar. Møtet gjelder innspill til forskningstemaer i forkant av utlysning av midler i samarbeid med Mattilsynet. Forskningsavdelingen sender ut informasjon.

Sak 15/2009
Prosess for videre behandling av skisser til Forskningsrådets program INFRASTRUKTUR

Dokumenter:

a) Saksframlegg
b) Vedlegg:
   1. Oversikt over skisser sendt inn fra UMB
   2. Innsendte skisser
   3. Forskningsrådets vurderingskriterier
   4. Kortfattet vurdering av skissene i forhold til UMBs strategi og Forskningsrådets vurderingskriterier

Forslag til vedtak:

1. Forskningsnemnda anbefaler følgende prosess for videre behandling av skissene til INFRASTRUKTUR:

   1. FON anbefaler en prioritering av alle skissene den 10. mars. Forutsatt god kvalitet, prioriteres skissene etter UMBs strategi og Forskningsrådets vurderingskriterier. Prioriteringen foretas innenfor hver av delutlysningene.
   2. Innen ca. 20. mars (etter at Forskningsrådet har kommet med eventuelle tilbakemeldinger): rektor foretar en foreløpig prioritering av skissene, eventuelt i samråd med de andre Campus Ås-institusjonene, NVH og Veterinærinstituttet.
   3. Endelig prioriteringsrekkefølge fastsettes av Universitetsstyret den 2. april.

2. Forskningsnemnda anbefaler følgende prioritering av skisser: til storskala forskningsinfrastruktur: *fastsettes i møtet*

Ås, 03.03.2009

Ragnhild Solheim
Forskningsdirektør

Bakgrunn

Utgangspunktet for saken

- Forskningsrådet har lyst ut 400 mill. kr til forskningsinfrastruktur på programmet INFRASTRUKTUR (fem delutlysninger).
- FON vurderte innkomne skisser den 13. februar og ga tilbakemeldinger til søkerne.
- UMB sendte inn 13 skisser (vedlegg 1 og 2) og et følgebrev til fristen 20. februar.
- UMBs skisser gikk til følgende delutlysninger:
    - Storskala forskningsinfrastruktur (30-200 mill. kr) – ferdig utredete prosjekter (1 skisse) og forprosjekter (3 skisser)
    - Avansert vitenskapelig utstyr (2-30 mill. kr) – 8 skisser
    - Vitenskapelige databaser og samlinger – 1 skisse
- Totalt søknadsbeløp i skissene fra UMB: 123 mill, hvorav 60 mill. på et ferdig utredet storskala-prosjekt (30 av disse er planlagt til Campus Ås, resten til Trondheim) og 5 mill på forprosjekter til storskala-prosjekter.
- Forskningsrådet vil nå behandle skissene "med tanke på mulig dialog med søkere tidlig i prosessen, for eksempel med tanke på nasjonal samordning der dette måtte være relevant. På grunn av stort forventet antall kan Forskningsrådet ikke forplikte seg til å gi tilbakemeldinger på samtlige skisser". Forskningsavdelingen har fått informasjon om at eventuelle tilbakemeldinger vil komme ca i uke 11-12.
- Fristene for fullstendige søknader er:
    - Storskala forskningsinfrastruktur (30-200 mill. kr): 4. juni
    - Avansert vitenskapelig utstyr (2-30 mill. kr): 22. april
    - Vitenskapelige databaser og samlinger: 22. april
- Søknader til delutlysningen på storskala forskningsinfrastruktur (30-200 mill. kr) skal i følge utlysningen prioriteres.
- Forskningsrådets vurderingskriterier er gitt i vedlegg 3. Viktige punkter:
    - Bred nasjonal interesse. Finnes ett eller få steder i landet. God arbeidsdeling og koordinering av norsk forskning. Tilgjengelig for relevante forskningsmiljøer og næringer
    - Skaper gode resultater og danner grunnlag for internasjonalt ledende forskning. Gjør norske forskningsmiljøer attraktive. Bidrar til etablering av nasjonale og internasjonale nettverk
    - Bidrar til effektivisering av innovasjonsprosjekter i næringslivet. Bidrar til å bedre norske næringers konkurranseposisjon

Hensikten med behandlingen av saken i FON

- Å ha en forutsigbar og åpen prosess
- Foreslå en plan for videre prosess
- Foreslå en prioritering av skissene til storskala forskningsinfrastruktur og ev. også skissene til de andre utlysningene

Hvor mange prosjekter kan UMB håpe på å få?

Ett storskala-prosjekt og 2-3 andre prosjekter?

Forslag til videre behandling av skissene

Alternativ 1 – prioritering av søknader til alle delutlysninger

4. FON anbefaler en prioritering av alle skissene den 10. mars. Forutsatt god kvalitet, prioriteres skissene etter UMBs strategi og Forskningsrådets vurderingskriterier. Prioriteringen foretas innenfor hver av delutlysningene.
5. Innen ca. 20. mars (etter at Forskningsrådet har kommet med eventuelle tilbakemeldinger): rektor foretar en foreløpig prioritering av skissene, eventuelt i samråd med de andre Campus Ås-institusjonene, NVH og Veterinærinstituttet.
6. Endelig prioriteringsrekkefølge fastsettes av Universitetsstyret den 2. april.

Fordeler:

- Signal til Forskningsrådet om UMBs strategiske prioritering.
- Øker sannsynlighet for å få gjennomslag fordi vi har noen få strategiske søknader
- Målrettet bruk av egne ressurser

Alternativ 2 – kun prioritering av søknader om storskala forskningsinfrastruktur
Som alternativ 1, men kun for søknader til storskala forskningsinfrastruktur, inkl. forprosjekter. Søknader til de andre delutlysningene sendes uprioritert forutsatt at de har akseptabel kvalitet.

Fordeler:

- Unngår å gi fra oss mulighet til finansiering av prosjekter som ut fra nasjonale prioriteringer er relevante
- Signal om at idé-mangfold er viktig for et universitet

Forslag til prioritering
Følgende forslag til prioriteringsrekkefølge er basert på en vurdering av skissene i forhold til UMBs strategi og Forskningsrådets vurderingskriterier (vedlegg 4).

Storskala forskningsinfrastruktur (30-200 mill. kr):
1. prioritet: Skisse 1 og 2
2. prioritet: Skisse 3 og 4

Da UMB i 2007 kom med innspill til nasjonalt veikart for forskningsinfrastruktur var BIOKLIMA prioritert som nr. 1 og Bioenergilabben som nr. 2. I ettertid har Bioenergimiljøene på Ås og i Trondheim fått tildelt en FME (Forskningssenter for Miljøvennlig Energi) og skissen til en storskala forskningsinfrastruktur til bioenergiforskning er nå blitt et samarbeid mellom Ås- og Trondheimsmiljøet. Dette, i tillegg til at søknaden om "Bioenergy Innovation Centre" sendes inn som et ferdig utredet prosjekt og ikke et forprosjekt, kan være grunner til å revurdere prioriteringen.

Avansert vitenskapelig utstyr (2-30 mill. kr)
1. prioritet: Skisse 5, 7, 10 og 11
2. prioritet: Skisse 6, 8 og 9

I dette forslaget til prioritering er alle de strategiske områdene til UMB ivaretatt.

Vitenskapelige databaser og samlinger:
Kun en skisse foreligger.

Lenker:
Forskningsrådets utlysning
(http://www.forskningsradet.no/no/Utlysning/INFRASTRUKTUR/1231248774631&visAktive=true)

Vedlegg 1 - Oversikt over skisser fra UMB til programmet INFRASTRUKTUR

Nasjonale prioriteringer	**Nr.***	**Delutlysning og navn på infrastruktur det skal søkes om**	**Samarbeidspartnere** og interessenter	**Beløp**
		Storskala forskningsinfrastruktur (30-200 mill. kr)		
Klima	1	BIOKLIMA - Large Scale Facility for Studying Climate Effects in Natural Ecosystems and Agroecosystems	**BIOFORSK, Skog og Landskap**	2 mill**
Energi	2	Bioenergy Innovation Laboratories	**BIOFORSK, Skog og Landskap, NTNU, SINTEF Energiforskning**	60 mill
Mat	3	Pilot Plant for Food and Feed	NVH, VI, NOFIMA, BIOFORSK	2 mill
Mat	4	Senter for husdyrforsøk – nasjonal utviklingsaktør for norsk husdyrhold	**NVH**	1 mill
		Avansert vitenskapelig utstyr (2-30 mill. kr)		
Klima	5	Core Instrumentation for Research on Greenhouse Gas Emission from Ecosystems (CIGGE)	**SINTEF IKT, BIOFORSK, NILU**	9 mill
Klima	6	Observatory of tidewater-glaciar dynamics	**Polarinstituttet, UiO**	3,9 mill
Miljø	7	Flow field fractionation (FFF) - High Resolution Inductively Coupled Plasma Spectrometer (HR-ICP-MS) system for variable molecular mass characterization	NIVA, NTNU, BIOFORSK, STAMI, NRPA, FFI, Polarinstituttet, Met.no, NINA, UiB, NOFIMA	7,2 mill
Mat	8	Food Lipids Laboratory Instrumentation	NOFIMA	4,2 mill
Mat	9	Konfokalmikroskop til et senter for biofilmstudier	NVH, VI, NOFIMA	2,5 mill
Bioteknologi	10	Infrastructure for advancing Norwegian marine genomic research***	Div. institusjoner representert av Norwegian Genotyping and Sequencing Consortium	19 mill
Bioteknologi	11	LTQ Orbitrap XL Mass Spectrometer	NOFIMA, BIOFORSK, Skog og Landskap	7,5 mill
Bioteknologi	12	Microbial Genomics	NVH, VI, Skog og Landskap, NOFIMA	3,5 mill
		Vitenskapelige databaser og samlinger		
Miljø	13	Archive for Norwegian landscape architecture	The National Museum Of Art, Architecture and Design, The Norwegian Association of Landscape Architects, The Directorate for Cultural Heritage, NIKU	2 mill

* nummereringen er ikke et uttrykk for prioritering
** pluss 0,5 mill i egeninnsats fra UMB
*** inkl. vitenskapelige databaser og samlinger; 8 mill.

1. General information

Title: **BIOKLIMA– Large Scale Facility for Studying Climate Effects in Natural Ecosystems and Agroecosystems**

Responsible institutions: Norwegian University of Life Sciences (UMB), The Norwegian Institute of Agricultural and Environmental Research (Bioforsk) and the Norwegian Forest and Landscape Institute (Norsk institutt for skog og landskap). BIOKLIMA was submitted from the partner institutions with top priority in 2007 and is listed in 'Verktøy for forskning – Nasjonal strategi for forskningsinfrastruktur (2008-2017)' under the thematic research priorities Energy, Environment and Food. *Scientific disciplines:* within the natural sciences disciplines: plant biology, soil sciences, ecology, environmental sciences, microbiology. The facility is also a required tool for assessing and developing resource managing tools to meet the challenges associated with the predicted climate changes. *Part of call:* Large-scale research infrastructure that will be a national facility. The application is for a pre-project (planning phase and prototyping) in 2010, full project (construction phase) in 2011-2013. *Pre-project cost:* 2.5 mill NOK, own funding 0.5 mill NOK. *Total cost:* will be estimated during pre-project phase, tentatively up to 200 mill NOK.

The research infrastructure is localized and consist of two integrated facilities; i) the phytotron SKP (Centre for Plant Research in Controlled Climate, www.umb.no/skp) which need major upgrading and modernization, and ii) an ecotron, a new and unique facility for integrated water-soil-microbial-plant research with special focus on terrestrial 'cold-climate' ecosystems typical for the northern hemisphere. The ecotron will facilitate completely new opportunities with respect to integration of ecological and biophysical research that will form the fundament for resource management strategies under a changing climate. SKP is owned by the three partner institutions at Campus Ås, and the research activity of a number of groups at the campus and from other institutions and the industry depend on modern controlled climate facilities. The SKP facilities are 15-40 yrs old, technically not up to date, and donot provide state of the art dynamic control of climatic factors needed for modern biological research. Since SKP is organized as a service centre with dedicated technical and administrative staff and is a separate budget unit at UMB, it is most efficient to upgrade and develop the new ecotron infrastructure as part of the existing organization at Campus Ås.

2. Short description of the research infrastructure

Needs with respect to scientific challenges

Climate change is a priority research area for agricultural and natural ecosystems in terms of:

1) Impacts: How will plants respond to the combination of multiple stressors brought about by climate changes? How will movement of contaminants in soils be affected by changing winter hydrology?
2) Feedbacks: How are greenhouse gas emissions from terrestrial ecosystems going to respond to climate changes? Are we really heading towards a soil-carbon time bomb?
3) Adaptation: Will the new crop varieties be adapted to the changing conditions? How to utilize longer growth seasons for increased biomass production?
4) Mitigation: Are the technological measures that we now consider going to be efficient under the new conditions? (e.g. effects of raising water-table levels on GHG emissions from cultivated peat-soils?)

These questions are central to many research activities in Norway, and especially at Campus Ås: UMB, Bioforsk and Skog og Landskap. The classical phytotrons are not sufficiently technologically advanced to serve the needs of modern climate-change research. Answering these questions requires an advanced ecotron (controlled ecosystem research facility) because:

1) There is an absolute need to simulate changes in selected environmental stressors while maintaining other environmental factors constant, e.g. simulations of complete growth seasons and winters including snow cover in order to study the effect of climate change on cold climate ecosystems. Only an ecotron can do this.

2) There is a need to test/simulate potential impacts and advanced mitigation techniques so that we can screen the most relevant elements for potential long-term *in situ* studies. For example, the ecotron will let us simulate (and provide unique measurement opportunities) and derive budgets (GHG, C, N, H2O) on entire systems, mimicking an entire field experimental station.

Tentative description

The advanced BIOKLIMA infrastructures will consist of an ensemble of controlled environmental units with associated permanent research equipment for measurements and labelling. These facilites will be unique in their ability to combine multiple factors and stressors associated with the expected climate changes. Controlled air and soil conditions will allow us to simulate changes in: 1) relative humidity, 2) air temperature, 3) atmospheric CO2 concentration, 4) light quality and duration (seasonal effects), 5) wind speed 6) snow cover, 7) soil temperature profile, including freezing and thawing cycles, 8) soil water regime (including drainage). The exact design of one or several complementary types of chambers (i.e. ecotron units) is a major objective of the present proposal. Permanent research equipment will likely include: automated phenology monitoring, advanced soil water measurement systems and continuous GHG (CO_2, CH_4 and N_2O) measurement systems. Stable isotope labelling will be implemented, together with advanced methods for measuring isotopic ratios in the greenhouse gases (e.g. tunable diode lazer spectrometers for 12/13C). Ecotron units will be designed as a research instrument, where samples can be brought in for measurement. Typical target samples will be monoliths previously equilibrated *in situ*. However, versatility will be important criteria, so that different kinds of plant-soil samples can be brought in for short time labelling and measurement when justified by projects.

BIOKLIMA also involves upgrading and modernization of the existing SKP phytotron facilities, and integration with the Ecotron, to serve a large research community on Campus Ås as well as research groups and industry outside the campus. Disciplines that depend on advanced BIOKLIMA research infrastructures include plant biology, soil science, biogeochemistry, eco-physiology, agronomy, food science, forestry, hydrology, and eco-toxicology. Current multidisciplinary research projects integrating these disciplines like bio-energy research, forest production research and research focused on plant cell walls for food, feed, energy, waste management and material technology also depend heavily on these infrastructures. Plant pathology, entomology, weed science and GMO research depend fully on contained environments provided by BIOKLIMA for estimation of risk and monitoring of plant health in natural environment and agro-ecosystems including forestry in a changing climate and globalized market.

3. Short description of collaboration and the national character

There is no facility for advanced simulations of winter climate in controlled environments in Norway, and the proposed BIOKLIMA will therefore be a unique national large-scale infrastructure, built and operated by the three institutions at Campus Ås. The legal and financial structure will be developed and settled during the pre-project phase. Recently it was estimated that about 160 scientists from these three institutions need advanced climate research facilities in their research. Research institutions currently using SKP are UMB (several departments), Bioforsk, Skog og Landskap, NTNU, UiB, UiT, Nofima, and Bioparken Ås. In addition industries like Nycomed-Alpharma, Norway Seafoods, Animalia and Graminor, and green house, transport, food, and forestry industries are users. Use of the ecotron will be particularly encouraged for scientists wanting to bring samples from *in situ* ecosystem experiments of the ICOS (and ANAEE) ESFRI stations of the Nordic countries. Research groups in Scandinavia, Canada, Northern USA, Eastern Europe, Russia and Northern China are interested in the facility we are planning, and will be invited to join this initiative. Links to the civil-engineering focused cold climate lab in Narvik (NORUT) and SINTEF, the Arctic lab on Svalbard, Risø lab (DTU), Denmark, and other international centres will be invited. BIOKLIMA will be promoted as a Norwegian contribution to ANAEE (Analysis and Experimentation on Ecosystems) (www.anaee.com/anaee), an EU FP7 design study aiming at ESFRI status. A European network of advanced ecotrons is a central component of ANAEE. If established, the infrastructure outlined here will attract international collaborators and expand our participation in national as well as international research collaborations.

Bioenergy Innovation Laboratories (BIL) – Prosjektskisse

1. General information

Name of the research infrastructure: Bioenergy Innovation Laboratories
Scientific discipline: Renewable energy
Host institution: UMB
Partners: SINTEF Energiforskning, NTNU, Insitutt for skog og landskap, Bioforsk
Total cost: 60 mill. NOK, annual operating costs will be covered by running projects.

Renovation necessary for installation of new experimental setups:	1+1 mill. NOK
Investments connected to new experimental setups:	58 mill. NOK
Total:	**60 mill. NOK**

Time-plan: A laboratory renovation period of one year. Two years of design and implementation of the new experimental setups from the onset of the project followed by a period with function testing and optimisation lasting for one year, i.e. three years in total.
Research infrastructure category: Large-scale research infrastructure; *Type of project:* Full project
Research infrastructure localization: Distributed research infrastructure (Ås and Trondheim)
Type of research infrastructure: Upgrade and expansion of existing research infrastructure
Type of research facility: National facility, linked to FME Bioenergy Innovation Centre (CenBio)

2. The research infrastructure

Vision: *The Bioenergy Innovation Laboratories will aid Norwegian industry in the development of environmentally friendly and highly efficient technology and methods for bioenergy conversion and biomass characterization and quality control, designed for the Norwegian and international market.*

The Bioenergy Innovation Laboratories (BIL) responds directly to the call and Norway's future strategic priorities within the ***"Energy and Environmental sector"*** as stated in "St.meld.nr.20 - Vilje til forskning". The laboratory is connected to the FME Bioenergy Innovation Centre (CenBio), hosted by UMB and lead by SINTEF. It takes into account the ***international aspects, fundamental research*** (with emphasis on quality and scientific subjects) and ***research based innovation***. BIL will contribute to bringing Norway to an internationally leading position within fundamental and applied bioenergy research, through extensive national and international collaboration with leading research groups and through training of highly qualified graduate students, PhDs and researchers.

The research activity will cover the whole bioenergy value chain from biomass supply to energy production. The new research infrastructures at the two campuses in Ås and Trondheim will complement each other. Due to practical operation and special needs in student courses, some equipment for chemical analyses will be located on both campuses. These new experimental facilities will offer unique possibilities for Norwegian industry to perform applied research based innovation with a great extent of flexibility in order to be able to handle all important experimental parameters. They will also attract researchers from leading research communities around the world.

Ås

Different types of biomass for the use in energy conversion processes exhibit large variations in characteristics. The laboratory set ups will be designed for characterization of, and processing and conversion experiments with, biomass from forest, agriculture and municipalities (sewage sludge, black water, and organic fraction of household and industrial waste).

- Lab. scale pellet production line and equipment for tests according to internat. standards. 4 MNOK
- Pilot scale infrastructure for the handling of biomass wastes. 2 MNOK
- Expansion of pilot-scale reactor setup for steam treatment and steam explosion. 2 MNOK
- Complete laboratory for anaerobic microbial conversion of biomass to biogas. Instruments for analysis of raw materials and products: BOD, GC, flow meters, pumps, samplers. 5 MNOK
- Laboratory scale microwave assisted pyrolysis reactor and a unit for conversion of biomass and environmentally challenging wastes in high-temperature catalytic molten salts. 5 MNOK

Ås 20. februar 2009

- Laboratory small-scale combustion chambers with extended possibilities for process monitoring and control. 1.5 MNOK
- Reactors for enzymatic saccharification of biomass for increased biogas yield; tailor-made enzyme reactors for running at ultrahigh dry matter contents; fermentors for in situ enzyme production e.g. with wood-degrading fungi; ultrafiltration equipment to separate reaction mixtures. 3.5 MNOK
- Infrastructure for rapid and detailed chemical analysis of raw materials and process products, from lignin and carbohydrate analysis to analysis of end products (gas, liquids, solids and heat): HPLC, water tolerant GC and gas detectors, as well as auto samplers. High grade of automation and remote control and monitoring will be implemented. 6 MNOK

Trondheim

The infrastructure will be connected to the design and erection of advanced experimental setups, with dedicated advanced measurement instruments. These setups are connected to fundamental and applied thermochemical conversion processes, i.e. combustion, gasification and pyrolysis. The setups will enable detailed studies on fuels and fuel mixtures, including additives, with respect to emissions, emission precursors and aspect related to sintering, slagging, fouling and corrosion; detailed studies on pyrolysis for bio-oil or charcoal production, or as a fuel pretreatment (e.g. torrefaction); detailed studies on the influence of fuel and fuel mixture characteristics combined with process parameters with respect to producer gas quality, for subsequent utilisation for heat- and power production.

- Flexible and advanced moving grate multi-fuel reactor. 4 MNOK
- Flexible and advanced pyrolysis/gasification reactor. 4.5 MNOK
- Particle and gas analysis equipment connected to the existing and new advanced experimental setups: LPI, advanced MS, GC, FTIR, multi-species conventional analyzers: 5 MNOK
- Fuel and ash characterization laboratory upgrade/expansion connected to the existing and new advanced experimental setups, with analysis equipment: deposit probes, plasma-ashing, pressurised digester, ICP-MS, elemental analyser, high heating rate TGA. 6 MNOK
- Deposits analysis equipment: SEM, XRD. 9.5 MNOK

Bioenergy is of national interest, with a national goal of doubling the bioenergy use in Norway within 2020. This demands a substantial research effort, on a high international level. The proposed research infrastructure will be unique for Norway, and will constitute state-of-the-art scientific services also needed by the industry partners in CenBio and other industrial projects.

3. Collaboration and the national character

The users of BIL will be researchers, master and PhD students as well as visiting researchers from Norway and abroad. Visiting researchers will be encouraged to come to BIL through the FME Bioenergy Innovation Centre (CenBio) and bi- and multi lateral programmes and other exchange programmes. Estimated there will be 6-8 PhD and researchers visiting annually. In addition 20-25 researchers at SINTEF, NTNU, Bioforsk, NFLI and UMB as well as about 10 project/master students annually will be enjoying the facilities of BIL.

BIL will be available for Norwegian industry either through projects directly funded by industry or through national or international research programmes co-funded by industry and the Research Council of Norway and the European Commission.

The institutions behind the proposal have a long experience and an extensive track record in the conversion of biomass and waste to heat, power and biogas. Collaboration will be made with other universities and research institutes within Norway and internationally, and within CenBio.

The location of BIL will be at Campus Ås (in two dedicated buildings) and in the thermal part of the joint laboratories of SINTEF Energy Research and NTNU Department of Energy and Process Engineering. The laboratories will need renovation in order to facilitate new and highly innovative experimental facilities. The available spacing and long term experienced personnel in the laboratories make these combined laboratories a perfect location for BIL. No other laboratories will have the same possibilities when taking into account the location (at Campus Ås where UMB, Bioforsk and NFLI are located; and at Gløshaugen where SINTEF and NTNU are located) and the already existing infrastructure on which BIL will build upon and take advantage of.

Research Council of Norway – Research Infrastructure
Call for proposals with deadline 22 April 2009
Deadline for submission of project outline 20 February 2009

APPLICATION FOR NATIONAL PILOT PLANT FOR FOOD AND FEED;
A PRE-PROJECT

1. General information – why a new pilot-plant at Campus-Ås?

Campus-Ås needs a new common pilot plant dedicated to the advancement of knowledge and research in specific commodity and general discipline within the food- and feed area. Regarding the forthcoming fusion between UMB and NVH/VI, the new facilities have to be able to handle foodborne pathogenes, tracability and HACCP principles. The new pilot plant facilities are important regarding strengthen and developing Campus Ås to an international center of academic competance within strategical and priority areas. The existing facilities are out of date and unsuitable to meet future challenges.

Category:	Large Scale Research Infrastructure
Total cost of pre-project:	Two millions NOK during 2 years
Time schedule of the pre-project :	Two years – 2010 and 2011

2. Short description of the research infrastructure

- The new facilities will be planned as a common multidisciplinary meeting arena between professional knowledge and questions of research where all the participants at Campus are integrated; UMB, NVH/VI, NOFIMA, BIOFORSK, including partners and external co-partners.
- Innovative tasks for the new pilot plant facilities will be; teaching, research, testing/commision and post-qualifying education.
- New pilot plant facilities will be designed in a way so that teaching, research, testing/commision and post-qualifying education are supported within; engineering/processing, veterinary diciplines, food and health, feed, packaging, biomass utilation of waste- and environmental ”products”, interdisciplinary synergy effects within projects concerning processing, health, nutrition, food safety etc.
  This suppose a new pilot plant equipped with an engineer work shop regarding assembling/deassembling and construction/welding of different equipment and adjustments. Facilities for test-productions and demonstrations (test-kitchen/sensoric tests/laboratory/canteen) with realistic production utilities in smaller scale, are assumed to be included in the new facilities.
- A new pilot plant will be used actively to meet the demands from both industry and consumers regarding testing of new- and better processes/products from raw materials, via recipes and effective production inclusive packaging, washing and waste handeling/utilizing.
- We are informed by relevant industries that they are interested to establish either some part of-, or their whole FoU- departements together with us in new pilot plant facilities at Campus-Ås. All involved industries and related branches pin-point the importance of such a common localisation of research, education and industry tasks. It can become a major force in the

scientific collaboration in Norway and of great benefit for consumers, industry, research and education.

2.1 Organisation and operation of a new common Pilot-plant
- Organisation as an independent and coordinating unit for the whole Campus, including partners.
- External partners will be included in the operation of the plant through long-term agreements.

2.2 Design of the new common pilot plant

- Modern and hygienic design is mandatory.It must fullfill national and international legislation for slaughtering, food/nutrition manufacturing and handling regarding building and equipments.This includes the barriers between different parts of the area, the walls and floor construction, drains, ventilation etc.The pilot-plant should be able to handle research also with pathogenes and toxic products.
- 3 main areas in each compartment/section:
    - Areas for storing and treatment of raw materials.
    - Areas for processing and production/monitoring and control.
    - Areas for packaging and storing of end-products.
- For included laboratories in the plant, the standard for building and equipment will vary according to the dedication (there are, for example, special rules concerning work with pathogens and toxic substances). Common areas should include rooms for meetings, groups, demonstrations and for the employees.
- Logistic and support, as water, steam, electricity, compressed air etc.should be planned according to the need/demand of external users.

3. Short description of collaboration and the national character
This is an application between collaborating Institutions and Institutes at the national level from: *Department of Chemistry, Biotechnology and Food Science (IKBM), Department of Animal and Aquaculture Science (IHA), Department of Plant and Environmental Science(IPM), Department of Economic and Resource management (IØR), all at University of Life Sciences (UMB), BIOFORSK, Department of Pharmacy (IFA), University of Tromsø (UiT), associating partners at the Norwegian School of Veterinary Science (NVH), The Veterinary Institute (VI), University of Oslo, NOFIMA and Industrial Partners.*

- For further planning of such a central pilot-plant it is of great importance to establish a comitting cooperation between excisting and future partners, net-works and user-groups. It is also of importance to include food- and feed industry, authorities regarding relevant legislation and funding and the research council. The work is proposed to be formalized as a project coordinated and charged by professional actor (Statsbygg) linked to a steering commitee of persons with responsability and authority on a level as high as possible representing the different participating groups.
- This pre-project is supposed to be integrated in the on-going fusion process between NVH/VI/UMB which passed The Norwegian Parlament in 2008.

References:
1. ”Framtidig pilotanlegg ved UMB”, note of 2008-03-04.

Senter for husdyrforsøk – nasjonal utviklingsaktør for norsk husdyrhold

Søker: Nils Dugstad, UMB

Forprosjekt: NOK 1 mill
Prosjekt: NOK 35 mill

Bakgrunn:

Senter for husdyrforsøk (SHF) ble etablert i 1994 og drives i dag som et senter eid av Universitet for miljø- og biovitenskap (UMB) og Norges veterinærhøyskole (NVH). Senteret skal være et nasjonalt senter med kompetanse på høyt internasjonalt nivå for gjennomføring av forskning som kan fornye kunnskapsgrunnlaget innen husdyrproduksjon og fôrteknologi. Senteret rommer storfe, småfe, gris, hest, fjørfe og pelsdyr. SHF har 34 medarbeider og for 2009 et budsjett på ca 23 mill kroner. NVH og UMB bruker senteret aktivt i sin forskning og undervisning. Omsetningen fra fakturerte tjenester er fordoblet i løpet av de siste 6 år.

I løpet av de siste 20 år har øvrige fasiliteter for husdyrforsøk i Norge både i offentlig og privat regi blitt nedbygd, bortsett fra NVH sin spesialenhet for forskning på småfe i Rogaland. SHF på Ås vil være det nasjonale forskningssenteret for husdyr i overskuelig framtid.

Ved Senter for husdyrforsøk gjennomføres forskning på dyrevelferd, produksjon, ytelse, fôringsspørsmål, etisk og effektiv produksjon av husdyr. Økologisk produksjon, energiutnytting på gården, miljø- og klimaspørsmål ved husdyrproduksjon og arealutnytting er eksempler på andre viktige forskningsområder.

Framtidsrettet forskning og undervisning krever moderne fasiliteter i tillegg til kompetente medarbeidere. Senteret har ikke mulighet for å investere i moderne utforming, utstyr og verktøy (fysiske og elektroniske) innenfor dagens budsjetter og er avhengig av eksterne midler til oppgradering av infrastruktur for å videreføre sin rolle som nasjonalt senter for anvendt forskning og fôrteknologi.

Arbeidet med finansiering av nødvendige investeringer går langs to linjer:

- mot næringslivet for å realisere tidsmessige bygg og produksjonsmiljøer
- mot Norges forskningsråd for å finansiere framtidsrettet vitenskapelig utstyr

Kort beskrivelse av forskningsutstyret:

Forskningsutstyret ved senteret består av spesialinnredninger (fysiske og elektroniske) for registrering av husdyrdata og eksperimentelle data knyttet til fôrprosessering. Med den teknologiske utviklingen som har skjedd (melkeroboter, økologisk drift, sporbarhet og dokumentasjon osv) må forskningsredskapene fornyes og tilpasses, blant annet gjennom digitalisering og fjernmåling. Dette vil være essensielt for at "det nye universitetet" på Ås skal gjennomføre husdyrforskning og gi forskningsbasert utdanning som kan bidra til å videreutvikle en bærekraftig og framtidsrettet næring.

Kort beskrivelse av forprosjektet:

UMB og NVH ønsker både å utvikle Senteret for husdyrforsøk som et moderne senter for produksjonsrettet og for grunnleggende husdyrforskning. Forprosjektet skal:

- levere søknadsdokumenter til finansiering av vitenskapelig utstyr for "Nytt senter for husdyrforsøk" til Forskningsrådets neste AVIT-frist.
- klargjøre og forplikte primærnæringens og industriens deltakelse i fornying av bygningsmessig infrastruktur av forsøkssenteret.

Senteret er dermed et forskningsinstrument som sammen med den forskningsinfrastrukturen som universitetet for øvrig og sektorforskningsinstituttene besitter, vil bringe "nye" Campus Ås til å være det nasjonale senteret for forskning på hele verdikjeden for matproduksjon.

Samarbeidspartnere:

NVH

Core Instrumentation for Research on Greenhouse Gas Emission from Ecosystems (CIGGE)
Applicants: Lars Bakken (IPM) and Åsa Frostegård (IKBM)

Category "Avansert Vitenskapelig Utstyr"; disciplines: biology, environmental sciences. Total cost: 9 millions NOK, Time-plan: 3 years. Host institution: Norwegian University of Life Sciences (UMB), responsible group: **UMB Nitrogen Group** (**UMBNG**), web site: **http://www.umb.no/nitrogengroup/**. Collaborating groups in consortium for drone development: SINTEF IKT (KH Haugholt), Bioforsk (A Korsæth), NILU (Terje Krognes).

The research infrastructure consists of three components:1) upgrading of instruments for molecular studies of ecology and regulatory biology 2)upgrading of process-laboratory for trace gas / phenotype studies 3) new robotized instrument for spatially resolved field flux measurements (DRONES).

The research facility will be a national facility. By virtue, **UMBNG** is already a national "core group" for research on greenhouse gas emissions as well as for the study of ecology and regulatory biology of the prokaryotes involved. The novel instrumentation (drones) as an integral part of more comprehensive and fundamental research will enhance the impact and relevance of all the activities, and strengthen our capacity to support other groups in Norway.

UMBNG has established a network for collaborative research with four leading research groups in China where one of the tasks is to build three copies of the incubation robot developed at UMB (to be placed in China). An extensive international network in Europe and US is established, which will be used to launch systems biology approaches on denitrification in the future (SYSMO).

Short description of the research infrastructure
By combining genomics and transcriptomics with refinement of the phenotype characterizations, UMBNG has achieved great progress in understanding the ecology and regulatory biology of denitrification, which is a clue to predict N_2O emissions to the atmosphere. A unique robotized incubation system has been constructed, providing rich phenotype data with high throughput compared to conventional techniques. These studies hold the potential to design strategies to reduce the emissions of N_2O to the atmosphere (= mitigations). Verification of such mitigations requires extensive spatially resolved trace gas flux measurements which is difficult to achieve with state of the art flux technologies (soil cover methods are labour intensive, micrometeorological methods lack spatial resolution). The proposed **flux drones** will break new ground on this arena, allowing fully automated spatially resolved (at meter scale) flux measurements. The drones will be based on an existing platform; a vehicle with programmable movements in the landscape (GPS-controlled), constructed by the Norwegian Engineering company ADIGO, which will operate fast responding instruments (FTIR and/or TDL) to achieve fast measurements of fluxes within mobile soil covers.

UMBNG needs an extensive upgrading of the laboratory equipment for phenotype studies and the molecular laboratory; old basic instruments need upgrading and new basic instruments are desperately needed to increase the capacity of a rapidly growing group and to serve others. This is why we apply for a package consisting of three components:

a. Upgrading of the molecular laboratory: 1.5 million NOK
- Real-time PCR, Gel Doc, DGGE DCode, Western blot equipment, FastPrep Homogenizer, basic equipment including centrifuge, and incubators and continuous culturing devices.

b. Upgrading of the process lab: 1.1 million NOK

- new incubation robot with H_2-detector, glovebox, analytic instruments (for NOx in liquid)

c. Deveolpment of field DRONE 6.4 millions NOK

- Drone platforms (3 units), GPS, software and development costs for drones (ADIGO 4 mill NOK), FTIR instruments, developments and implementation (SINTEF 1.2 mill NOK), TDL-cavity ringdown instruments, adaptation, implementation (NILU, 1.2 mill NOK).

Personell for running the molecular and process lab at UMB will be staff members at IKBM and IPM. Running costs will be covered by projects (three new NFR projects at IPM/IKBM are funded for 2009-2011/12, and more are in the pipeline). SINTEF IKT has already invested own funding (1.5 mill NOK) in development of their FTIR instrument for field drone applications.

Impact on national research and innovation

UMBNG holds a unique position on a national level regarding studies of gas kinetics and advanced molecular biology (transcriptomics, genomics and PLFA) in soils, sediments, and aquatic environments. The group serves as a national resource by collaborative research with others who hold complementary expertise at UMB (J Mulder and Å Almås at IPM, M Ohlsson at INA, B Sitaula at NORAGRIC) and elsewhere. UiO (D Hessen) has co-financed the construction of a second gas analysis robot in our lab, in use for limnological trace gas studies. The same system will be used for analyses of tracer(CF6)-based CH_4 emissions from ruminants in collaboration with IHA at UMB (OM Harstad's group). Further, our group supports several Bioforsk projects (nanoparticle toxicology: E Joner; trace gas flux measurements: Hansen and Linjordet, Rasse, French, Sørheim,). We have also worked with the Norwegian waste water industry (VEAS) to characterize microbial community structure and product stoichiometry of their nitrification reactor.

In short, UMBNG has already proved its potential as a collaborative partner with a special expertise regarding matrix (soils, sediments, biofilms), extraction and analytic techniques (PLFA, genomics, transcriptomics), and trace gas kinetics (NO, N_2O, CH_4, CO_2). Our intention is to continue along this collaborative avenue, and the current instrument package will improve our potential. The planned field flux DRONEs will greatly enhance studies of trace gas fluxes between soils and atmosphere on a national scale, and will strengthen the collaboration between industry (ADIGO), relevant industrial research (SINTEF) and air research (NILU).

Relevance to the call

Investigations of greenhouse gas emissions is highly prioritized nationally. The construction of field flux drones opens for a new era in the research on trace gases in the environment. The project meets requirements for national division of labour in science: UMBNG serves others, the complementary expertise of NILU, SINTEF, Bioforsk and UMB forms a consortium for drone development in collaboration with an industrial partner (ADIGO). UMBNG collaborates with Yara, which is a Norwegian world leading fertilizer produces, and with TINE (via IHA, UMB) which is a nationally leading food industry. The field flux drones will be applicable in practical field trials in collaboration with Bioforsk and farmers' R&D organizations.

Collaboration and the national character

The nature of this research demands considerable expertise in planning experiments, sampling, analytical techniques and interpretation of data. Thus, in most cases the analyses are not suitably "sold" as a commodity, but conducted in collaborative research (as is the current practice of UMBNG). The field flux drones will be available for use by other research groups on a collaborative basis (campaigns), one of the drones will be permanently placed at Bioforsk for use in their field experiments.

Project outline – Research Infrastructure 2009. C.Rolstad, IMT, UMB

General information

Name/title of the research infrastructure:

Observatory of tidewater-glacier dynamics, Ny-Ålesund, Svalbard.

Scientific discipline: Glaciology/Geomatics/Radar Technology/Geodesy.

*Host institution(s):*Inst.of Mathematical Sciences and Technology, UMB, Norwegian Polar Institute, Norwegian Mapping and Cadastre Authority, and Univ. of Oslo.

Total cost and time-plan: 3,9 mill N.kr,- , 3 years.

	Equipment costs	Establishment/improvements/maintenance
ISPAS radar	1 900 000,- N. kr	300 000,- N. kr. per year for 3 years
Scintrex CG-5 gravimeter	800 000,- N. kr	100 000,- N. kr. per year for 3 years

Research infrastructure category :Advanced Scientific equipment, 'Energi og miljø, overvåkning av klimaendringer.'

The proposal will apply for a full project. The research infrastructure is localized, however, the data will be made electronically accessible for the national and international research community through the Internet. The proposal concerns the establishment of new research infrastructure, and it is a national facility, applying Svalbard as a research platform.

Research Infrastructure

The objective of this project is to establish an 'Observatory of tidewater-glacier dynamics in Ny-Ålesund'. The reason for this is that a reduction in grounded ice volume of glaciers and ice sheets may, on a longer time scale, have a direct influence on both the climate and on the global sea level. Injecting cold fresh water from glaciers and ice sheets into the Artcic ocean has the power to reduce the thermohaline ocean circulation (Knies and others, 2007). The global sea level is affected by melt of grounded ice, and thermal expansion of the oceans (IPCC, 2007). However, projections of sea level rise for the next century has large uncertainties, in particular from glaciers and ice sheets (IPCC, 2007). Cold freshwater is produced from melting of glacier and ice sheets, but *increasingly more importantly from enhanced ice flow and calving of ice bergs* (Shepherd and Wingham, 2007, Rignot and Kanagaratnam, 2006). Observations in the period from 1850 to 2006 of the fastest moving outlet glacier in Greenland, Jakobshavn glacier, draining 6.5 % of the ice sheet area, show a doubling of the ice flow from land to ocean, with a rapid increase since 2001. A recent paper in Nature Geoscience (Nick and others, 2009) points out that the dynamics of tidewater glaciers are controlled by the processes at the terminus. The main limitation of the existing climate/glacier models used to estimate the future potential decrease in grounded ice volume is that they do not take into account any future rapid dynamical changes in ice flow. When modeling future ice volumes, Nick and others emphasize the importance of understanding particularly the processes that occur at the calving front, which is the focus of this proposed observatory.

Due to the very limited data set of annual series from all calving fronts, knowledge of calving controls is not complete. Measuring on a calving front is challenging for the current technologies, which are GPS and remote sensing, and also dangerous (Kohler 2009), thus remote sensing methods are preferred. The calving rate is controlled by the ice flux of the drainage basin, and of possible other controls such as presence of sea ice cover, ocean temperature, bathymetry and glacier bed topography, and sun exposure. These controls will now be determined through the proposed observatory through monitoring, which will be conducted continuously over several years.

The positions of Kronebreen and Conwaybreen calving fronts (Fig. 1, left) are unique in a global perspective, in the sense that they offer direct views from the Norwegian Polar Instiute (NPI) Sverdrup research station, which is manned on yearly basis. We propose extensive monitoring of the dynamical processes that occur at the two calving fronts of Kronebreen, which is the fastest tidewater glacier in Svalbard, draining it's second largest drainage basin, and the calving front of Conwaybreen. In the NPI research station, in a safe distance to the glaciers, a high frequent ground based interferometric radar will be deployed to

continuously monitor accurate calving front velocities at a high temporal rate, and to identify calving events and depths of the calving blocks. Preliminary studies conducted in August 2007 (Fig. 2, middle and right panel) and 2008 shows that this radar has a great potential for monitoring the calving dynamics (Rolstad & Norlands, 2009). Acoustic measurements will be conducted at Kronebreen southern calving front as an additional method to time calving events, and NPI will deploy a time lapse camera and an automatic weather station.

Ground based gravimeters are proposed as a tool for making constraints on the observed mass changes of the glaciers. The gravity signal consists of two components, i.e. the Newtonian attraction from glacial snow and ice, and the elastic response of the Earth due to mass changes on glaciers in the region. Today, ground based gravimeters measure gravity with an accuracy 2-10 $\cdot$ 10^{-8} m/s^2. This allows monitoring of annual and long time gravity signals due to changes in the Earth's cryosphere. A Scintrex CG-5 relative gravimeter will be used to observe a gravity network twice a year near Kronebreen glacier. Study sites consisting of steel markers in bedrock or small concrete platforms will be established. GPS will be used to monitor geometrical (horisontal and vertical) deformations of the network. Gravity time series for the network is calculated by connecting the relative gravity measurements to absolute gravity observations conducted at the geodetic observatory near Ny-Ålesund air-port. The Norwegian Mapping and Cadastre Authority also operates a super conducting gravimeter which continuously monitors the gravity field, and provides information on seasonal gravity changes in the area, which must be understood to isolate ice mass change signals in the relative observations.

Our objectives are to build time long series that will be coupled with the following additional methods: passive seismic monitoring, GPS for uplift rates and glacier velocity, optical satellite remote sensing for monthly average glacier velocities, terrestrial photogrammetry, visual observations of the calving fronts, NPIs conventional mass balance measurements of the Kronebreen drainage basin, satellite based gravity for measuring ice mass changes, and numerical modeling of the ice dynamics.

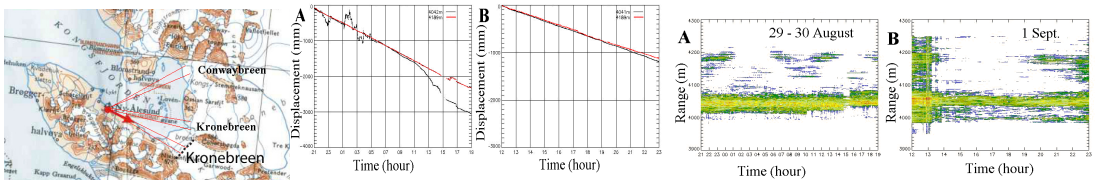

Figure 1: Left: Map showing the proposed position of the radar in Ny-Ålesund, with beams towards two calving fronts of Kronebreen, and Conwaybreen calving front. Middle and right: Test measurements conducted in 2007 of Kronebreen calving front (Rolstad and Norland, 2009), middle: tracked velocities, right: amplitude of returned radar signal.

Collaboration and the national character

The radar equipment will be mounted in the NPI Sverdrup research station in Ny-Ålesund. NPI will maintain the radar after the initial the 3-year project period proposed here. NPI will provide conventional mass balance data, automatic weather station data and web camera monitoring of Kronebreen. The gravimeter will be owned by UMB, and operated by UMB and NPI during annual mass balance measurements. The Norwegian Mapping and Cadastre Authority contributes with gravity and GPS measurments. The Inst. of Geoscience, Univ. of Oslo, will contribute with remote sensing and seismic.

The deployment of the radar will be sub-contracted to the company ISPAS as, which has participated on two test campaigns in Ny-Ålesund, in 2007 and 2008, and deployed a similar permanent radar in Western Norway, for rock slide monitoring (Norland, 2006).

Data series will be available through the Internet for national and international researchers. The infrastructure is unique, both national and international, offering a completely new data set to the international glaciological community. The project is a continuation of activities in the NFR IPY project Glaciodyn, which has several international contacts. In addition Prof. Murray and Dr. Luckman, Glaciology group, Swansea University, UK, will be involved through satellite remote sensing activities on Kronebreen, and Dr. Hamilton, Climate Change Institute, Maine University, USA, through calving investigations in Greenland. Norwegian competence on gravity, and radar for monitoring for Geohazards (rockslides, landslides and glacier calving) will also be further strengthened.

Flow field fractionation (FFF) - High Resolution Inductively Coupled Plasma Spectrometer (HR-ICP-MS) system for variable molecular mass characterization

Applicant: Norwegian University of Life Sciences (UMB), Department of Plant and Environmental Sciences (IPM), Environmental Chemistry Section.

General information

Equipment highly needed: a new innovative separation instrumentation for the characterisation of low to high molecular mass compounds at low concentration levels. FFF is an advanced technology for the separation of proteins, polymers and nanoparticles/colloids in the range 1 nm to 100 µm in aqueous and organic solvents, and coupled to high performance HR-ICP-MS, the system represents state-of-the art technology with high resolution and low detection limits. HR-ICP-MS is the most powerful technique for the quantification of trace elements, long lived radionuclides and isotope ratios in both solid and liquid samples, allowing the separation of molecular masses in the whole range of the periodic system. The FFF-HR-ICP-MS system will complement existing facilities at IPM/UMB: ICP-OES, ICP-MS, and IR-MS, where sample digestion in a closed system (UltraCLAVE) and use of ultra pure acid (duoPUR) secure low detection limits. Furthermore, existing HPLC system will also be connected to the new device. With the growing need for information on a series of essential/toxic elements and their compounds in the environment within international research, the development of low level multi-elemental methods for a wide range of sample matrices is essential if Norway will play a role within international environmental science.

The equipment will be unique in Norway, and will serve a series of collaborating institutions at the Campus Ås, as well as nationally and internationally (see below). The proposed equipment will be used both within MSc and PhD education (lab. courses in analytical chemistry/Research School) and as an analytical research tool particularly within environmental science, bio-production (plant sciences, domestic animal sciences) and in aquaculture/wild salmon research under the suggested NVH-UMB-VI AquaLife Research Platform. The FFF-HR-ICP-MS system should also be essential to projects associated with other suggested NVH-UMB-VI Research Platforms and should provide excellent possibilities for joint future projects at Campus Ås, in Norway and internationally.

The application is directed towards the NFR program INFRASTRUKTUR on Advanced scientific equipment (April 22nd 2009). The total cost of the equipment is about 7.2 mill NOK including the equipment, necessary introduction systems (for sample handling and speciation), installation, training and service. Budget breakdown will be given in the full application. The equipment should be fully up and running within one year after start of project:

Start of project	August 2009	Delivery and Installation equipment	January 2010
Contract negotiations	September–November 09	Testing, courses and successful running	January–August 2010
Building clean room	September–December 09	Final Report	August 2010

Room facility is available at IPM and a skilled chief engineer will take the responsibility for the daily maintenance, and will give the necessary training to make the instrument accessible to MSc/PhD students, staff and visiting scientists.

Short description of the research infrastructure

The FFF-HR-ICP-MS will be a key instrument within the different research groups at IPM. Combining competence within different research areas, available techniques and instrumentation, IPM represents a centre for modern analytical/environmental chemistry with tasks associated with a series of national and international research areas (eg. EU, NATO, IAEA). Research focussing on environmental colloidal inorganic and radioactive species has been of key importance for this research group over the past 20 years, and is one of its kind in Norway and also internationally. Our competence in analytical chemistry and environmental chemistry has previously been international evaluated: *"This type of comprehensive approach should be encouraged"* (NFR 1998). According to the present NFR International Evaluation in Chemistry Science in Norway (to be published February 09), the Environmental Chemistry group at IPM has "*maintained an important position in Norway as the centre for environmental radioactivity research...*" The work of the group is described and "*excessive work*

load has developed in part as a consequence of the success of the group in establishing this small centre of excellence." Thus, the grading excellence was given for scientific merit, relevance and international network. They also state the following: "*The need to upgrade instrumentation and general laboratory facilities for the group, which are not adequate, and below standard expected of a high quality research group, is clear. The overall upgrading of facilities…is therefore a high priority given the unique status of this research group for National capability in environmental radioactivity.*" This application is a following up of the recommendations given by the International Evaluation Committee, to meet the needs of international standard within analytical/environmental chemistry and environmental radioactivity. Nationally, the equipment will be unique and secure the competence this research group has within the areas 1) future colloidal/nanoparticle research, 2) isotope ratios for source identification and 3) speciation of elements/radionuclides in environmental and biological samples.

The need for HR-ICP-MS

Trace elements (essential and toxic) and radionuclides can be present in different physico-chemical forms varying in size (molecular mass) and charge properties, influencing biological uptake and biological responses/effects. The separation, characterization and quantification of species, such as metals or metal-organic compound, biomolecules and nanoparticles/colloides, separated according to molecular masses represent state-of the-art technology. The interface with HR-ICP-MS allows the detection of low-levels of trace element/radionuclide species in biomolecules (e.g. selenium-proteins) or in nanoparticles of ecotoxicological relevance and their isotopic fingerprint in biological (source identification) and geological (age determination) systems. For certain isotopes, the technique has greater sensitivity and selectivity than any other technique currently available.

Case: Based on determination of uranium-isotopes, impact from the mining (Central–Asia) could be followed far downstream the site. Based on FFF-HR-ICP-MS, further developments are expected within the three main isotope technique ares used in environmental studies: tracing, source identification and dating; were results are essential for impact and risk assessments associated with contaminated sites. **Case:** Speciation of Se-containing molecules, such as selenoproteins and selenometabolites, is crucial to understand its metabolism and importance in nutrition. Based on HR-ICP-MS, the resolution allows quantification of the Se isotope ^{80}Se (abundance of 49 %) instead of ^{82}Se (abundance of 8.7 %) used today. Chromatograms of Se-molecules in wheat flour based on ^{80}Se provide 7 distinct peaks, whereas chromatograms based on ^{82}Se are giving 3 peaks only. The identification and quantification of element/radionuclide species, metal-organic compounds, bio-molecules, and nanoparticles/colloids together with isotopic fingerprints are still challenging within environmental sciences. This application, separation/fractionation of species according to molecular mass on-line low level detection system, represents a novel combination of advanced techniques.

Short description of collaboration and the national character

The NFR International Evaluation committee in Chemistry science in Norway, expresses that the work of the Environmental Chemistry group at UMB/IPM is "*highly relevant across the spectrum of research and, in the case of environmental radioactivity, this is the leading Norwegian group and is an important national asset.*" Therefore, this new instrumentation is important to secure the work of this unique group in Norway. National network related to the instrumentation includes IPM/prof II positions (NIVA, NTNU, BIOFORSK, STAMI, NRPA), national project collaborations (e.g. FFI, Polarinstituttet, Met.no) as well as national consortium associated with aquaculture and wild salmon research (NIVA, NINA, UiB, NOFIMA). At present the Env. Chem section is heading a Nordic collaboration on ICP-MS and quality assured measurement of longlived radionuclides/isotope ratios (funded by NKS) and UMB-IPM is, to our knowledge, the only institute in Norway building competence in Se-speciation, working together with the leading research groups in biomolecular element speciation techniques in Pau, France. According to the Int. Evaluation Committee, the "excellent" international network is based on a series of research projects within international programmes (EU from 3rd to 7th FP, NKS, NATO, ISTC, Copernicus, IAEA) and includes research institutions in a series of countries, also outside Europe, e.g. all Nordic countries, UK, Irland, Spain, France, Belarus, Ukraine, Central Asia countries, USA and Canada, Turkey, etc. within the field of environmental sciences, radioecology/radioecotoxicology and bio production/food science.

Research Council of Norway – Research Infrastructure
Call for proposals with deadline 22 April 2009
Deadline for submission of project outline 20 February 2009

APPLICATION FOR INSTRUMENTATION NEEDED FOR LIPID RESEARCH:

1. General information

IKBM has identified a common platform of research. This common platform is in lipid research and the platform is foreseen to integrate food and health sciences, chemistry and cell biology at this institute. IKBM has identified some present infrastructural needs in order to become more effective in the area of lipid research.

These two urgent infrastructural needs regard

a) NMR instrumentation (NMR 500 MHz instrument equipped with advanced software) and
b) mass spectroscopic equipment : The new Agilent 7000A Triple Quadrupole GC/MS EI bundle with new injection and preprocessing systems for use with gas chromatography

Scientific discipline: Lipid Chemistry, lipidomic, Analytical Chemistry, Mass spectrometry (MS), Protein chemistry, Proteomics, Nutraceuticals, Functional food, Food Science.

Host institution: Institute of Chemistry, Biotechnology and Food Science, UMB.

Total cost: 4.2 million NOK investment during 2 years

- NMR 500 MHz instrument equipped with advanced software. Cost NOK 3 mil. Timeframe: 2009
- Additional equipment (headspace , HS) to a gas chromatography instrumentation located in Food Science Lab, IKBM
  Cost: 1.2 mill NOK mil. Timeframe: 2010

The instrument is localized; they can be regarded as upgrades as IKBM has experience using this type of instrumentation already and possess elder versions.

2. Short description of the research infrastructure

An advanced NMR instrument with the latest software of this kind is the most powerful methodologies for structural elucidation of organic molecules. This is needed for analysis of fat and fatty acids consisting of structurally of long carbon chains with up to six double bonds from new sources like Krill oil, Seal oil and "Raudåte-Oil".

The application regards the newest version from Agilent in MS-detection (7000A versus 5975). This allows for many improvements incl. improved contamination elimination. 7000A offers breakthrough in sensitivity and selectivity. The system provides better method reliability and laboratory productivity. The 7000A combines femtogram-level sensitivity and research flexibility. Also a cooled injection system (cryotrap) is applied for as this is much requested for the high water containing systems that we work with in our food lipid research.

Addition equipment for efficient pre-processing (Thermal Desorption Unit) is included as well. It is very important to have efficient analysis of flavour profiles in foods since they typically *comprise* hundreds of volatile organic compounds (VOCs) that are needed to be detected at a low level for producing products with optimal shelflife and sensory quality. The strength of such an advanced MS instrument is that this *it* is developed for flavour profiling with the lowest concentration analyte *that often has the* most profound effects on perceived aroma. Headspace GC-MS are today necessary instrumentation in food area. It is extremely important to IKBM since the Department do not have a permanent sensory panel and also because it has a strong emphasis on chemistry and metabolic mechanisms. Good facilities are necessary to become a partner in EU applications. Instrumentation, elder versions, is available in Norway. The institute (IKBM) has today several externally funded projects including EU projects where this facility is vital. A list of such projects can be provided.

These instruments will serve many of the research work of many PhD/MSc students and postdocs. It is vital to Norway to educate Master and PH D students with experience in the latest technologies. Also the industry in Norway (*e.g.* TINE) makes use of this technology and request educated people trained in the use and interpretation of modern techniques in flavour research.

~~3.~~ Short description of collaboration and the national character

National collaboration, partners, networks and user groups, how the research infrastructure will be made accessible for relevant users, the international framework and cooperation, whether the research infrastructure is nationally unique.

The activity in lipid research is a joint effort with other departments at UMB (IHA, IPM) as well as the Strategic Food Alliance at Campus Ås.

It is the aim of IKBM to establish a Lipid research center that is nationally and internationally visible. IKBM has already done some "homework" in this area. We have identified some of our internal infrastructural needs. The board of IKBM has also given economical support within the frame possible for the institute. The equipment applied for here will be an integrated part of our Lipid Research centre and will be marketed to attract as many users as possible both within IKBM, our allied research partners and the industry that we have close contact with, and also serve, through educating students.

A payment system will be established where the cost per analysis will be minimized on order to keep availability and access ability high. IKBM aim at keeping technician/personnel integrated with advanced equipment and already has such personnel allocated for HS-GC.

Together with the skill and equipment at NOFIMA FOOD the research infrastructure will be nationally unique.

Konfokalmikroskop til et senter for biofilmstudier ved UMB.

Søker: Leiv Sigve Håvarstein.

Bakgrunn:

Når bakterier vokser på overflater danner de organiserte strukturer kalt biofilm. En biofilm er et samfunn av bakterier som skiller ut ekstracellulære polymerer som ”limer” biofilmen sammen. Mikrobielle biofilmer kan bestå av noen få, eller hundrevis av ulike bakteriarter. Mange internasjonale studier har vist at dannelsen av biofilm er avhengig av såkalt quorum-sensing, dvs. kommunikasjon mellom bakterier med feromonlignede signalmolekyler. Mikrobiologimiljøet på IMBM er blant de fremste i verden på denne typen celle-celle kommunikasjon hos bakterier. Det er derfor av stor interesse å utnytte denne kunnskapen til grunnleggende studier av mekanismene som regulerer biofilmdannelse under ulike forhold.
Mikrobiell biofilm har stor praktisk betydning for ulike typer industri, samt human- og veterinærmedisin. Eksempler på dette er oljeindustrien, skipsflåten og andre typer industri som opererer med olje under trykk. Begroing i form av mikrobiell biofilm i oljeførende systemer kan tette igjen ventiler, ødelegge ulike typer hydraulisk utstyr, motorer, etc. Dette fører til store økonomiske tap. Mikrobiologer på IKBM har siden 1995 hatt samarbeid med FRAS Technology AS (http://www.fras.com/) på dette området. Næringsmiddelindustrien har lignende begroingsproblemer i sitt produksjonsutstyr, noe som forårsaker produksjonstap eller i verste fall spredning av matvarebårne patogener til forbrukeren. Opprettelsen av et senter for biofilmstudier vil derfor utvilsom være et attraktivt kompetansesenter som næringsmiddelindustrien vil søke samarbeid med. Det var også stor interesse for dette temaet på seminaret som nylig ble avholdt på Soria Moria (2-3 februar), der forskere fra UMB, NVH og VI deltok. Mikrobiologer fra de respektive institusjonene ble vi enige om å gå inn for en felles satsing på biofilm. Dette ble sett på som et godt utgangspunkt for videre samarbeid mellom NVH, UMB og VI.

Kort beskrivelse av forskningsutstyret

Siden mikrobiell biofilm representerer store utfordringer både for grunnforskningen og industrien er det viktig å samle ulike fagmiljøer i et senter som spesialiserer seg på basale og anvendte problemstillinger innen dette fagområdet. For å studere mikrobiell biofilm trengs det utstyr til å dyrke, visualisere og bestemme den fysiske strukturen til slike bakteriefilmer. Utstyr til dyrking av biofilm (flow-cells, peristaltiske pumper, etc.) vil vi finansiere selv, men søker om 2.5 millioner fra NFR til innkjøp av et konfokalmikroskop. Slike mikroskoper gjør det mulig å ta 3-dimensjonale bilder av biofilm, og dermed studere biofilmens tykkelse og struktur. Ved i tillegg å bruke forskjellige fluoriscerende

markører og/eller såkalte ”reporter genes” vil det være mulig å studere sammensetningen av biofilmen og uttrykket av ulike målgener in situ. Siden vi ønsker å studere levende bakterier er det helt essensielt at konfokalmikroskopet er tilgjengelig der biofilmen dyrkes.

Samarbeidspartnere på IKBM som støtter søknaden:

Professor Tor Lea (IKBM)
Professor Rolf Arnt Olsen (IKBM)
Professor Arne Tronsmo (IKBM)
Forsker Jon Fredrik Hanssen (IKBM)
Forsker Gro Amdam (IKBM)

Eksterne samarbeispartnere på biofilm:

FRAS Technology AS

Prof. Per Einar Granum (NVH)
1. Aman. Trine L’Abèe-Lund (NVH)
1. Aman. Lotte Arnesen (NVH)

Gro Johannesen (VI)
Berit Djønne (VI)
Duncan Colquhoun (VI)
Ida Skaar (VI)
Arne Holst-Jensen (VI)

1. General information (~ 1/2 page)

Title: Infrastructure for advancing Norwegian marine genomic research.

Applicant: Sigbjørn Lien, Assistant Director, Centre for Integrative Genetics (CIGENE), Norwegian University of Life Sciences (UMB).

CIGENE serves in the FUGE program as a national core facility responsible for detection, genotyping and interpretation of SNPs, with a particular research responsibility for agricultural and marine species. The main objectives of this application are to 1) fulfill Norway's commitments as a collaborator in the international effort to sequence the Atlantic salmon genome, 2) to establish a 3rd generation DNA sequencing technology for a) generating inexpensive whole genome SNP-arrays for Atlantic salmon, Atlantic cod and salmon lice and b) provide a service pipeline for scientific and commercial exploitation of these resources. The infrastructure will be established and made available to relevant researches and industry in Norway through the FUGE platforms; Norwegian Genotyping and Sequencing Consortium (NGSC) and the Resource and Competence platform in marine genomics GenoFisk. Internationally the work is coordinated through the Collaboration to Sequence the Atlantic Salmon Genome (ICSASG) involving researchers, funding agencies and industry from Canada, Chile and Norway.

We will apply for a full project. The total cost over 3 years will be 19 MNOK. The proposal will ask for funding from research infrastructure categories "Scientific databases and collections" (8 MNOK) and "Advanced scientific equipment" (11 MNOK). More specifically: (1) Scientific databases and collections: 8.0 M NOK is needed in Q1 2010 to fulfill Norway's stated commitments as a collaborator in the international effort to sequence the Atlantic salmon genome (Norwegian contributions conducted by the Research Council of Norway). This project will generate electronically accessible resources. (2) Advanced scientific equipment: Introduction of a 3rd generation sequencing platform into the current CIGENE infrastructure before Q1 2011. This massive sequencing technology is just emerging and current instrumentation cost estimates are 5.0 MNOK. It will be a localized resource, but generate electronically accessible resources. It provides the necessary hardware foundation for setting up the following infrastructure: a) High-density SNP arrays for Atlantic salmon, Atlantic cod (and possibly sea lice) within Q3 2011 (3 MNOK). These are resources which can be distributed across genotyping platforms, and the data generated by the resources will be electronically accessible. (b) Building upon current expertise and our national mandate, to establish a nationally available pipeline for resequencing of individuals (QTN-detection pipeline). This will be a localized resource, but will serve the whole Norwegian research community focusing on the genotype-phenotype map in population and production biology, and the data generated will be electronically accessible (3 MNOK).

2. Short description of the research infrastructure (~ 1 page)

Atlantic salmon and cod are species of considerable importance for aquaculture, fisheries and recreational sport fisheries. In addition to their great economic and societal importance, these fish species are also of considerable scientific importance as model research organisms in areas of evolutionary biology, ecology, physiology, genetics, immunology, toxicology, nutritional and environmental science. Access to a high quality genome sequence of focal species has become a prerequisite for performing functional genomic research at an international level. Activity to sequence the Atlantic salmon genome has been initiated through an international collaboration involving researchers, funding agencies and industry from Canada, Chile and Norway.

The sequencing will be carried out in two phases. Phase 1 will use traditional Sanger technology to sequence the ends of 100,000 BACs and 100,000 fosmids and produce 16-20 million reads (depending on cost) from shotgun libraries of different insert size. This should yield 4-5X coverage of the genome and provide a solid foundation for phase 2. Phase 2 will use novel sequencing technologies that are deemed to be appropriate to complete the sequence, identify SNPs and finish selected regions of interest. Sequence assemblies will be; after reaching 3X coverage, after phase 1 and after phase 2. The project is anticipated to be completed in 2.5 years.

In conjunction with whole-genome sequencing projects it is now standard practice to catalogue a large number of SNPs generated through resequencing of individuals or sample pools. Such a resource is critical for developing genotyping arrays which are a prerequisite for performing QTL fine mapping of complex traits with commercial/life history importance, as well as defining a starting point for in-depth ecological and evolutionary studies of populations involving genotype-phenotype map issues. CIGENE has in place some of the most advanced methodology for QTL fine mapping in well-structured pedigreed populations, which has been developed by CIGENE staff together with international collaborators. Generic bioinformatics and computational infrastructure are built up and maintained in conjunction with USIT, UiO (http://www.usit.uio.no/suf/vd) (as a part of the ongoing eVITA project in CIGENE). We are also uniquely positioned to establish ourselves as an international authority on the genetics of Atlantic Salmon and Atlantic cod thanks to our participation in the international and national efforts to sequence the Atlantic salmon and Atlantic cod genomes, respectively, and our experience in collection and analysis of genetic data from other important domestic species including cattle, sheep, and pig. Crucially, our active involvement in high-profile international efforts examining the genetics of cattle and sheep has lead us to recognize the critical need for improved genome information and SNP analysis tools in aquacultural species, and an appreciation of how this need may be met.

CIGENE's genomics infrastructure includes low (Sequenom) and high (Illumina/Affymetrix) throughput platforms, and as a member of the Norwegian Genotyping and Sequencing Consortium (NGSC) we also have a detailed understanding of the sequencing capacity in Norway for constructing better genetic resources. Currently, two of the three "2nd-generation" sequencing Sequencing-by-Synthesis (SBS) platforms are active in Norway, and offer great opportunities to researchers. The two technologies, a 454 (Roche) and a Genome Analyzer (Illumina) complement each other well; the 454 generates relatively few sequenced bases (0.5G) however the average read-length (400bp) is high compared to the Genome Analyzers high output (10G) but short reads (75bp). Read-length is an essential consideration for the bioinformatic challenge of sequence assembly, whereas read-volume is a vital parameter to make experiments cost-effective and for assuring sequence quality. The ability to generate many, long reads remains an elusive target for current SBS technologies, however several companies have recently emerged that promise 'third generation' sequencing technologies to meet this goal. One of the most promising technologies is being developed by Pacific Biosciences (PacBio) who promise to begin selling their sequencer in 2010. The PacBio platform is based on single-molecule, real-time sequencing data obtained from a single polymerase performing uninterrupted template-directed synthesis with four fluorescently labelled dNTPs. Polymerases, confined within zero-mode waveguide nanostructures can be arrayed in parallel for optical detection of potentially thousands of sequencing reactions. Using a prototype instrument PacBio have demonstrated they can achieve read-lengths of 1500 bases which is longer than the current gold-standard Sanger sequence length (Eid et al., Science, 323: 133-138, 2009), and while the sequence output is not clearly defined, estimates of 100G per hour indicate an improvement of at least one order of magnitude over currently available platforms.

3. Short description of collaboration and the national character (~ 1/2 page)

The International Collaboration to Sequence the Atlantic Salmon Genome (ICSASG) is an international collaboration involving researchers, funding agencies and industry from Canada, Chile and Norway. Resources generated in this project will be made available through databases nationally and internationally. CIGENE has served as a national core facility in the FUGE programme responsible for detection, genotyping and interpretation of SNPs since 2003. Recently we have initiated establishment of the Norwegian Genotyping and Sequencing Consortium (NGSC), which now serve as a consortium for DNA sequencing and high-throughput genotyping in Norway. The genomic marine infrastructure established by this application will coordinated through GenoFisk which has been established as a national FUGE platform built on four main foundations: establishment of resources; technology development; acquisition of expertise, and national sharing of tasks and responsibilities. Atlantic salmon and cod are currently the two focal species in GenoFisk.

SØKNAD "Avansert Vitenskapelig Utstyr (2 – 30 millioner)"; Februar 2009
LTQ Orbitrap XL Mass spectrometer

1. General information

On behalf of the proteomics community at Ås campus, and with support from Nofima-Mat, SkogogLandskap og Bioforsk, The University of Life Sciences (UMB) at Ås applies for 7.5 million Norwegian Crowns (NOK) to purchase an LTQ Orbitrap XL mass spectrometer, coupled to a nanoflow-HPLC system for liquid chromatography. The requested funds will also cover installation costs and a service contract for three years. > 90 % of the requested funds will be spent in 2009. UMB and Nofima-Mat allocate a full time senior engineer (Ph.D., fixed staff position) to run the machine, which will be part of the Ås campus proteomics/MS platform that was started up in 2003. There will be additional running support from the FUGE programme (2008-2011).

The infrastructure will be part of a national network of connected and interoperable facilities for proteomics that together make up the "NorProteomics" FUGE Research infrastructure platform. Three subnodes in NorProteomics near Oslo (UMB, Biotechnology Centre & The National Hospital) are further clustered through a joint facility (person) for data handling and data management, funded by "Fuge-Øst" (NOK 1.5 million, 2009-2011). The Research Council has stated that FUGE platforms should keep their infrastructure up-to-date through the "Avansert Vitenskapelig Utstyr" programme, and this is what we try to do through the present application.

As explained below mass spectrometers with the performance level of an LTQ Orbitrap have created a revolution in proteomics and are essential in most state-of-the-art studies of the proteome. In the past two-three years the field has seen an instrument-driven transition from analyzing some hundreds of proteins through months of work to analyzing thousands of proteins (i.e. approaching a true genome-scale) within a week or so. This application is meant to provide Ås campus with a crucial upgrade of equipment that will (1) strengthen proteomics research at Ås campus, (2) make proteomics more accessible and more like a routine type of analysis at Ås campus, and (3) enable Ås campus to fulfil its role in Norproteomics.

In addition to being crucial for modern proteomics, the LTQ Orbitrap will also provide Ås campus with other important analytical possibilities related to e.g. glycomics and metabolomics.

2. Short description of the research infrastructure

The LTQ Orbitrap was developed by Thermo in cooperation with one of the most prominent scientists in proteomics, Matthias Mann. Within a very few years, the LTQ has become the gold standard among ion traps and is now a key instrument in almost any proteomics laboratory. The LTQ delivers spectacular performance, in terms of very high sensitivity, high acquisition speed, multidimensional capabilities (MS/MS analyses), and the dynamic range of detection. In addition, and perhaps even more importantly, the LTQ Orbitrap is also known for its stability, robustness and ease of operation. The advent of the LTQ Orbitrap has made many existing MS machines for proteomics obsolete primarily because of the LTQ Orbitrap's superior resolution. For example, in many applications, time consuming gel-based proteomics can now be replaced by (much faster) gel-free proteomics. One needs to put much less focus on separating the sample because the extremely high resolution of the new machines makes it possible to analyze very complex samples, containing many proteins, in "one shot". The new gel-free proteomics methods that have become so common since the advent of the LTQ Orbitrap machines are not only faster but also provide a much more complete picture of the proteome. For example, while gels rarely provide more than 500 proteins (after an enormous amount of work), modern LTQ Orbitrap-based LC-MS analyses may provide thousands of proteins in addition to unsurpassed control on determination of post translational modifications of proteins, approaching truly "genome-wide" analysis.

One of the most important features of the LTQ Orbitrap is its reported performance worldwide. The applicants are very familiar in the field and have never met researchers that were not very enthusiastic about their LTQ Orbitraps. Its performance is reported to be excellent throughout the proteomics field, at any proteomics conference. A tremendous advantage is the

robustness of the LTQ Orbitrap. There is virtually no down time and the instrument can be used 24 hours a day, 7 days a week throughout the year. Its user friendliness (compared to early advanced MS machines for proteomics) is legendary. Several researchers in the applicant's laboratories have been testing their samples (bacterial extracts, human cell lysates) on LTQ Orbitrap machines. This has confirmed both the high performance and the user friendliness of the machine. The LTQ Orbitrap is so spectacularly much better than our five-year old existing set-up for LC-MS, that the existing set-up is no longer used. Finally, while existing LC-MS equipment is far too complex to be implemented in regular teaching, this is fully possible for the LTQ Orbitrap.

The LTQ Orbitrap will primarily be used to cover the "Ås-niches" in Norwegian proteomics as they are defined in the NorProteomics consortium agreement:

1. Raw materials/ difficult matrices (= food matrices)
2. Gram-positive bacteria, bacterial proteomics (e.g. lactic acid bacteria, probiotics)
3. Enzyme discovery (primarily for biomass conversion, e.g. related to bioenergy production)
4. High-throughput and data management (related to the strength of Ås campus in chemometrics)

Clearly, these niches fit very well in the national research strategies for Norway, linking clearly to topics such as "food" (and health), "biotechnology", and "environment". Ås campus has numerous ongoing projects (funded by the Research Council, Fund for Research Levy on Agricultural Products in Norway, UMB itself and EU) that will benefit directly from the new LTQ Orbitrap machine. Just to mention a few activities:

- Several projects in bacterial proteomics, e.g. focus on the "surface proteome" that determine bacterial interactions with human cells (Eijsink, Nes, Lea; with Nofima-Mat)
- The proteome of the honeybee brain during aging (Amdam)
- Responses in human cells related to food ingredients (Lea, Vegarud; with Nofima-Mat)
- Enzyme discovery for biomass conversion (Eijsink; with SkogogLandskap)
- Responses in human cells related to allergens and pro-apoptotic stimulants (Sørlie, Lea)
- The effect of mycotoxins on human and animal cell cultures and animals with respect to reproductive ability (Sørlie; with Veterinær instituttet og Norges Veterinærhøgskole)
- Proteolysis in dry-cured hams (Hollung at Nofima-Mat)
- Projects on beef tenderisation, muscle proteomics (Hollung, Veiseth-Kent, at Nofima-Mat)

In addition to being crucial for modern proteomics, the LTQ Orbitrap will also provide Ås campus with important analytical possibilities related to e.g. glycomics and metabolomics.

3. Short description of collaboration and the national character

The proteomics/MS platform at Ås campus is the result of a joint investment by UMB and Nofima-Mat in 2003 of NOK 5.5 million. UMB and Nofima-Mat support the platform through allocation of fixed staff (one full position), whereas users support the direct running costs. Other institutions at Ås campus (Bioforsk, SkogogLandskap) also have access to the platform and make minor economic contributions. The platform serves protein and carbohydrate researchers from most institutions at Ås campus as well as researchers from outside Ås campus, including companies. In 2008, the platform became part of FUGE's national NorProteomics platform. Recently, additional funding was obtained from FUGE-Øst, who supports the collaboration with proteomics laboratories in Oslo (who also are FUGE nodes). The Fuge-Øst money ensures sufficient support in bioinformatics.

On the one hand, the requested equipment is "local" in the sense that it will primarily serve Ås researchers. Despite its high price, the LTQ Orbitrap is becoming "must have" equipment in any modern research institution working on functional genomics. On the other hand, there is a clear national dimension because the LTQ Orbitrap will be crucial for Ås campus to play its role in the national NorProteomics platform and in functional genomics research in Norway in general.

The applicants have large networks of international collaborations where proteomics is becoming increasingly important. For example, work on bacterial surface proteomes is conducted together with groups in Wageningen and Cork, proteomics work on enterococci is part of an EU project, and enzyme discovery work is conducted in collaboration with the University of Minnesota and The Agricultural University of Sweden.

1. General information

Name of Project: Microbial genomics

Applicant: Norwegian University of Life Sciences (UMB) Department of Chemistry, Biotechnology and Food Science
Total Cost: A full cost project in the investment of new microbial genome technology. Total cost of 3.5 mill kroner, all in 2009.
Research infrastructure with national relevance and presently linked up to NVH, VI and three institutes at Campus Ås. We also see that international research groups will be using our microbial genome competence.
UMB has a strong focus on microbiology that includes genomics. During the last 4-5 years we have established genomic DNA microarrays technology (comparative genome hybridization and transcriptome analysis) on working on bacteria. In order to keep up with the development and the field of research we have to renew our infrastructure as well as introduce new infrastructure in order to keep apace changing technology. The present application will replace the present technology by the new NimbleGen technology.
The advantage of this technology, 1) it is more reliable, 2) it does not depend on independent DNA oligo synthesis thereby printing on slides, 3) the costs to run experiments are dramatically reduced and 4) the introduction new bacterial genomes is economical possible without high cost of independent DNA oligo synthesis.
We apply for full set-up for running NimbleGen technology that include washing station, hybridization station, microarray scanner dedicated for NimbleGen arrays as well as dedicated software.
In addition some renew investments for necessary support is needed, such as in real-time PCR instrumentation, sonication equipment (Branson model 450 Sonifier recommended by NimbleGen), NanoDrop spectrophotometer and some minor items The new equipment will be located at IKBM as the present infrastructure and will be made available for all external users.

2. Short description of the research infrastructure

Microbial genomics is becoming crucial for most aspects of research of microorganisms. Numerous bacterial genomes have been fully sequenced in the past few years, and the information content of genome databases is increasing rapidly. The genome of microorganisms is extremely diverse, quite different from higher eukaryotic organisms and consequently we do not have access to a commercial DNA microarrays as seen with human and mouse genomes. Presently more than 1000 bacterial genomes have been sequenced and more than 50% of these genome sequences are publically available. In addition enormous amount of bacterial genetic information are becoming available through metagenome sequencing.
All this information could efficiently be used in research if technology is made available. In this proposal outline we will make available the most efficient and cheapest technology in DNA microarray in order to study the transcriptomes of bacteria and to do comparative genome hybridization(CGH).
To exemplified such research: i) functional studies of unknown genes; ii) differential expression of genes under various growth conditions; iii) identify potential virulence genes by CGH; iv) identify genes that are only expressed in infection; v) identify targets for antimicrobial therapy; vi) investigate the effect of gene expression by genetic modification related to GMO.

All the participants in this proposal have a strong interest in microorganisms. Bacteria involved in human and animal health will be a general focus for most of the participants. This area will cover important food-borne pathogens such as E. coli EHEC/STEC, Staph. aureus, Listeria monocytogenes and others. Commensal bacteria such as enterococci, used in food fermentation, being part of the intestinal bacterial flora as well as being nosocomial will be studied.
Food fermenting bacteria and probiotic bacteria will also be an important group to be applied in this technology. Among all these bacteria genome sequences are available often more than one genome within one species.
Plant pathogens are also being sequenced and study of such organisms by use of DNA microarray technology will benefit to the understanding of the interaction with their host and their pathogenicity.

3. Short description of collaboration and the national character

This application is supported by the following Institutes at Campus Ås: **Nofima**, **Bioforsk** and **The Norwegian Forest and Landscape Institute**. In addition **Norwegian School of Veterinary Science** (NVH) and **National Veterinary Institute** (VI) are also supporting this technology set up and will be active users of this technology in their microbial research of food and animal pathogens. It is also important to add that we have sufficient space to host researchers for shorter and longer stay to use the technology. In addition bioinformatic researchers at UMB are already strongly associated to this technology.
Our relatively early start on using DNA microarray technology on bacteria has made us competitive in participating in both EU and ERA projects and the renewal of the technology is prerequisite in order to keep ahead in our respective areas of bacterial research
The introduction of NimbleGen will make us nationally unique and we will be able to approach microbial questions in a new and rational way and strengthen us to be the genomic centre for microorganisms related to food safety, and human, animal and plant health.

Archive for Norwegian landscape architecture

Call: Scientific databases and collections

General information

Since 1919 the Department of Landscape Architecture and Spatial Planning (ILP) at UMB, as one of the oldest institutions in the world, is responsible for education in landscape architecture and garden art.[1] The Department has in its possession different collections of former professors and landscape architecture offices dating back to the early 20th century. These collections contain maps, drawings, written documents, slides and photos of unique value for education and research in natural sciences and humanities (specific botany, art history, architecture and landscape architecture) and for the professions architecture and landscape architecture in the country. Because of age and uniqueness the whole archive is of international interest. ILP is the only institution in Norway that contains an archive of gardens and parks. ILP plans to secure, list and catalogue all collections in their ownership, and, in addition, an infrastructure should be established for securing current remains of important landscape architecture firms in Norway. A pre-project started in 2008 with funding from the Directorate for Cultural Heritage (Riksantikvaren) and the department's own funding.

The application concerns the following objectives:

- to organise and unify the collections
- to index the collections
- to secure and protect the collections (against fire and other damages)
- to digitize the collections and to make them electronically accessible for education and research

The application concerns financial support for:

- Equipment for safe archive-solutions
- Establishment and operating costs
- IT-equipment (PCs, work with websites, software etc.)

Expected costs:

Equipment	650.000 Nkr
Establishment and operation	700.000 Nkr
Travel costs and exchange	50.000 Nkr
IT	600.000 Nkr
Total:	**2.000.000 Nkr**

The archives and the research infrastructure will be located at UMB. The initial analysis of the archive has been completed. The new project, which the present application concerns, will start in 2010 with the coordination, development and establishment of the research infrastructure. This initial establishment will end in 2012 with the presentation of the whole archive with web solutions. After 2012 the project will pass into a stage of maintenance and continued operations. The project group plans to link the collection to other national and international infrastructure in this field, as for instance, links to the archive of The National Museum of Art, Architecture and Design in Oslo, other Special collections at UMB and other relevant Nordic and European educational institutions for botany and landscape architecture.

[1] Webpage at the ILP/UMB: http://www.umb.no/ilp/artikkel/hagekunsthistorie-ved-umb-nest-eldst-i-verden

Short description of the research infrastructure
The pre-project from 2008 showed that the collections at the Department are of high quality. It contains original documents of landscape architect projects and/or original records of gardens and parks in Norway from different periods.
The collections at the Department are not registered and a proper catalogue is missing. Because of this the documents are not accessible for external researchers or students. In addition, the documents are partly in a very bad condition because of inadequate storage. The scientific and technological challenges in this project are the development of an index/catalogue for the various types of archive documents such as maps, slides etc. There has to be developed a system of keywords to assure satisfactory and easy search of documents. The archive infrastructure will be linked to the garden and parks archive "Askeladden" from The Directorate for Cultural Heritage and the photo archive of UMB, Infoavdelingen.
The main goal is to make the material electronically accessible. This will have an impact on national but also international research in this field. The project group expects innovation because of this new accessible material and collaboration with other institutions in Norway and Europe due to the uniqueness and type of documents.

Short description of collaboration and the national character
The project will involve different partners in Norway where ILP already has an ongoing collaboration:

- other UMB departments as Department of Plant and Environmental Sciences, IPN
- The National Museum of Art, Architecture and Design in Oslo
- The Norwegian Association of Landscape Architects
- The Directorate for Cultural Heritage, Oslo and
- The Norwegian Institute for Cultural Heritage Research, NIKU in Oslo

The project will establish and broaden international collaboration and networks due to the special character of the archive. Enough knowledge about how to register and organise such different types of documents is also missing in other institutions in the world. An international collaboration is therefore essential, particularly with departments where registration work of landscape architecture archives has started like at the HSR – Hochschule für Technik in Rapperswil, Switzerland and the Hannover University, Germany.

The project will use the infrastructure of ECLAS – European Council of Landscape Architecture Schools www.eclas.org to promote the project and to inform about the collections. This network with about 150 member universities from all other the world will help to get an interesting exchange of knowledge for the Norwegian project. It will be discussed if the project results could be a special issue on one of the annual conferences within the organization.

The documents in the archives will be accessible for students and researchers interested in for instance landscape architecture, botany or archive infrastructure in these fields. For commercial use of documents in newspapers, books and other published sources the project group has to find satisfactory solutions to assure the appropriate handling of copyrights.

Nasjonal satsing på forskningsinfrastruktur, kriterier for vurdering av søknader

Midler til forskningsinfrastruktur tildelt gjennom Forskningsrådet vil være rettet mot infrastruktur av nasjonal karakter. Med dette menes forskningsinfrastruktur som:

- har bred nasjonal interesse
- legger grunnlaget for internasjonalt ledende forskning
- forefinnes ett eller få steder i landet (som hovedregel)
- skal gjøres tilgjengelig for relevante forskningsmiljøer og næringer

I samsvar med Nasjonal strategi skal finansiering av nasjonal forskningsinfrastruktur bidra til:

- å skape resultater av høy kvalitet og originalitet og med stor gjennomslagskraft
- en god arbeidsdeling og koordinering av norsk forskning innenfor relevante forskningsområder
- etablering av nettverk nasjonalt og internasjonalt
- å øke effektiviteten i gjennomføringen av næringslivets innovasjonsprosjekter og utviklingen av norske næringers internasjonale konkurranseposisjon
- å sikre lett tilgjengelighet for relevante forskningsmiljøer og næringer
- å gjøre norske forskningsmiljøer attraktive for de beste forskerne, norske som utenlandske

For investeringer i storskala forskningsinfrastruktur og investeringer knyttet til internasjonalt samarbeid om forskningsinfrastruktur, vil det i tillegg bli lagt vekt på at infrastrukturen skal:

- bringe forskning av stor nasjonal og internasjonal betydning frem i forskningsfronten
- gi mulighet for å gjennomføre høyt prioritert forskning som norske forskningsmiljøer alene ikke kunne ha deltatt i

Utover disse overordnede kriteriene vil følgende bli vurdert:*

*) Alle kriteriene vil bli benyttet for fulle søknader. For forenklede søknader trinn 1 og forprosjekter vil de kriteriene som er markert med * (forenklede søknader) og # (forprosjekter) ikke bli benyttet.

- **Relevans i forhold til utlysning:**
  - relevans i forhold til utlysning og strategiske føringer
  - infrastrukturens nasjonale karakter
  - samsvare med definisjonen gitt for en av de 4 kategoriene infrastruktur
- **Forskningsmessig betydning:**
  - infrastrukturens bidrag til faglig fornyelse og bredde, utvikling av ny kunnskap og bidrag til å bringe forskningen innen områder av nasjonal og/eller internasjonal betydning frem i forskningsfronten.
  - operasjonalisering og anvendelse av forskningsinfrastrukturen i forhold til eksisterende infrastruktur
  - bidrag til langsiktig kompetansebygging på forskningsområder som forventes å være av betydning for Norge
- **Prosjektledelse og søkerinstitusjon (*):**
  - søkerinstitusjonens og prosjektleders/prosjektteamets kompetanse og ressurser til å etablere, drive og utnytte infrastrukturen optimalt
  - organisering og bidrag til å sikre lett tilgjengelighet for relevante forskningsmiljøer og næringer(jf kravet om nasjonal karakter)
  - samsvar med institusjonens egen strategi på området

- **Forskningsmiljø (*):**
  - forskningsmiljøenes dokumenterte kompetanse på forskningsinfrastrukturens anvendelsesområder og den nasjonale forskningen på området
  - mulighetene som forskningsinfrastrukturen vil gi norske forskningsmiljøer
  - eventuelle samarbeidspartneres bidrag til prosjektets kvalitet og gjennomførbarhet (#)
- **Gjennomførbarhet (* #):**
  - faglige og tekniske vurderinger med hensyn til teknologivalg, design og organisering (gjelder prosjekter som innebærer en betydelig utviklingsdel)
  - vurdering av fremdriftsplan, investeringsplan og finansieringskilder
  - beskrivelse av gjensidige forpliktelser for drift og oppgradering, livssyklus
- **Internasjonalt samarbeid:**
  - bidrag til å fremme etablering av internasjonalt nettverk og forskningssamarbeid
- **Nasjonalt samarbeid:**
  - bidrag til en god arbeidsdeling og koordinering av norsk forskning innenfor nasjonale relevante forskningsområder
- **Strategisk betydning:**
  - bidrag til å gjøre norske forskningsmiljø attraktive for de beste forskerne, norske som utenlandske
  - mulighet for å gjennomføre høyt prioritert forskning som norske forskningsmiljøer alene ikke kunne ha deltatt i (for prosjekter som krever internasjonalt samarbeid om forskningsinfrastruktur)
- **Næringsmessig relevans:**
  - bidrag til gjennomføringen av næringslivets innovasjonsprosjekter og utviklingen av norske næringers internasjonale konkurranseposisjon (der dette er relevant)
- **Generell prosjektkvalitet:**
  - generell kvalitet i søknaden, herunder klarhet i målformuleringer og problemstillinger

I tillegg vil følgende forhold vil bli tillagt vekt når Forskningsrådets administrasjon utarbeider en innstilling til bevilgning for vedtak i Forskningsrådets overordende styrende organer:

- Bevilgninger over Forskningsrådets budsjett skal støtte opp om utvikling av nasjonalt prioriterte forskningsområder og næringer med stort behov for forskningsinfrastruktur.
- Det skal være god kobling mellom finansiering av forskningsinfrastruktur og øvrig forskningsfinansiering.
- Det skal foretas en helhetlig vurdering av balansen mellom nasjonal investering og deltakelse i internasjonale forskningsinfrastrukturer.
- Forskningsrådets vil arbeide for nasjonal koordinering og helhetstenkning (se definisjon av ”nasjonal karakter” ovenfor).

Også eventuell medfinansiering fra institusjonene vil bli tatt med i Forskningsrådets administrative helhetsvurdering.

			NFRs vurderingskriterier		
Nr *	**Delutlysning og skisse**	**UMBs strategi**	**Nasjonal karakter**	**Potensiale for ledende forskning****	**Nyttig for norsk næringsliv**
	Storskala forskningsinfrastruktur (30-200 mill. kr)				
1	BIOKLIMA - Large Scale Facility for Studying Climate Effects in Natural Ecosystems and Agroecosystems	Miljø	Ja		Ja
2	Bioenergy Innovation Laboratories (forprosjekt)	Bioenergi, Næringsutvikling	Ja		Ja
3	Pilot Plant for Food and Feed (forprosjekt)	Mat, Næringsutvikling	Ja		Ja
4	Senter for husdyrforsøk – nasjonal utviklingsaktør for norsk husdyrhold (forprosjekt)	Mat, Næringsutvikling	Ja		Ja
	Avansert vitenskapelig utstyr (2-30 mill. kr)				
5	Core Instrumentation for Research on Greenhouse Gas Emission from Ecosystems (CIGGE)	Miljø	Ja	Ja	
6	Observatory of tidewater-glaciar dynamics	Miljø	Ja		
7	Flow field fractionation (FFF) - High Resolution Inductively Coupled Plasma Spectrometer (HR-ICP-MS) system for variable molecular mass characterization	Miljø	Ja	Ja	
8	Food Lipids Laboratory Instrumentation	Mat			
9	Konfokalmikroskop til et senter for biofilmstudier	Mat, Næringsutvikling		Ja	Ja
10	Infrastructure for advancing Norwegian marine genomic research	Bioteknologi, Akvakultur	Ja	Ja	
11	LTQ Orbitrap XL Mass Spectrometer	Bioteknologi, Mat, Helse, Bioenergi	Ja	Ja	
12	Microbial Genomics	Bioteknologi, Mat, Helse		Ja	
	Vitenskapelige databaser og samlinger				
13	Archive for Norwegian landscape architecture	Miljø	Ja		

* Nummereringen i denne tabellen er ikke et uttrykk for prioritering

** Vurdering kun gjort utifra om UMBs forskning innen feltet kan anses å være internasjonalt ledende per i dag.

Sak 16/2009

Midler til vitenskapelig utstyr på UMBs budsjett i 2009

Dokumenter:

a) Saksframlegg

Forslag til vedtak:

1. Midler til vitenskapelig utstyr i 2009 lyses ut og tildeles som foreslått i saksframlegget, med følgende datoer for henholdsvis utlysning og tildelingsvedtak: *fastsettes i møtet*

Ås, 03.03.2009

Ragnhild Solheim
Forskningsdirektør

Saksframlegg

Bakgrunn

Det er satt av 3 mill. kr på UMBs budsjett for 2009.

Følgende vurderinger ligger til grunn for forslaget til vedtak:

1. Midlene bør lyses ut snarest slik at de blir benyttet til investeringer inneværende år.
2. Det bør foreligge en plan for framtidig praktisk og finansiell drift av utstyret som er forankret hos det ansvarlige instituttet.
3. Utstyret som det bevilges midler til bør være strategisk viktig for UMB lokalt og sentralt og det bør ha stor nytteverdi.

Forslag til prosess

1. Utlysning snarest. Minste søknadsbeløp 100 000 kr. Forutsetning om at utstyret skal være tilgjengelig for forskere fra hele UMB.
2. Søknadene fremmes av instituttene
3. En komité bestående av forskningslederne på IHA, IKBM, IMT, INA og IPM (ev. ILP), ledet av nestleder i forskningsnemnda (Sørlie), behandler søknadene og anbefaler vedtak om tildeling til forskningsnemnda
4. Forskningsnemnda vedtar tildeling

Forslag til tidslinje

Alternativ 1:
Søknadsfrist 26. mars og vedtak i forskningsnemnda 21. april
Fordel: Rask avklaring

Alternativ 2: Søknadsfrist 5. mai og vedtak i forskningsnemnda 26. mai
Fordel: Bedre tid til søknadsskriving og søknadsbehandling

Forslag til kriterier for tildeling

- Kvalitet på søknad og søker
- Strategisk forankring lokalt og sentralt
- Egenfinansiering fra instituttet (innkjøp)
- Merverdi

Hva bør søknadene inneholde?

- Hva skal kjøpes og hva er prisen?
- Er utstyret knyttet til strategiske prioriteringer, ev. hvordan?
- Prosjektansvarlig forskers CV
- Budsjett for innkjøp
- Kort om merverdi
- Maksimal lengde på søknaden: 1 side