

**BIOLOGISK INSTITUTT
ADMINISTRASJONEN
I. 1/2011**

INNKALLING STYREMØTE

**Instituttstyrets møte nr 1/2011 – 17.03.2011, kl.12.15, rom 1206 (skolelabbens møterom)
Det serveres lunsj på møtet**

VEDTAKSSAKER:

**V-SAK IS 1/2011 GODKJENNING AV INNKALLING
Forslag til vedtak: Innkallingen godkjennes**

**V-SAK IS 2/2011 GODKJENNING AV REFERAT IS 4/2010
Forslag til vedtak: Referatet godkjennes**

V-SAK IS 3/2011 REGNSKAP 2010

Sakspapirer:

Saksfremlegg fra leder for økonomiseksjonen/instituttleder
BIO Regnskap internt 2010
BIO Rapport 3. tertial 2010
Enhetens ledelseskommmentar 3. tertial 2010

Forslag til vedtak: Regnskap 2010 tas til etterretning

V-SAK IS 4/2011 REGNSKAP 2010 OG BUDSJETT 2011 SFE-CEES

Sakspapirer:

Saksfremlegg fra Eva Grøttland/leder for økonomiseksjonen/kontorsjef
Budsjett og regnskap 2010
Budsjett 2011

Forslag til vedtak: Regnskap 2010 og budsjett 2011 for CEES tas til etterretning uten anmerkninger

ORIENTERINGSSAKER:

O-SAK IS 1/2011 MN-FAKULTETETS LIFE SCIENCE STRATEGI

Sakspapirer:

Saksfremlegg fra instituttleder
Life Science ved Det matematisk-naturvitenskapelige fakultet. Mandat og oppnevning
Life Science profil ved MN-fakultetet – Et innspill fra Biologisk institutt,

Farmasøytisk institutt og Institutt for molekylære biovitenskap ved instituttlederne

O-SAK IS 2/2011 [BIOFAGEVALUERINGEN](#)

Sakspapirer:

Saksfremlegg fra instituttleder

Biofagevalueringen 2011 – fakta-ark og selvevalueringer (nivå 1 og nivå 2)

O-SAK IS 3/2011 [MIDTVEISEVALUERING AV CoE – CENTRE FOR ECOLOGICAL AND EVOLUTIONARY SYNTHESIS](#)

Sakspapirer:

Saksfremlegg fra kontorsjef

Midterm evaluation of one Centre of excellence, Experts' appraisal form and panel report

O-SAK IS 4/2011 [VIRKEMIDLER TIL FORSKNING 2011](#)

Sakspapirer:

Saksfremlegg fra instituttleder

Publikasjons- og småforsk-incentiver (deles ut på møtet)

O-SAK IS 5/2011 [STATUS HMS-ARBEID](#)

Sakspapirer:

Saksfremlegg fra kontorsjef

Notat til MN-fakultetet 14.01.2011

HMS prosjektrapport 3. kvartal 2010

HMS prosjektrapport 4. kvartal 2010

O-SAK IS 6/2011 [UNDERVISNINGSSAKER](#)

Sakspapirer:

Saksfremlegg fra studieseksjonen/studieleder

Svar på søknad om nedleggelse av emnet 4220/9220

EVENTUELT

Blindern, 10.03.11

Trond Schumacher
Instituttleder

**BIOLOGISK INSTITUTT
ADMINISTRASJONEN
I. 4/2010**

REFERAT STYREMØTE

Instituttstyrets møte nr 4/2010 – 9.12.2010
Møtet ble formelt satt 12.30 og ble hevet kl. 14.25

Til stede: Trond Schumacher, Anne Brysting, Tore Slagsvold, Hanne Ballestad, Hans Borg, Nanna Winger Steen, Synnøve Botnen, Ingebjørg Hagen Agøy
Fra administrasjonen: Maren Onsrud, Kjetil Bråthen

VEDTAKSSAKER:

V-SAK IS13/2010 GODKJENNING AV INNKALLING
Vedtak: *Innkallingen godkjennes*

V-SAK IS 14/2010 GODKJENNING AV REFERAT IS 3/2010
Vedtak: *Referatet godkjennes*

V-SAK IS 15/2010 BUDSJETT 2011
Sakspapirer:
Saksfremlegg fra økonomileder
Budsjett 2011
Vedtak: *Det framlagte budsjettforslag 2011 vedtas*

V-SAK IS 16/2010 ÅRSPLAN 2011
Sakspapirer:
Saksfremlegg fra instituttleder/kontorsjef
Årsplan 2011
Vedtak: *Årsplanen for 2011 vedtas*

DISKUSJONSSAKER:

D-SAK 1/2010 HMS-ARBEIDET PÅ INSTITUTTET OG FAKULTETET
Sakspapirer:
Målsetninger for HMS-prosjektet 2010-2012
Handlingsplan HMS-prosjektet 2010-2010
Fakultetets HMS-strategi for perioden 2010-2015 (Vedtaks sak 26/10 i MN-fakultetets styre)

ORIENTERINGSSAKER:

O-SAK IS 11/2010 MIDTVEISEVALUERING AV CoE-CENTRE FOR ECOLOGICAL AND EVOLUTIONARY SYNTHESIS

Sakspapirer:

Saksfremlegg fra administrativ leder ved senteret
Midtveisevaluering (lenke i mail)

O-SAK IS 12/2010 HMS HANDLINGSPLAN 2011

Sakspapirer:

Saksfremlegg fra institutleder/kontorsjef
HMS-handlingsplan for BIO og IMBV 2011

O-SAK IS 13/2010 UNDERVISNINGSSAKER

Sakspapirer:

Saksfremlegg fra leder for studieseksjonen/studieleder
Søknad til fakultetet om endring av BIO4260/9260
Svar på søknad om endring av BIO4260/9260
Institutt rapport for undervisning i studieåret 2009/2010
Program rapport for masterprogrammet i studieåret 2009/2010
Program rapport for bachelorprogrammet i studieåret 2009/2010

EVENTUELT:

Fast tilsetting:

- Kjetil Bråthen har fått fast tilsetting som seniorkonsulent, fom 01.01.2011

Midlertidig tilsetting:

- Alexander Nederbragt har fått midlertidig tilsetting i 100% stilling som senioringeniør, eksternt finansiert, fom 01.01.2011 tom 31.12.2013
- Kyrre Kausrud har fått midlertidig tilsetting i 20% stilling som forsker, eksternt finansiert, fom 01.11.2010 tom 31.08.2012
- Ave Tooming-Klunderud har fått midlertidig tilsetting i 100% stilling som senioringeniør, fom 01.02.2011 tom 31.01.2014
- Gunnar Dick har fått midlertidig tilsetting i 50% stilling som forsker, eksternt finansiert, fom 21.01.2011 tom 22.01.2012
- Jonathan Colman har fått midlertidig tilsetting i 50% stilling som forsker, eksternt finansiert, fom 01.01.2011 tom 31.12.2011
- Mari Espelund har fått midlertidig tilsetting i 100% stilling som senioringeniør, eksternt finansiert, fom 01.01.2011 tom 30.06.2011
- Ane Vollsnes har fått midlertidig tilsetting i 100% stilling som forsker, eksternt finansiert, fom 15.09.10 tom 31.12.10
- Morten Helberg har fått midlertidig tilsetting i 100% stilling som stipendiat, eksternt finansiert, fom 31.08.10 tom 20.08.13

- Sudhagar Balasundaram har fått midlertidig tilsetning i 100% stilling som stipendiat, internt finansiert, fom 30.09.10 tom 29.09.14
- Halvor Knutsen har fått midlertidig tilsetning i 20% stilling som forsker, eksternt finansiert, fom 01.01.2011 tom 31.12.2012

Forlenget midlertidig tilsetning:

- Trine Ballestad Rounge har fått midlertidig forlengelse i 100% stilling som postdoktor, eksternt finansiert, fom 1.08.2011 tom 12.02.2012
- Ralf Neumann har fått midlertidig forlengelse i 100% stilling som vit.ass., fom 31.12.10 tom 31.05.11
- Alexander Sadykov har fått midlertidig forlengelse i sin 100% stilling som stipendiat, eksternt finansiert, fom 16.11.2010 tom 28.02.2011
- Endre Knudsen har fått midlertidig forlengelse i sin 100% stilling som stipendiat, fom 01.11.2010 tom 28.02.2011
- Hege Gilbø Bakke har fått midlertidig forlengelse i sin 100% stilling som avdelingsingeniør, fom 01.02.2011 tom 31.03.2011
- Hildegunn Viljugrein har fått midlertidig forlengelse i sin 20% stilling som førsteamanuensis, fom 01.02.2011 tom 31.12.2014
- Håvard Harstad har fått midlertidig forlengelse i sin 100% stilling som forsker, eksternt finansiert, fom 31.12.2010 tom 31.01.2011
- Christian Brinch har fått midlertidig forlengelse i sin 10% stilling som forsker, eksternt finansiert, fom 01.01.2011 tom 31.12.2011
- Diress Tsegaye Alemu har fått midlertidig forlengelse i sin 100% stilling som forsker, fom 01.01.2011 tom 06.03.2011, og forlengelse i 50% stilling som forsker, fom 07.03.2011 tom 31.12.2011
- Marte Holten Jørgensen har fått midlertidig forlengelse i sin 100% stilling som stipendiat, fom 25.02.2011 tom 9.03.2011
- Unni Grimholt har fått midlertidig forlengelse i sin 100% stilling som forsker, eksternt finansiert, fom 01.01.2011 tom 31.03.2011
- Per Erik Jorde har fått midlertidig forlengelse i sin 100% stilling som forsker, eksternt finansiert, fom 01.01.2011 tom 31.03.2011
- Claudia Junge har fått midlertidig forlengelse i sin 100% stilling som vit.ass., eksternt finansiert, fom 01.01.2011 tom 30.04.2011
- Guri Sogn Andersen har fått midlertidig forlengelse i 100% stilling som stipendiat, eksternt finansiert, fom 01.01.2011 tom 13.03.2011
- Sagnik Sengupta har fått midlertidig forlengelse i sin 100% stilling som stipendiat, fom 30.09.2014 tom 14.11.2014
- Adine G. Thoresen har fått midlertidig forlengelse i sin 100% stilling som seniorkonsulent, fom 01.02.2011 tom 17.02.2011
- Therese Fosholt Moe har fått midlertidig forlengelse i sin 100% stilling som stipendiat, eksternt finansiert, fom 30.01.2012 tom 05.03.2012

Permisjoner:

- Katinka E. Grønli er innvilget permisjon uten lønn fra sin 100% stilling som kontorsjef, fom 01.01.2011 tom 30.09.2012
- Camilla Lothe Nesbø er innvilget permisjon uten lønn fra sin 100% stilling som forsker, fom 17.07.2010 tom 19.01.2011

- Lee Hsiang Liow er innvilget permisjon med lønn fra sin 100% stilling som forsker, fom 08.01.2011 tom 17.09.2011
- Torbjørn Ergon er innvilget permisjo nmed lønn fra sin 100% stilling som forsker, fom 18.09.2011 tom 17.12.2011

Endring av stilling:

Blindern, 16.12.10

Trond Schumacher
Instituttleder

Til: Instituttstyret ved Biologisk institutt

Sakstype: Vedtakssak

Saksnr.: V-Sak IS 3/2011

Møtedato: 17.03.11

Notatdato: 9.03.11

Saksbehandler: Kjetil Bråthen/ Trond Schumacher

Sakstittel: Regnskap 2010

De viktigste problemstillinger:

Regnskap 2010 er gjort opp med et akkumulert underskudd på **NOK 4.190 mill**, en økning på **NOK 1.34 mill** fra 2009. Dette skyldes i hovedsak økte utgifter p.g.a. flere avlagte dr. disputaser (NOK 500.000), økte utgifter på time/hjelpelærer-budsjettet (NOK 250.000), og ekstra utgifter i forbindelse med oppgradering av lokaler (NOK 550.000). Det henvises for øvrig til vedlegg 3 (Enhetens ledelseskommentar 3. tertial 2010. Utgifter er for øvrig i samsvar med budsjett, som justert og prognostert gjennom driftsåret 2010.

Forslag til vedtak: Regnskap 2010 tas til etterretning

Vedlegg:

1. BIO Regnskap internt 2010
2. BIO Rapport 3. tertial 2010
3. Enhetens ledelseskommentar 3. tertial 2010

Budsjett/ Regnskap BIO 2010

Inntekter	Budsjett styremøte	Prognose	Regnskap 2010
Overført fra forrige år	-2 854 916	-2 854 916	-2 854 916
Bevilgning post 50 (ekskl. CEES stip/ingeniør)	75 498 900	75 498 900	75 498 900
Nye stipendiater 1/2-års	1 727 500	600 000	600 000
Incentivmidler PhD stud Tøyen 2010	-500 000	-668 530	-668 530
Lifescience-satsning (Jakobsen)	521 000	600 000	600 000
Stipendiat NHM - Ruben A. Pettersen	691 000	691 000	691 000
Overhead eksterne prosjekter (inkl. CoE NFR)	10 000 000	10 900 000	11 789 000
CEES overhead interne kontostrenger	800 000	1 100 000	1 089 499
Publiseringsmidler	i rammen	i rammen	i rammen
Småforskmidler	976 000	976 003	976 003
Startpakker drift 6 stk	2 422 500	1 222 500	1 222 500
Kvinnelig II'ere - Sverdrup	35 000	56 150	56 150
Unvervisningsfrikjøp Brysting, MNF	0	30 000	30 000
Studiekvalitetsmidler, MNF	0	63 500	63 500
Universitetet i Bergen for Finse	330 000	330 000	330 000
Stipendiatstilling (EMBIO)KSJ	650 000	650 000	650 000
Stipendiatstilling (EMBIO)NCS	650 000	650 000	650 000
Stipendiatstilling (EMBIO)GPS	650 000	456 667	456 667
EMBIO KAMRAN	0	400 000	400 000
Velferdspenger	10 000	10 000	14 348
Internasjonaliseringsmidler	50 000	50 000	50 000
Egenandel studenter feltkurs	150 000	130 000	146 495
IMBV1020 2010	160 000	160 000	160 000
Leie av Forskningsfartøy	1 300 000	1 300 000	1 300 000
Leie av Fytotronen	200 000	200 000	200 000
Leie av Drøbak	100 000	100 000	100 000
Leie av Biologisk stasjon Finse	200 000	200 000	200 000
Salg Skolelab	30 000	30 000	30 000
Inntjening sentralverkstedet	300 000	300 000	300 000
Felles-laber	4 000 000	4 000 000	4 000 000
Til disposisjon 2010	98 096 984	97 181 274	98 080 616
Utgifter			
Fastlønn vit. ansatte/post.doc	-27 307 010	-25 449 052	-25 530 280
Fastlønn stipendiater	-9 073 707	-8 235 853	-8 566 042
	-36 380 717	-33 684 905	-34 096 322
Fastlønn teknisk ansatte	-12 128 638	-11 971 054	-11 961 034
Fastlønn administrasjonen	-5 605 004	-6 913 636	-6 950 623
	-17 733 642	-18 884 690	-18 911 657
Refusjon trygdeordninger:	2 000 000	2 400 000	2 069 806
Avsetning til life science satsning (Jakobsen)	-500 000	-623 313	-623 313
Overtid Fytotronen	-250 000	-275 000	-348 441
Overtid teknisk/administrativt	-100 000	-100 000	-55 000
	1 150 000	1 401 687	1 043 052
Sensorer bachelor/master	-250 000	-250 000	-251 426
Dr. disputaser	-400 000	-800 000	-928 765
Time/hjelpelærere bachelor/master	-700 000	-700 000	-963 938
Drift lab/feltkurs bachelor	-1 200 000	-1 200 000	-1 357 809
Drift lab/feltkurs master	-300 000	-300 000	-342 699
Masterstudenter	-800 000	-800 000	-800 000
Fagutvalget	-30 000	-30 000	-31 056
Bachelorprogram i Biologi	-40 000	-40 000	-40 000
Sum drift undervisning/utdanning	-3 720 000	-4 120 000	-4 715 693
Drift interne stip'er a 50 000	-800 000	-800 000	-700 000
Drift nye stipendiater	-125 000	-150 000	-150 000
Drift interne post.docs a 50 000	-100 000	-100 000	-50 000
Startpakker nytillsatte	-1 200 000	-1 200 000	-1 200 000
Drift forskningsprogrammer	-1 200 000	-1 200 000	-1 200 000
Småforskmidler	-970 000	-970 000	-970 000
Drift forskere 30 a 10 000	-300 000	-300 000	-300 000
Drift professor/amanuensis II 8 a 10 000	-80 000	-80 000	-80 000

Publikasjonsstøtte a 8 000	-1 300 000	-900 000	-900 000
Faglige reiser : 40.000 pr program + CEES	-160 000	-160 000	-160 000
EMBIO-Jakobsen	0	0	0
EMBIO KAMRAN	0	-400 000	-400 000
EMBIO-NCS	-650 000	-650 000	-650 000
EMBIO-Sætre	-650 000	-456 667	-456 667
Internasjonalisering	-50 000	-50 000	-50 000
Sum drift forskning	-7 585 000	-7 416 667	-7 266 667
Egenandel vit.utstyr	-250 000	-250 000	0
Drift instituttleder	-50 000	-100 000	-100 000
Kompetansetiltak teknisk/admin	-100 000	-100 000	-107 874
Arbeidsmiljøtiltak	-100 000	-300 000	-308 381
Sum Kompetanse/Miljø/Egenandel	-500 000	-750 000	-516 255
Avsluttet prosjekt			
FYTOTRONEN FYT	-190 000	-190 000	-190 000
SKOLELABORATORIET SKO	-80 000	-80 000	-80 000
DRØBAK DRØ	-250 000	-250 000	-250 000
FINSE FIN	-400 000	-400 000	-400 000
BÅTPOOL BÅT	-2 000 000	-2 000 000	-2 000 000
BILPOOL	-100 000	-100 000	-100 000
SENTRALVERKSTEDET VER	-300 000	-300 000	-300 000
FELLESDRIFT INSTITUTTET	-300 000	-400 000	-520 623
Sum drift fellesavdelinger	-3 620 000	-3 720 000	-3 840 623
DNA-laber, Megabase, FLX genom sekv.etc	-4 000 000	-4 000 000	-4 000 000
Internhusleie	-27 534 982	-27 534 982	-27 534 982
Investeringer/vedlikehold	-400 000	-1 300 000	-1 851 391
IT drift	-300 000	-200 000	-229 769
Generell reserve	-300 000	-200 000	-350 382
Sum utgifter	-100 924 341	-100 409 557	-102 270 689
Inntekter - utgifter	-2 827 357	-3 228 283	-4 190 073

UNIVERSITETET I OSLO



ØKONOMIRAPPORT
FOR
DET MATEMATISK-NATURVITENSKAPELIGE FAKULTET

ENHET: 152100-152160 Biologisk institutt
PERIODE: ÅRSVSLUTNING
ÅR: 2010

Saksbehandler: Kjetil Bråthen oppdatert per 26.01.2011
Rapporterende enhets leder: Trond Schumacher

OPPSUMMERING

Enhet: 152100-152160 Biologisk institutt
Periode: ÅRSVSLUTNING

Hittil i år

	Budsjett	Regnskap	Avvik
Bevilgning	-5 688	-1 642	-4 045
Bevilgning - reelt resultat	-1 188	1 364	-2 551
Bidrag - NFR	-8 274	-7 118	-1 156
Bidrag - Øvrige prosjekter	-1 518	-2 572	1 054
Oppdrag	-145	84	-229
SUM	-15 626	-11 250	-4 376
SUM - REELT RESULTAT	-11 126	-8 244	-2 882

Årsbasis

	Årsbudsjett	Årsprognose	Avvik
	-5 688		-5 688
	-5 688		-5 688
	-8 274		-8 274
	-1 518		-1 518
	-145		-145
SUM	-15 626		-15 626
	-15 626		-15 626

tall i t kr

For bevilgning: beskriv kort den økonomiske situasjonen pr avsluttet regnskapsperiode, både reelt og nominelt resultat. Gi også en kommentar til årsprognosen.

Instituttet har redusert de bundne midlene kraftig i løpet av året. I tillegg er de interne utsatte midlene også redusert. Sammen med en stor investering i vedlikehold av lokaler har dette medført at instituttet har redusert sitt overskudd av midler.

Vurdering av usikkerhetsfaktorer i gjennomføringen av enhetens årsplan og årsbudsjett. Beskriv eventuelle tiltak som er iverksatt for å redusere usikkerhet:

Instituttet har fokus på bundne midler, og følger opp disse postene fortløpende. Dette reduserer usikkerheten i instituttets regnskap. På grunn av lavere reell grunntildeling er instituttet avhengig av større andel overhead fra eksterne prosjekter. Instituttet har økt dekningsbidragsprosent for prosjektene.

Underskrift (rapporterende enhets leder):

BEVILGNING

Enhet: 152100-152160 Biologisk institutt
Periode: ÅRSAVSLUTNING

	HITTIL I ÅR				HELÅR			
	Budsjett	Regnskap	Avvik	Avvik i %	Årsbudsjett	Årsprognose	Avvik	Avvik i %
INNTEKTER								
Overført saldo fra i fjor	-8 733	-8 733	0	0 %	-8 733	0	-8 733	100 %
Bevilgning/bidrag fra KD	-89 146	-87 052	-2 094	2 %	-89 146	0	-89 146	100 %
Investeringer	2 317	5 402	-3 084	-133 %	2 317	0	2 317	100 %
Inntektsføring v/avskrivning		-286	286	ikke budsjett		0		ikke budsjett
Bevilgning/bidrag fra andre dept		0		ikke budsjett		0		ikke budsjett
Bidragsinntekter fra NFR		103	-103	ikke budsjett		0		ikke budsjett
Andre bidragsinntekter		-36 020	36	ikke budsjett		0		ikke budsjett
Oppdragsinntekter		-156 686	157	ikke budsjett		0		ikke budsjett
Egenandel	21 200	24 012	-2 812	-13 %	21 200	0	21 200	100 %
Andre inntekter	-6 770	-11 754	4 984	-74 %	-6 770	0	-6 770	100 %
Dekningsbidrag	-26 000	-28 569	2 569	-10 %	-26 000	0	-26 000	100 %
Sum inntekter	-107 132	-107 070	-61	0 %	-107 132		-107 132	100 %
KOSTNADER								
Varekost varer for ekst. videresalg				ikke budsjett		0	0	ikke budsjett
Fastlønn	40 746	42 027	-1 281	-3 %	40 746	0	40 746	100 %
Variabel lønn	1 755	3 556	-1 801	-103 %	1 755	0	1 755	100 %
Feriepenger	5 320	5 641	-321	-6 %	5 320	0	5 320	100 %
Sosiale kostnader	13 541	14 315	-774	-6 %	13 541	0	13 541	100 %
Offentlige refusjoner	-2 200	-1 929	-271	12 %	-2 200	0	-2 200	100 %
Frikjøp BOA	-6 000	-7 959	1 959	-33 %	-6 000	0	-6 000	100 %
Andre frikjøp		204	-204	ikke budsjett		0		ikke budsjett
Andre lønnskostnader		714	-714	ikke budsjett		0		ikke budsjett
Sum lønn	53 162	56 569	-3 408	-6 %	53 162	0	53 162	100 %
Internhusleie	27 535	27 535		0 %	27 535	0		100 %
Indirekte kostnader	792	1 089	-298	-38 %	792	0	792	100 %
Andre driftskostnader	19 956	19 861	95	0 %	19 956	0	19 956	100 %
Avskrivninger		286	-286	ikke budsjett		0	27 535	ikke budsjett
Sum kostnader	101 444	105 341	-3 897	-4 %	101 444		101 444	100 %
Finansinntekter/-kostnader		6	-6	ikke budsjett				ikke budsjett
Avsluttede prosjekter		81	-81	ikke budsjett				ikke budsjett
Resultat	-5 688	-1 642	-4 045	71 %	-5 688		-5 688	100 %
Utsatt aktivitet	4 500	3 006	1 494	33 %				ikke budsjett
Reelt resultat	-1 188	1 364	-2 551	215 %	-5 688		-5 688	100 %

Kommentarer til inntekter:

Bevilgning/bidrag fra KD: Instituttet har budsjettert med 2,9 mill NOK mer i inntekter for startpakker og stipendiater enn hva som ble mottatt. I tillegg ble det mottatt 800' NOK mer enn budsjettert for diverse ekstrabevilgninger (FØBI-støtte, MLS- og Lifescience-støtte). **Investeringer:** Det har vært større investeringer i ved instituttet enn budsjettert; innkjøp av instituttbiler, oppgradering av lokaler og mer bruk av investerings-tildelinger. **Egenandel/Dekningsbidrag/Frikjøp BOA:** Sees under ett. Kun mindre avvik. **Andre inntekter:** Større inntekter enn budsjettert ved instituttets felleavdelinger; Diverse laber 1,3 mill NOK, Forskningsfartøy 1,5 mill NOK, Drøbak forskningsstasjon 0,5 mill NOK, diverse andre konti 1,5 mill NOK, Totalt 4,8 mill NOK

Kommentarer til lønn:

Fastlønn: CEES har hatt flere ansettelser enn budsjettert, 400' NOK. Diverse andre bundne midler, 850' NOK. **Variabel lønn:** Instituttet har hatt mer variabel lønn ved følgende steder: Forskningsfartøyene, 600' NOK, Forskningsstasjon Finse 200 NOK ', Fytotron 100' NOK, disputas 150' NOK, andre diverse konti 700' NOK, totalt 1,75 mill NOK.

Kommentarer til drift, investeringer og avsluttede prosjekter:

Kommentarer til prognoseendringer:

Underskrift (rapporterende enhets leder):

BIDRAG-NFR

Enhet: 152100-152160 Biologisk institutt
 Periode: ÅRSVSLUTNING

	HITTIL I ÅR				HELÅR			
	Budsjett	Regnskap	Avvik	Avvik i %	Årsbudsjett	Årsprognose	Avvik	Avvik i %
INNETEKTER								
Overført saldo fra i fjor	-10 676	-10 676		0 %	-10 676		-10 676	100 %
Bevilgning/bidrag fra KD				ikke budsjett				ikke budsjett
Bevilgning/bidrag fra andre dept	-399	-399		0 %	-399		-399	100 %
Investeringer	6 189	2 704	3 486	56 %	6 189		6 189	100 %
Inntektsføring v/avskrivning		-164	164	ikke budsjett				ikke budsjett
Bidragsinntekter fra NFR	-58 420	-46 107	-12 313	21 %	-58 420		-58 420	100 %
Andre bidragsinntekter		-47	47	ikke budsjett				ikke budsjett
Oppdragsinntekter				ikke budsjett				ikke budsjett
Egenandel	-19 153	-20 963	1 810	-9 %	-19 153		-19 153	100 %
Andre inntekter		-375	375	ikke budsjett				ikke budsjett
Dekningsbidrag				ikke budsjett				ikke budsjett
Sum inntekter	-82 459	-76 027	-6 432	8 %	-82 459		-82 459	100 %
KOSTNADER								
Varekost varer for ekst. videresalg				ikke budsjett				ikke budsjett
Fastlønn	21 533	20 683	849	4 %	21 533		21 533	100 %
Variabel lønn	240	787	-547	-228 %	240		240	100 %
Feriepenger	2 613	2 578	35	1 %	2 613		2 613	100 %
Sosiale kostnader	7 008	6 763	244	3 %	7 008		7 008	100 %
Offentlige refusjoner	-414	-703	289	-70 %	-414		-414	100 %
Frikjøp BOA	6 895	7 690	-794	-12 %	6 895		6 895	100 %
Andre frikjøp		24	-24	ikke budsjett				ikke budsjett
Andre lønnskostnader	237	357	-120	-51 %	237		237	100 %
Sum lønn	38 112	38 179	-67	0 %	38 112		38 112	100 %
Internhusleie				ikke budsjett				ikke budsjett
Indirekte kostnader	22 373	22 819	-446	-2 %	22 373		22 373	100 %
Andre driftskostnader	13 700	7 746	5 954	43 %	13 700		13 700	100 %
Avskrivninger		164	-164	ikke budsjett				ikke budsjett
Sum kostnader	74 185	68 908	5 277	7 %	74 185		74 185	100 %
Finansinntekter/-kostnader				ikke budsjett				ikke budsjett
Avsluttede prosjekter		1	-1	ikke budsjett				ikke budsjett
Resultat	-8 274	-7 118	-1 156	14 %	-8 274		-8 274	100 %
Utsatt aktivitet				ikke budsjett				ikke budsjett
Reelt resultat	-8 274	-7 118	-1 156	14 %	-8 274		-8 274	100 %

Kommentarer til inntekter:

Investeringer: Forsinket bruk av utstyrstildeling ved prosjekt 143348 - 3 mill NOK, 142969 - 0,5 mill NOK, totalt 3,5 mill NOK **Bidragsinntekter fra NFR:** Forsinket tildeling på fire store prosjekter; 143348 - 5 mill NOK, 142957 - 4,9 mill NOK, 142984 - 1,5 mill NOK, 143334 - 0,9 mill NOK, totalt 12,3 mill NOK

Kommentarer til lønn:

Kommentarer til drift, investeringer og avsluttede prosjekter:

Forsinket aktivitet på flere store prosjekter. Derfor også tilsvarende reduserte tildelinger. Prosjekt 143348 - 2,2 mill NOK, 143334 - 1 mill NOK, 143324 - 1,3 mill NOK, 142969 - 1,1 mill NOK, totalt 5,6 mill NOK

Kommentarer til prognoseendringer:

Underskrift (rapporterende enhets leder):

BIDRAG ØVRIGE

Enhet: 152100-152160 Biologisk institutt

Periode: ÅRSAVSLUTNING

	HITTIL I ÅR				HELÅR			
	Budsjett	Regnskap	Avvik	Avvik i %	Årsbudsjett	Årsprognose	Avvik	Avvik i %
INNTEKTER								
Overført saldo fra i fjor	-5 968	-5 968		0 %	-5 968		-5 968	100 %
Bevilgning/bidrag fra KD				ikke budsjett				ikke budsjett
Bevilgning/bidrag fra andre dept	-780	-980	200	-26 %	-780		-780	100 %
Investeringer	457	539	-83	-18 %	457		457	100 %
Inntektsføring v/avskrivning		-104	104	ikke budsjett				ikke budsjett
Bidragsinntekter fra NFR				ikke budsjett				ikke budsjett
Andre bidragsinntekter	-7 939	-7 765	-175	2 %	-7 939		-7 939	100 %
Oppdragsinntekter				ikke budsjett				ikke budsjett
Egenandel	-2 955	-3 050	95	-3 %	-2 955		-2 955	100 %
Andre inntekter	-50	-121	71	-141 %	-50		-50	100 %
Dekningsbidrag				ikke budsjett				ikke budsjett
Sum inntekter	-17 235	-17 447	212	-1 %	-17 235		-17 235	100 %
KOSTNADER								
Varekost varer for ekst. videresalg				ikke budsjett				ikke budsjett
Fastlønn	4 773	4 892	-119	-3 %	4 773		4 773	100 %
Variabel lønn	182	193	-11	-6 %	182		182	100 %
Feriepenger	588	599	-12	-2 %	588		588	100 %
Sosiale kostnader	1 562	1 594	-32	-2 %	1 562		1 562	100 %
Offentlige refusjoner	-48	-172	124	-256 %	-48		-48	100 %
Frikjøp BOA	554	308	246	44 %	554		554	100 %
Andre frikjøp		-717	717	ikke budsjett				ikke budsjett
Andre lønnskostnader	54	121	-66	-123 %	54		54	100 %
Sum lønn	7 664	6 818	846	11 %	7 664		7 664	100 %
Intern husleie				ikke budsjett				ikke budsjett
Indirekte kostnader	4 566	4 578	-13	0 %	4 566		4 566	100 %
Andre driftskostnader	3 487	3 457	30	1 %	3 487		3 487	100 %
Avskrivninger		104	-104	ikke budsjett				ikke budsjett
Sum kostnader	15 717	14 957	760	5 %	15 717		15 717	100 %
Finansinntekter/-kostnader				ikke budsjett				ikke budsjett
Avsluttede prosjekter		-82	82	ikke budsjett				ikke budsjett
Resultat	-1 518	-2 572	1 054	-69 %	-1 518		-1 518	100 %
Utsatt aktivitet				ikke budsjett				ikke budsjett
Reelt resultat	-1 518	-2 572	1 054	-69 %	-1 518		-1 518	100 %

Kommentarer til inntekter:

Kommentarer til lønn:

Avvik ved frikjøp på 717.000 gjelder ompostering gjort av sted 151220 for feilpostering i 2009.

Kommentarer til drift, investeringer og avsluttede prosjekter:

Kommentarer til prognoseendringer:

Underskrift (rapporterende enhets leder):

OPPDRA

Enhet: 152100-152160 Biologisk institutt
 Periode: ÅRSAVSLUTNING

	HITTIL I ÅR				HELÅR			
	Budsjett	Regnskap	Avvik	Avvik i %	Årsbudsjett	Årsprognose	Avvik	Avvik i %
INNTEKTER								
Overført saldo fra i fjor	-75	-75		0 %	-75		-75	100 %
Bevilgning/bidrag fra KD				ikke budsjett				ikke budsjett
Bevilgning/bidrag fra andre dept				ikke budsjett				ikke budsjett
Bidragsinntekter fra NFR				ikke budsjett				ikke budsjett
Andre bidragsinntekter				ikke budsjett				ikke budsjett
Oppdragsinntekter				ikke budsjett				ikke budsjett
Investeringer				ikke budsjett				ikke budsjett
Inntektsføring v/avskrivning				ikke budsjett				ikke budsjett
Egenandel				ikke budsjett				ikke budsjett
Andre inntekter	-351	-514	162	-46 %	-351		-351	100 %
Dekningsbidrag				ikke budsjett				ikke budsjett
Sum inntekter	-426	-588	162	-38 %	-426		-426	100 %
KOSTNADER								
Varekost varer for ekst. videresalg				ikke budsjett				ikke budsjett
Fastlønn		2	-2	ikke budsjett				ikke budsjett
Variabel lønn		5	-5	ikke budsjett				ikke budsjett
Feriepenger				ikke budsjett				ikke budsjett
Sosiale kostnader				ikke budsjett				ikke budsjett
Offentlige refusjoner				ikke budsjett				ikke budsjett
Frikjøp BOA	126	283	-157	-125 %	126		126	100 %
Andre frikjøp				ikke budsjett				ikke budsjett
Andre lønnskostnader				ikke budsjett				ikke budsjett
Sum lønn	126	291	-165	-131 %	126		126	100 %
Internhusleie				ikke budsjett				ikke budsjett
Indirekte kostnader	41	121	-80	-196 %	41		41	100 %
Andre driftskostnader	114	104	10	9 %	114		114	100 %
Avskrivninger				ikke budsjett				ikke budsjett
Sum kostnader	281	515	-235	-84 %	281		281	100 %
Finansinntekter/-kostnader				ikke budsjett				ikke budsjett
Avsluttede prosjekter		157	-157	ikke budsjett				ikke budsjett
Resultat	-145	84	-229	158 %	-145		-145	100 %
Utsatt aktivitet				ikke budsjett				ikke budsjett
Reelt resultat	-145	84	-229	158 %	-145		-145	100 %

Kommentarer til inntekter:

Kommentarer til lønn:

Kommentarer til drift, investeringer og avsluttede prosjekter:

Kommentarer til prognoseendringer:

Underskrift (rapporterende enhets leder):

TOTAL

Enhet: 152100-152160 Biologisk institutt

Periode: ÅRSVSLUTNING

	HITTIL I ÅR				HELÅR			
	Budsjett	Regnskap	Avvik	Avvik i %	Årsbudsjett	Årsprognose	Avvik	Avvik i %
INNETEKTER								
Overført saldo fra i fjor	-25 452	-25 452		0 %	-25 452		-25 452	100 %
Bevilgning/bidrag fra KD	-89 146	-87 052	-2 094	2 %	-89 146		-89 146	100 %
Bevilgning/bidrag fra andre dept	-1 179	-1 379	200	-17 %	-1 179		-1 179	100 %
Investeringer	8 964	8 645	319	4 %	8 964		8 964	100 %
Inntektsføring v/avskrivning		-554	554	ikke budsjett				ikke budsjett
Bidragsinntekter fra NFR	-58 420	-46 004	-12 417	21 %	-58 420		-58 420	100 %
Andre bidragsinntekter	-7 939	-7 848	-92	1 %	-7 939		-7 939	100 %
Oppdragsinntekter		-157	157	ikke budsjett				ikke budsjett
Egenandel	-907		-907	100 %	-907		-907	100 %
Andre inntekter	-7 171	-12 763	5 592	-78 %	-7 171		-7 171	100 %
Dekningsbidrag	-26 000	-28 569	2 569	-10 %	-26 000		-26 000	100 %
Sum inntekter	-207 252	-201 133	-6 119	3 %	-207 252		-207 252	100 %
KOSTNADER								
Varekost varer for ekst. videresalg				ikke budsjett				ikke budsjett
Fastlønn	67 051	67 604	-554	-1 %	67 051		67 051	100 %
Variabel lønn	2 177	4 541	-2 363	-109 %	2 177		2 177	100 %
Feriepenger	8 521	8 819	-298	-3 %	8 521		8 521	100 %
Sosiale kostnader	22 111	22 672	-562	-3 %	22 111		22 111	100 %
Offentlige refusjoner	-2 663	-2 804	142	-5 %	-2 663		-2 663	100 %
Frikjøp BOA	1 575	322	1 253	80 %	1 575		1 575	100 %
Andre frikjøp		-489	489	ikke budsjett				ikke budsjett
Andre lønnskostnader	291	1 192	-901	-309 %	291		291	100 %
Sum lønn	99 063	101 857	-2 794	-3 %	99 063		99 063	100 %
Internhusleie	27 535	27 535		0 %	27 535		27 535	100 %
Indirekte kostnader	27 771	28 608	-837	-3 %	27 771		27 771	100 %
Andre driftskostnader	37 257	31 167	6 090	16 %	37 257		37 257	100 %
Avskrivninger		554	-554	ikke budsjett				ikke budsjett
Sum kostnader (inkl invest.)	191 626	189 721	1 905	1 %	191 626		191 626	100 %
Finansinntekter/-kostnader		6	-6	ikke budsjett				ikke budsjett
Avsluttede prosjekter		157	-157	ikke budsjett				ikke budsjett
Resultat	-15 626	-11 250	-4 376	28 %	-15 626		-15 626	100 %
Utsatt aktivitet				ikke budsjett				ikke budsjett
Reelt resultat	-15 626	-11 250	-4 376	28 %	-15 626		-15 626	100 %



Enhetsens ledelseskommmentar 3. tertial 2010

Instituttet har i flere år hatt nedslitte og utdaterte, små laboratorieenheter samtidig som det har vært et økende press på egnede kontorlokaler til en stadig økende gruppe av personer på institutt og senter (CEES). Enkelte rom og laboratorieenheter som ikke har tilfredsstilt tidens krav til bl.a. HMS-standard, er blitt oppgradert. Det har i 2010 medført store engangsutgifter på budsjettposten for vedlikehold og oppgradering av instituttets bruksarealer. I "oppgraderingsprosjektet" er også gjennomført en bedre samlokalisering av instituttets forskningsprogrammer og fakultetets satsingsmiljøer (MERC, toksikologi) i 4. etg. og en utvidelse av senterets arealer i 3. og 2. etg. Dette har medført store utgifter til renovering og oppussing av rom og arealer som ikke har vært oppgradert de siste 40 år. Dette var ikke innlagt i instituttets budsjett 2010, men har senere blitt lagt inn i det løpende budsjettet og er innmeldt i instituttets tertial-rapporter for 2010. Oppgradering og samlokalisering ble igangsatt i god dialog med fakultet og Teknisk Avdeling i januar 2010, men i januar 2011 er det fortsatt uavklart hvorvidt instituttet kan påregne seg tilskudd fra TAs budsjetter til alle fakturerte oppgraderings-tiltak i 2010. Ved årsavslutning er vedlikeholdsutgifter ført til utgift med NOK 1.850000 mot NOK 400.000 i budsjett 2010, dvs. en økning på NOK 1.45 mill. fra 2009 til 2010.

En sammenligning av resultat 2010 med foregående år viser en økning i undervisnings-/disputasutgifter som følge av økt kurstilbud og flere fullførte dr.grader.

Det har vært en viktig oppgave å få innestående midler på annumskonti for forskere og fellesavdelinger ("bundne midler") i omløp, noe instituttet har lykket godt med. Instituttets "bundne midler" er redusert fra NOK 11.3 mill. til NOK 5.5 mill., en reduksjon på NOK 5.8 mill. Dette har bl.a. bidratt til en ikke ubetydelig endring i resultat fra 2009 (- 2.827 mill.) til 2010 (-4.190 mill.), ført som underskudd i regnskap 2010 og i budsjett 2011.

Det er til enhver tid instituttets eksterne prosjektportefølge som i stor grad bestemmer forskningsfokus, oppbygging av infrastruktur og grad av aktivitet. Innhenting av dekningsbidrag på prosjekter har vist en stigende kurve i 2009 og 2010,, hvilket gir håp om ytterligere aktivitet og infrastruktur bygd opp rundt våre studenter og forskere i tiden fremover. Å huse og serve en stadig økende gruppe av personer, gir klare føringer og begrensninger, hvor instituttets økonomi til enhver tid blir avgjørende for hvilke tiltak som kan iverksettes.

Dato 26. januar 2011

Instituttleder, Biologisk institutt

Til: Instituttstyret ved Biologisk institutt

Sakstype: Vedtakssak

Saksnr.: V-SAK IS 4/2011

Møtedato: 17.03.11

Notatdato: 09.03.11

Saksbehandler: Ketil Bråthen/Eva Grøttland/Maren Onsrud

Sakstittel: Regnskap 2010 og budsjett 2011 SFF-CEES

Regnskap 2010:

Inntekter: Direkte inntekter fra NFR og UiO i 2010 er NOK 22 827 965, inkludert overførte midler fra 2009.

Lønnsutgifter: CEES har brukt NOK 1 514 686 mer enn budsjettert for 2010. Av dette er det et merforbruk av NFR-midler på NOK 560 592, og UiO-midler på NOK 954 093. Dette skyldes hovedsakelig flere tilsetninger enn planlagt i 2010.

Andre driftomkostninger: CEES har brukt NOK 1 063 656 mindre på generell drift enn budsjettert, fordelt på NOK 32 227 for UiO-midler og NOK 1 031 429 for NFR-midler. Årsaken til reduserte utgifter er i hovedsak utsatte aktiviteter knyttet opp mot drifting av midlertidig vitenskapelig personale (PhD'er), foruten reduserte utgifter ift publiseringsstøtte.

Budsjett 2011:

Inntekter: NFR-tildelingen (SFF'en): Forventede inntekter er korrigert ift revidert kontrakt med NFR. Noen inntekter har blitt overført fra 2010 til 2011.

Utgifter: Lønnsbudsjettet viser en betydelig økning i 2011 i forhold til 2010 på grunn av økt aktivitet og nyansettelser av midlertidig vitenskapelig personale. Driftsbudsjettet er redusert ift 2010, pga økte lønnsutgifter i 2011.

Forslag til vedtak: Regnskap 2010 og budsjett 2011 for CEES tas til etterretning uten anmerkninger

Vedlegg:

Budsjett og regnskap 2010

Budsjett 2011

Budsjett/Regnskap 31.12.10

	Basis UiO		NFR-SFF		Totalt	
Inntekter	Budsjett 2010		Budsjett 2010		Budsjett 2010	
Overføring fra 2009	-654 913		-959 784		-1 614 697	
Bevilgning	-2 000 000		-13 772 000		-15 772 000	
Publiseringsmidler (estimert)	-570 000	-544 000			-570 000	-544 000
Inger Maren Rivrud Godvik	-682 667				-682 667	
Annette Taugbøl	-682 667				-682 667	
Jan Husek	-682 667				-682 667	
Kvinneteknikerstilling matnat	-630 000				-630 000	
Likestillingstiltak - Liow	-287 600		-800 000		-1 087 600	
Stipendiatstilling (EMBIO) NCS	-625 000	-650 000			-625 000	-650 000
Stipendiatstilling (EMBIO) GPS		-456 667				-456 667
Nordisk posisjonering for NCOE søknadskrivning	-25 000				-25 000	
Totalt inntekter	-6 840 514	-7 296 181	-15 531 784	-15 531 784	-22 372 298	-22 827 965
Utgifter	Basis UiO	Basis	NFR-SFF	NFR	Totalt	Totalt
	Budsjett 2010	Regnskap 31.12.10	Budsjett 2010	Regnskap 31.12.10	Budsjett 2010	Regnskap 31.12.10
Totale lønnsrelaterte utgifter	3 442 799	4 219 121	9 827 432	10 420 903	13 270 231	14 640 024
Lønn(Unntatt frikjøp og lønn på likestillingstiltak)	3 442 799	4 219 121	8 325 597	8 625 997	11 768 396	12 845 118
Likestillingstiltak(lønn)			1 501 835	1 794 906	1 501 835	1 794 906
Refusjoner	-200 000	-208 949	-75 000	-190 965	-275 000	-399 914
Refusjoner permisjon	-200 000	-208 949	-75 000	-190 965	-275 000	-399 914
Bruk av fellestjenester hos Biologisk Institutt (overhead)	791 663	978 383	1 375 841	1 458 926	2 167 504	2 437 310
Lønn på basis(Unntatt frikjøp og lønn på likestillingstiltak)	791 663	1 024 283	1 165 584	1 207 640	1 957 247	2 231 923
Likestillingstiltak (overhead)			210 257	251 287	210 257	251 287
Tilbakeføring OH 2009 - kvinneingeniørstilling		-45 900			0	-45 900
Lønnskostnader	4 034 462	4 988 555	11 128 273	11 688 865	15 162 734	16 677 420
Reise, representasjon og møter/konferanser	1 300 000	1 644 721	100 000	0	1 400 000	1 644 721
Master/PhD konferanse 2010, inkl reise og hotell	250 000	311 621			250 000	311 621
SAB møte, akademiet, inkl reise og hotell	200 000	86 277	0		200 000	86 277
Div gjester CEES seminarer og lignende (inklusive arbeidsmøter)	850 000	1 246 823			850 000	1 246 823
Konferansestøtte CEES core medlemmer			100 000		100 000	0
Drift, publiseringsstøtte og diverse	1 090 000	713 052	3 097 912	2 166 483	4 187 912	2 879 535
Drift Embio,	30 000	-43 109			30 000	-43 109
Publiseringsstøtte til forskerne	570 000	305 000			570 000	305 000
Utgifter lab	100 000	56 524			100 000	56 524
Kollokvium 1 avslutte arbeid (Stipend til D. Griffin)	90 000	68 882			90 000	68 882
Kollokvium 2	200 000	250 167			200 000	250 167
Drift PhD'er			792 010	90 645	792 010	90 645
Drift post doc/ forskere			375 000	360 417	375 000	360 417
Drift til felt og lab prosjekter CEES	100 000	75 588	1 930 902	1 715 421	2 030 902	1 791 009
Rest til fordeling			165 000		165 000	0
Flowcytometer			39 817		39 817	0
Population of passing birds			106 183	163 056	106 183	163 056
Sheep grazing			61 394	25 000	61 394	25 000
Reaction norms in trout			47 760	59 355	47 760	59 355
Genetic and phenotypic data on passerines across Europe			27 350	40 771	27 350	40 771
Polyploid evolution			250 000	173 182	250 000	173 182
Honest signalling			185 000	247 791	185 000	247 791
Sekvensiering Jo Hermansen - CEES 2010-2012			200 000		200 000	
Etiopia			168 398	256 988	168 398	256 988
Årsrapporten			80 000	89 705	80 000	89 705
Genrell drift			600 000	659 573	600 000	659 573
Darwin 2010, formidlingstiltak	100 000	75 588			100 000	75 588
Driftskostnader	2 390 000	2 357 773	3 197 912	2 166 483	5 587 912	4 524 256
Nordisk posisjonering for NCOE søknadskrivning	25 000	15 352			25 000	15 352
Utstyr, investeringer			200 000	95 623	200 000	95 623
Totale utgifter	6 449 462	7 361 680	14 526 185	13 950 971	20 975 646	21 312 651
OVERSIKT						
Sum reel balanse	-391 052	65 499	-1 005 599	-1 580 813	-1 396 652	-1 515 314

Budsjett 2011

	Basis UiO Budsjett 2011	NFR-SFF Budsjett 2011	Totalt Budsjett 2011
Inntekter			
Overføring fra 2010	65 499	-604 813	-539 314
Bevilgning	-2 000 000	-11 904 000	-13 904 000
Publiseringsmidler (estimert)	-624 000		-624 000
Inger Maren Rivrud Godvik	-719 176		-719 176
Annette Taugbøl	-719 176		-719 176
Jan Husek	-719 176		-719 176
Lars Qviller	-719 176		-719 176
Paul Ragnar Berg	-719 176		-719 176
Kvinneteknikerstilling matnat	-630 000		-630 000
Likestillingstiltak		-849 000	-849 000
Stipendiatstilling (EMBIO) NCS	-650 000		-650 000
Stipendiatstilling (EMBIO) GPS	-650 000		-650 000
Totalt inntekter	-8 084 381	-13 357 813	-21 442 194
Utgifter	Basis UiO Budsjett 2011	NFR-SFF Budsjett 2011	Totalt Budsjett 2011
Totale lønnsrelaterte utgifter	4 879 312	10 334 174	15 213 486
Lønn(Unntatt frikjøp og lønn på likestillingstiltak)	4 879 312	10 334 174	15 213 486
Likestillingstiltak (lønn)			0
Refusjoner	-150 000	-300 000	-450 000
Refusjoner permisjon	-150 000	-300 000	-450 000
Bruk av fellestjenester hos Biologisk Institutt (overhead)	1 269 355	1 446 784	2 716 139
Lønn på basis(Unntatt frikjøp og lønn på likestillingstiltak)	1 269 355	1 446 784	2 716 139
Likestillingstiltak (overhead)			0
Lønnskostnader	5 998 667	11 480 958	17 479 626
Reise, representasjon og møter/konferanser	1 150 000	50 000	1 200 000
Master/PhD konferanse 2011, inkl reise og hotell	250 000		250 000
SAB møte, akademiet, inkl reise og hotell	100 000	0	100 000
Div gjester CEES seminarer og lignende (inklusive arbeidsmøter)	800 000		800 000
Konferansestøtte CEES core medlemmer		50 000	50 000
Drift, publiseringsstøtte og diverse	910 000	1 726 759	2 636 759
Drift Embio,	30 000		30 000
Publiseringsstøtte til forskerne	380 000		380 000
Utgifter lab	300 000		300 000
Kollokvium 2	200 000		200 000
Drift PhD'er		802 000	802 000
Drift post doc/ forskere		350 000	350 000
Drift til felt og lab prosjekter CEES	0	574 759	574 759
Rest til fordeling		165 000	165 000
Flowcytometer		39 817	39 817
Population of passing birds		-56 873	-56 873
Sheep grazing		36 394	36 394
Reaction norms in trout		-11 595	-11 595
Genetic and phenotypic data on passerines across Europe		-13 421	-13 421
Polyploid evolution		76 818	76 818
Honest signalling		-62 791	-62 791
Sekvensiering Jo Hermansen - CEES 2010-2012		200 000	200 000
Etiopia		-88 590	-88 590
Årsrapporten		90 000	90 000
Genrell drift		200 000	200 000
Driftskostnader	2 060 000	1 776 759	3 836 759
Utstyr, investeringer		100 000	100 000
Totalte utgifter	8 058 667	13 357 717	21 416 385
OVERSIKT			
Sum reel balanse	-25 713	-96	-25 809

BUDSJETTMAL 2011- FASTE STILLINGER

02.03.2011

CEES - Basis

Navn	SKO	Vilkår	Ltr	St. brøk ART	Sted	Prosj/Tiltak	Brutto mnd.lønn	TOTALT	jan.	feb	mar	apr	mai	jun	jul	aug	sep	okt	nov	des	DB-sats	DB
Berg Paul Ragnar			47	1,00			31 442	345 327	31 442	31 442	31 442	31 442	32 071	-4 934	32 071	32 071	32 071	32 071	32 071	32 071	30 %	146 902
Gaup Hege Junita			52	1,00			34 250	376 170	34 250	34 250	34 250	34 250	34 935	-5 375	34 935	34 935	34 935	34 935	34 935	34 935	30 %	160 023
Gundersen Gry 3 lønnstrinn			1	0,15			2 596	28 515	2 596	2 596	2 596	2 596	2 648	-407	2 648	2 648	2 648	2 648	2 648	2 648		0
Hermansen Jo Skreie			48	1,00			31 975	351 184	31 975	31 975	31 975	31 975	32 615	-5 018	32 615	32 615	32 615	32 615	32 615	32 615	30 %	149 394
Husek Jan			47	1,00			31 442	345 327	31 442	31 442	31 442	31 442	32 071	-4 934	32 071	32 071	32 071	32 071	32 071	32 071	30 %	146 902
Malmstrøm Martin			49	1,00			32 533	357 317	32 533	32 533	32 533	32 533	33 184	-5 105	33 184	33 184	33 184	33 184	33 184	33 184	30 %	152 003
Quiller Lars			48	1,00			31 975	351 184	31 975	31 975	31 975	31 975	32 615	-5 018	32 615	32 615	32 615	32 615	32 615	32 615	30 %	149 394
Rivrud Inger Maren			47	1,00			31 442	345 327	31 442	31 442	31 442	31 442	32 071	-4 934	32 071	32 071	32 071	32 071	32 071	32 071	30 %	146 902
Rygg Kari 3 lønnstrinn			1	0,15			2 596	28 515	2 596	2 596	2 596	2 596	2 648	-407	2 648	2 648	2 648	2 648	2 648	2 648		0
Taugbøl Annette			47	1,00			31 442	345 327	31 442	31 442	31 442	31 442	32 071	-4 934	32 071	32 071	32 071	32 071	32 071	32 071	30 %	146 902
Vikar Gaup			52	1,00			34 250	209 610							34 935	34 935	34 935	34 935	34 935	34 935		0
Voje Kjetil			49	1,00			32 533	357 317	32 533	32 533	32 533	32 533	33 184	-5 105	33 184	33 184	33 184	33 184	33 184	33 184	14 %	70 935

Sum til overføring - Hovedbudsjett

Fast lønn					5001 xxxxxx	410000		3 441 118	294 226	294 226	294 226	294 226	300 111	-46 171	335 046	335 046	335 046	335 046	335 046	335 046		
Feriepenge avsetning			12,00 %		5180 xxxxxx	410000		412 934	35 307	35 307	35 307	35 307	36 013	-5 541	40 205	40 205	40 205	40 205	40 205	40 205		
Pensjon			11,15 %		5421 xxxxxx	410000		422 295	32 806	32 806	32 806	32 806	33 462	33 462	37 358	37 358	37 358	37 358	37 358	37 358		
AGA (av Lønn/ Fp og Pensjon)			14,10 %		5401 xxxxxx	410000		602 965	51 090	51 090	51 090	51 090	52 112	-2 573	58 178	58 178	58 178	58 178	58 178	58 178		
Lønn								4 879 312	413 429	413 429	413 429	413 429	421 698	-20 822	470 787	470 787	470 787	470 787	470 787	470 787		
DB								1 269 355														
Totalt								6 148 667														

BUDSJETTMAL 2011- FASTE STILLINGER

02.03.2011

CEES - SFF																						
Lønnsøkning		102,0 %		St.		Brutto																
Navn	SKO	Vilkår	Ltr	brøk	ART	Sted	Prosjekt	Tiltak	mnd.lønn	TOTALT	jan.	feb	mar	apr	mai	jun	jul	aug	sep	okt	nov	des
Navn	SKO	Vilkår	Ltr	brøk	ART	Sted	Prosjekt	Tiltak	mnd.lønn	TOTALT	jan.	feb	mar	apr	mai	jun	jul	aug	sep	okt	nov	des
Ben Ari Tamara Myriam	1352		57	1,00					37 350	295 927	37 350	37 350	37 350	37 350	38 097	-5 861	38 097	38 097	38 097			
Gundersen Hege	1109		64	0,20					8 500	93 356	8 500	8 500	8 500	8 500	8 670	-1 334	8 670	8 670	8 670	8 670	8 670	8 670
Henderiks Jorijntje	1109		62	0,20					8 182	89 860	8 182	8 182	8 182	8 182	8 345	-1 284	8 345	8 345	8 345	8 345	8 345	8 345
Hoel Cecilia	1020		40	1,00					28 183	42 275	28 183	14 092										
Holen Øistein Haugsten	1109		60	1,00					39 383	432 551	39 383	39 383	39 383	39 383	40 171	-6 180	40 171	40 171	40 171	40 171	40 171	40 171
Junge Claudia	1020		47	1,00					31 442	31 442	31 442											
Kausrud Kyrre	1109		57	0,20					7 470	82 044	7 470	7 470	7 470	7 470	7 619	-1 172	7 619	7 619	7 619	7 619	7 619	7 619
Knudsen Endre	1017		49	1,00					32 533	65 067	32 533	32 533										
Labra Lillo Antonieta	1352		59	1,00					38 700	308 945				38 700	39 474	-6 073	39 474	39 474	39 474	39 474	39 474	39 474
Lagesen Karin	1352		60	1,00					39 383	432 551	39 383	39 383	39 383	39 383	40 171	-6 180	40 171	40 171	40 171	40 171	40 171	40 171
Lambrou Jayne Patricia	1408		46	0,80					24 733	221 192	24 733	24 733	24 733	24 733	25 228	-3 881	25 228	25 228	25 228	25 228	25 228	25 228
Liow Lee Hsiang	1109		61	1,00					40 133	440 788	40 133	40 133	40 133	40 133	40 936	-6 298	40 936	40 936	40 936	40 936	40 936	40 936
Omholt Stig W	1183		86	0,50					35 721	441 642	42 865	42 865	42 865	42 865	43 722	-6 727	43 722	43 722	36 435	36 435	36 435	36 435
Reitan Trond	1352		59	1,00					38 700	425 045	38 700	38 700	38 700	38 700	39 474	-6 073	39 474	39 474	39 474	39 474	39 474	39 474
Rueness Eli Knispel	1109		67	0,20					8 978	206 350	44 892	44 892	44 892	8 978	9 158	-1 409	9 158	9 158	9 158	9 158	9 158	9 158
B-tillegg	1109		67	0,10					4 489	35 837				4 489	4 579	-704	4 579	4 579	4 579	4 579	4 579	4 579
B-tillegg	1109		67	0,10					4 489	35 837				4 489	4 579	-704	4 579	4 579	4 579	4 579	4 579	4 579
Sadykov Alexander	1017		47	1,00					31 442	141 802	31 442	31 442	31 442	31 442	16 035							
Stenseth Nils Christian	1404		90	1,00					78 675	864 094	78 675	78 675	78 675	78 675	80 249	-12 346	80 249	80 249	80 249	80 249	80 249	80 249
Sæther Stein Are	1109		61	1,00					40 133	440 788	40 133	40 133	40 133	40 133	40 936	-6 298	40 936	40 936	40 936	40 936	40 936	40 936
Wallem Tore	1408		58	1,00					38 017	337 370	36 708	36 708	38 017	38 017	38 777	-5 966	38 777	38 777	38 777	38 777	38 777	38 777
Yedid Gabriel	1352		58	1,00					38 017	417 540	38 017	38 017	38 017	38 017	38 777	-5 966	38 777	38 777	38 777	38 777	38 777	38 777
Schweder Tore			74	0,25					12 817	140 767	12 817	12 817	12 817	12 817	13 073	-2 011	13 073	13 073	13 073	13 073	13 073	13 073
Jentoft Sissel	1434		62	1,00					40 908	208 633							41 727	41 727	41 727	41 727	41 727	41 727
Hutchings Jeffrey	1183		74	0,20					10 253	81 238	10 253	10 253	10 253	10 253	10 458	-1 609	10 458	10 458	10 458			
Richter Andries Peter	1108		47	1,00					31 442	62 883	31 442	31 442										
Rogers Lauren			57	0,50					18 675	91 191		18 675	18 675	18 675	19 049	-2 931	19 049					
Hernandez-Aquillar Adriana			57	0,50					18 675	167 759			18 675	18 675	19 049	-2 931	19 049	19 049	19 049	19 049	19 049	19 049
Jorgensen Marthe			49	1,00					32 533	65 067			32 533	32 533								
Grottdland Eva			61	1,00					40 133	320 388				40 133	40 936	-6 298	40 936	40 936	40 936	40 936	40 936	40 936
Coll II			57	1,00					37 350	260 818					38 097	-5 861	38 097	38 097	38 097	38 097	38 097	38 097
Sum til overføring - Hovedbudsjett																						
Fast lønn									5001 xxxxxx	410000												
Feriepenge avsetning				12,00 %					5180 xxxxxx	410000												
Pensjon				11,15 %					5421 xxxxxx	410000												
AGA (av Lønn/ Fp og Pensjon)				14,10 %					5401 xxxxxx	410000												
									Lønn	10 334 174	988 148	950 408	914 507	987 431	991 551	-45 807	969 020	1 000 885	990 646	922 419	832 483	832 483
									DB 14%	1 446 784												
									Totalt	11 780 958												

Budsjett Basis UiO	2009	2010	2011	2012	2013	2014	2015	2016	2017
Inntekter Basis UiO									
Overføring	-1 513 527	-654 913	65 499	-25 714	107 801	199 558	-189 052	-146 953	-104 854
Bevilgning Matnat basis	-2 000 000	-2 000 000	-2 000 000	-2 000 000	-2 000 000	-2 000 000	-2 000 000	-2 000 000	-2 000 000
Publiseringsmidler (estimert)	-570 000	-544 000	-624 000	-600 000	-600 000	-600 000	-600 000	-600 000	-600 000
Inger Maren Rivrud Godvik	-667 000	-682 667	-719 176	-1 198 333	-719 176	-719 176	-719 176	-719 176	-719 176
Annette Taugbøl	-667 000	-682 667	-719 176	-1 078 500					
Lars Quiller			-719 176	-719 176	-719 176	-719 176			
Jan Husek	-667 000	-682 667	-719 176	-719 176	-719 176	-719 176	-719 176	-719 176	-719 176
Paul Ragnar Berg			-719 176	-719 176	-719 176	-719 176			
Nettosum tildeling stip midler 2008: tillegg pga tidlig tils.-trekk pga sen tils.	440 000								
Kvinneteknikerstilling matnat	-610 000	-630 000	-630 000						
Forskerskolen	-50 000								
Likestillingstiltak	-100 000	-287 600							
Nordisk posisjonering for NCOE søknadskrivning		-25 000							
Darwin 2009, formidlingstiltak - overført fra 2008	-50 000								
Stipendiatstilling (MLSUiO) GPS		-456 667	-650 000	-650 000	-650 000	-223 333			
Stipendiatstilling (MLSUiO) NCS	-625 000	-650 000	-650 000	-650 000					
Totalt inntekter Basis UiO	-7 079 527	-7 296 181	-8 084 381	-8 360 075	-6 018 903	-5 500 479	-4 227 404	-4 185 305	-4 143 206
Kostnader Basis UiO									
Lønnskostnader	3 214 064	4 010 172	4 729 312	4 696 868	2 600 361	1 952 479	1 073 211	1 073 211	1 073 211
Bruk av fellestjenester	829 233	978 383	1 269 355	1 771 008	1 018 100	758 947	407 240	407 240	407 240
Drift	2 381 317	2 373 125	2 060 000	2 000 000	2 600 000	2 600 000	2 600 000	2 600 000	2 662 755
Totale kostnader	6 424 614	7 361 680	8 058 667	8 467 876	6 218 461	5 311 427	4 080 451	4 080 451	4 143 206
Overføring til neste år	-654 913	65 499	-25 714	107 801	199 558	-189 052	-146 953	-104 854	0

Budsjett NFR-SFF	2007	2008	2 009	2 010	2 011	2 012	2 013	2 014	2 015	2 016	2 017	Totalt
Inntekter NFR-SFF												
Overføring			-1 380 513	-959 784	-604 813	-96	-81 878	-8 849	-96 474	-129 188	133 161	
Opprinnelig CEES-Bevilgning	-2 912 000	-6 338 000	-9 296 661	-12 772 000	-11 904 000	-11 427 339	-11 100 000	-11 000 000	-9 000 000	-8 200 000	-6 050 000	-100 000 000
Bevilgning til likestillingstiltak			-800 000	-824 000	-849 000							-2 473 000
Totalt inntekter NFR-SFF			-11 477 174	-14 555 784	-13 357 813	-11 427 435	-11 181 878	-11 008 849	-9 096 474	-8 329 188	-5 916 839	
Kostnader NFR-SFF												
Lønnskostnader			7 762 844	10 229 938	10 034 174	8 680 313	8 528 973	8 300 329	6 594 110	6 238 903	4 741 794	
Bruk av fellestjenester			1 030 868	1 458 926	1 446 784	1 215 244	1 194 056	1 162 046	923 175	873 446	663 851	
Drift			1 723 678	2 166 484	1 776 759	1 250 000	1 250 000	1 250 000	1 250 000	1 250 000	511 194	
Investeringer				95 623	100 000	200 000	200 000	200 000	200 000	100 000		
Totale kostnader			10 517 390	13 950 971	13 357 717	11 345 557	11 173 029	10 912 375	8 967 285	8 462 350	5 916 839	
Overføring til neste år			-959 784	-604 813	-96	-81 878	-8 849	-96 474	-129 188	133 161	0	

Til: Instituttstyret ved Biologisk institutt

Sakstype: Orienteringssak

Saksnr.: O-SAK IS 1/2011

Møtedato: 17.03.2011

Notatdato: 09.03.2011

Saksbehandler: Trond Schumacher

Sakstittel: MN-fakultetets Life science strategi

Tidligere vedtak i saken/Plandokumenter/Henvisning til lovverk etc.:

O-sak 3/2010 MATNAT21 og Life Science

De viktigste problemstillinger:

Arbeidet med Life Science (LS)-satsningen på fakultetet har avdekket behov for en helhetlig gjennomgang av LS-aktiviteter ved fakultetet for å oppnå en optimal satsning. Målet er å utvikle et mindre antall robuste og tverrfaglige satsinger som skal utgjøre fundamentet i fakultetets LS strategi for perioden 2010 – 2020. En arbeidsgruppe bestående av instituttlederne ved Biologisk institutt, Institutt for molekylær biovitenskap og Farmasøytisk institutt har utarbeidet en rapport som allerede har vært framlagt og diskutert med instituttledere og LS satsingsledere ved fakultetet. Denne rapporten legges nå fram for styret og instituttets forskningsprogrammer. Fakultetet ønsker i det videre arbeidet å trekke inn faggrupper i biofysikk, biomatematikk/statistikk og computational life science (bioinformatikk) i større grad også som bidragsytere innenfor fakultetets LS satsninger. Likeledes er planlagt en gjennomgang av LS-utdanningen ved fakultetet i løpet av våren.

Vedlegg:

- Life Science ved Det Matematisk-naturvitenskapelige fakultet. Mandat og oppnevning
- Life Science profil ved MN-fakultetet – Et innspill fra Biologisk institutt, Farmasøytisk institutt og Institutt for molekylær biovitenskap ved instituttlederne

Life Science ved Det matematisk-naturvitenskapelige fakultet

Mandat og oppnevning

Bakgrunn

Life science (LS) prosessen ved Det matematisk-naturvitenskapelige fakultet (MN) ble initiert på det første Holmen-møtet i 2007 – og har ført til utvelgelse av 17 satsningsmiljøer innen LS. Et mål med utnevning av satsningsmiljøer er å få fram forskningsmiljøer av ypperste nasjonale og internasjonale klasse. Et annet mål er å få til økt samarbeid både innad i og mellom faggrupper på ulike institutter. Dette skal igjen føre til både mer effektiv utnyttelse av forskningsmidler, bedret konkurransedyktighet i forhold til eksterne bevilgninger og en styrket evne til å gjøre fag-strategiske valg ved institutter og i fagmiljøer. LS-feltet har sterk tilknytning til biomedisinsk forskning som foregår ved andre fakultet – først og fremst ved de Odontologiske og Medisinske fakultetene. MLS – UiO (Molecular Life Science ved UiO) er blitt opprettet for å være en brobygger når det gjelder interfakultære aktiviteter innen LS-feltet. MNs strategiske tenkning og planer på LS-feltet må koordineres med MLS.

De biologiske fagene ekspanderer kraftig (og har gjort det i flere tiår) og er blitt en betydelig premissleverandør for de tradisjonelle ”tunge” realfagene slik som matematiske fag, informatikk, kjemi og fysikk. Systembiologi og syntetisk biologi er nye fag som ytterligere utfordrer hva biologer må kunne. Dette er en utvikling som visker ut de tradisjonelle faggrensene og driver fram tverrfaglighet innen bio-feltet. Det er også en trend fra laboratorieorientert virksomhet til *in silico* orienterte aktiviteter. Framtidig vil mange eksperimenter kunne utføres ved datamaskinene heller enn i laboratoriet – simuleringer og bioinformatiske verktøy blir viktige.

Arbeidet med LS-satsningen har vist til tydelighet at det er behov for en helhetlig gjennomgang av LS-aktiviteter ved MN for å oppnå en optimal satsning. Dette er bakgrunnen for opprettelsen av komiteen.

Målsetting

MN har som målsetting å gjøre LS til et fagfelt dominert av toppforskningsmiljøer - internasjonalt sett – og klart ledende i Norge. LS-profilen skal bidra til å trekke de beste studentene til MN og bidra til internasjonalisering.

Mandat

Arbeidsgruppen skal i sitt arbeid:

- **Med utgangspunkt i en definisjon av fagområdet Life Science**
 - Identifisere de faglige retningene som MN bør ha som hovedsatsninger innen LS-området. - En vurdering av hovedsatsningene må bygge på en lokal (UiO), regional (Oslo regionen), nasjonal og internasjonal forståelse og prioritering .
 - Gi en vurdering av opptrapping og evt. nedtrapping av pågående aktivitet.
 - Forslag til framtidige prioriteringer må også inkludere vurderinger av relevante samfunnsbehov
- **Med utgangspunkt i de foreslåtte innsatsområder**
 - Gjennomgå dagens faglige struktur og evt. foreslå en ny struktur med vekt på hvordan LS-aktivitetene ved MN best kan optimaliseres. I dette arbeidet skal det legges vekt på:
 - a) om og evt. hvilke faglige konsolideringer som bør gjennomføres for å sikre maksimalt faglige positive effekter
 - b) muligheten for opprettelser av store tverrgående tematiske satsninger (hvor respektive lokale miljøer kan innrulleres)
 - c) hvordan relevante teknologiplattformer ved MN tettere kan knyttes opp til de sentrale biologiske problemstillingene og forskningsmiljøene innen LS (tettere integrering mellom teknologi og biologi)
- **Gjennomgå hvordan undervisningen innen Life Science feltet kan styrkes**
 - Se LS relevant utdanning ved UiO i et helhetlig perspektiv. Dette bør også ta utgangspunkt i det arbeidet som gjøres med Utdanningsstrategi under MATNAT21
- **Utarbeide et forslag til fremdriftsplan for reformene i LS-feltet ved MN**

Ferdigstillelse

Endelig innstilling forventes levert **20 mai 2010**. Det tas sikte på at Arbeidsgruppen i samarbeid med Fakultetet legge fram rapporten på et større heldagsseminar.

Sammensetning av arbeidsgruppe

Det har vært ønskelig å holde arbeidsgruppen liten. Samtidig er det flere institutter som berøres sterkt av denne strategien. Arbeidsgruppens medlemmer får derfor også et konkret ansvar for å være kontaktpersoner mot ett av de andre instituttene for å holde dem informert og innhente innspill. Kontakt med øvrige miljøer (sentre, satsinger senternoder) vil også være viktig, men er ikke formalisert gjennom arbeidsgruppen.

Arbeidsgruppen foreslås sammensatt av:

- Bengt Söderström, Universitetet i Lund (leder)
- Kjetill S. Jakobsen, biologisk institutt (kontaktperson for Fysisk institutt)

- Instituttleder Biologisk Institutt, Trond Schumacher (kontaktperson for Matematisk institutt)
- Instituttleder Institutt for molekylær biovitenskap, Finn-Eirik Johansen (kontaktperson for Institutt for informatikk)
- Direktør Farmasøytisk institutt, Karen Marie Ulshagen (kontaktperson for Kjemisk institutt)
- En studentrepresentant oppnevnt av MNSU

Arbeidsgruppen vil bli tildelt sekretærkapasitet.

Måsetting

MN har som målsetting å gjøre Life Science (LS) til et fagfelt dominert av toppforskningsmiljøer – internasjonalt sett – og klart ledende i Norge. LS-profilen skal bidra til å trekke de beste studentene til MN og bidra til internasjonalisering.

Spesifikke delmål

- MN skal prege større nasjonale satsinger innen LS
- MN skal koordinere eller delta i norske noder i EU-satsinger
- MN skal utnytte mulighetene MLS^{UIO} gir for samhandling på UiO innen LS
- MN skal utvikle nye flerfaglige undervisningsprogrammer innen LS
- MN skal øke innovasjon og samarbeid med industri innen LS

Biologiens tidsalder er et faktum

De biologiske fagene ekspanderer kraftig og er i dag en betydelig premissleverandør for "tunge" realfag som matematiske fag, informatikk, kjemi, og til dels geofag og fysikk. Life Science (LS) er det begrep vi ved MN finner mest hensiktsmessig å benytte for å beskrive biologiens økte innflytelse. LS-konseptet favner basal organismeorientert biologi (evolutionary and organismic biology), genetikk, molekylærbiologi, biokjemi, farmasi og deler av den strukturelle kjemien, analytisk kjemi, biofysikk samt deler av statistikk og informatikk. Samlet er dette en dominerende forskningsvirksomhet ved MN. Utover MN-fakultetet er de medisinske og odontologiske fagene også tungt forankret i biologi og molekylærbiologi; spesielt innenfor de medisinske og odontologiske basalfagene (biomedisin). Våre MN kandidater er meget konkurransedyktige når det gjelder jobber innen biomedisinfeltet.

Framtidige måsettinger – Life Science

UiO er et LS universitet. I Oslo er LS-aktivitetene ytterligere styrket ved at våre ledende sykehus ligger i Oslo og Oslo-området. Videre bidrar NVH, UMB og de mange forskningsinstituttene som VI, NIVA, NINA etc. til ytterligere styrking av LS profilen i Oslo-området. Stilt overfor LS-feltets komplekse problemstillinger, som i dag krever ny, tilgjengelig teknologi, vil økende grad av tverrfaglig kompetanse i forskningsgruppene være avgjørende for å kunne møte de faglige utfordringene og de nye forskningsoppgavene. Overordnede strategiske planer for LS-området krever velfunderte målsettinger og virkemidler.

LS involverer ofte tverrfaglige initiativ og samarbeid, og bør derfor være særdeles egnet til å danne store forskningsgrupper. Store forskningsgrupper vil bidra til å gi mer resultater ut av hver forskningskrone bevilget – samt bidra til å rive ned kulturforskjeller innen fagene. Ikke minst derfor er en satsing på LS et strategisk grep egnet til å styrke MN.

En vellykket LS-satsing vil ha implikasjoner for de medisinske fagene. Grensen mellom biologi/molekylær biologi og biomedisin er ikke-eksisterende. Undervisningen i biomedisin ved Det medisinske fakultet (MF) bør kunne samkjøres med MNs undervisning, og MF og MN behøver en felles politikk med hensyn på det faktum at MN utdanner mange av de kommende generasjoners biomedisinske forskere (som skal arbeide ved MF).

Anbefalinger

Med bakgrunn i eksisterende fagområder og kjernefasiliteter ved instituttene legger vi her frem anbefalinger til hovedsatsinger innen LS ved MN. Disse vil kunne deles inn i rene satsinger med utspring i allerede eksisterende satsingsområder og faggrupper, og kompetanseplattformer rettet inn mot kjernefasilitetene ved MN som krever videre utvikling på tvers av instituttene. Men først noen ord om en av hovedutfordringene, den eksisterende instituttstrukturen.

Instituttstrukturen

Den største utfordringen for LS ved MN i dag er små og fragmenterte miljøer som ikke klarer å hevde seg i nasjonal og internasjonal konkurranse om de større prosjektene, som bl.a. krever flerfaglig tilnærming. Tre institutter, BI, IMBV og FAI, er i sin helhet innenfor LS-feltet og flere forskningsgrupper innen KI faller også innunder LS. I tillegg er andre MN-institutter berørt i større eller mindre grad. IFI bidrar betydelig til en nyorganisering av computational LS på UiO. I tillegg til de tre fakultetene med LS aktivitet (MN, MF og OF) har UiO to sentre direkte plassert under MLS, Bioteknologisenteret (BIO) og Norwegian Centre for Molecular Medicine (NCMM). Det har nylig blitt vedtatt en felles organisering av disse sentrene med felles leder i UiO-styret. Det er både en styrke og en utfordring å ha disse sentrene som driver ”konkurrerende” virksomhet med grunnenhetene med annerledes rammebetingelser. På sikt bør MN arbeide for at disse sentrene inkorporeres bedre i UiOs grunneheter (institutter) enn i dag.

Et mer integrert samarbeid mellom de 3-4 LS-instituttene (deler av KI inkludert) ved MN er nødvendig for å møte morgendagens utfordringer. Forsknings samarbeid er det som synes å fungere best på tvers av de nåværende instituttgrensene. Innen dagens instituttstruktur har det vært mulig å opprette og utvikle flere tverrfaglige forskningsgrupper med deltagelse fra flere institutter (for eksempel Glyconor som er representert ved tre institutter). Samarbeid innen undervisning fungerer delvis på tvers av instituttene i regi av programstrukturen. Her er det imidlertid rom for forbedringer. Finansieringsmodellen fører til suboptimale løsninger, og instituttene tenderer til å ville skreddersy egne undervisningsopplegg. Samarbeid i administrative funksjoner kan fungere på tvers av instituttgrenser, men forutsetter samlokalisering. Det har vært mulig å få til administrativ rasjonalisering mellom de samlokaliserte instituttene (BI og IMBV) uten sammenslåing (BI og IMBV har siste år slått sammen økonomiavdelinger, ansatt felles HMS-prosjektleder, planlegger felles innkjøpsseksjon etc.).

Det er likevel mulig at etablering av nye, større og flerfaglige forskningsgrupper innen LS lettere vil kunne oppnås dersom man fikk ett stort LS-institutt ved MN. Dette ville også styrke LS-profilen på MN utad. For å oppnå dette måtte man slå sammen BI, IMBV, FAI og deler av KI (som følgelig må deles). Den potensielle gevinsten ved et stort LS-institutt, både innen forskning og innen undervisning, vil være langt større enn gevinsten ved å sammenslå BI og IMBV alene. Disse to instituttene viser allerede at de samhandler godt som to institutter. En innlemming av Farmasøytisk institutt i et LS-institutt, vil kreve at farmasiprogrammene får en tydelig og sterk organisering slik at profesjonsforankringen opprettholdes.

En etablering av det anbefalte store LS-instituttet vil ha betydelige konsekvenser for fakultetet. En rekke støtte- og kontrollfunksjoner, som i dag er sentralisert på fakultetet, forutsettes flyttet til et storinstitutt, som kan ivareta disse oppgavene på en effektiv måte i nærhet til de vitenskapelig ansatte. Dette vil påvirke fakultetets evne til å ivareta tilsvarende

behov hos mindre institutter. Etableringen av et stort LS-institutt bør derfor være en pådriver for faglig begrunnet fusjon mellom institutter på MN-fakultetet også utenfor LS-området.

Faglige satsingsområder for MN

Vedlegg 1 er en kortfattet beskrivelse av dagens MN-satsinger innen LS området. Med MN-fakultetets målsetting og delmål for øyet vil det være et grunnlag for å danne mer robuste forskningsgrupper med flere faste vitenskapelige ansatte. Vi har indikert mulige temaer for forsterkede satsinger og hvilke nåværende satsinger som kunne bidra med kompetanse til de ulike nye forskningsgruppene.

- 1) Evolusjon, inklusive komparativ genomikk og metagenomikk – miljøer ved MN som i første rekke vil kunne bidra her er CEES, Micro-NET (MERG, LaMDa, Koomey v/IMBV), Matematisk inst. (statistikk og biostatistikk), IFI (computational LS {se nedenfor}) og bioinformatikk)
- 2) Epigenetikk, genregulering og transkriptomikk – GREC, CEES, MERG, BIFF, MURES
- 3) Strukturbiologi – ProtStruc, SMS, Glyconor, Legemiddelkjemi
- 4) Subcellulær trafikkering og protein-protein interaksjoner – CIR-noden, Glyconor, GREC, Griffiths og Fyhn (v/IMBV - se også Bio-imaging), Therapy group (IMUP), ProTarg, Toksikologi (nevrobiologi)
- 5) Bioanalyse (inkl. proteomikk) – Bioanalytics, Glyconor
- 6) Computational LS – opprettet på IFI, se vedlegg 3
- 7) Systembiologi – inkl. MN-fakultetets økologi- og miljøforskning- CEES, Integrativ biologi og Marinbiologi (begge BI-satsinger), MERG, BIFF
- 8) Bionanoteknologi – SiteDel, Pharamlux lab, deler av Micro-NET, Griffiths v/IMBV

Teknologiplattformen

Deler av LS-forskningen driver i dag fram et kontinuerlig behov for ny avansert og kostbar teknologi. MN bør støtte opprettelse og drift av teknologiplattformen slik at forskerne får tilgang til nødvendig teknologi som enten er for kostbar eller for avansert til å kunne etableres i enkeltstående forskningsgrupper. Teknologiplattformen skal dekke et reelt behov og tilby service til andre forskningsmiljøer. Teknologiplattformen bør tilby opplæring, være pådriveren for implementering av ny teknologi ved MN og være forankret i grunnenhetens strategi. Teknologiplattformen skal samarbeide og koordineres med tilsvarende plattformen støttet av MLS, MF og OUS (se vedlegg 4 for MLS/EMBIO-støtte til teknologiplattformen i perioden 2002-2010). Nedenfor skisseres teknologiplattformen av viktighet for morgendagens LS-forskning ved MN. Se vedlegg 2 for en beskrivelse av dagens situasjon.

1. Sekvenserings- og genomikk-plattformen:

Plattformen er en nødvendig fasilitet for mange brukergrupper internt ved UiO, nasjonalt og internasjonalt, i første rekke innen evolusjons- og genomikkforskningen, den molekylært funderte økologi- og systembiologi- forskningen og den strukturelle (komparative) og funksjonelle genom-forskningen. UTSP har så langt representert et stort løft på grunn-nivå, som nå bør løftes og driftes som det den er: en enhet innen LS-satsingen ved MN-fakultetet og UiO. Plattformen må kobles mot ELIXIR (European Life Sciences Infrastructure for Biological Information) så vel som plattformen Computational Life Science v/ UiO. BI, i

samhandling med fakultetet, har forpliktet seg overfor NFR å sikre driften av UTSP - enheten utover prosjektperioden (etter 2010).

1.1. ABI-lab (www.bio.uio.no/ABI-lab)

Opprettet i 2005 som et resultat at samarbeide mellom BI og IMBV. ABI-lab utfører DNA-sekvensering og fragmentanalyse, og fungerer som en servicelab for brukergrupper nasjonalt og internasjonalt. Bio-instituttene, NHM, Med.-fak. og Ullevål universitetssykehus og eksterne brukere fra Universitetsstudiene på Svalbard, Høgskolen i Oslo, UMB, Statens arbeidsmiljøinstitutt, VH (Veterinærhøgskolen), Sveriges lantbruksuniversitet og Göteborgs universitet er storbrukere av plattformen.

1.2. Ultra high-throughput sequencing platform (UTSP)/Norwegian High-Throughput Sequencing Centre – GS-FLX lab (www.sequencing.uio.no)

I 2007 ble Biologisk institutt/CEES/UMB tildelt midler fra Forskningsrådets program for funksjonell genomforskning (FUGE) til å etablere UTSP som en nasjonal serviceplattform innen sekvensering. Plattformen har vært operativ fra januar 2008. I 2009 ble det initiert et samarbeid mellom UTSP og sekvenseringsplattformen ved Oslo universitetssykehus HF, Avdeling for medisinsk genetikk, Ullevål, for å etablere et nasjonalt sekvenseringssenter "Norwegian High-Throughput Sequencing Centre – NSC". Høsten 2009 ble NSC tildelt 23 mill. kroner fra NFR til videre konsolidering av denne plattformen, og kjøp av tredje generasjons sekvenseringsutstyr. De to nodene ved NSC tilbyr komplimenterende service innen "high-throughput" sekvensering.

UTSP har siden etableringen hatt en kraftig økning i antall brukere, en trend som ser ut til å fortsette. UTSP har brukere fra UiO, andre nasjonale universiteter, og internasjonale utdannings- og forskningsinstitusjoner. I 2009 ble torskengenomet fullsekvensert ved hjelp av "high-throughput sequencing".

2. Strukturbiologi:

En strukturbiologiplattform for LS har fokus på bestemmelse av tredimensjonale strukturer av hovedsakelig proteiner, men også andre biomolekyler. Det er tre hovedteknikker (beskrevet nedenfor), samt flere spektroskopiske teknikker (for eksempel Raman, EPR, CD/ORD) som må dekkes av en slik plattform. Strukturbiologi i Oslo utføres i dag både ved MN, OUS/MF (Rikshospitalet) og ved NCMM. Selv om disse samarbeider i dag, er spredningen av kompetansen ugunstig for UiO. Til tross for at Oslo-miljøet er langt større en Tromsø, og for eksempel tildeles mer "beam time" av European Synchrotron Radiation Facility, oppfattes Tromsø-miljøet som større av NFR og andre nasjonale aktører. Av enheter med strukturbiologi ved UiO er det MN som er størst og benytter det bredeste register av teknologier. Det er derfor naturlig at MN tar føringen i en samling (virtuell eller reell) av strukturbiologien ved UiO. Strukturbiologi er på European Strategy Forum on Research Infrastructures Road Map (ESFRI-veikartet; project INSTRUCT), men her er Norge ikke med. Det burde være et mål at vi er med i det Europeiske samarbeidet.

2.1 Røntgendiffraksjon

Røntgendiffraksjon benyttes til å bestemme proteinstrukturer (og mindre molekyler) med høy oppløsning. Dette er en helt nødvendig teknikk for strukturbiologien og for organisk kjemi generelt. Utstyrmessig er det i tillegg til diffraktometere (for store, men også mindre molekyler) behov for automatiske krystallisering og screening systemer. Synkrotronkildene utgjør svært viktig infrastruktur innen protein-krystallografien. Denne type instrumentering er viktig for store brukergrupper ved fakultetet. Organisk kjemi ved KI, FAI samt biofysikk (FyI) er avhengig av enkrystallrøntgen for mindre molekyler. Proteinkrystallografi er mer

spesialisert. Det er i dag tre proteinkrystallografigrupper i Oslo (Krengel - KI, Bjørås - Rikshospitalet, Andersson - IMBV). En fjerde gruppe er nylig etablert (Morth - NCMM).

2.2 NMR-spektroskopi

En bred NMR infrastruktur er nødvendig for å dekke behovene innen hele LS segmentet. Det er formålstjenlig å dele instrumenteringen inn i høyfelt (600 MHz og høyere) og lavfelt (600 MHz og lavere). Høyfeltinstrumentering er nødvendig for studier av proteiner og store suktermolekyler samt molekyler i tynne konsentrasjoner. Det er en aktivitet innen protein-NMR ved IMBV. Lavfeltinstrumentering er helt essensiell for all aktivitet innen organisk kjemi ved KI og FAI inklusiv medisinalkjemi og studier av prosesser i kroppsvæsker (metabolomikk). Instrumenteringen benyttes dessuten av en rekke andre grupperingen innen polymerkjemi, analytisk kjemi og materialkjemi. MN må ha et NMR-laboratorium for organisk kjemi (lavfeltinstrumentering) ved KI og FAI. Høyfeltsinstrumentering bør ligge ved KI men bør i et lengre perspektiv (nybygg) vurderes organisert klarere som en felles infrastruktur uavhengig av et spesifikt institutt.

2.3 Massespektrometri (i strukturbestemmelse, men må ses i sammenheng med punkt 4. Bioanalyse)

Massespektrometri benyttes i mange sammenhenger. Mye er mindre enheter drevet og brukt av lokale forskergrupper. Det er likevel behov for en serviceaktivitet ved fakultetet. Instrumenteringen må dekke behovet for analyse av både ikke-flyktige polare forbindelser og mer flyktige og upolare substanser. Organisk kjemi ved KI og FAI samt glycobologi er avhengig av MS-service. Disse behovene dekkes i dag ved delvis overlappende instrumentering lokalisert og drevet ved de forskjellige instituttene. KI har en vitenskapelig tilsatt med MS som spesialte og to tekniske stillinger knyttet opp til aktiviteten/service-funksjonen.

3. Bioimaging:

Ved MN er det i dag flere forskningsgrupper som er storbrukere av imaging. MN er vertsenhet for Oslo-noden av Norwegian Molecular Imaging Consortium (NorMIC, en teknologiplattform under FUGE II), som også inkluderer fasiliteter ved MF/OUS. Internasjonalt er det et initiativ på ESFRI-veikartet, Euro-Bioimaging beregnet til 370 M EUR i konstruksjonsfasen (2010-2012) etterfulgt at 160 M EUR/år i operasjonskostnader. Euro-Bioimaging visjon er å tilby teknologi for å kunne avbildet alle makromolekyler i sitt naturlige miljø. Imaging fra celler til modellorganismer til mennesker er en langsiktig visjon som krever tverrfaglig innovasjon. Høy oppløsning og kvantitativ imaging er en viktig forutsetning for systembiologi og utvikling av imaging biomarkører. Teknologi utviklet i Euro-Bioimaging vil kunne brukes blant annet for forbedret diagnose, veilede terapi og design av legemidler. Euro-Bioimaging omfatter både Medical Imaging og Advanced Light Microscopy (ALM). MN er ledende i Norge innen ALM, både på utstyrssiden og på kompetansesiden, men teknologitvillingen krever stadig nye investeringer i utstyr for å kunne ligge i front. MN bør ha som målsetting å lede eller delta aktivt i en norsk node av Euro-Bioimaging. Euro-Bioimaging vil være tett koblet mot ELIXIR (European Life Sciences Infrastructure for Biological Information). Tilsvarende må MN Bioimaging teknologiplattform være tett koblet mot plattformen Computational Life Science. En teknologiplattform for bioimaging ved MN bør også inkludere både "ny og gammel" teknologi som atomic force microscopy (AFM) og elektronmikroskopi (EM). EM er også relevant for strukturplattformen (punkt 2) og bør koordinere sine aktiviteter både mot et imaging miljø og et strukturbiologimiljø.

Som nevnt ovenfor inkluderer Euro-Bioimaging også Medical Imaging, men i Norge vil dette feltet i stor grad domineres av de medisinske miljøer. MN bør allikevel støtte samarbeide med MF og OUS om positronemisjonstomografi (PET). Oslo-syklotronen (OCL) er sentral i utviklingen av PET. Det er vanskelig å tenke seg PET-forskning i frontlinjen, også klinisk, uten at den radiofarmasøytiske kjemien utgjør en viktig del av strategien, men det er allikevel slik at de kjemiske prosjektene må ha en begrunnelse i et klinisk behov.

4. Bioanalyse:

De mest sentrale aktørene innenfor analytisk kjemi ved MN-fakultetet er Bioanalyseplattformen ved FAI/KI og Glyconor MS-enheten ved IMBV. Ved vurderingen av ulike initiativ innen bioanalyse kan det være formålstjenlig å skille mellom *analytisk kjemi* og *kjemisk analyse*, der det i førstnevnte kategori handler om utvikling av teknologi og innovasjon, mens det i den andre kategorien handler om anvendelse av teknologi og service- og driftsfunksjoner. Bioanalytics@UiO har et klart fokus på utviklingssiden. Deres instrumenter er ikke satt opp til å drive servicefunksjoner. De hjelper andre grupper med å utvikle nye analysemetoder, og overlater deretter til gruppene selv å kjøre analysene. På den annen side er Glyconor MS-enheten satt opp som en service-enhet som leverer tjenester til Glyconor-konsortiet og andre. I tillegg til de to gruppene beskrevet ovenfor, gir Bernd Thiedes gruppe ved Bioteknologisenteret et viktig bidrag. Gruppen er med i NorProteomics nettverket organisert av FUGE, og arbeider med å etablere metoder innen proteomikk, som er av interesse for forskere innen funksjonell genomikk. Det vil være viktig for fakultetet å ha tilgang til grupper som har teknologi som sitt primære forskningsfokus. For de farmakologiske forskningsgruppene er det særlig viktig å ha en gruppe som er ledende innen kvantitativ analytisk kjemi. Dette er nødvendig for å opprettholde kompetanse, både akademisk og industrielt. Men det er også viktig å etablere en god servicefunksjon på MN innen det bioanalytiske området. Dette bør gjøres ved en bedre koordinering og arbeidsdeling mellom de tre nevnte grupper.

5. Computational LS:

Status og utfordringer innen bioinformatikk/computational LS ved Universitetet i Oslo har vært evaluert av en MLS-oppnevnt komité. Vi støtter anbefalingene fra denne komiteen. Hovedkonklusjonen er gjengitt her og detaljert rapport finnes i vedlegg 3.

”En oppdatert oversikt over aktiviteter og forskningsmiljøer viser brede aktiviteter på både MN og MF. Det er relativt få forskere involvert i "algoritme-drevet" bioinformatikk, mens ganske mange forskere er avanserte brukere av bioinformatikk. Det er for få faste stillinger i bioinformatikk. Komiteen er av den oppfatning at definisjonen av bioinformatikk internasjonalt har blitt utvidet den senere tiden; aktiviteter som støtter den nye kunnskapsdrevne tilnærmingen til systembiologi inkluderer nødvendigvis alt fra database utvikling til statistiske og beregningsorientert aktiviteter. Disse bredere beregningsorienterte LS aktiviteter utgjør den nye generasjonen av bioinformatikk. Vi foreslår en to-trinns prosess for å styrke bioinformatikk ved UiO. Først, anbefales å styrke kjernefasiliteten og satellitter. Kjernefasiliteten består i dag, men den trenger forsterkning, økt synlighet og servicekapasitet, og dens mange satellitter må også styrkes. En forbedret kjernefasilitet vil i sin tur være det ideelle utgangspunkt for å etablere et senter for Computational Life Sciences. Et slikt senter bør fremme toppforskning, yte best service funksjoner og tilby utdanning på både lavere og høyere grad. Den foreslåtte to-trinnsprosessen vil kreve en betydelig investering i CLS ved UiO, og bør være organisatorisk tilknyttet IFI, eventuelt den planlagte Life Science bygningen.”

6. Annen forskninginfrastruktur: - se vedlegg 2

MN har en rekke andre infrastrukturer nødvendig for forskning og undervisning innen LS-området. Drift og oppgradering av disse må ses i sammenheng med teknologiplattformene og kostnader må vurderes mot innkjøp av tilsvarende tjenester.

- a. Dyreavdeling
- b. Fytotron
- c. Verksted
- d. Forskningsfartøy
- e. Forskningsstasjoner

Mulighet for innovasjon i LS

Innenfor LS området er veien ofte kort fra grunnforskning til anvendelse innen viktige områder som for eksempel biofarmasi, helse og mat. De fire LS instituttene er allerede de mest aktive innen MN når det gjelder forskningsbasert innovasjon. En ytterligere styrking av forskningsgruppene og samling i mer robuste strukturer, vil kunne gi bedre vilkår for å utvikle forskningsbaserte innovasjoner videre slik at de blir lettere å kommersialisere. Samtidig vil en samordning av administrative prosesser på instituttene kunne gi en økt profesjonalisering i håndtering av administrative aspekter rundt innovasjon. Økt synlighet av LS ved fakultetet vil være viktige for at miljøene skal bli mer attraktive for industripartnere. Dette er en forutsetning for å lykkes i innovasjonsprosessen.

Implikasjoner for undervisning

Undervisningen ved MN skal som hovedregel være disiplinbasert i den betydning at grunnundervisningen skal gis av spesialister innen de grunnleggende disipliner. Et unntak fra dette har vært basalundervisningen i farmasi som de senere år er tatt hånd om av ansatte ved FAI. Her er undervisningen lagt om til å bli tverrfaglig og farmasifokusert fra første dag i undervisningen. Ansatte som gir denne undervisningen er ofte i utgangspunktet rekruttert fra de disiplinbaserte miljøene, men deres forskning er tverrfaglig og legemiddelrettet. Undervisningen organiseres av emnekomiteer som sammen utarbeider og vedlikeholder de tverrfaglige emnene.

Ettersom forskningsgruppene nå organiseres på tvers av instituttene og det etableres tettere kontakt mellom disiplinene innen LS-feltet, åpner det for å trekke undervisere fra disiplinene inn i farmasiundervisningen igjen. På samme måte burde det være et stort potensial i at lærere fra de ulike disiplininstituttene som i dag underviser i tilnærmet like eller tilstøtende emner, koordinerer sin undervisning. Det må da etableres gode incentivordninger som sørger for at ikke finansieringsmodellen blir til hinder for god samhandling og rasjonalisering. Grunnundervisningen i LS må også i større grad enn før ta hensyn til samfunnets behov og ikke bestemmes av hvilke lærekrefter som er tilgjengelig i disiplinene. En spissing av LS-forskningsprofilen ved MN vil innebære at enkelte emner vi må undervise ikke forskes på ved MN. Selv om undervisningen er, og skal være, forskningsbasert vil ikke dette være et problem. Mange vitenskapelige ansatte befinner seg allerede i en situasjon hvor de underviser et stykke på siden av eget forskningsfagfelt uten at kvalitet på undervisningen forringes av den grunn. Fordelen ved en forskningsmessig spissing vil være langt større enn ulempen den vitenskapelige ansatte vil ha ved å undervise noe bredere enn han/hun gjør i dag.

Likeledes er det er stort potensial for å rasjonalisere og samkjøre undervisningen på master- og ph.d.-nivå. Toksikologi er eksempel på et fagområde på masternivå hvor instituttene må samarbeide om undervisningen. Toksikologi i sin fulle bredde er ikke utpekt som en egen forskningssatsing, men samfunnet har et behov for kandidater med generell og bred kompetanse i toksikologi. Vitenskapelig ansatte fra institutter som har forskning innen toksikologi-relevante temaer må gå sammen om å lage et godt koordinert undervisningstilbud som gir kandidater med den nødvendige kompetanse innen området.

Undervisningen må fordeles mellom de vitenskapelig ansatte på en slik måte at det blir muligheter for alle til å bidra til fakultetets overordnede målsetning om å heve kvaliteten på forskningen og undervisningen. Innen LS må kvaliteten og relevansen på undervisningen på samme måte heves slik at vi trekker til oss de beste studentene som i sin tur kan bygge faget videre.

Forslag til gjennomføringsplan for reformene i LS-feltet ved MN:

- Fakultetets forskningssatsinger må revideres, og antallet satsinger reduseres slik at de som blir igjen kan styrkes. Vi foreslår 8 tematiske områder det er grunnlag for å satse på innen LS.
- Teknologiplattformene må gjennomgås, og plattformene fakultetet støtter må formaliseres og utvikles. Vi foreslår opprettelse av 5 teknologiplattformer innen LS.
- Annen forskningsinfrastruktur må gjennomgås og prioriteres innenfor fakultetets forskningssatsinger innen LS.
- Programmene og emneporteføljen innen LS må gjennomgås. Det må etableres incentivsytelser som støtter samhandling mellom instituttene innen undervisning.
- Støttefunksjoner må deles mellom samlokaliserte LS institutter.
- Revisjon av instituttstrukturen må vurderes for å understøtte en helhetlig LS-profil.

Life Science – et postludium

DNA-koden er blitt kalt livets instruksjonsbok. Etter at menneskets genom ble bestemt i begynnelsen av dette århundre, har vi hatt tilgang til en komplett genetisk “oppskrift” på gjennomsnittsmennesket. I dag kjenner vi DNA sekvensen til mer enn 100 eukaryoter, 15-20 archaeale genom og over 400 bakterigenom. Pattedyr og sopp utgjør de største gruppene av sekvenserte eukaryoter, men også protister, planter, insekter, nematoder og andre dyr er med. I tillegg blir nå enkeltindivider av en art (populasjoner) gjenstand for fullsekvensering. Noen få promiller i forskjell mellom individer representerer få til mange millioner endringer i koden og utgjør vår individuelle genetiske ”makeup”. Alle har en unik “software” som også forteller om vår disposisjon for sykdom, hvordan vi responderer på miljøgifter (f eks røyking) og på medikamenter.

Tilgangen til organismers DNA-sekvenser har bl.a. gitt en ny “drive” i biosystematikk- og evolusjonsforskningen ved MN. Her har MN-fakultetet tradisjonelt hatt flere sterke miljøer. Kravet om nytt instrumentarium og en styrking av den genetiske og molekylærbiologiske kompetansen for å kunne delta i fagområdets utvikling, har medført at tidligere internasjonale og nasjonale disipliner som botanikk, zoologi, bakteriologi etc. i dag (i stor grad) er erstattet med mer robuste grupperinger av evolusjonsbiologer med et felles fokus i problemstillinger og analyser og som arbeider på tvers av organismegrupper. Fylogenomikk, komparativ genomikk og metagenomikk er konsepter og kompetanseområder som i dag står sentralt i den evolusjonsbiologiske forskningen internasjonalt og ved MN, områder som setter nye krav til storskala analyser av molekylære datasett og bioinformatikk-kompetanse for å løse forskningsoppgavene.

Det er etter hvert blitt klart at DNA-sekvensen alene ikke er den eneste informasjonsbærende struktur som ivaretar genetisk hukommelse. Også måten våre gener er pakket inn på, i det vi kaller kromatin, representerer et eget språk som lagrer informasjon. Vi har både et DNA-språk og et kromatin-språk. De siste få årene har vi sett en eksplosiv økning i forståelse av dette nye nivået (innpakningen) som vi kaller epigenetikk. Vi vet nå at miljøpåvirkninger kan bestemme aktiviteten av våre gener gjennom kjemisk modifisering og kromatin. Biologiske og miljøbetingete forklaringsmodeller har ofte fremstått som motpoler i samfunnsdebatten, men epigenetikken kan lukke gapet mellom disse modellene. Dette fagområdet åpner også for en ny, intracellulær dimensjon i miljøforskningen (økologien).

DNA er bare et av de underliggende biomolekyler som bestemmer livsfunksjoner. Fett- og suktermolekyler finnes også i et utall varianter og utgjør komponenter i det komplekse livsmaskineriet. Utfordringen er å analysere det samlede bildet av alle disse komponentene. Flere såkalte storskalateknologier ("high-throughput" metoder) gjør dette mulig. Vi har sett fremvekst av en rekke "-omics" teknologier for å analysere komplekse sammensetninger av proteiner (proteomics), RNA (transcriptomics), gener (genomics) osv. I tillegg til de etablerte "-omics" felter utvikles stadig ny og mer avanserte teknologi som leverer data innen stadig flere disipliner. Et viktig eksempel er RNAi-screening.

Et annet fagfelt under utvikling er kjemisk biologi. Det dreier seg her om å finne fram til småmolekylære substanser som virker på biologiske mål ved å aktivere eller avbryte biologiske funksjoner. Disse har vist seg å være svært verdifulle både som forskningsverktøy og i behandling av sykdom idet de fleste medikamenter vi bruker i dag tilhører denne klassen. Aspirin og penicillin er klassiske eksempler. Det er imidlertid en utfordring å finne nye småmolekylære substanser som retter seg mot et bestemt mål molekyl eller hemmer en bestemt biologisk prosess. Til dette brukes kjemisk biologi hvor store biblioteker av substanser skannes med stor gjennomstrømningshastighet, såkalt high-throughput screening.

På samme måte som teleskopene flytter grenser for vår utforskning av verdensrommet, flyttes grensene for vårt innsyn i de molekylære prosesser på organ- og cellenivå. Dette er takket være teknologiske nyvinninger innen lysmikroskopi, PET og kjernemagnetisk resonans (MRI). Multifotonkonfokalmikroskopi, PET og MRI gir muligheten til å studere enkeltceller i hele dyr. De nyeste lysmikroskopene gir anledning til å følge enkeltmolekyler inne i levende celler med en oppløsning ned til 50 nanometer. I tillegg til at disse visualiseringsmetodene driver utviklingen av celle- og molekylærbiologisk forskning, har de også et stort potensial innen billeddiagnostikk for eksempel ved kreft, nevrologiske sykdommer og hjertekarsykdommer.

Bionanoteknologi er et fagområde som utvikler seg raskt i store deler av verden (spesielt er bionanoteknologirelatert helse et felt i stor utvikling, og denne utviklingen forventes å fortsette). Fokuset bør nå settes på temaer der suksess vil kunne gi radikale sprang i teknologi og dermed grobunn for betydelig ny verdiskapning som for eksempel innen formulering (drug delivery) for biologiske legemidler (legemidler laget av levende humane eller animalske celler eller organismer). For moderne biologisk deriverte legemidler er styrt biodistribusjon via nanopartikulære systemer et konsept som for tiden er svært aktuelt i forskningen. De nye distribusjonssystemene kan også bidra til at legemidler som tidligere ikke lot seg formulere eller var for toksiske kan anvendes. De nye konseptene vil ofte kombinere diagnostikk og terapi ("theranostics") som for eksempel Epitargets teknologi med terapeutisk ultralyd ved ultralyd-mediert legemiddelfrisetting. Dette kan kombineres med MRI ved at kontrastmiddel tilsettes det nanopartikulære systemet.

FUGE-programmet satte storskalateknologi og “-omics” på kartet for norske forskere. Oppbyggingen av nasjonale teknologiplattformer gjør at vi i dag produserer store mengder av storskaladata. Men slike “hypotese-frie” datasett er gjerne deskriptive. Utfordringen videre vil være integrering og modellering av storskala datasett som kan gi ny forståelse av sammenhenger. Systembiologien har dette som sin sentrale oppgave og representerer et “neste trinn” i analyse og forståelse av komplekse cellulære systemer (signalveier, genprogrammer osv), sammensatte sykdommer, miljø- og klima etc., for å trekke fram enkelte viktige biologiske “systemer”. Kompleks modellering er en kompetanse som også norsk bioteknologi vil trenge. En kobling mellom LS og matematikk er viktig for dette området hvor store sprang forventes.

Begrepet systembiologi har eksistert i forskjellige fortolkninger siden 1960-tallet, men fremveksten av feltet de siste 10 årene har i stor grad vært drevet av teknologiske gjennombrudd innen molekylærbiologi, slik som “high-throughput”-sekvensering, proteomikk og metabolsk profilering, hvor systembiologien kan forene flere nivåer av “-omics” gjennom matematisk modellering av metabolske nettverk og cellefunksjoner. Det har vært foreslått mange presiseringer av systembiologiens hovedmålsetting, men den følgende fra Kitano (2001) er mye brukt: *“to understand every detail and principle of biological systems, linking the behaviors of molecules to system characteristics and functions.”* Systembiologien er således reduksjonistisk i den forstand at den tar utgangspunkt i molekylære mekanismer, men også integrativ på tvers av hierarkiske organisasjonsnivåer. Selv om de mest vellykkede anvendelsene så langt har vært på veldefinerte delsystemer i celler og individer (for eksempel metabolsk regulering i gjærsopp, kjemotakse hos bakterier, genregulering hos invertebrat-larver, etc.), er det ærgjerrige og langsiktige målet for mange systembiologer å kunne anvende de samme angrepsmåtene også for populasjoner og økologiske systemer. Dette under klar erkjennelse av at det ennå er langt fram før en kan oppnå en fullstendig mekanistisk beskrivelse av alle funksjoner og reguleringsmekanismer, selv i enkeltceller. Den systembiologiske angrepsmåten beskrives gjerne som en iterativ prosess, hvor eksisterende forståelse av systemet integreres i en matematisk modell som kan brukes til å predikere utkommet av perturbasjonseksperimenter. Avvik mellom det predikerte og det faktiske resultatet av et eksperiment gir grunnlag for å justere eller revidere modellen, som så kan brukes til å predikere nye eksperimenter, osv. Eksperimentelle studier av biologiske systemer er en sentral del av det systembiologiske programmet, selv om det teoretiske fundamentet ligger i skjæringspunkter mellom biokjemi, informatikk og dynamiske systemer.

Innspill til MN strategi for Life Science fra instituttlederne ved Biologisk institutt, IMBV og Farmasøytisk institutt, 24.09.2010

Vedlegg 1: MN satsinger og andre LS satsinger ved instituttene

A. Satsinger oppnevnt av MN

A.1 BIFF

Generelt om satsingen: Utviklingsmiljø bestående av 4 faste ansatte ved IMBV, pluss en aktiv pensjonist og en professor II fra Veterinærhøyskolen. Satsingen har et felles molekylærlaboratorium, som de sammen har bygget opp. De har et praktisk og intellektuelt fellesskap, men ellers er det lite samarbeid og få felles prosjekter. Fysiologene har noe samarbeid med andre grupper ved IMBV og med grupper på MedFak. Nevrofysiologi står sterkt både ved IMBV og ved MedFak og det er planlagt et felles masteremne. Ved IMBV har vi professor II og 1.amanuensis II med hovedstilling ved Veterinærhøyskolen og ved STAMI. Disse både underviser og forsker ved IMBV i samarbeid med våre egne grupper. IMBV har ansette ny nevrofysiolog som sannsynligvis vil styrke samarbeidet med MedFak. BIFF ble opprettet etter en søknad om SFF i 2006 (søknaden fikk gode evalueringer, men kom ikke til finalen).

Rekrutteringsgrunnlag: Til sammen har 5 post.doc (4 NFR + 1 EMBIO) og 6 stipendiater (hvorav 3 fra NFR). Satsingen får det antall masterstudenter de ønsker. Rekrutterer stort sett PhD fra masterstudentene, bare Kristian har rekruttert utenfra. Masterstudentene er meget attraktive også for medisin, stor konkurranse om dem. Viktig å ha en stilling parat når man har en god master.

A.2 Bioanalytics@UIO

Generelt om satsingen: Satsingen består av 8 faste ansatte, som til sammen legger ned ca 2,5 forskningsårsverk i satsingen. I tillegg er 3 II-stillinger tilknyttet satsingen. Overordnet visjon/slagord: "Improved technology Improves health". Har tre hovedprosjekter:

- Nanocolumns and microchips in chromatographic separations
- Miniaturized sample preparation based on artificial liquid membranes
- Methods and strategies (analytical proteomics, other biomolecules, drugs and metabolites)

Alle har sitt hovedprosjekt, men deltar inn i de andres. De har felles stipendiater og begynner å få felles publikasjoner. Satsingen har formaliserte ukentlige faglige møter og en rekke sosialiserende og kulturbyggende tiltak. Satsingen har kommet over en kritisk masse, og får henvendelser om samarbeid nasjonalt og internasjonalt. Har hatt godt gjennomslag på Avit-søknader til NFR, men har vanskelig for å komme gjennom med prosjektsøknader. Satsingen legger vekt på at de ikke er en service plattform, men driver selvstendig teknologidrevet forskning. Imidlertid er det ikke tvil om at satsingen er viktig for andre grupper ved FAI og eksternt i forbindelse med utvikling av nye analysemetoder. Satsingen må finne partnere og anvendelser av sin forskning som gjør det mulig å øke graden av ekstern finansiering.

A.3 Biomedisin

Generelt om satsingen: Satsingen består av 2,5 faste ansatte, eller 1,25 forskningsårsverk. I tillegg har de 5 II-stillinger knyttet til satsingen. Satsingen deltar i en rekke sentre, 2 SFF (CCB ved Radiumhospitalet og CMBN ved Med.fak.), en SFI ((sfi)2 ved NR) samt satsingen BMMS (Centre for Biostatistical Modelling in the Medical Sciences) ved Med.fak. I kraft av dette har de fått status som Assosiert toppforskningsmiljø. De fleste prosjekter er knyttet til sentrene. Kjernefasiliteten for Bioinformatikk ligger på IFI og delvis på (sfi)2. De driver service mot andre enheter, bl.a. mot sykehusene. Innenfor de ulike sentrene de er med i deltar de i en rekke fellesaktiviteter. For øvrig har gruppa et ukentlig seminar (Veilab-seminaret) – hver onsdag. Stipendiater og post.doc. legger frem sine prosjekter

Rekrutteringsgrunnlag: Satsingen har 2 postdoc (KD), 2 forskere og 7 stipendiater (hvorav 6 er fra NFR). Rekrutteringsgrunnlaget er vanskelig, særlig i statistikk, her er det rett og slett mangel på kandidater. Tverrfagligheten gjør det vanskelig å finne virkelig gode stipendiater. Bachelorprogrammene skaper et skisma. Studentene velger den ene eller andre retning og bioinformatikk faller mellom.

A.4 CEES

(toppforskningsmiljø) - *Biologisk institutt, Matematisk institutt, Økonomisk institutt. Ledes av Nils Chr. Stenseth, BI*

Generelt om satsingen: Centre for Ecological and Evolutionary Synthesis (CEES) ble opprettet som SFF høsten 2007, men har eksistert som et senter for tematiske satsinger ved BI i snart 10 år. Senteret fokuserer på sammenhenger mellom økologiske og evolusjonære prosesser. CEES er et integrert Life Science-senter mellom økologer, molekylærbiologer, evolusjonsbiologer, genetikere, matematikere, bioinformatikere, statistikere og økonomer og har status som et toppforskningsmiljø ved MN-fakultetet og BI. De faglige aktivitetene er strukturert i "Colloquia" (fokuserte prosjekter med varighet 3 år) og "Themes" (langsiktige, prioriterte temaer). Foruten å være en grunnforskningsenhet omsettes kunnskapen til utvikling av strategier for forvaltning av naturressurser og bevaring av biologisk mangfold. CEES har de siste årene vokst fram også som en viktig aktør i marin forskning og har ambisjoner om å være et kraftsenter i modellering av populasjonsdynamiske prosesser og mønstre i tid og rom i akvatiske så vel som terrestre systemer. Fokusområder er effekter av klima, konkurranse og predasjon, romlige mønstre, og økologiske og evolusjonære effekter av høsting (fiske og jakt). CEES vil også gå inn for å hevde seg internasjonalt innen marin genomikk, etter å ha ledet sekvenseringen av torskegenomet som ble fullført i 2009. I årene fremover vil arbeidet med å sammenstille genomisk og økologisk kunnskap være en viktig satsning. I tillegg fokuseres det på flere mikrobiologiske systemer der man ved å kombinere eksperimentell og teoretisk forskning forsøker å øke forståelsen av samspillet mellom økologiske og evolusjonære prosesser. Mye av Life Science aktiviteten ved CEES er koblet opp mot nylig ervervet infrastruktur. I 2007 ble CEES/Biologisk institutt tildelt midler fra forskningsrådets program for funksjonell genomforskning (FUGE) til å etablere UTSP (Ultra-High throughput Service platform) som en nasjonal serviceplattform innen sekvensering. I 2009 ble det etablert et samarbeid mellom UTSP og sekvenseringsplattformen ved Oslo universitetssykehus HF, Avdeling for medisinsk genetik – Ullevål, om å etablere et nasjonalt sekvenseringssenter, NSC (www.sequencing.uio.no).

Rekrutteringsgrunnlag: CEES hadde i 2009 46 postdok/forskere (hvorav 35 helt eller delvis finansiert av NFR og 4 fra EU Marie Curie) og 28 stipendiater veiledet av sentermedlemmer (hvorav 13 helt eller delvis finansiert av UiO/Biologisk institutt, 6 helt eller

delvis fra NFR og 4 fra Marie Curie EST). Internasjonal rekruttering til postok- /forskerstillingene er 54%, til stipendiatstillingene 36%. CEES har god erfaring med å tilby midlertidige overgangsstøtte til spesielt dyktige studenter i påvente av ledige stillinger ved senteret, hvor de da på lik linje med internasjonale søkere konkurrerer om ledige stillinger.

A.5 CIR-noden

Generelt om satsingen: Satsingen er en større node i SFFen CIR ved Det medisinske fakultet, og er derfor gitt status Assosiert toppforskningsmiljø. To faste vitenskapelig ansatte ved IMBV utgjør kjernen SFF-noden, Inger Sandlie og Oddmund Bakke. Inger Sandlie er nestleder i CIR og har i januar 2010 flyttet til Rikshospitalet selv om hun beholder sin undervisningsplikt og formelle tilknytning til IMBV. Dette er naturligvis et tap for instituttet.. Oddmund Bakke leder Oslo-delen av en FUGE-plattform i imaging – NorMic. Denne er nyttig for CIR og for IMBV, det er ca 10 brukergrupper ved Instituttet som benytter seg av plattformen. Begge bidrar inn i de medisinske miljøene med bioteknologisk kompetanse. Begge har over en årrekke hatt felles publikasjoner både med hverandre og med medisinerne. Innen CIR arrangeres en rekke ulike miljøskapende fellestiltak, seminarer, faste møter m.m.

Rekrutteringsgrunnlag: Til sammen har de 8 post.doc (NFR og Kreftforeningen) og 4 stipendiater (hvorav kun 1 fra NFR). De er begge populære veiledere og får mange masterstudenter. Rekrutterer PhD-kandidater fra egne rekker, men lyser ut Post.doc. internasjonalt. De har i en årrekke også forsynt Med.fak. med kandidater.

A.6 GLYCONOR

Generelt om satsingen: Et Utviklingsmiljø som består av 6 faste ansatte og i tillegg har de 2 professor-II knyttet til satsingen. Alle har hver sin forskningsgruppe med post.doc og stipendiater. Satsingens fellesnevner er Glykanenes struktur og funksjon i kroppen. Glycobiologi er sentralt i alle prosjekter og en proteomikk (MS) lab ved IMBV har spesialisert seg på å analysere glycoproteiner. Leder av MS-labben, W Egge-Jacobsen har ikke fast stilling. GLYCONOR har i tillegg til KD-stipendiater støtte fra FUGE og MLS. De foregår en del felles aktiviteter på tvers av flere institutt og også forskere ved Radiumhospitalet med Prof II på IMBV er med. Det er cellebiologer, mikrobiologer og andre typer biologer i GLYCONOR, med det fellesskap at de er opptatt av hva sukker gjør på ulike molekyler. Et stort område hvor man i dag bare ser toppen av isfjellet. Ønsker å være og tror de er det ledende glykomiljøet i Norge. Vil gjerne være et betydelig glykomiljøet også i Europa. Har som mål innen 2010 å ha en plattform funksjon i Europa, dvs. andre oppsøker dem for tjenester og råd. Planlegger et Master og PhD-kurs fra 2010.

Rekrutteringsgrunnlag: Satsingen har til sammen 8 post.doc, hvorav 7 kommer fra NFR og 1 fra KD. I tillegg har de 9 stipendiater som alle kommer via KD (2 er EMBIO stipendiater). De IMBV- ansatte har god tilgang på masterstudenter, og derfor tilgang på gode norske PhD kandidater, som også forsyner Med.fak og Kjemi.

A.7 GREC

Generelt om satsingen: Utviklingsmiljø som består av 4 faste ansatte + 1 med karrierestipend. I tillegg har de 5 II-stillinger. Hver av de 5 ansatte har hver sin forskningsgruppe med post.doc og stipendiater. Fellesnevner er epigenetikk og klassisk genregulering. De har mange fellesprosjekter på tvers av gruppene, men foreløpig ingen

felles publikasjoner. Forskere i GREC har også samarbeid med forskere ved MedFak og ved Radiumhospitalet (nå Oslo Universitetssykehus). Internt i satsingen har de faste ledermøter, men ingen faste felles samlinger for post.docs og stipendiater. I forbindelse med etablering av deep sequencing på Radiumhospitalet, og prosedyrer som CHIP-seq åpner det seg nye muligheter for å studere epigenetikk. Gruppen ved Radiumhospitalet som har etablert Chip-seq ledes av forsker med Prof II ved IMBV slik at det burde være åpenbart å se samarbeidsmuligheter. I tillegg er det mange sterke grupper inne fagområdet på MedFak (bl.a. med stamcellesenter). Dessverre er ikke disse potensielle samarbeid ikke ennå utviklet. Noe samarbeid med MedFak finnes innefor visse områder med bruk av dyremodeller der og in vitro systemer her. Satsingen har 102,5 mill i eksterne midler i perioden 2004 – 2009. 9 av 15 FUGE prosjekter ved IMBV er GREC prosjekter.

Rekrutteringsgrunnlag: Satsingen har til sammen 13 post.doc (11 NFR, 2 Kreftforskningen) og 17 stipendiater (4 fra KD). Rekrutteringsgrunnlaget er greit hvis man har gode mastere og kan rekruttere dem videre, ellers kan det være vanskelig. Satsingen har imidlertid, takket være merkevarebygging, relativt mange mastere.

A.8 LaMDa

Generelt om satsingen: Liten satsing som består av 3 faste ansatte. Har en forsker innen bioinformatikk lønnet av NFR, N.J. Tourasse, som har utviklet en database (MLST database), som ligger på en egen server som driftes av Bioteknologisenteret, og brukes rundt om i hele verden. Satsingen har ukentlige labmøter. Ellers har de hatt mye kontakt med MERG, og deltar nå aktivt i etableringen av et mikrobiologinettverk på fakultetet sammen med MERG. I tillegg har de to felles forskningsprosjekter med MERG. Det ene er Statoil VISTA finansiert. Satsingen har ellers to afilierte samarbeidspartnere Tor Gjøn og Kaare M. Nilsen i Tromsø. Begge er interessante samarbeidspartnere. Hanne Winther-Larsen er nylig blitt tilsatt som førsteamanuensis ved FAI. Hun vil være et bindeledd mellom forskningen i LaMDa og Gjønens forskning. Forskningsgruppen fikk meget positiv vurdering i siste fagevaluering og har lykket meget godt i å tiltrekke seg ekstern finansiering (Storforsk, FUGE).

Særlige behov: Trenger å få sikret seg N.J. Tourasse med hans unike bioinformatikk kompetanse. Ønsker ham over i fast stilling.

A.9 MERG

(utviklingsmiljø) – *Biologisk institutt, Institutt for molekylær biovitenskap og Naturhistorisk museum. Ledes av Kamran Shalchian-Tabrizi, BI*

Generelt om satsingen: Utviklingsmiljø med 8 fast ansatte, som legger ca. 5 forskningsårsverk i satsingen. MERG har to II-stillinger; en med hovedstilling ved Veterinærinstituttet (VI) og en ved NIVA. Begge underviser, veileder (master- og PhD-studenter) og gjør deler av forskningen sin ved BIO. MERG er tverrfaglig (cross-disciplinary), med bred basiskompetanse i mikrobiell økologi og evolusjon. Utviklingsmiljøet har etter etableringen vært gjennom en omfattende konsolidering; faglig, sosialt og strukturelt (samlokalisering). Programmet har lykket i å skape en samfungerende forskningsgruppe (coherent group) av tidligere velfungerende, mindre robuste grupper av mykologer, protistologer og mikrobiologer. MERG har lagt vekt på å skape gode synergier i de internt prioriterte forskningsprosjektene, hvor bredden av enkeltforskernes spesialkompetanse er godt trukket inn i enkeltprosjektene. En prioritert oppgave fremover må være å sikre god ekstern finansiering av fellesprosjektene, hvorav flere er i oppstartfasen. Forholdene er spesielt lagt

godt til rette for gode samarbeidsrelasjoner mellom eldre (professorer/amanuenser) og yngre forskere (post docs, stipendiater, master studenter) i programmet.

MERG har utviklet et nettverkssamarbeid med andre etablerte satsingsområder i mikrobiologi internt ved fakultetet, - MICRO nettverket -, f.eks. ved BI (CEES); IMBV (Kooimey – gruppen) og FAI (LaMDa). Dette er en utvikling som bør støttes opp om. Miljøet ønsker å gå for en SFF-søknad i denne runde (oktober) med utgangspunkt i MICRO-nettverket.

Rekrutteringsgrunnlag: MERG har fått tilført 7 stipendiater, derav 2 som følge av startpakkeordningen, og 2 post doc forskere (NFR, intern). Stipendiatenes prosjekter er fundert på et utstrakt samarbeid og co-veiledning fra forskere/post docs i MERG, noe som gjør at prosjektene fremstår som innovative og faglig utfordrende.

A.10 MURES

Generelt om satsingen: MURES er en nyetablering med 5 faste ansatte fra to institutter. Fra å definere deler av sin forskning inn i satsingen, identifiserer de fleste av dem seg nå helhetlig med satsingen. De ulike deltakerne har hvert sitt kompetansefelt som utfyller hverandre. Samarbeider på kryss og tvers. Har som felles visjon at de skal utvikle en sterk norsk forskningsgruppe som fokuserer på basal mekanistisk forskning i skjelettmuskel - for å identifisere musklens rolle og teste potensielle legemidler rettet mot metabolske sykdommer som type 2-diabetes. Stipendiaten gruppa er tildelt som satsing er satt direkte på dette samarbeidet. Tester stoffer utviklet av legemiddelkjemikerne ved FAI på muskelcellemodellene fra FAI. Neste stipendiat vil ta det videre til organmodellene fra IMBV.

Gruppen fungerer godt med felles møte ca 1 gang på mnd. der alle er med. Der legger og de yngre legger fram sine resultater og liknende. I tillegg har de prosjektmøter.

Gruppen har felles publikasjoner, og søker felles eksterne prosjekter. Det har så langt vært vanskelig å nå opp på Medisin og helse programmene. Gruppen er aktiv innen innovasjon og har et stort utviklingsprosjekt i regi av Birkeland innovasjon. Dette prosjektet defineres nå som en del av satsingen.

A.11 ProtStruc – Proteinstrukturer

Generelt om satsingen: Utviklingsmiljø bestående av 6 faste ansatte ved IMBV som alle har hver sin forskningsgruppe ved Instituttet. Til sammen utgjør de ca 1,5 forskningsårsverk. Satsingens felles forankringspunkt er studier av proteiners 3-D struktur og strukturens betydning for proteinenes virkemåte. Alle de 6 faste vitenskapelige representerer hver sin forskningsgruppe ved IMBV, og flere deltar også i en eller flere andre satsinger. ProtStruc, fungerer som en teknologiplattform som består av 3 enheter, et Proteinproduksjonslaboratorium, et Røntgenkrystallografi laboratorium og et NMR-laboratorium. Noen av medlemmene i ProtStruc er ikke strukturbiologer, men det er en oppgave for ProtStruc å løse strukturen til proteiner disse er interessert i. Det brukes en rekke forskjellige teknikker: røntgenkrystallografi, NMR, Raman, og andre fysiske teknikker, men det er få som behersker hver enkelte teknikk. Denne satsingen er avhengig av tungt og kostbart utstyr samt nøkkelpersonell som pt ikke har faste stillinger. Det er mange strukturmiljø på UiO, både ved MN og på MedFak, men et mer utstrakt samarbeid kan være nødvendig for å opprettholde gjennomslagskraft. Kostnadene ved drift og innkjøp av utstyrsparke tilsier også en bedre

koordinering, både internt ved UiO og nasjonalt. Rekrutteringsgrunnlag: Til sammen kan 4 post.doc. (NFR), 9 stipendiater (hvorav 1 NFR og 2 EMBIO) regnes til gruppa.

A.12 SAFE

Generelt om satsingen: Nyetablering bestående av 4 faste ansatte, hvorav to er i 50% stilling. I tillegg er det 5 II-stillinger knyttet til satsingen. Satsingen består kjernefysikere og kjernekjemikere som har gått sammen om å danne et senter. Det som binder SAFE sammen er syklotronen, som er et så allsidig instrument at forskningsaktiviteter som ikke publiserer sammen likevel danner et fellesskap mht. selve maskinen. De har søkt felles prosjekter, og vil fortsette med det der det er naturlig, men foreløpig har de ikke lyktes. Selv om seniorforskerne ikke har felles prosjekter, har studentene på begge sider glede av hverandre. De har felles undervisning og felles lesesal, og har for øvrig fått et større og mer spennende miljø. Mye blir gjort for å skape et miljø, som hytteturer, julebord, framstøt for rekruttering av nye studenter, omvisninger, egne nettside, kjernefysikk workshop i mai 2009.

Rekrutteringsgrunnlag: Satsingen har i dag 3 post.doc og 7 stipendiater. Det er vanskeligst for kjernekjemikerne å rekruttere gode kandidater. Stor konkurranse om de som finnes i markedet.

Særlige behov: Stillinger av alle slag, men først og fremst flere vitenskapelig ansatte samt en driftstekniker. Har to meget gode masterstudenter som de ønsker å beholde, trenger derfor to stipendiatstillinger, hvorav den ene til PET. Mangler også administrative støtte for å kunne utnytte syklotronen fullt ut bl.a. til gjesteforskere.

Blir SAFE mye større tvinger behovet seg frem for en administrativ ansatt. Langsiktig finansiering er også viktig, 10 års perspektiv.

A.13 SITEDEL

Farmasøytisk institutt, Kjemisk institutt.

Generelt om satsingen: SITEDEL er en nyetablering med 4 fast vitenskapelig ansatte, som bruker hele sin forskningstid inn mot satsingen. De har som visjon at de gjennom samarbeid med nasjonale og internasjonale forskningsgrupper skal etablere et avansert senter for utvikling av nye legemiddelformuleringer, og at de skal legge det vitenskapelige grunnlaget for utvikling av nye legemiddelformuleringer med stedsspesifikk frisetting av virkestoffet. Polymerkjemi er grunnlaget for forskningen og satsingen faller inn under BionNanoVT-området. Satsingen har felles prosjekter, de har skrevet felles publikasjoner og de har lyktes med å tilrekke seg eksterne midler. Satsingen er imidlertid liten, og den bør knytte seg opp til andre initiativ for å fortsette å utvikle seg med tanke på å kvalifisere til et utviklingsmiljø. Det foreligger konkrete planer om forskningssamarbeid med mikrobiologer på FAI og IMBV med tanke på å utvikle konsepter for formulering av vaksiner og andre legemidler til fisk. Utgangspunktet for dette samarbeidet er en SFI søknad som ikke kom videre etter kvalifiseringen. Det viste seg vanskelig å få med industrien på dette tidspunktet, men nettverket kan på sikt ha potensial til å konkurrere om SFF/SFI-midler.

A.14 Statistikk og biostatistikk

Generelt om satsingen: Stor satsing, toppmiljø, som omfatter hele avdeling C ved Matematisk institutt. 11 faste ansatte pluss en statsstipendiat og 4 II-stillinger. Gruppa deltar

i en rekke sentre: (sfi)2, CEES, CMA og BMMS. Så godt som hele gruppa er med i (sfi)2 . (sfi)2 virker som et lim i systemet. Seminarserier i statistikk og biostatistikk arrangeres i samarbeid med (sfi)2 og BMMS. Likeledes arrangeres møter og workshops i samarbeid med (sfi)2, BMMS og Forskerskolen i biostatistikk.

Statistikkfaget får sin næring i anvendelsene, og har en teknologitransfer rolle. To typer prosjekter, grunnleggende metodespørsmål i statistikkfaget og anvendte prosjekter knyttet til eksterne samarbeidspartnere.

Forskningsgruppen i statistikk og biostatistikk er en integrert del av statistikkmiljøet i Oslo, som samlet sett er et stort miljø også i en europeisk sammenheng.

Rekrutteringsgrunnlag: Trass i mange faste ansatte har satsingen bare 1 post.doc og 7 stipendiater (hvorav 3 er fra NFR). Litt problematisk rekrutteringssituasjon. Har av og til med suksess rekruttert folk fra andre fagområder, for eksempel fysikk. Har dårlig erfaring med å få gode kandidater fra utlandet. Burde hatt flere masterstudenter, og de som er, er i tillegg attraktive for næringslivet og forsvinner ofte dit. Tror det kunne ha en effekt å bli tydeligere profilert som et toppmiljø.

Særlige behov: Halvparten av gruppa går av med pensjon de nærmeste 10 årene, og rekruttering for å erstatte disse er viktig. Trenger flere post.doc. og stipendiatstillinger, og gjerne også et "tenure track" system.

A.15 Syntese og molekylstruktur (SMS)

SMS er et utviklingsmiljø som i dag ligger ved Kjemisk institutt. Målet med satsningen er å kombinere kunnskap innen syntetisk organisk kjemi, naturproduktkjemi, strukturløsning og biokjemi til design og syntese av potensielle drugs og biomolekylære tools.

Satsingsleder: Lise-Lotte Gundersen – fungerer mens Tore Hansen er i permisjon.

Generelt om satsingen: Utviklingsmiljø med 6 faste ansatte, som legger ca 2,5 forskningsårsverk i satsingen. Disse kommer fra tidligere 3 grupper ved instituttet. Har trengt tid til å gå seg til. Samarbeider mye bedre enn før, og går sammen om helt nye prosjekter. Kan nå gå sammen om å lage organiske materialer på en måte de ikke har kunnet før, da de kan se både på stabilitet og på struktur. Har skrevet flere felles publikasjoner på tvers av tidligere forskningsgrupper. Satsingen har gruppemøte ca hver 14 dag, der stipendiater og post.doc. som redegjør for hva de driver med. Nettside profilerer dem som gruppe ved instituttet, ikke spesielt som satsing.

Rekrutteringsgrunnlag: Satsingen har 2 post.doc (1 KD, 1 NFR) og 9 stipendiater (hvorav 3 fra NFR). Kommet senere i gang enn håpet p.g.a. rekrutteringsproblemer. Det er vanskelig å få norske kandidater. Få flinke masterstudenter.

Særlige behov: Samlokalisering er den største hindringen. Trenger innredet et felles spiserom. Teknisk støtte er også et problem. Har for lite driftsmidler, og mener det burde være skjevdeling av driftsmidler til stipendiater i teoretiske fag og i eksperimentelle fag. Håper det blir lyst ut en stilling i organisk kjemi.

Diverse: Satsingen ble pålagt å holde kontakt med ProtStruc på IMBV. Dette har foreløpig ikke blitt til noe. Frode Rise og Jon Nissen-Meyer har imidlertid skrevet felles søknad om tungt utstyr sammen, og de har en EMBIO (FUGE) miniplattform sammen med Proteinprogrammet på IMBV (nesten det samme som ProtStruc).

Ser for seg at det kunne være interessant å slå seg sammen med Legemiddelkjemi på FAI. Betrakter seg selv som et miljø som ligger mellom og kan sammenbinde Legemiddelkjemi og ProtStruc.

A.16 Toksikologi

(nyetablering) – *Biologisk institutt, Farmasøytisk institutt, Kjemisk institutt, NIVA. Ledes av Ketil Hylland, BIO*

Generelt om satsingen: 10 fast ansatte ved tre deltagende institutter er involvert i satsingen med til sammen ca 1,5 forskningsårsverk. Satsingen har to II-stillinger, en tilknyttet STAMI, og en tilknyttet VERITAS, begge med arbeidsplass ved Biologisk institutt.

TOKSIKOLOGI har levert et strategisk innspill (5 s) til utvalget som redegjør for status presens, fagområdets spesielle utfordringer ved UiO og en skisse for veien videre. Miljøet har utpekt fire fokus-områder for forskning, hvorav tre har etablerte samarbeidskonstellasjoner som kan videreutvikles, mens det fjerde (immuntoksikologi) er et område som ennå ikke er oppgående, men har et utviklingspotensiale. De etablerte fokusområdene er: (1) Oksidativ stress, DNA-skade og – reparasjon, (2) cellebasert toksikologi og (3) modellering – fra celle til næringsnett.

Særlige forhold: Har i dag nedkjørte laboratorier og lite teknisk hjelp. Opprusting av laboratorier internt på BI er en prioritert oppgave. Faglig spriker satsingen i mange retninger rundt humantoksikologiske og økotoksikologiske (marine) prosjekter. Deltagerne fra Farmasøytisk institutt er nyttige på support siden og bidrar med viktige metoder, men kan neppe være premissleverandører for faget. Imidlertid etterlyser fagevalueringen satsing på legemiddeltoksikologi i Norge. NIVA har et stort miljø i økotoksikologi, som det kunne være interessant å knytte seg nærmere opp til. Farmasøytene driver et lite forskningsmiljø i humantoksikologi, men fungerer nå på sidelinjen. De store miljøene i humantoksikologi er på Folkehelse og på sykehusene. Biologisk institutt har i sine strategiske planer allokert to faste vitenskapelige stillinger til Toksikologi.

Rekrutteringsgrunnlag: Gruppen har de siste tre årene fått 3 stipendiater (2 BI, 1 FAI) og 1 post doc fra fakultetet, den siste stillingen (opp mot Ketil Hylland) som et resultat av startpakkeordningen. Vanskelig å rekruttere gode kandidater til forskning, da masterstudentene er svært attraktive på arbeidsmarkedet.

Veien videre: Professor Hylland ønsker seg primært en kjerne lokalisert til Biologisk institutt og er åpen for en omorganisering av satsingen. En mulighet er å favne videre og å "døpe om" satsingen til Stressbiologi, hvor toksikologi vil bli et underområde. En annen mulighet er å rendyrke økotoksikologi, inklusive marin økotoksikologi, og knytte satsingen opp mot marinbiologi og MarLis.

B) Instituttene satsinger

B.1 Grupper ved Farmasøytisk institutt

De satsingene instituttet deltar i er relevante for viktige området innen de farmasøytiske fagene. Blant de forskningsgruppene som ennå ikke er i fakultetssatsinger, vil på sikt de fleste kunne assosiere seg med eksisterende satsingsområder. Samfunnsfarmasi er et klart unntak fra dette. De anvender samfunnsvitenskapelig metode og har høy aktivitet innen

registerforskning. Dette er en utfordring i MN-konteksten. Imidlertid er faget sentralt i undervisningen og det er uaktuelt å legge ned faget. Videre er forskning i emnet ønsket løftet på nasjonalt plan fordi forskning om legemiddelbruk har stor samfunnsmessig betydning. Et annet område som er utfordrende er translasjonsforskningen. Vi har grupper som er aktive i å bringe resultatene fra laboratoriet inn i klinikken. Dette er et område som forskningsrådet ønsker økt fokus på, men som ikke finner støtte i MN-satsingene.

I det følgende redegjøres det nærmere for de gruppene som instituttet jobber med å utvikle og som per i dag ikke er formelt tilknyttet fakultetssatsingene.

PharmaLuxLab: er aktive innen forskning på formulering av legemidler. Arbeidet er innen samme hovedområde som SiteDel, men det anvendes andre innfallsvinkler til det å levere legemidler på virkestedet. Gruppen er aktiv innen fotodynamisk terapi og fotokjemisk internalisering og har tett samarbeid med Kristian Berg sin gruppe på Radiumhospitalet. Gruppen har tre fast vitenskapelig tilsatte og med Kristian Berg i en professor II-stilling. Gruppen vant konkurransen om en av de fire ISP-FARM tildelingene som NFR bevilget etter Farmasievalueringen. Gruppens aktivitet faller inn under "Pharmaceutics" som var et prioritert område i utlysningen.

Individualized drug therapy: Gruppen er aktiv innen moderne farmakologisk forskning med fokus på farmakokinetikk, bioanalyse og biomarkører og anvender simuleringsmetoder til å predikere effekten av legemiddelinteraksjoner som senere verifiseres *in vivo*. Organtransplanterte og fedmeopererte har vært fokusgrupper for forskningen. Gruppen består av to fast vitenskapelig ansatte og to professorer i delt stilling med hhv. Oslo universitetssykehus og Diakonhjemmets sykehus. Gruppen har også samarbeid med farmasøytisk industri og den er tett assosiert med satsingen Bioanalyse. Gruppen vant konkurransen om en av de fire ISP-FARM tildelingene som NFR bevilget etter Farmasievalueringen. Gruppens aktivitet faller inn under området "Translational research" som var et prioritert område i utlysningen. En av de fast ansatte er også med Toksikologi-satsingen.

Legemiddelkjemi: Organisk syntetisk kjemi er ettertraktet og nødvendig innen mange biofarmasøytiske forskningsområder. Instituttet har for tiden tre fast vitenskapelig ansatte innen dette området. Forskerne innretter for tiden sine aktiviteter sterkt opp mot grupper som har identifisert terapeutiske targets og som disponerer biologiske testsystemer. De nærmeste samarbeidspartnerne er Toksikologi (nevro-gruppen) og CMVN. Det er også samarbeid med den nyetablert ProTarg gruppen på instituttet. Se også omtalen under fakultetssatsingen Syntese og Molekylstruktur. Det ligger åpenbare muligheter i en tettere integrering av legemiddelkjemigruppen ved FAI med SMS.

ProTarg: Dette er en nyetablert gruppe (Proteolytic enzymes as drug targets). ProTarg studerer proteolytiske enzymer (proteaser) som farmakologiske targets) i forbindelse med utvikling og progresjon av inflammatoriske sykdommer (kreft og aterosklerose). Eksperimentene baserer seg i stor grad på anvendelsen av ulike cellemodeller. Gruppen har to fast vitenskapelig ansatte som begge har restrukturert sin forskning de siste årene. De jobber med å finne en bredere basis for samarbeid.

Virus: Gruppen forsker på interaksjoner mellom virus og vertsceller og benytter ISAV-viruset som modellorganisme (Infectious salmon anemia virus). Metodene som benyttes er RT-PCR av immun genespresjon og har etablert metoder for studier av apoptose i celler fra atlantisk laks. Siktemålet er utvikling av vaksiner og funksjonell fôr for akvakulturnæringen. Gruppen er liten, med en fast vitenskapelig ansatt, og vil kunne integreres i LaMDa evt. MERG. Det er tilsatt en ny fast vitenskapelig ansatt innen farmasøytisk mikrobiologi som vil bidra til å binde sammen Virus-gruppen og LaMDa. En mulig utviklingsretning for forskningen her ble

klarlagt under arbeidet med SFI-søknaden AFISH. Her vil de to mikrobiologene ved FAI som jobber med fisk, samarbeide med Gareth Griffiths ved IMBV og SITEDEL om nye formuleringer av legemidler/vaksiner til fisk.

B.2 Grupper ved Biologisk institutt

Marinbiologi

(forskningsprogram - Ledes av Bente Edvardsen, BI)

Marinbiologi-programmet, med 7 (6) fast ansatte ved BI, hvorav 1 i langtidspolisjon, har det siste året prioritert arbeidet med å fremstå som en mer integrert satsing innen fagområdet. Programmet har 2 amanuensis II-stillinger tilknyttet aktivitetene, begge med hovedstilling ved NIVA. Programmet har levert et strategisk innspill til utvalget der de redegjør for satsingens hovedtemaer, gruppens spesielle forutsetninger, og veien videre.

Det er tatt initiativ til en marin satsing på fakultetet – *MarLis* - med medlemmer fra forskningsprogrammene og CEES ved BI, Institutt for geofag, og NIVA. MarLis ønsker å utvide samarbeidet med flere forskningsinstitutter i og rundt Oslo og Skagerrak (f.eks., HI, NVH/VI, Göteborg Univ., København Univ.). Den nye satsingen er konsentrert omkring 3 temaer: (1) *Biodiversitet*, (2) *funksjon* og (3) *hav i endring*. Problemfokus og prosjekter er konsentrert i området rundt Oslofjorden, Skagerrak og Barentshavet, hvor det finns en infrastruktur som muliggjør et samarbeid mellom universiteter (med båtfasiliteter) og forskningsinstitutter i Norden. Målsetningen er å bli et nasjonalt ledende og topp internasjonalt forskningsmiljø innen (alle tre?) satsingsområdene i løpet av de neste 5 til 10 årene. Miljøet har skissert en allsidig tilnærming (eksperimenter, feltstudier og modellering) og tverrfaglig samarbeid som nøkkelen for å være et kunnskapssenter for 1) marine organismers forekomst og tilstedeværelse i tid og rom, 2) samspill og interaksjoner mellom marine organismer, 3) marine økosystemer i forandring, og 4) respons og utvikling i marine økosystemer ved globale endringer

Rekrutteringsgrunnlag: Programmet har fått 1 KD-stipendiat fra fakultet gjennom deltagelse i MERG, 2 KD-stipendiat som følge av startpakkeordningen, og 1 intern stipendiat fra BI.

Integrativ Biologi

(forskningsprogram; inkluderer Toksikologi (nyetablering på fakultetet) - Ledes av Hans Petter Leinaas, BI)

6 fast ansatte; 1 amanuensis II og en professor II tilknyttet toksikologi-biten av programmet

IB har levert et strategisk innspill (10 s) til utvalget der det redegjøres for satsingens hovedtemaer, gruppens spesielle forutsetninger og veien videre. Gruppen har bred kompetanse i økofysiologi, toksikologi, støkiometri, studier av livshistorietrekk og populasjonsbiologi.

Programmet har som mål å utvikle et internasjonalt ledende forskningsmiljø som kobler miljøeffekter og økosystemfunksjoner. Satsingen er todelt: (1) *Cellulære prosesser og responser på individnivå* og (2) *Fra individ til økosystem; tilpasninger til og konsekvenser av miljøendringer*, og omfatter utvikling og bruk av eksperimentelle modellsystemer for terrestre og akvatiske organismer/habitater på ulike nivå, fra cellulære prosesser til

✦

populasjonsdynamikk. Fokus er bl.a. å studere respons på klimaendringer, tilgjengelighet av næringsselementer, og effekter av fremmedstoffer. Toksikologimiljøet ved BI (se over) utgjør en integrert del av forskningsprogrammet. Forskningsprogrammet har et utstrakt samarbeid med CEES og MERG.

Rekrutteringsgrunnlag: : Toksikologigruppen har de siste tre årene fått 2 KD stipendiater og 1 post doc fra fakultetet, den siste stillingen som et resultat av startpakkeordningen opp mot nytilsetting Ketil Hylland; programmet har fått 1 intern stipendiat fra BI. Programmet har i tillegg 1 intern stipendiat.

Innspill til MN strategi for Life Science fra instituttlederne ved Biologisk institutt, IMBV og Farmasøytisk institutt, 24.09.2010

Vedlegg 2:

Eksisterende teknologiplattformer og annen forskningsinfrastruktur ved MN

I vedlegget har vi gitt en kortfattet beskrivelse av teknologiplattformer som kan betraktes som MNs kjernefasiliteter innen LS. MN bør støtte opprettelse og drift av teknologiplattformer slik at forskerne skal få tilgang til viktig teknologi som enten er for kostbar eller for avansert til å kunne etableres i enkeltstående forskningsgrupper. Teknologiplattformer skal dekke et reelt behov og tilby service til andre forskningsmiljøer. I sin natur er teknologiplattformer dynamiske i innhold og spesialkompetanse selv om enkelte plattformer naturlig vil være mer langlevde enn andre.

Vi beskriver også annen forskningsinfrastruktur som er nødvendig for å drive eksperimentell forskning innen LS. Dette inkluderer forskningsstasjoner, forskningsfartøy, verksted, dyreavdeling og fytotron.

1. Bioinformatikk og beregningsmessig biologi

Bioinformatikk/matematisk/statistisk/beregningsmessig biologi ved UiO er spredt på ulike fakultet og sentre. En MLS-opprettet komité har nylig høstet inn data om "Computational Life Science" ved UiO og kommet med konkrete anbefalinger om hvordan et løft for feltet kan implementeres. Det foreslås en totrinns prosess hvor en forsterket kjernefasilitet (lokalisert til Informatikk) – med satellitter på medisin, bioteknologisenteret og BI – etableres. Dette innebærer at den eksisterende kjernefasiliteten ved Informatikk (og dels medisin) må omorganiseres. MLS har gitt bevilgning til denne prosessen – under forutsetning av at instituttene (dvs. BI, IFI, Medisinske Basalfag og Bioteknologisenteret) bidrar med egenfinansiering. Dette har instituttene gått med på og MN har stilt seg bak BI og IFI her. Dette innebærer at et "Extended Bioinformatisk Core Facility – EBCF" ved UiO etableres med en ledelse og daglig drift fra 2010 – høstsemesteret, styrt av MLS-clusteret. Det er ønskelig at EBCF skal munne ut i et fremtidig senter for Computational Life Sciences (CLS), hvor Life Science instituttene (BI, IMBV, KI, FI) er sentrale aktører sammen med IFI og USIT.

1.1 Bioportalen

Bioportalen er en web-basert biocomputing service ved Universitetet i Oslo, <http://www.bioportal.uio.no>. Bioportalen er p.t. den mest brukte bioinformatikkserviceenheten i Norge og representerer den største gruppen av HPC (High Performance Computing)- brukere på tvers av fagområder og institusjoner i Norge. I 2009 hadde Bioportalen tidenes største belastning på våre beregningsressurser, der 17 515 analyser ble utført og 4,1 millioner CPU timer ble brukt, som tilsvarer 460 CPU år. Bioportalen har brukere fra alle kontinenter. Totalt er registrert 1900 brukere, hvorav 1000 brukere fra UiO (alle fra Life Science fakultetene), 400 brukere fra andre institusjoner i Norge, og 500 brukere fra andre land. Bioportalen i sin nåværende form er spesielt viktig for evolusjons- forskningen og -utdanningen ved MN-fakultetet.

1.2 Life Science og matematiske fag

Det er en klar utvikling internasjonalt mot en større bruk av matematiske metoder innen biologi og medisin. Etter alle solemerker vil denne trenden forsterkes fremover. Matematisk biologi er et raskt voksende fagfelt som kombinerer empiriske, matematiske og beregningsorienterte teknikker for å få forståelse av fysiologiske og biologiske prosesser. (Se f.eks. *ESF Science Policy Briefing December 2008* og *ESF 2007 Forward Look (FL) report on System Biology: a grand challenge for Europe.*) Tradisjonelle statistiske metoder vil fortsatt ha en sterk posisjon, men i tillegg er det særlig to hovedområder man kan fremheve. Det ene er håndtering og analyse av de store datamengdene genomikken gir opphav til, og det andre er matematisk modellering av komplekse biologiske fenomener. LS- satsingen ved MN og UiO er avhenging av at sterke miljøer innenfor matematikk og statistikk engasjerer seg i disse problemstillingene, noe som selvsagt må skje i tett samarbeid med biologer og medisinere.

Statistikkmiljøet ved Matematisk institutt har i dag et utstrakt samarbeid med LS- miljøer ved MN, Med. Fak., Rettsmedisinsk institutt, Oslo Universitets sykehus (Radiumhospitalet) og Nasjonalt Folkehelse institutt. Miljøet samarbeider også tett med statistikere og bioinformatikere ved Biomedisinsk forskningsgruppe (IFI, Mat.Nat), Avdeling for biostatistikk (IMB, Med.Fak) og Norsk Regnesentral. Samarbeidet har både formell og uformell karakter, der det formelle samarbeidet er organisert via sentrene [BMMS](#), [\(sfi\)²](#) og [CEES](#). Den faglige aktiviteten består dels av utvikling og studier av statistiske og bioinformatiske metoder som er av betydning for LS- feltet, dels av konkrete biologiske/medisinske studier. Noen viktige forskningsområder er (i) studier av høydimensjonale genomiske data (som genekspressjonsmålinger, snper og kopitall data) og hvordan disse henger sammen med ulike kliniske variable (for eksempel levetider), (ii) metoder for å integrere data fra ulike kilder og studier av komplekse kliniske forløp, og (iii) metoder for studier av biologiske populasjoner. Ledelsen ved Matematisk institutt har uttrykt at de vil prioritere en satsing på aktiviteter knyttet til LS- satsingen., men at det neppe vil være mulig å dekke det reelle behovet for matematisk og statistisk kompetanse innen de rammene instituttet i dag har til rådighet.

Biostatistikk er allerede et prioritert område ved Matematisk institutt, og instituttet forventer en økt aktivitet innen feltet i de neste 10 årene. Det blir viktig å finne egnede organisatoriske rammer for denne aktiviteten som fremmer samarbeid mellom de ulike metodemiljøene ved UiO (samt Norsk Regnesentral) uten å svekke statistikkfaget ved Mat.Nat.Fak. Som et eksempel på dette fremheves planene om å opprette en statistisk enhet ved Biologisk institutt, der en fast tilhørighet til Matematisk institutt har vært fremhevet som avgjørende for å opprettholde et kjernemiljøet i statistikk og for å unngå fragmentering av fagmiljøet. De senere årene har matematikkmiljøet innenfor beregningsvitenskap utviklet seg til å bli et internasjonalt toppmiljø. Ikke minst er etableringen av CMA ved UiO en viktig grunn til dette. Miljøet har en utstrakt kompetanse innenfor partielle differentiaalligninger, stokastisk analyse og numeriske metoder, og har anvendelser og modellbygning innen disse feltene som et av sine hovedfokus. Tilsvarende har Monte Carlo metoder blitt et svært viktig verktøy innen for statistikk og er en viktig metodekomponent i miljøet rundt [\(sfi\)²](#). På CMA er det en klart tiltagende interesse for problemstillingen og en uttalt vilje til å bidra innenfor LS- området. Det er etablert kontakter med medisin- og biologimiljøer ved UiO for å kartlegge aktuelle samarbeidsflater. For å styrke denne prosessen arrangerte CMA nylig en workshop med deltagelse blant annet fra IMB, CMBN, Bioteknologisenteret og CEES.

1.3 Kvantekjemi/mekanikk i Computational life science

Kjemien har i løpet av de siste 10–20 år gjennomgått en revolusjon, som har medført at mange kjemiske systemer og prosesser kan simuleres med stor grad av pålitelighet ved hjelp av kvantemekaniske metoder. Denne utviklingen kan illustreres ved at 40% av alle artiklene i Journal of American Chemical Society benytter simuleringer (som oftest kvantemekaniske) i tilknytning til eksperimentelt arbeid og ved at hver tredje fastansatte ved Kjemisk institutt har benyttet kvantekjemiske beregninger i sine arbeider. Et viktig trekk ved utviklingen av beregningsmetoder går i dag mot store molekyler, bestående av mer enn 1000 atomer. Ved å benytte massive parallell processing (MPI) vil slike metoder i fremtiden kunne benyttes til studier av en rekke biologiske prosesser, på et fundamentalt kvantemekanisk nivå, til å studere dynamiske prosesser og biologiske strukturer på en måte som vil revolusjonere slike studier på samme måte som kvantemekaniske metoder i dag har revolusjonert kjemien. Kjemisk institutt har i dag en internasjonalt høyt anerkjent forskningsgruppe innen teoretisk kjemi, som arbeider med utvikling og anvendelse av kvantekjemiske beregningsmetoder for store molekylære systemer. Denne gruppen har blant annet stått sentralt i utviklingen av programsystemet DALTON for kvantekjemiske simuleringer av molekylære systemer og prosesser. Gruppen utgjør sammen med teoretiske kjemikere i Tromsø SFF'en CTCC (Centre of Computational Chemistry). Med den kompetanse og internasjonale berøringsflate som Kjemisk institutt på denne måten har opparbeidet seg over flere tiår innen kvantekjemiske simuleringer av molekylære systemer vil det kunne gi viktige bidrag til oppbyggingen av et tilsvarende simuleringsmiljø innen biokjemi spesielt og biologi generelt.

2 Bioanalyse

De mest sentrale aktørene innenfor analytisk kjemi ved MN-fakultetet er Bioanalyseplattformen ved FI/KI og Glyconor MS-enheten ved IMBV. De to enhetene er beskrevet nærmere nedenfor. Ved vurderingen av ulike initiativ innen bioanalyse kan det være formålstjenlig å skille mellom *analytisk kjemi* og *kjemisk analyse*, der det i førstnevnte kategori handler om utvikling av teknologi og innovasjon, mens det i den andre kategorien handler om anvendelse av teknologi og service- og driftsfunksjoner. Bioanalytics@UiO har et klart fokus på utviklingssiden. Deres instrumenter er ikke satt opp til å drive servicefunksjoner. De hjelper andre grupper med å utvikle nye analysemetoder, og overlater deretter til gruppene selv å kjøre analysene. På den annen side er Glyconor MS-enheten er satt opp som en service-enhet som leverer tjenester til Glyconor-konsortiet og andre. I tillegg til de to gruppene som er nærmere beskrevet nedenfor, er Bernd Thiedes gruppe ved Bioteknologisenteret viktig å ta med i beskrivelsen. Gruppen er med i NorProteomics nettverket organisert av FUGE, og arbeider med å etablere metoder innen proteomikk som er av interesse for forskere innen funksjonell genomikk. En kort beskrivelse av gruppens forskning er tatt inn til slutt. Det som i hovedsak skiller Thiedes gruppe og Bioanalytics@UiO er utgangspunktet for forskningen. Thiede jobber med biologiske problemstillinger og anvender proteomikk til å løse dem. Bioanalytics@UiO jobber med teknologien som utgangspunkt,- proteinene er modeller.

Det vil være av stor viktighet at fakultetet har tilgang til grupper som har teknologi som sitt primære forskningsfokus. Dette er nødvendig for å opprettholde kompetanse, både akademisk og industrielt. Bioanalysegruppen er i ferd med å gjennomgå et generasjonsskifte. Dette gjelder både ved Farmasøytisk institutt og Kjemisk institutt. Dette er krevende prosesser hvor nye nøkkelpersoner skal rekrutteres og sosialiseres inn i prosjektene og ny kurs skal staves ut

for framtidens forskning. Gruppen Bioanalytics@UiO har så langt ikke vært blant de mest aktive i søknadsprosesser om forskningsmidler. Imidlertid har de lyktes i å finansiere det utstyret gruppen trenger og i å skaffe midler til å drifte dette. De bygger seg målrettet opp mot å søke SFF-status og andre store søknader for å ekspandere ytterligere.

2.1 Bioanalytics@UiO

Bioanalytics@UiO skiller seg fra andre enheter med servicefunksjon (og lignende tung instrumentering) i at målsettingen ligger i å utvikle teknologi og metodologi (analytisk kjemi) fram for bruk av teknologi og metoder i et rutinebasert analyselaboratorium (kjemisk analyse). Det er tre store forskningsområder innen Bioanalytics@UiO som danner kompetanseplattformen for analytisk kjemi/bioanalyse ved MatNat fakultetet. Disse forskningsområder er:

- Mikroekstraksjon

Prosjektet her er fokusert på å utvikle helt nye konsepter og teknologier for prøveopparbeidelse innen legemiddelanalyse og analytisk kjemi, hvor hensikten er å isolere stoffer av interesse, som legemidler og peptider, fra forskjellige prøvetyper som eksempelvis blod og urin. Dette er viktig for å kunne øke påliteligheten av kjemiske analyser, for å kunne utføre dem raskere og med enklere utstyr, og for å kunne lage systemer som i fremtiden kan utføre målinger som ikke er mulige i dag. Bruk av kunstige væskemembraner i mikroskala står sentralt i dette prosjektet, som har samarbeid blant annet med universitetene i København og Helsinki.

- Nye separasjonsteknologier

I prosjektene innen dette området arbeides det med utvikling av separasjon-teknologi i kombinasjon med massespektrometri for å løse problemstillinger innen life sciences hvor det er behov for å kunne bestemme svært lave konsentrasjoner i ultrasmå prøver. Hovedsakelig er metodene basert på mikro og nanoLC-MS(MS). Det er et spesielt fokus på miniatyrisering og nye separasjons-materialer, samt miniatyriserte multidimensjonale teknikker (med mulighet for automatisering) for analyse av komplekse prøver.

- Nye diagnostiske verktøy

Prosjektene her er fokusert på å kunne måle diagnostiske proteiner i 10^{-12} M nivå i komplekse matrikser som f.eks blod, urin eller cellekulturer ved hjelp av avansert prøveopparbeidelse koblet til LC-MS/MS. Både en tidligere og mer presis diagnose (ingen falsk positive/negative analyser) og et mer differensiert oppklaring av sykdomsbilde kan oppnås i forhold til eksisterende teknikker brukt i rutine per dags dato.

Forskningsaktivitetene innenfor Bioanalytics@UiO er preget av sterke samarbeidspartnere både innenfor UiO (Farmasøytisk Biovitenskap – Farm. Inst., SFI CAST – Med. Fak./Oslo Univ. sykehus) nasjonalt (f.eks Radiumhospitalet, Rikshospitalet - begge Oslo Univ. sykehus) og internasjonalt (f.eks. Universitetet i København og Universitetet i Helsinki). Det er stor variasjon i utfordringene men fellesnevner for alle samarbeidsprosjekter er at bidraget fra Bioanalytics@UiO gjenspeiler innovasjon, teknologi- og metodeutvikling og med fellespublikasjoner som mål. Det presiseres at kompetanseplattformen Bioanalytics@UiO per dags dato ikke har som mål / ressurser til å utføre rutinebasert kjemisk analyse , men deres kunnskap om utvikling av teknologi og metodologi kan være et bidrag til forbedring av rutineanalyser (typisk core-facility). Bioanalytics@UiO er per dags dato en viktig støttespiller for de forskninggrupper som ønsker å utvikle ny analyseteknologi og/eller forbedre målestrategier og metoder.

2.2 The Glyconor Mass Spectrometry Unit

The Glyconor Mass Spectrometry Unit at IMBV established in 2008 has the goal to facilitate MS analysis of clinical and biological samples by offering state-of-the-art instrumentation and MS expertise in preparing, analyzing, and interpretation of experimental data within and outside the Glyconor consortium. The unit is headed by Wolfgang Egge-Jacobsen. The major focuses in 2009 were bacterial protein glycosylation in an independent and collaborative manner. Furthermore phylogenic comparison of protein glycosylation as well as the effect of diseases (psychological stress) on protein glycosylation are major topics of the group.

Current mass spectrometry instrumentation includes a high resolution Thermo LTQ- Orbitrap XL mass spectrometer with an Agilent Nano 2D HPLC system and a Water micro Q-TOF. Methods have been developed for the analyses of glycopeptides, as well as for complex mixtures of oligosaccharides. These LC-MS assays are performed using in addition the 3D ion trap instrument with electron transfer dissociation (ETD) from Agilent Technologies and include chromatographic separation on a porous graphitized carbon column (oligosaccharides) or a reversed-phase column (peptide-glycopeptides mixtures) using the chip technology. Additionally, the unit has two data analysis workstations including the Bioworks SEQUEST and Proteome Discoverer search engines, and in-house software to search for peptide matches after unspecific protease cleavages.

In 2009 the Glyconor MS Unit analyzed a total of 1364 samples of which 1049 samples were analyzed using the Orbitrap XL. In addition to project related to Glyconor and national/international collaborators in Norway, the USA and Germany, several external users from the University of Kiel, Germany, the Life Science University in Ås and the National Veterinary Institute in Oslo visited the MS Unit.

2.3 Bernd Thiedes gruppe (ved Bioteknologisenteret, direkte underlagt MLS)

Fra Bioteknologisenterets årsrapport for 2008: "The main activity of the cell death proteomics group is independent research in apoptosis and providing of proteomics service. Signaling in apoptosis comprises several processes such as regulated proteolytic cleavage of specific target proteins by caspases, posttranslational modifications, protein-protein interactions, and protein translocations. Therefore, the general concept of the group is to establish and develop proteomics approaches to identify proteins involved in apoptosis signaling which are also of relevance for customers of proteomics service. Furthermore, quantitative temporal proteome profiling projects are performed to study also processes precedent of apoptosis such as mitotic arrest, DNA damage, and ER stress which are triggered by different chemotherapeutic drugs."

3 Imaging

3.1 The Electron Microscopy Laboratory (EM-Lab)

The EM-Lab was established in 1966. The equipment of the laboratory has an estimated value of NOK 25-30 million and is, due to its methodological resources, the largest EM laboratory in Norway for the biological, molecular and biomedical sciences. Presently the laboratory includes five electron microscopes, of which three are transmission microscopes and two scanning electron microscopes. Two of the microscopes are standard instruments while three include various types of equipment that allow the use of advanced and special techniques for elemental analysis, cryotechniques and high resolution. Images are captured digitally, and photographic film is only

3.2 The IMBV Imaging Platform

The miniplatform for imaging at IMBV is a specialized microscopy unit for the study of living and fixed cells. The unit in addition is a part of the UiO imaging platform NORMIC, a FUGE-supported facility. About 75 researchers used the platform in 2009.

Equipment: *Olympus FluoView 1000 inverted LX81 confocal laser scanning microscope* - This confocal microscope is a setup for the study of living cells and includes an incubation chamber for maintaining 37 °C and a sufficient supply of CO₂ over a long time. FV1000 is equipped with four laser lines and thus may detect four different fluorochromes. The instrument is equipped with a SIM scanner to allow fast and specific bleaching experiments, and this makes the microscope well suited for techniques like FRAP, FLIP, FRET and photoactivation.

Olympus FluoView 1000 upright BX61WI confocal laser scanning microscope - This instrument is set up for the study of fixed cell samples as well as for living animals and is attached to the Gundersen group. The microscope has water immersion as well as oil immersion objectives with a large working distance, making it suitable for microscopic studies of tissue sections as well. The two Olympus microscopes were in 2009 used for 4400 hours, corresponding to 12 hours daily use throughout the year, including weekends and holidays.

Andor Revolution XD spinning disk confocal microscope - This is a fast and very sensitive microscope equipped with three laser lines and designed for live cell studies. The detector is a EMCCD camera with a high signal/noise ratio that can record up to 300 pictures per second. This makes the instrument ideal for recording living cells with a low phototoxicity threshold and for the study of cellular processes in several dimensions, such as 3D and 4D. The Andor instrument were in use about 35 hours per week in 2009. The use is steadily increasing, partly because the Olympus instruments are overbooked and since more people have been instructed in the use of the spinning disk microscope.

Scan^R high throughput immunofluorescence microscope - This Olympus microscope is a fluorescence microscope that has been designed for the analysis and microscopy of several cell samples. The instrument may be programmed to follow up to 396 cell clones simultaneously. The software is also designed for the analysis of several parameters at the same time. Due to the high number of objects that can be analysed, one may perform objective analyses of microimages with good statistics. This microscope was used for 1200 hours in 2009, with users from several sections of the University. It is in daily use in often long-lasting experiments, and in addition the computer equipment is used to analyse data from the other microscopes.

Imaris software (visualization and data analysis) - Data sets from microscopy of living cells in 3D or 4D often have a size of several gigabytes and will need a high end computer with specialized software. Imaris from Bitplane is a software module that is used to study functionality, to visualize, for segmentation and for the interpretation of data from the microscopes.

3.3 AFM

Atomic Force Microskopi – er en eksperimentell teknikk som kan utføre avbildning av ubehandlede celler, mikroorganismer, virus, biopolymerer og aggregater av disse, både i tørket preparat og i væske. Avbildningen over tid under fysiologiske forhold vil kunne vise dynamiske interaksjoner mellom molekyler. AFM-teknikken kan også benyttes til å bestemme topografisk elastiske egenskaper i et preparat, med en oppløsning i nm-området, samt å

bestemme bindingskrefter i spesifikke interaksjoner mellom preparat (f.eks. immobiliserte proteiner) og en behandlet probe.

Farmasøytisk Institutt har et *JPK NanoWizard AFM* koblet sammen med et *Nikon TE2000* invert mikroskop. Nanowizard kan utføre scan av celler (inkludert mikroorganismer) og polymerer i luft og i væske. AFM er også utstyrt med BioCell som kan brukes med varmeregulering for å studere dynamiske prosesser med levende celler og enkeltmolekyler. Pr idag er AFM primært benyttet av brukere fra Farmasøytisk institutt, men har også vært testet ut av forskere fra Odontologisk Institutt, IMBV og NVH.

4 Strukturanalyse av biomolekyler

En strukturplattform for life-science har fokus på bestemmelse av tredimensjonale strukturer. Det er fire hovedteknikker som må dekkes av en slik plattform

- Røntgendiffraksjon
- NMR-spektroskopi
- Andre spektroskopiske teknikker
- Massespektrometri (overlapper med analyseplattform)

I tillegg er det behov for en kjernefasilitet for proteinproduksjon og opprensing.

4.1 Røntgendiffraksjon

Røntgendiffraksjon benyttes til å bestemme proteinstrukturer (og mindre molekyler) med høy oppløsning. Dette er en helt nødvendig teknikk for strukturbiologien og for organisk kjemi generelt. Utstyrmessig er det i tillegg til diffraktometere (for store, men også mindre molekyler), behov for automatiske krystallisering og screening systemer. Synkrotronkildene utgjør svært viktig infrastruktur innen proteinkrystallografien. Denne type instrumentering er viktig for store brukergrupper ved fakultetet. Organisk kjemi ved KI, FI samt biofysikk (FyI) er avhengig av enkeltkrystallrøntgen for mindre molekyler. Proteinkrystallografi er mer spesialisert. Det er i dag tre proteinkrystallografigrupper i Oslo (Krengel - KI, Bjørås - Rikshospitalet, Andersson - IMBV). En fjerde er nylig tilsatt (Morth - NCMM). I tillegg er det en aktivitet innen protein NMR ved IMBV. En hovedutfordring er at den totale aktiviteten inne proteinkrystallografi i Oslo området er basert på fire mindre grupperinger. En samlokalisering av to eller flere av disse gruppene vil gi en totalt sett mer robust og helhetlig aktivitet.

4.2 NMR-spektroskopi

En bred NMR infrastruktur er nødvendig for å dekke behovene innen hele life science segmentet. Det er formålstjenelig å dele instrumenteringen inn i høyfelt (600 MHz og høyere) og lavfelt (600 MHz og lavere). Høyfeltinstrumentering er nødvendig for studier av proteiner og store sukkermolekyler samt molekyler i tynne konsentrasjoner. Lavfeltinstrumentering er nødvendig for organisk kjemi, medisinalkjemi og for studier av prosesser i kroppsvæsker (metabolomikk). Lavfeltinstrumenteringen er helt essensielt for all aktivitet innen organisk kjemi ved KI og FI. Instrumenteringen benyttes dessuten av en rekke andre grupperingen innen polymerkjemi, analytisk kjemi og materialkjemi. Dagens NMR-laboratorium er godt integrert i øvrig virksomhet innen organisk kjemi ved KI.

MN må ha et NMR-laboratorium for organisk kjemi (lavfeltinstrumentering) ved KI og FI. Dette bør ligge ved KI men bør i et lengre perspektiv (nybygg) vurderes organisert klarere som en felles infrastruktur uavhengig av et spesifikt institutt (spesielt dersom vi går for høyfeltinstrumentering). KI har tre fast vitenskapelig tilsatte innen NMR-spektroskopi, og en større integrasjon er ønskelig.

4.3 Andre spektroskopiske teknikker

En rekke spektroskopiske teknikker benyttes innen life science. Mye er mindre enheter drevet og brukt av lokale forskergrupper. Det er behov for en analyse av hvilke teknikker som er av en så stor og kompleks karakter at den skal være lokalisert/organisert som en del av en strukturplattform. For øvrig utgjør synkrotronkildene en svært viktig infrastruktur for avansert spektroskopi.

4.4 Massespektrometri

Massespektrometri benyttes i mange sammenhenger. Mye er mindre enheter drevet og brukt av lokale forskergrupper. Det er likevel behov for en service type aktivitet ved fakultetet. Instrumenteringen må dekke behovet for analyse av både ikke-flyktige polare forbindelser og mer flyktige og upolare substanser.

Organisk kjemi ved KI og FI samt glycobologi er avhengig av MS-service. Disse behovene dekkes i dag ved delvis overlappende instrumentering lokalisert og drevet ved de forskjellige instituttene. KI har en vitenskapelig tilsatt med MS som spesialtekniske og to tekniske stillinger knyttet opp til aktiviteten/service-funksjonen.

5 Sekvensering- og genomikk-plattformer

5.1 ABI-lab

ABI-laben (www.bio.uio.no/ABI-lab) ble opprettet i 2005 og har to ABI 3730 kappilærelektroforese sekvenseringsmaskiner, begge utstyrt med 48 kapillærer. ABI-laben utfører DNA sekvensering og fragmentanalyse, og fungerer som en servicelab for brukergrupper internt, nasjonalt og internasjonalt. ABI-labens inntekter kommer hovedsakelig fra sekvensering av pcr-produkter og plasmider utført av teknikerne (3) tilknyttet laben, men også fra fragmentanalyser utført av brukerne selv.

5.2 The Ultra high throughput sequencing platform (UTSP)/Norwegian High-Throughput Sequencing Centre (NSC) - GS-FLX lab

UTSP ble i 2007 opprettet som en nasjonal service-plattform innen sekvensering og ble i 2009 oppgradert til et nasjonalt sekvenseringssenter ("Norwegian High-Throughput Sequencing Centre - NSC" (<http://www.sequencing.uio.no>)) med innkjøp av tredje generasjons sekvenseringsutstyr i samarbeid med UTSP og sekvenseringsplattformen ved Oslo universitetssykehus HF, Avdeling for medisinsk genetikk – Ullevål. De to nodene ved NSC tilbyr komplementerende service innen "high-throughput" sekvensering. UTSP besitter 2 GS-FLX maskiner (454/Roche) og er med sine lengre sekvenser (4-500 bp i snitt) best egnet til *de novo* sekvensering, transkriptom- og metagenom- analyser, i tillegg til sekvensering av PCR amplicons. Noden ved Ullevål besitter 2 Genome Analyser II maskiner (Illumina), som med sine relativt korte sekvenser (fra 18 opp til 100 bp) er best egnet til prosjekter innen re-sekvensering, mikroRNA og transkriptomanalyser i tillegg til epigenetiske analyser.

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6 OCL-Nukleærmedisin

Radiofarmasøytisk kjemi:

Radiofarmasøytisk kjemi er et stort og viktig felt for dagens forskning. Forskning ved KI (kjernekjemi) har resultert i etableringen av ALGETA – et av Norges nye flaggskip innen forskningsbasert næringsliv. Videre aktivitet innen feltet må vurderes i et fakultetsperspektiv. PET-relatert forskning er et alternativ som i løpet av de siste årene har blitt prioritert sterkt ved fakultetet og ved UiO. Det er investert i størrelsesorden 200 millioner på PET i Oslo-regionen, men mye med klinisk vinkling. Større fokus på forskning er ønskelig fra UiO, men krever betydelig politisk/strategisk innsats. Ved enighet om et slikt forskningsfokus vil utviklingen av PET-forbindelser være et sentralt tema – men ikke som en uavhengig virksomhet. Det er vanskelig å tenke seg PET-forskning i frontlinjen, også klinisk, uten at den radiofarmasøytiske kjemien utgjør en viktig del av strategien, men de kjemiske prosjektene må ha en begrunnelse i et klinisk behov.

Vi er nasjonalt helt avhengig av kompetanse innen kjernekjemi. Dette er pr i dag et fagområde som kun dekkes ved KI, UiO. Med dette som bakgrunn er spørsmålet vinklingen på aktiviteten innen kjernekjemi, og her er radiofarmasøytisk kjemi svært aktuelt. Mhp PET-forskning har UiO en sterk strategisk fordel. Tilgangen til syklotronen (OCL) og dermed alternative radionuklider. Det er helt klart at det må være muligheter på syklotronen for produksjon av ^{18}F og forbindelser merket med denne, men syklotronen har også stort potensial til å danne grunnlaget for forbindelser som pr. i dag ikke har fått den plass de kanskje bør, og som er basert på radionuklider som $^{60,61}\text{Cu}$, ^{62}Zn , ^{64}Cu , $^{86,87}\text{Y}$, ^{94}Tc , ^{124}I osv.

Aktiviteten må ha en samlende, drivende leder som evner å samarbeide med komplementære miljøer. Et slikt samarbeid er sannsynligvis helt nødvendig for at miljøene skal tiltrekke seg den eksterne finansiering som er påkrevd for en kostnadsintensiv virksomhet som dette. Det er utenkelig at denne virksomheten i stor grad kan baseres på interne midler.

En radiofarmasøytisk aktivitet bør vurderes utviklet til en bredere aktivitet i samarbeid også med Fysisk og FI, i regi av SAFE og fokusere på de mulighetene som ligger i OCL. Denne lokale infrastrukturen gir fagfeltet unike fortrinn internasjonalt som bør utnyttes.

7 Store internasjonale installasjoner:

Store internasjonale infrastrukturer er drivere for moderne vitenskap. Dette er instrumentering som er for ressurskrevende for de enkelte land. Denne state-of-the-art teknologien kan for life-science i stor grad samles under heading synkrotron og nøytronstråle fasiliteter, representert ved henholdsvis ESRF og MAX II/IV samt ESS. To av disse anleggene bygges i Lund og selv om Norge er en liten bidragsyter er det i nasjonal målestokk store midler som avsettes til denne typen stor infrastruktur. 350 millioner er gitt til ESS, mens MAX IV er under debatt. Følgforskningensmidler vil måtte følge for å utnytte investeringene.

Pr i dag er disse anleggende mest interessante for brukerne av strukturplattformen. Dette dreier seg i stor grad om strukturbestemmelse i ulike målestokker;

- atomskala 3D-strukturer ved diffraksjon
- form og morfologi av makromolekyler ved småvinkelspredning
- molekylære bevegelser ved uelastisk spredning
- overflater og membraner ved reflektometri

Eventuell aktivitet knyttet mot disse internasjonale anleggene gir fakultetet, til tross for at relevante hjemmelaboratorier er påkrevd, muligheter for relativt kostnadseffektive forskningsaktiviteter av høy internasjonal standard.

Annen forskningsinfrastruktur på MN

Sentralverkstedet. Sentralverkstedet utfører utviklingsoppdrag og konstruksjon av nye instrumenter og utstyr samt reparasjoner/service, i første rekke for Bio og IMBV, men påtar seg også oppdrag for andre forskningsinstitusjoner og bedrifter..

Sentralverkstedet brukes til oppgaver i elektronikk, mekanikk, glassblåsing og sveising, spesielt på instrumentsiden og mot båt- og lab-fasiliteter (fysiologi, mikroskopi-park etc.), og i første rekke til oppgaver som er vanskelig eller umulig å få kjøpt eller utført eksternt. Sentralverkstedet har også ansvaret for BIOs interne bilpark (5 biler i helkontinuerlig drift knyttet opp mot feltkurs og feltforskning).

Forskningsfartøyene. Universitetet i Oslo ved MN-fakultet har to forskningsfartøyer i Oslofjorden, F/F Trygve Braarud (22m) og F/F Bjørn Føyn (12m). Fartøyene benyttes til forskning og undervisning i biologi, fysikk, geofag og i samarbeidsprosjekter med andre nasjonale og internasjonale forskningsinstitusjoner. Fartøyene leies også ut til andre institusjoner som utfører forskning, miljøovervåkning og miljørådgivning. NIVA, NGI og NGU er enkeltvis og samlet betydelige brukere. "Bjørn Føyn" benyttes i hovedsak til skolekurs og annen utadrettet marinbiologisk aktivitet i Drøbak.

Finse forskningscenter. Eies av MN-fakultetene ved Ui Bergen og Ui Oslo i felleskap. Driften og administrasjon av stasjonen er lagt til Bio, UiO. Senteret har én forskningsavdeling med 15 sengeplasser og mindre laboratorier, og én kurs- og konferanseavdeling med 44 sengeplasser. Forskning og undervisning ved MN-fakultetene har fortrinnsrett og benytter interne satser for bruk av stasjonen. Stasjonen lånes også ut til brukere fra andre forsknings- og undervisningsinstitusjoner i inn- og utland til eksterne satser.

Biologisk stasjon i Drøbak. Etablert som feltstasjon i 1894 og omfatter en forskningsstasjon (Biologen) og et kurscenter (Tollboden), som begge er bygninger beliggende ved sjøen i den antikvariske vernesonen i Drøbak sentrum. Stasjonen har saltvannssystemer og akvarie- og kulturrom for studier av marine planter og dyr, enkelt utrustede molekylærbiologiske og kjemiske analyselaboratorier, mikroskopirom med fluorescensmikroskop og programvare for bildeanalyse, vannrenseanlegg, studiesamlinger, lettbåter og innsamlingsutstyr. Stasjonen tilbyr ulike typer skole-feltkurs i marinbiologi og har de siste 30 år vært en av de større utadrettede virksomheter ved UiO og fakultetet mot skolen.

Fytotronen. Fytotronen er et anlegg for plante-dyrking og klimasimulering som ble ferdigstilt i 1972 og dengang representerte et av verdens mest avanserte dyrkningsanlegg for planter. Anlegget disponerer i dag ca. 900 m² klimakontrollert areal, laboratorier, kurssaler (bl.a. BIOs største kursussal med plass til 50 laborerende studenter), kontorer og seminarrom. Driften av Fytotronen finansieres ved *basismidler* fra Biologisk institutt og *brukerbetalning (leie)* for dyrkning og arealdisponering. Det benyttes graderte (interne og eksterne) betalingsatser. Avdelingen har helgevakt.

Anleggets størrelse og fleksibilitet, samt jevnlig teknisk vedlikehold og oppgraderinger de siste 30 år, har gjort det mulig å innrette fytotronen etter skiftende bruker-behov og å følge den fagbiologiske utvikling med hensyn på forsøksmetodikk i de ulike prosjektene. Avdelingen brukes i første rekke og i like stor grad av Bio og IMBV, og i andre rekke av

Naturhistorisk museum (National Centre for Biosystematics (NCB)). NCB har anmeldt at de går for en SFF ved neste utlysningrunde i NFR. Fytotronen har en egen lukket avdeling for arbeid med transgene planter (inneslutningsnivå S3). Fytotronen og prosjekttilgangen til fytotronen står sentralt i de framtidige planer for infrastruktur rundt de nasjonale satsingene innen **Bioklima og Plantenettverk** (se nedenfor).

Dyrestallen. Dyrestallen har blitt ombygd i løpet av hele 2009, og kapasiteten har vært redusert på grunn av dette. Ombyggingen er nær slutført, men noe arbeid gjenstår. Anlegget har begrenset kapasitet for store transgene musestammer, men huser også, rotter, kylling, fjellrotter, og klatremus. I tillegg er det mulighet for noe større dyr. Dyreavdelingen har også en akvariedel. Blant de artene som er plassert i akvariet er stingsild, ål, torsk, karuss, karpe (ulike arter), regnbueørret, ørret, laks, skilpadder og klorte frosk. I dag er alle rom opptatt, og flere medaka-akvarier har blitt installert. I alt har anlegget ca. 40 brukere, inkludert studenter.

Planlagte infrastrukturer:

Bioklima og Plantenettverk

Bio er deltager i det nasjonale Plantenettverket (www.plantnorway.no). Det er tatt initiativ til etablering av en storskala infrastruktur – kalt Bioklima – som omfatter alle universitetene i Norge og som har som mål å kunne finansiere avanserte klimasimulerings -muligheter for alle typer økosystem og organismer (planter, alger, sopp, vann, jord, luft osv). En forprosjekt-søknad har fått 2,5 mill i støtte fra NFR for å utforme en fullstendig søknad med en ramme på 200-500 mill NOK. De nasjonale arbeidsgruppene har startet arbeidet med søknaden som vil bli sendt til NFR i 2011. Det arbeides også for å etablere et forskningsprogram i plantebiologi som skal "serve" infrastrukturen og være med å gi den infrastrukturelle satsningen et tungt faglig prosjekt -innhold og finansiering. Planene er levert, men foreløpig skrinlagt i KD.

VEDLEGG 3,

MLS^{UiO} report

Towards the new Computational Life Sciences Centre in two steps - a strategic proposal for bioinformatics

Summary

In this report the current status and challenges in the field of bioinformatics at the University of Oslo have been evaluated. We provide an updated overview of the activities and research groups, and this shows broad activities at both MN and MF. Most notably, there are relatively few scientists involved in "algorithm-driven" bioinformatics, while quite a number of scientists are advanced users of bioinformatics. There are too few permanent positions in bioinformatics. The committee is of the opinion that the definition of bioinformatics has broadened; activities that support the new knowledge driven approach to systems biology necessarily include everything from database development to statistical and computational activities. These broader computational life science activities constitute the new generation of bioinformatics. We suggest a two-step process in order to enhance bioinformatics at UiO. First, we recommend strengthening the core facility and its satellites. The core facility does currently exist, but it needs reinforcement, increased visibility and service capacity, and its many satellites need to be strengthened as well. An improved core facility will in turn be the ideal starting point for exploring the establishment of a Centre for Computational Life Sciences. Such a centre should promote top-level research, provide the best service functions and offer undergraduate and graduate education. The proposed two-step process will require a considerable investment in CLS at UiO, and should be organizationally associated with IFI and possibly with the planned Life Science building.

Blindern 3 November 2009

Kjetill S Jakobsen (leader)

Bjørn S Skålhegg

Eivind Hovig

Ian Donaldson

Ole Christian Lindgjærde

1. Committee and mandate

The following committee was appointed by the MLS Board:

- Kjetill S Jakobsen (Dept of Biology, MN, MLS, leader)
- Ole Christian Lingjærde (Dept of Informatics, MN)
- Ian Donaldson (Biotechnology Centre -BiO)
- Eivind Hovig (Dept of Informatics, MN and OUS, Radium Hospital, MF)
- Bjørn S Skålhegg (Inst for Basic Medical Sciences, Dep of Nutrition, MF)

The committee has been given the following mandate:

Arbeidsgruppen gis i oppdrag å gi en kort oversikt over dagens situasjon innen bioinformatikk ved de aktuelle fakulteter ved UiO, inklusive hvilke sentrale forskningsgrupper vi har og innenfor hvilke spesialiteter, Videre bes arbeidsgruppen om å analysere hvilke utfordringer bioinformatikken står overfor mhp

- 1) organisering, synlighet og tverrfakultært samspill
- 2) faglige utfordringer
- 3) utfordringer innen undervisning
- 4) utfordringen innen service og support.

Arbeidsgruppen skal i sin konklusjon komme med konkrete anbefalinger til MLS@UiO om tiltak som vil kunne styrke fagområdet til beste for life science-forskningen ved UiO. MN-rapporten om bioinformatikk fra mars 2007 bør inngå som grunnlagsmateriale for MLS-rapporten.

2. Short overview of current bioinformatics activities at UiO

Traditionally, bioinformatics encompassed the application of information technology to the field of molecular biology. Today, bioinformatics covers many activities within the fields of advanced sequence analysis, gene predictions, protein structure activities/function as well as new developments in high throughput sequencing, systems biology, and analysis of -omics data, phylogeny (including phylogenomics), imaging, model- building and testing. These are all in need of complex computational methods and structures, putting heavy demands on computer infrastructure and statistical expertise. Hence, bioinformaticians to an increasing degree team up with statisticians and biologists, in Norway as well as internationally.

A detailed description of bioinformatics activities at UiO is given in the previous report from 2007 (Appendix 1), and gives a good overview of the field even in 2009. We have, however, made a short summary of the current activities and groups (Table 1). As can be seen from the table, the number of people involved in bioinformatics activities is steadily growing, although most of the research groups also existed in 2007. One notable difference from 2007 is that high throughput sequencing (HTS) has emerged as a major technology, and a technology that puts heavy demands on bioinformatics skills and infrastructure. Thus, there has been a build-up at the Ultra-high Throughput Sequencing Platform (UTSP) at Centre for Ecological and Evolutionary Synthesis (CEES) and at Oslo University Hospital (OUS, both at Ullevål and Radiumhospitalet). This is reflected in Table 1. In the future, the HTS activities will create even larger amounts of data and require more sophisticated analyses (and databases). The challenges raised by HTS technology with regard to computer infrastructure, bioinformatics and computational biology should not be underestimated. There are also some challenging data security issues concerning HTS human genome/transcriptome data. Imaging is another field where the activities are steadily growing, and there is a build-up of groups and activities at several sites. There is a need for coordination in these areas. In sum, the overview shows that there are few people involved in algorithm-driven bioinformatics research, while a

substantial number of scientists apply advanced bioinformatics methods. The number of scientists with permanent positions is low.

Table 1: Overview of current bioinformatics (“algorithmic-driven”) activities and groups at UiO*

	Group (leader)	No of positions (permanent)	Core areas
MN - IFI	Biomedical Research Group (O.C. Lingjærde)	10 (3)	Statistical and computational analysis of genomics data and other high-dimensional -omics data, integrative cancer genomics, sequence analysis, analysis of HTS data, DNA variation analysis, structural bioinformatics, biostatistics, structural biology
Dept of Biology	CEES (K.S. Jakobsen)	2	Metagenomics, genome analysis, HTS analyses
	High throughput sequencing platform (K.S. Jakobsen)	2	Genome analysis, assembly, annotation, SNP analysis, comparative genomics
	Bioportal (K. Shalchian-Tabrizi)	1,5 (service)	Phylogeny, annotation, phylogenomics, population genetics, metagenomics, statistical analyses of genome data, simulations
	MERG (K. Shalchian-Tabrizi)	4	Megaphylogeny, high throughput sequence analysis, metagenomics, amplicon/deep sequencing, population genomics, sequence annotation
Pharmacy	A.B. Kolstø group	1	Bacterial genomics
MLS - Biotech. centre	I. Donaldson group	3	Protein-protein interaction databases and biomedical text mining
	EMBNet node (G. Magklaras)	2 service	Operation of EMBOSS/GCG/MRS sequence analysis and retrieval services, training on bioinformatics
USIT	Research Computing Services group. Competence resource for research computing and HPC facilities (H. A. Eide)	3 service	Hardware and software support, advanced user/research support, support functions for the Bioportal and bioinformatics research environment (sequencing data processing pipe-line), user courses and help-desk.
Odont	H. Osmundsen	1	
Med – OUS/ MN	CMBN Bioinformatics group (T. Rognes)	8(1)	Computational analysis of genome sequences, DNA repair mechanisms, homology search tools, structural bioinformatics, modelling the structure of proteins, predicting the effect of mutations

Med – OUS (and IFI)	Bioinformatics core facility (E. Hovig, T. Rognes)	3 service	Part of the national FUGE platform
	E. Hovig group	7(1)	Integrative and inferential genomics, DNA variation, DNA melting, complex trait networks, text mining, chromatin genomics
	R. Skotheim/R. Lothe group	3	Integrative cancer genomics, array bioinformatics and high-throughput sequencing.
	A.L. Børresen-Dale group	3	Breast cancer integrative genomics, array bioinformatics.
	H. Danielsen, Inst. for Medical Informatics	2	Imaging
	J. Bjaalie	5	Brain imaging, databases
	O. Andreassen	2	GWAS
	G. Christensen	1	Bayesian networks
	D. Undlien	1	Genetics, deep sequencing
Med- Ahus	V. Kristensen	3	Breast cancer integrative genomics, array bioinformatics.

- * 1) The table is not exhaustive, but provides a general picture of the situation within the field of “algorithmic-driven” bioinformatics. This implies that all researchers using bioinformatics – including advanced users – are not mentioned here.
- 2) The table does not include bioinformatics activities in groups having a major focus on biostatistics.
- 3) A few people may be counted more than once in the table, because of multiple affiliations. Hence, the actual number of positions is slightly smaller than indicated in the table.

3. Challenges within the field of bioinformatics at UiO

The committee was given the mandate to evaluate the main challenges within research, teaching and service. In addition, we have added a particular point dealing with “organization, visibility and interdisciplinary challenges”. The main challenges are summarized under the headings below.

3.1 Organization, visibility and interdisciplinary challenges

Presently there is *no obvious and strong central coordination or recognized authority* for teaching, services, research or communications related to bioinformatics. There is the FUGE platform for bioinformatics and the associated core facility and help desk functions, and these are structures that can serve as useful building blocks. However, the situation is best described by a number of institutions and groups having each assembled their own solutions in each of these areas (see Table 1). This presents a fragmented view to potential students, biologist users and granting agencies. The committee sees the fragmented view as a disservice to all these groups, as well as to the present bioinformatics researchers themselves.

3.2 Research challenges

Research group leaders require a pool of students trained in the theory and method of their expertise. Despite the fact that IFI has educated 22 master students over the past 6 years, the committee feels that the *pool of students trained in bioinformatics theory and methods is too limited at the UiO as a whole.*

This may be a reflection of the fact that the UiO does not promote bioinformatics as a career path and has no international recruitment programme that focuses on bioinformatics research. Hence, even when suitable talents have been recruited, *current mechanisms employed by the UDI to immigrate students and researchers are painfully slow and inefficient.*

Bioinformatics is a research field that has great impact and use within various sciences in biology and medicine including, molecular biology, genomics, evolutionary biology, microbiology, cell biology, and physiology as well as chemistry, medicinal chemistry and pharmacy to mention some. This success may also be a challenge; the field grows into every subject and risks the fate of being “absorbed” by those respective fields. The fact that bioinformatics is being used “everywhere” represents a challenge for setting up a centre or a core facility. Therefore, there will be many “satellites” located at the different departments, of which all of them are highly needed. The challenge will be to organize this in such a way that there is good communication and collaboration between the core and the satellites. The view of the committee is that currently, as well as in the years to come, bioinformatics will be extremely important – and it is imperative that the largest university in Norway is capable of doing premium research in this field. This implies the need for a rethinking of the strategy for research, education and service. The committee has observed that such a strategy appears to be lacking at UiO.

The lack of an overall focus on the impact of bioinformatics on biology and medicine today is further stressed by the fact that *there are no funding calls (for example at Norwegian Research Council (NRC)) dedicated to bioinformatics research.* As such, bioinformatics competes with biological experimentalist calls. It appears as though bioinformatics is viewed as a service, while there is *too little recognition of the research required to create and improve upon these services.*

3.3 Education challenges

Biologists might make use of a broad range of advanced information science methods in their work. *It is hard to anticipate ahead of time what these methods will be, and the biologists themselves may be unaware of what is available.* Bioinformatics education requires multiple forms that cater to different user types.

- *Outreach courses* simply educate life science researchers on what methods are available to them.
- *Workshops* provide fast, “catch-up” learning for those who need targeted courses on specific methods.
- *Working groups* provide a place where semi-experienced and experienced method users can meet to discuss problems and experience. While biologists can and should perform their own analyses, they need a recognized resource where they can check their work and improve skills.
- *Undergraduate and graduate courses* need to educate students in the use of the most up to date datasets and tools that are commonly used.

The expertise to teach bioinformatics is located at multiple physical locations and involves multiple faculties and departments of the UiO. This reflects the multidisciplinary nature of this research field and of those who use its products. Coupled together with the various learning modes described above, *the primary challenge to teaching bioinformatics is coordination across multiple locations, faculties, disciplines and user types.*

3.4 Service and support challenges

The primary challenge to bioinformatics services at the UiO is *inadequate funding opportunities*. In those cases where biologists really should be using a service, the service is likely to involve highly specialized personnel and very expensive hardware. Continuity of this expertise requires dedicated funding. Failure to maintain these resources will mean that they become replicated in multiple places at great expense. Currently, no mechanisms exist for ensuring outreach of available services, and rely heavily on service personnel initiatives without the support of a larger organizational structure. Until now, most of all service-related funding has originated from two sources, Helse Sør-Øst and FUGE 1 and 2. The former supports in three-year grants of variable amounts, while FUGE funding has been obtained through a national service structure. This is a well-functioning structure serving also the larger purpose of knowledge-dissemination across Norway, and has been in operation for close to eight years. One postdoctoral fellow has been granted to aid in fostering the science within the service group, as there is a requirement that high-quality service needs to be research-based. As far as this committee is aware of, the dedicated service-related funding that has been granted from the University (through EMBIO and MLS) has been to the Bioportal (www.bioportal.uio.no), to Frigessi (bistatistics) and the Biotechnology Centre (EMBnet node)

Finally, coordination is again another major challenge. *There are no less than four groups at the UiO that advertise some form of bioinformatics service or support* (Bioportal, EMBNet, FUGE Helpdesk, and the VD group at USIT). All report that they are working at capacity. Both the services and their users would all benefit from a representative and coordinating umbrella organization.

The recommendations of the committee are given under point 5

4. From core facility to centre: a two-step process for advancing bioinformatics research, teaching and service at the UiO

4.1 Phase I: An extended bioinformatics core facility

Currently, bioinformatics at the UiO lacks proper organization. However, through funding to the Oslo node of the FUGE bioinformatics platform, a core facility structure serving scientists at both the MF and MN has been established (see <http://core.rr-research.no/index.php?section=3>) Here, a help desk function is also operative, and this is also part of the national helpdesk (<http://www.bioinfo.no/help-desk>). Awareness of this facility needs to be improved. A future core facility should organize the following types of activities

- 1) Access to hardware, software and data resources via user friendly web portals
- 2) advanced user support for satellites, including helpdesk functionality
- 3) supporting research on information infrastructures and computational methods

It is clear that the current core facility, which is loosely associated with IFI could be further strengthened by allocating more funds and positions. A reinforced core facility could be affiliated with IFI. This group would consist of a core doing service and research and would also offer a science hotel function where life scientists could come for limited periods to get advanced help. The core facility currently has connections to several satellites both at MN and MF. The satellites should be associated with the core in name, but otherwise retain autonomy. In turn, the core facility should advertise these services and, where appropriate, coordinate users with services, coordinate courses related to the services and help the services assess ongoing needs of life science users at UiO. The satellites would typically be well established

structures already serving important purposes, such as the Microarray platform, the Image analysis platforms, the Biportal, the high throughput sequencing platform etc). As an alternative, any of these satellites (such as BioPortal) might be invited to join as part of the core facility (as shown in Fig 1 and see detailed recommendations in Appendix 1). The core facility would be responsible for coordinating the creation of new services as user needs arise. This is illustrated in Fig 1.

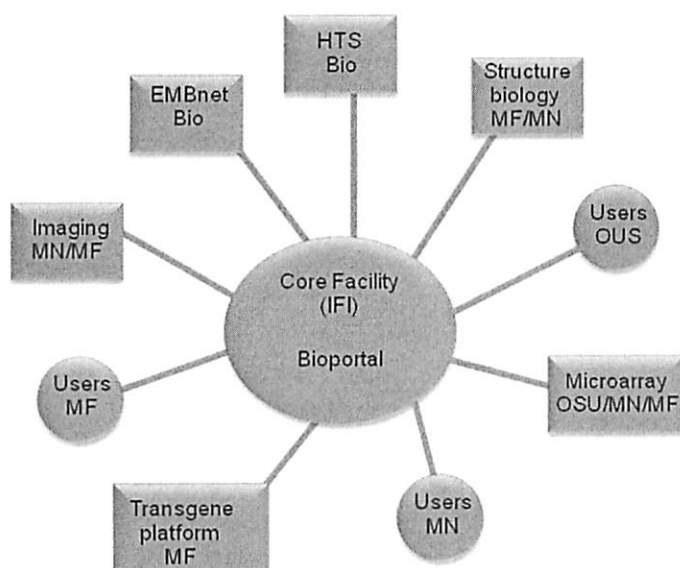


Fig 1 – Phase I. In the proposed structure, Department of Informatics (IFI) is hosting the Core Facility at the University of Oslo (UiO). The Core Facility serves a number of satellites, including regular platforms and larger user units (squares) as well as various research groups and single users (users) within the UiO, Bio and Oslo University Hospital (OUS). In this model, the BioPortal unit accepts an invitation to become co-located in the core facility at IFI. Alternatively, the Bioportal could choose to continue as a satellite.

4.2 Phase II: A computational life science centre

Bioinformatics is currently far more than the rather narrowly defined “classical bioinformatics” that included sequence analysis, gene predictions, protein structure (and function) activities. New developments in high throughput sequencing, systems biology, metabolomics, phylogeny (including phylogenomics) and imaging are examples of computational demanding activities requiring a very strong computer infrastructure(s), as well as strong computational and statistical skills. In addition, building models and testing the models using for example simulations and advanced statistics are crucial activities. This really implies that bioinformaticians team up with statisticians and biologists – and consequently we suggest that the term “*computational biology*” or “*computational life science*” (CLS) be used to reflect this broader scope. In the remainder of this document, we will use the latter term interchangeably with “bioinformatics”. Whatever the field is called, research involves the development of datasets related to biology, as well as the development of methods, algorithms or tools that work on these data. Life sciences are becoming increasingly dependent on this field of research, and it is appropriate that the UiO establishes a strong position in it, rather than remaining a passive user. Thankfully, the UiO has strong competence in statistics, mathematics and informatics and thus is well positioned to play a prominent role in the field of computational life science.

However, should the phase II proposed here become a reality, there is a need for a *major effort that implies allocating considerable new funding to bioinformatics*. In other words, an enhanced core facility will not fulfill the idea of creating a bioinformatics body for

the next decade. The core facility model will take care of some of the demands for service, but it will not support sufficient scientific development, interfaculty interactions nor the *critical mass* required to deal with the future challenges in the bioinformatics field.

Since a core facility exists today, it is on a short term realistic to build on the core facility and strengthen this further. This will be the first step. The next step, which is realistic in the longer term, is the building of a centre in computational life sciences (CLSC). Establishment of such a centre may coincide with the planned Life Science building.

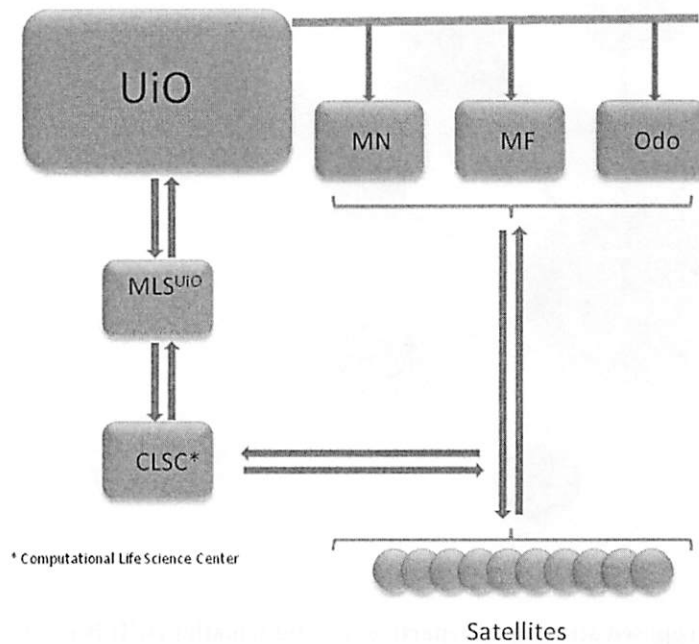


Figure 2 -- Phase II: Schematic drawing of the organization of a Computational Life Science Centre (CLSC) organized directly under Molecular Life Science (MLS) at the University of Oslo (UiO).

4.3 Education and teaching

Computational Life Sciences may serve mainly as a tool, while the aim is to derive new computational and statistical methodology that could serve as the basis for the bioinformatics tools of tomorrow. Bioinformatics may also involve changing or adapting existing tools or and datasets, or making new tools based on existing theory. Today's organization of teaching in bioinformatics at The Faculty of Mathematics and Natural Sciences reflects this pattern: several departments offer courses in bioinformatics, and these range from tool-oriented courses to methodological courses. In addition, there are multiple study paths in bioinformatics at all levels. While *no existing study paths lead to a bachelor degree specifically in bioinformatics*, several bachelor programs offer paths that provide some exposure to bioinformatics and prepare students for more specialized studies in bioinformatics at the master level. We propose a more compulsory study path based at CLSC leading to a Master degree in Bioinformatics. CLSC will also provide a PhD programme in collaboration with relevant faculties.

4.3 Bachelor programmes

The bachelor programmes should be organized with study directions that recommend or require introductory courses in mathematics, statistics and informatics in addition to bioinformatics. It should be required that students also participate in courses relevant to biology and medicine. Bachelor courses should include subjects of basic and advanced comparative genomics and medical biology as well as basic and applied biochemistry, structure biology, imaging and training in animal modelling.

- The Informatics programme recommends introductory courses in bioinformatics for all students planning to take a master thesis in bioinformatics. The courses are open for all students of the programme. *In the new education programmes that will be launched next year, teaching of bioinformatics will be strengthened.*
- The Computational Science and Mathematics (MIT) programme has a study direction in data analysis for which an introductory course in bioinformatics is strongly recommended. Students following other study directions in biology, medicine and odontology are not likely to take this course because of other course requirements.
- The molecular biology, medical, odontology, biological/medical and chemistry programmes recommend an introductory course in bioinformatics. These courses are likely to be taken by many students in one of the other study directions as well (Molecular biology/medicine/odontology).

In addition to this, the committee foresee an opening for students to participate at relevant courses at MN, MF and Odont. At these faculties there are today other programmes and various courses in several programmes that apply bioinformatics or discuss bioinformatics methodology to a smaller or larger extent. For example, the biology and medical programmes offer courses in statistics, evolutionary and ecological theory and practically oriented aspects of these fields, and bioinformatics issues arise in several contexts.

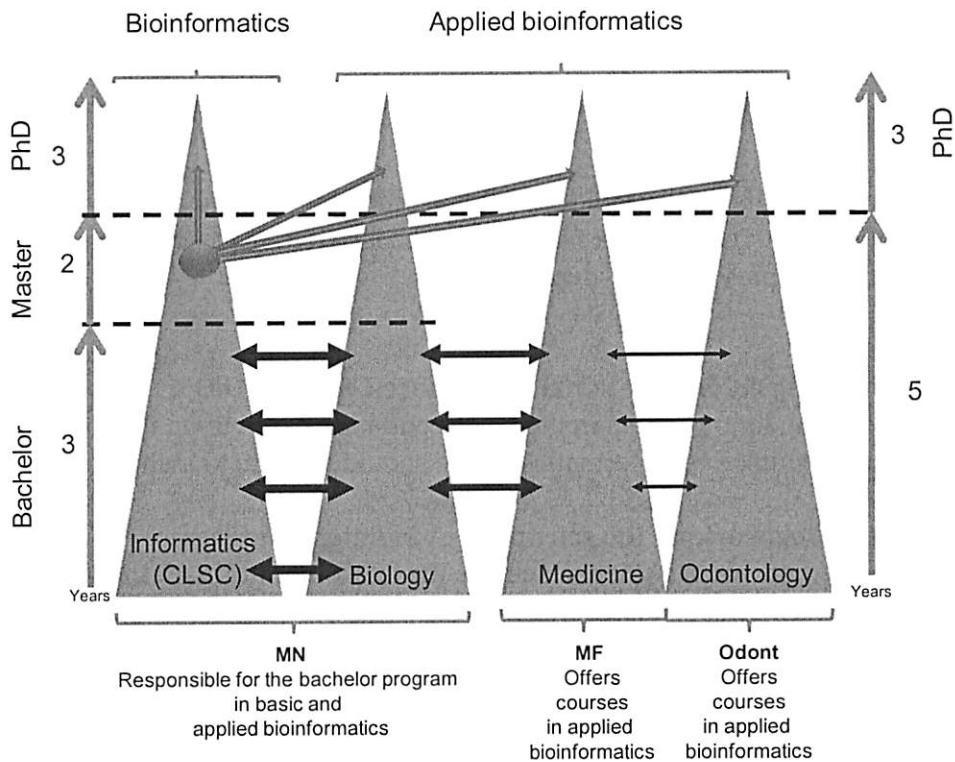


Figure 3: CLSC and Biology are the core units for the bioinformatics education at the bachelor and master level. The study paths suggested interplay of various relevant introductory courses at the MN, MF and Odontology faculties (black arrows) at the bachelor level. This will prepare students for a master degree in either basic bioinformatics at CLSC or applied bioinformatics at MN (Biology). Master students

at CLSC will be prepared for a PhD programme in either basic bioinformatics or applied bioinformatics at MN, MF or Odontology (red arrows).

5. Recommendations

The committee is of the opinion that there is a strong need for a major effort to strengthen bioinformatics – in its broadest sense (meaning “computational life sciences” – CLS). The goal of such an effort should be to promote top-level research, enhance collaborations and exchange of scientific ideas between various environments, strengthening education and making biocomputing education more flexible and improve the service functions in such a way that our services have a better outreach.

5.1 Our main recommendations

- Strengthen the core facility and its associated satellites. This should be done as a first step and will not require substantial changes in the current structure – but essentially more funding and positions. The core facility should provide access to hardware resources and, advanced user support and it should support application-driven research on information infrastructures and computational methods.
- As a second step, establish a centre for bioinformatics. The time frame should be within 3-5 years. We suggest that the centre is called centre for computational life science (CLSC), in order to underline a strong integration of informatics, computational sciences and life sciences. The organizational placement of such a centre needs to be reviewed. Undergraduate and graduate education should be made as flexible as possible, and there is a need for a computational life sciences education. The CLSC should be a coordinating body here – in close collaboration with the life science faculties (and IFI).
- CLSC should be the main provider of service function and the coordinator of services throughout the university. There is a need for coordination of services since several of the satellites are providing services.

5.2 Principles governing a Computational Life Science Centre at UiO

The concrete recommendations given in the next section are based upon the following principals of what we think a bioinformatics centre should provide to a university.

I. Education for working life scientists. A bioinformatics centre should provide courses that empower life scientists to use the latest bioinformatics databases and tools. Life scientists can and should do their own data collection and analyses wherever possible. This activity may take the form of short 2-5 day courses that target specific tools, data sets and techniques. Many such courses may already exist and need only be advertised by a bioinformatics centre that acts as a centrally recognized authority.

II. Education for undergraduates. A bioinformatics centre should coordinate with life science faculties to ensure that their undergraduates are receiving a prescribed minimum level of information science training. This activity may include facilitating access to courses where they are not already available in the student’s department or

faculty. Establishing bioinformatics classes with extra supervision early in the bachelor studies should be considered.

III. Education for graduates. A bioinformatics centre should provide advanced bioinformatics training that can be accessed by students of informatics or students of life sciences with sufficient pre-requisites in informatics. These students would be suitable for bioinformatics research projects at the Ph.D. level (see below).

IV. Services for working life scientists. Service should be a prioritized activity, and in order to provide the best service at all time, the service groups need to be in very close contact with the ongoing science, and therefore should be lead by scientists. A bioinformatics centre should provide services in those cases where life science researchers cannot easily carry out the work themselves. Such services would involve

- i) maintaining and providing access to large data sets,
- ii) access to high-performance computing resources
- iii) advanced applications or methods

In each of these cases, users should be provided with the training necessary to give them the greatest degree of independence in using these services. Services may also take the form of consultation. Many such services may already exist and need only be advertised by a bioinformatics centre that acts as a centrally recognized authority. Some degree of service financing should be obtained through user services, while some funding activity could be provided through user-directed calls which are prioritized by the core facility for feasibility and implemented through obligatory collaborations.

V. Research. A bioinformatics centre should consist of some critical mass of researchers and act to create or improve biological datasets and analytical methods that make use of these data. This activity ensures that UiO is connected with the international bioinformatics community and that bioinformatics teaching and services at the UiO draw upon the most recent advances in the field.

VI. Visibility and coordination. A bioinformatics centre should be tasked with advertising and/or coordinating all of the above activities at the university whether they occur “within its own walls” or at any other faculty or department of the university or nearby academic institution. This activity would also include an “outreach officer” that physically visits life science groups to collect and assess bioinformatics needs of the university overall. This officer could act to match users with resources at the university as well as help set up lectures, courses and even new collaborations.

Appendix 1:

Detailed and concrete recommendations

Overall recommendations: *The MLS should work with UiO to establish the Computational Life Science Centre - CLSC. The construction should proceed in two phases. Phase I consists of immediate to near term action that can be taken over the next year. The goal of phase I is to establish an extended bioinformatics core facility. Phase II planning will occur during year one and will be implemented in years 2 and 3. The goal of phase II is to establish the Computational Life Sciences Centre - CLSC. Concrete suggestions are provided for the mandate and goals of the CLSC.*

Phase I – establish an extended bioinformatics core facility (EBCF)

1. A plan explaining and describing the implementation of phase I and II is presented and accepted from major stake-holders before proceeding.
2. MLS appoints a 3 person 20% committee plus one year contract for a coordinator.
3. Web-site established (bioinformatics.uio.no) that advertises courses, services and research groups in Oslo.
4. MLS announces new web-site, coordinator and plan to set up extended bioinformatics core facility. Mandated with coordination of teaching and services and dedicated to bioinformatics research.
5. MLS extends open invitation to researchers and services interested in relocating to an extended bioinformatics core facility. Applications are considered by IFI.
6. Coordinator carries out outreach and requirements analysis in preparation for planning of phase II.
7. Planning of phase 2. See below.
8. The extended bioinformatics core facility co-localizes with IFI.
9. MLS announces new extended bioinformatics core facility. The MLS together with the UiO should work to promote the CLSC within UiO as the authoritative coordinator for teaching and services and related to bioinformatics at the UiO.
10. MLS announces plans for the upcoming CLSC and its mandate.

Throughout this first year (phase I), the MLS will also consider the following:

11. The MLS will establish PhD fellows dedicated to computational life-science.

12. The MLS will establish funding calls to support the development and maintenance of databases and tools that have (potential for) international recognition. Proposals will be internationally peer reviewed by recognized leaders in the field.
13. The coordinator (above) will gather usage and requirements data from life science researchers related to bioinformatics services. The MLS will establish appropriate strategic funding for these services to ensure their continuity.
14. The MLS will work with the UiO to promote funding calls dedicated to bioinformatics research from the NRC. Proposals will be internationally peer reviewed by recognized leaders in the field.
15. The MLS will work with the NRC to ensure that bioinformatics proposals are internationally peer reviewed by recognized leaders in the field.
16. The MLS will explore establishing a Marie Curie fellowship in bioinformatics to attract foreign researchers.
17. The MLS will invite speakers from three international bioinformatics centres to discuss strategies and experience in developing bioinformatics capabilities. The MLS will visit at least one such international site. These actions may lead to establishment of a scientific advisory board.

Estimated costs of Phase I*):

- one year contract for a coordinator	800.000
- committee for steering the phase I (3 persons 20%)	200.000
- 4 PhD positions from MLS*)	2.100.000
- funding for making a Marie Curie application	100.000
total:	3.200.000

*) Costs for one year

The figures are based on numbers used by the research council (approximately) and that there still is FUGE funding (or continued in some way by the university).

Phase 2 – establish computational life sciences centre (CLSC)

18. **CLSC governance.** We are uncertain as to the best implementation here. However, since several faculties and departments are stakeholders and intended beneficiaries, we believe it is important to either place CLSC in neutral territory (like IFI) or set it up as an independent entity (like the Biotechnology Centre of Oslo). CLSC may be organized directly under MLS^{UIO} (see Figure 2). Obviously, there are also other ways to organise CLSC, and the various options should be evaluated
19. **CLSC location.** It is suggested that CLSC should be co-localized with IFI. Geographically this would be a compromise midway between the hospitals and the Blindern campus. Outreach is an obvious concern addressed below. IFI is close to Universitetets senter for informasjonsteknologi (USIT), HPC resources and of course other informatics researchers. This will best facilitate infrastructure use and academic

discourse. Space is to be determined after staffing and services local to the CLSC has been decided. *The final staffing plan may require a change of location (say to the new Life Sciences building).*

20. **CLSC staffing.** The CLSC should be composed of at least three research group leaders that are recruited from existing staff at UiO. An additional three permanent research group leader positions should be recruited over a period of two to three years. The MLS could extend a second round open invitation to existing researchers at the UiO that might wish to relocate to the CLSC. The MLS should identify a centre leader from within this group. In addition to the required administrative staff, the centre should recruit a permanent outreach and coordination officer.
21. **CLSC services mandate.** The MLS should extend a second round open invitation to existing services at the UiO that might wish to relocate to the CLSC. The CLSC will cooperate with existing services to apply for additional resources or new services where needed. The CLSC will make an annual report to the MLS on the assessment of user needs at UiO, as well as current use of resources.
22. **CLSC teaching mandate.**
 - a) Maintain web-site to advertise existing courses.
 - b) Work with exiting courses and education programs to reduce overlap.
 - c) Assess outstanding needs in bioinformatics education and organize courses. These may include outreach courses, workshops or working groups (see below).
 - d) Work with life science faculties to establish a minimum training in informatics for life scientists.
 - e) Adopt the M.Sc. Bioinformatics programme at IFI for its M.Sc. students.
 - f) Establish pre-requisites for entry of life-science students to its M.Sc. programme.
 - g) Establish an international recruitment programme to attract students.
 - h) The CLSC will make an annual report to the MLS on bioinformatics education and future needs at the UiO.
23. **CLSC research mandate.** The CLSC should carry out research to develop and improve biological data sets as well as methods, tools and algorithms that act on this informational infrastructure. (computational methods includes “algorithms”). This rather loose research mandate is intentional and gives support to bioinformatics research in its own right. Collaborations with life science researchers are expected to inform and drive this research (not replace it). Where appropriate the CLSC will facilitate larger research grant proposals involving multiple groups at the UiO. The CLSC will make an annual report to the MLS on bioinformatics research at the UiO.
24. **CLSC coordination and outreach mandate.** An outreach and coordination officer is to be recruited to carry out teaching and services coordination activities mandated to the CLSC. This activity will include
 - a) setting up and maintaining a website related to the centre and its activities
 - b) physically visiting life science research labs to promote the centre, survey needs and match users with services.
 - c) facilitating communications between the CLSC and external satellites for courses, services and research.
 - d) setting up advanced user courses and user workshops and working groups (see definitions above).

25. The MLS together with the UiO should work to promote the CLSC within UiO as the authoritative coordinator for teaching, services and research related to bioinformatics at the UiO.

Appendix II: The 2007 Bioinformatics Report

Sakstype: Orienteringssak

Saksnr.: O-SAK 2/2011

Møtedato: 17.03.11

Notatdato: 09.03.11

Saksbehandler: Trond Schumacher

Sakstittel: Biofagevalueringen

Tidligere vedtak i saken/Plandokumenter/Henvisning til lovverk etc.:

O-sak 8/2010: Fagevaluering av biologi, medisin og helsefag, inklusive psykologi

De viktigste problemstillinger:

Fakta-ark og selvevaluering av instituttet (nivå 1) og forskningsprogrammene, inklusive CEES (nivå 2) er oversendt Forskningsrådet ved Divisjonsstyret for vitenskap, pr. 15. desember 2010 (vedlegg).

Forskningsrådet har i ettertid foretatt bibliometriske analyser av de relevante fagområder og grupper ved de ulike institusjonene i Norge. Disse er overlevert de internasjonale fagpanelene som skal stå for den endelige evalueringen. Biologisk institutt skal møte fagpanelet for sitt område fredag 1. april. Fra Biologisk institutt stiller ledelsen og (forsknings)programledere/ senterleder. Panelet har avsatt 1 ½ time til gjennomgang og utspørring.

Vedlegg:

- Biofagevalueringen 2011 – fakta-ark og selvevalueringer (nivå 1 og nivå 2)

Evaluation of research in Biology, Medicine and Health in Norway 2010-2011

Self-assessment report

University of Oslo

Faculty of Mathematics and Natural Sciences

Department of Biology Level 1

Centre for Ecological and Evolutionary Synthesis (CEES) Level 2

Integrative Biology (IB) Level 2

Marine Biology (MB) Level 2

Microbial Evolution Research Group (MERG) Level 2

- All to be evaluated by Panel 1

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1.1 Institutional level (level 1)

1.1.1 Organisation of the institution

The Department of Biology, established in its present form in 2007, is organized in 3 research programs and one interdisciplinary Center of Excellence (CEES). The present organization results from following up The Research Council of Norway (RCN)'s Evaluation of Biological Research (“Biofagevalueringen”) in 2000 and advice given by RCN (“Fagplanutvalget”) in 2003. Previously, the Department was organized in smaller research groups based on a more traditional division of biology, while the present organization reflects the recent technological and conceptual developments (e.g. in genetics), more focused on collaboration across traditional disciplinary borders. The aim was to get more coherent groups of researchers with shared research focuses. Also, the establishment of our Centre of Excellence (CEES) in October 2007 prompted further reorganisation of the remaining research groups. These now constitute three programs: Molecular Evolution Research Group (MERG), Integrative Biology (IB), and Marine Biology (MB). A major task over the last 3 years has been to physically relocate the research units within the Kristine Bonnevie’s house (the Biology building).

1.1.2 Research leadership

A new model of leadership was introduced at the University of Oslo (UiO) in 2005. Both the Departments and the University as a whole established Boards focusing on strategic long-term planning. The Department Head is elected for a period of four years, and can only be re-elected once. The Head is the ultimate authority at Department level - being responsible for all the scientific, educational and administrative activities. It is the responsibility of the Department Head to individually follow up the researchers in order to make use of their specific skills and abilities, and to ensure optimal division of working time between research and teaching as well as between research and outreach activities like scientific advice to the governing authorities and other important commitments to the society. Each research program has a Chair and a vice-Chair who are jointly responsible for following up budgets and strategies, setting the agenda for internal meetings, managing communication within and out from the program, and reporting to the Department Head and the Head of Administration at the Department. As part of the yearly budgeting process, the Department Board decides on the internal allocation of resources to the research programs based on the Department's strategic plan. The strategic leadership with respect to research activities within the programs is improving but should still be better developed.

The program Chairs encourage researchers to develop collaborative projects in order to increase research activity and quality and to seek external funding, which to a large extent has been successful. The Department encourages the program Chairs and research group leaders to participate in leadership courses offered at UiO since 2007. Over the past 3 years, six members of the Department have passed this course; the Department Head and Deputy, the Centre of Excellence Chair and Deputy, the Chair of the Norwegian High-Throughput Sequencing Centre (NSC)-platform, and the research manager of MERG. By April 2011, the leaders of the Marine Biology and Integrative Biology research programs will also have completed this course. In 2011, we are planning to establish a new strategic leadership team at the Department, consisting of the Centre of Excellence Chair, the Managers of the research units, the Chair of education, the Department Head and the Deputy Head.

The Department of Biology and the Department of Molecular Biosciences jointly offer a management development program for our post docs and researchers. The main goal has been to raise the participants’ consciousness of and to enhance their capability of taking on leadership roles, and to facilitate their personal development in order to strengthen their career opportunities. The program covers two semesters and is a combination of half day seminars, exercises and coursework. Since 2008 altogether 9 post docs and researchers from the

Department have joined the program. The participants have given the program excellent reviews.

1.1.3 Strategy

RCN's Evaluation of Biological Research (2000) concluded that: “*a lack of strategic planning, leading to fragmented research profiles and poor cohesiveness is commonly observed within university departments or other research units*”. To some extent, this also applied to the Department of Biology (at that time including researchers now employed by the Department of Molecular Biosciences). In subsequent years, in agreement with “*Biofagevalueringen*”, the Faculty and the Department have developed hiring policies with the goal to form strong competitive research units with clear research agendas. Over the last five years, the Department (and UiO) has shifted hiring policies from the traditional focus on education (i.e. keeping a large and diverse scientific staff to be able to teach a wide range of subjects) to focusing on performing high-level research. Also, staff resources are being used strategically in order to create a seamless research and education plan. As part of this, costs have been reallocated from salary costs to operating costs in order to increase the financial incentives, equipment and supporting functions of the scientific staff. By this, we increase our researchers' ability to stay abreast of the international development within their fields of research. Nevertheless, the current age profile among the Department staff clearly shows a need for new staff members in the coming years, which is a challenge given the present level of internal funding from UiO. However, the Department has been quite successful at obtaining external funding, a trend we expect to continue.

The policy of choosing a small number of core areas for research, and establishing a more specialized educational profile in biology based on quality and strength, is relatively new at the Department and at the universities in Norway (and Europe). Based on past hiring policies, our permanent staff is therefore still spread over a relatively broad spectrum of biological sub-disciplines. We strive towards integrating the existing staff in the larger and more robust research groups that have emerged (see Life Science below). It will take time to reach a level where we have optimal research units working to solve current and relevant research issues, and also to produce the very best syntheses and analyses in biology and natural sciences. The Department of Biology takes active part in the strategy work at the Faculty with regard to strengthening the research field of Life Science. Parts of the cutting edge research in Life Science has a continuous need for advanced and expensive technology. Due to the complexity of the Life Science research field, there will be an increasing demand for interdisciplinary skills and knowledge in the research teams in order to face scientific challenges. A great challenge for the Faculty and its various Departments (including Dept. of Biology) is to further rearrange and restructure the organization in order to qualify and compete on an international arena for the large grants needed to be in the forefront of Life Science research.

1.1.4 Scientific quality – Strong and weak research areas

The Department of Biology is a large “Department of organismic and evolutionary Biology” with its strength within Ecology and Evolutionary Biology in Norway. We believe that the institution has a national leading position in the current focus areas of our centre and research programmes.

A brief account of the research programs of the center and the other research groups:

CoE-CEES, via a large number of scientists representing various disciplines (tenured and temporary staff) related to ecology and evolution, is working on the integration of these two fields. Many CEES members have expansive publication records (past and current), which attracts many high quality collaborators and help secure additional funding. The center also attracts a large number of highly talented young researchers. The centre can, and does,

facilitate and conduct a large body of exciting and relevant scientific work. Through its size and dynamic structure, CEES is able to adjust to new scientific challenges with relative ease. CEES has the manpower and facilities to grasp opportunities emerging within the fast-moving field of biology.

The **Marine Biology program** has broad scientific expertise and extensive national and international formalized collaborators. The program has good access to funding from RCN and EU, and has a good reputation. The program has access to good available infrastructure and excellent access to the Oslofjord as a model system with both pristine and polluted systems. MB attracts numerous MSc students.

MERG has gone through an integration process where separate research groups have merged into one coherent group of interacting scientists, students and technicians. This integration process has created an inter-disciplinary research group with a wide knowledge in the fields of microbial ecology and evolution, and a robust organization ready to meet future challenges. Through the focus on networking and team building, there is an efficient knowledge transfer between master students, PhDs and post docs, which is considered one of the program's strengths.

The strength of the research programme **Integrative Biology** lies in the wide range of scientific experience among the scientific staff, and a common interest in developing an integrative approach. Over the past few years, Integrative Biology has used a major part of the internal resources to develop methods and concepts to promote integrative projects. The members of the toxicology group, are part of a strategic initiative at Faculty level.

Two of the researchers in the Department have their close collaborators outside the core activities of the 4 research units at Department level, i.e. one with the plant biosystematist at the Natural History Museum, and one with archeological research groups at Kulturhistorisk museum and with international collaborators in the field of human ancient DNA.

We identify four research areas where the Department has an internationally leading position:

- **Ecological climate effects.** Researchers at CEES and IB have strong publication records in climate effect studies, spanning from effects on individual life histories to populations and communities. Study systems include a range of organisms and habitats, such as rodents, marine pelagic systems, and plague.
- **Phylogeny and speciation.** By using phylogenetic, genomic and transcriptomic approaches, research at MERG/CEES suggest substantial revisions of the eukariotic Tree of Life, while ecological, behavioural and genetic aspects of recent (or ongoing) speciation processes are being studied at CEES in insect and passerine bird model systems.
- **High-throughput shotgun sequencing and bioinformatics.** The establishment of a sequencing platform at CEES in 2007 has enabled us to take a leading position within the marine functional genomics field, both nationally and internationally, and taking the lead in sequencing of the cod genome (www.codgenome.no). The cod genome is the first large and complex *de novo* genome completed utilizing exclusively next-generation whole genome shotgun sequencing (454/Roche) technology combined with state-of the art bioinformatics algorithms designed for maximal exploitation of this technology – and the first of an economically important fish species to be sequenced.
- **Integrative studies.** The Department as a whole has strong expertise in merging classical biological approaches with modern molecular genetics technologies (genomics) and statistical modelling.

Research areas with strong potentials include:

- **Linking genotypes to phenotypes.** The sequenced cod genome opens a range of new possibilities for CEES. This technology is likely to provide a hitherto unperceived link to the genotype-phenotype relationships and thus the biological implications in numerous ecological

important systems. MERG has ongoing related efforts on microbes, e.g. on genomes and transcriptomes of cyanobacteria and eukaryote algae.

- **Microbial functioning and diversity.** MERG has in the past revealed unknown microbial diversity by applying PCR on environmental sampled DNA, and has recently uncovered a tremendously large, and hitherto unknown, diversity of eukaryote parasites and symbionts in aquatic organisms. CEES focuses on the development of bacterial communities of the human gut by applying time series analysis to the outcome of chemostat experiments.

- **Marine plankton interactions and diversity.** In the Marine Biology program, Kaartvedt's group has been in the forefront of using modern hydroacoustic methods to reveal behaviour and interactions of marine zooplankton on the individual level. Recent work has also included molecular methods, and with the recent addition of Titelman to the group, they have a large potential for being in the forefront of plankton research.

- **Extend knowledge on ecological effects of climate to better understand the evolutionary consequences of climate change and human activities.** Climate change and human activities (such as harvesting) cause plastic phenotypic responses as well as genetic change; ongoing work at the CEES and the other research units has a great potential for unraveling the interplay between the two.

The strategies for publications, including popular science, are in accordance with the recommendations from the “Biofagevalueringen” (2000):

“The research groups should place an increased emphasis on publishing in the very best international journals available. The focus should be on publishing in general journals addressing fundamental questions in the biological sciences rather than specialist journals”.

The proportions of level 2, level 1 and level 0 publications from the Department seem to have reached a “steady state”. The number of publications, however, is expected to increase, primarily as an effect of the hiring of new academic staff on temporary contracts at CEES.

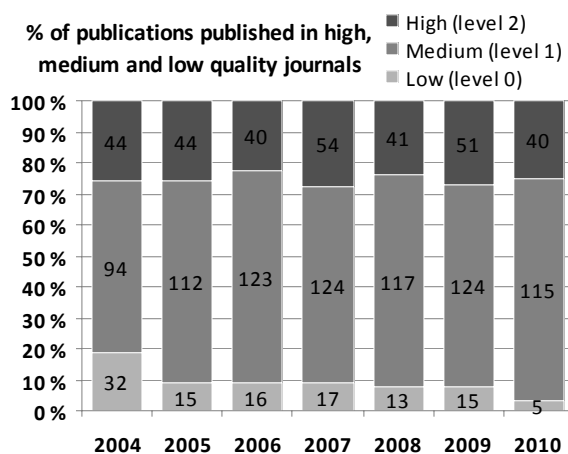


Fig. 1 shows the % of publications from staff (all 4 research units) in 6 years, starting in 2004, when 20% of the total publications were delivered to popular scientific journals (level 0), and ending in June 2010, where the number of publications in this category has decreased to < 10%. The proportions of level 1 and level 2 publications are stable throughout the period.

As part of the preparations for its new Strategy2020, the University of Oslo ordered a bibliometric benchmarking analysis from the Centre for Science and Technology Studies (CWTS), University of Leiden. Results for the field ‘Biological Sciences: Animals and Plants’ are shown in the table below.

BIOL SCI: ANIMALS & PLANTS				Indicators:
Field	P	C	MNCS	
ZOOLOGY	105	890	1,85	<p>P: The number of articles (normal articles, letters, notes and reviews) published in journals processed for the Web of Science (CI) versions of the Science Citation Index, the Social Science Citation Index, the Arts and Humanities Citation Index (see Section 2.1).</p> <p>C: The number of citations recorded in CI journals (as contained in Web of Science CI version) of all articles involved. Self-citations are excluded.</p> <p>MNCS: Mean Normalized Citation Score: Normalization is performed by first calculating the ratio of actual and expected citations for each publication separately and then by taking the average of the ratios. The expected number of citations is based on the average citation score of publications of the same document type that belong to the same field and were processed for the citation index in the same year.</p>
BIODIV CONSERVAT	20	184	1,67	
EVOLUT BIOLOGY	66	954	1,49	
FISHERIES	60	382	1,43	
BIOLOGY	97	1 367	1,42	
ECOLOGY	274	3 309	1,27	
ORNITHOLOGY	27	107	1,21	
MARIN&FRESHW BIO	152	1 194	1,21	
FOOD SC&TECHNOL	41	236	1,15	
VETERINARY SC	29	82	1,09	
MYCOLOGY	61	334	1,05	
PLANT SCIENCES	137	1 298	1,04	

Table 1: Research and impact profile of the University of Oslo. Source: Bibliometric Benchmarking Analysis of the University of Oslo, 2001-2008 (CWTS, Leiden University). Note that only citations up until 2006 are included in the analysis, hence the impact of the CoE CEES is not visible here.

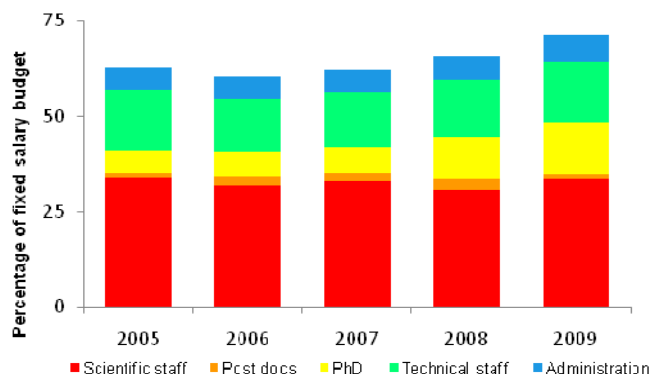
When comparing with a selection of other universities (15 ‘benchmarking universities’), the study shows that the average impact (MNCS, which takes into account the number of citations compared to the average number of citations for a particular journal) shows that UiO is well over the European average, on level with the rest of Norway, but below the other main Scandinavian universities for “Biological Sciences: Animals and Plants” (the area that best covers the research done at the Department of Biology). The field-normalized citation score (MNCS), reveals that UiO performs 26 % above the average of the 365 most publishing universities world wide within this area. That is about equal to the impact score in the largest subfield ‘Ecology’. UiO does well in a range of other subfields including ‘Zoology’ (85 % above average), ‘Evolutionary Biology’ (49 %), ‘Fisheries’ (43 %) and ‘Biology’ (42 %). We therefore conclude that the quality of our publications is generally high. The volume and quality of the scientific production within the Department are reasonably adjusted to the resources available in the various research groups.

The dissemination policy of the Department is to be visible on both the scientific and public arenas. This is particularly true for many of the activities of CEES, involving a number of core members who are particularly talented in this field. Members of the toxicology group have chaired and contributed to a range of national and international organizations through the last decade, including work in OECD, ICES, OSPAR, JRC and EU working groups and committees.

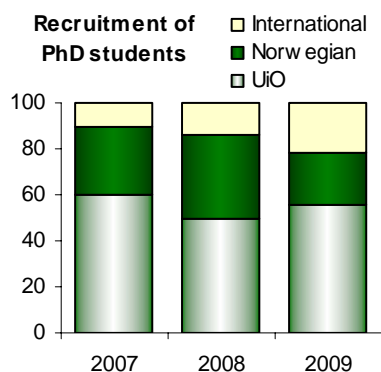
1.1.5 Resource situation

We have been able to keep up the scientific production and the education of PhD-candidates by keeping the permanent staff stable (32 permanent scientific staff at the end of 2009), and have increased the number of associate professors to 7 (20% and 40% positions). This has become possible due to a yearly increase and taxing of the external project portfolio, as we have experienced yearly setbacks in transfers from the university and faculty. There has been a formidable increase in internal PhD fellows from 9 PhD students at the beginning of 2005 to 23 PhD students at the end of 2009. However, this also means that a larger proportion of the internal budget is bound to salaries. The internal UiO budget is sufficient to pay salary to the present staff and to maintain a high quality education for students (except PhDs), but is insufficient for conducting research activities proper. We have in general been successful at

gaining external funding, but the research groups, representing different fields of biology, have uneven access and success at this. At the end of 2004, the Department had 33 permanent academic staff and 9 internal PhD fellows.



The annual output of MSc (on average 30) and PhD (on average 15) candidates, trained in biological sciences is relatively stable. There has been a significant increase in recruitment of PhD students from abroad; from < 10% in 2007 to > 20% in 2009 (to 30% in 2010).



Infrastructure for molecular biology and DNA sequencing

The Department has several infrastructures for molecular biology and DNA sequencing, run by CEES; MERG and MARINE BIOLOGY. For details regarding users and acquisition/upgrading of equipment, please refer to the parts written by each program (level 2).

- *The CEES DNA Lab* (www.cees.uio.no/research/facilities/dna-lab) has an infrastructure consisting of an isolation lab, separate PCR facilities, post PCR, DNA sequencing labs (see ABI lab below) and a lab for class 2 security research. It contains all the basic instrumentation of a modern molecular biology laboratory as well as automated nucleic acid purification and gel electrophoresis systems.
- *The Marine molecular biology lab* for PCR, DNA/RNA isolation, probe development, cloning, microarray run by MARINE BIOLOGY.
- *The ABI lab* (www.bio.uio.no/ABI-lab) is a shared facility between the Departments of Biology and Molecular Biosciences. It is equipped with two ABI 3730 capillary electrophoresis sequencers, each with 48 capillaries providing DNA sequencing and fragment analysis. It is a service lab for various research groups and institutes at the university, as well as affiliated institutions nationally and internationally.
- *The Ultra-high Throughput Sequencing Platform (UTSP)* at CEES. The Ultra High-Throughput Sequencing Platform (UTSP) was established in 2008 under the FUGE and AVIT programmes. The platform was strengthened through a new Infrastructure Programme grant from RCN (23 mill NOK) in 2009 and consolidation with the *Illumina sequencing platform at Institute of Medical Genetics (IMG), Oslo University Hospital* (Box 1).
- *Laboratory for harvesting single cells/organisms*: Laboratory for harvesting single cells under sterile environment to prevent contamination, isolate single organisms for growth

- and harvesting material for further analysis by DNA/RNA/Protein analyse.
- *Eukaryote Lab*: Laboratory for growths and experiment on eukaryotic cells and organisms (not fungi). A separate lab is established for fungi to prevent contamination. In this lab, material will be harvested for further analysis by DNA/RNA/Protein analysing techniques.
 - *Mycology lab*: Laboratory for growths and experiment on sterile fungi. The lab is separated from 'environmental labs' to prevent contamination. In this lab, material will be harvested for further analysis by DNA/RNA/Protein analysing techniques.
 - *Environmental lab*: Laboratory for the study of environmental samples obtained from nature. In this lab pure cultures of e.g. fungi will be obtained and transmitted to the mycology lab. Various microscopes for studying environmental samples are included in this lab.
 - *Experimental microbial lab*: This is a laboratory for studying interactions between microorganisms and their hosts, such as: Plants, fungi and bacteria, Parasite diversity and Cyanobacteria and fungi.

Infrastructure for experimental biology:

- *The Alpine Research Center Finse* attracts biologists, geologists, geophysicists and other researchers from a wide range of Norwegian and international institutions. Seminars and meetings, as well as university field courses, are regularly held in the conference unit.
- UiO has two *research vessels*, F/F Trygve Braarud (70 ft) F/F Bjørn Føyn (40 ft), that are used in research and education. The Department of Biology are in charge of the daily running of the vessels. F/F Trygve Braarud is very well kept and equipped for research in fjords, with instrumentation such as CTDs, ROV, closable trawls and advanced echosounders.
- MARINE BIOLOGY is in charge of running the *Biological Station in Drøbak*. It offers a teaching centre as well as a research station. The station also features advanced experimental set-ups for the study of acousto-mechanical senses in fish and crustaceans in relation to anti-predator behaviour.
- *Culture facilities* for marine organisms with eight temperature-controlled rooms, toxin-free plankton labs, advanced light microscopes, *a unique marine algal collection* with 300 strains of micro and macroalgae, hosted by MARINE BIOLOGY.
- INTEGRATIVE BIOLOGY has inherited and developed good facilities for *elemental analyses* in different matrices. Other facilities include instrumentation for automated *cell or particle analysis*, a range of plate readers for different applications, and culturing facilities for terrestrial and aquatic test organisms. *State of the art equipment for water and particle analyses* such as flow cytometer, particle counter, HCN analyser, spectrophotometers, fluorometers, and autoanalysers for nutrient analyses are available
- The CEES/INTEGRATIVE BIOLOGY has recently upgraded the '*Ecoflux*' *lab facilities* for analysing basic food-web related parameters; see the CEES self-assessment report.
- *The Phytotron* offers advanced facilities for plant research under controlled climate. It can simulate all kinds of climate types from tropical to arctic. In addition the phytotron provides facilities for simulating air and soil pollutions, and light and nutrient conditions. The facility offers 900 m² of area for plant breeding within greenhouses and controlled climate chambers. The Phytotron also offers teaching facilities and laboratories. It mainly serves the Department of Biology and the Department of Molecular Biosciences, but also other universities, research institutions and private industry.
- An *electron microscopy laboratory* (EML) with TEMs, SEMs, microtoms, and sample preparation equipment, mainly serving the Dep. of Biology and the Dep. of Molecular Biosciences is available at Dep. of Molecular Biosciences. MARINE BIOLOGY and MERG are among the major users of EML.
- Department of Molecular Biosciences is responsible for the *aquarium facilities* with a recirculated seawater system in Kristine Bonnevis building. These facilities are used by all research groups at the Department.

Infrastructure for bioinformatics services:

- *Bioportal* is a web-based biocomputing service at University of Oslo, which so far has been run by MERG and USIT, <http://www.bioportal.uio.no>. The Bioportal is currently the most used bioinformatics service in Norway and represents the largest HPC (high performance computing) community across any research area in Norway. Bioportal has users from all world continents. The service is connected to the 454-sequencing lab at UiO, ensuring that produced data are automatically transferred from the sequencing facility to the users Bioportal account. Bioportal is used as a framework for publishing web-bioinformatics applications and also in regular courses and workshops at UiO and other universities in Norway, Sweden and Switzerland.

Obstacles: The missing funding for equipment in the midrange, from 100.000 to 700.000 NOK, is a problem in the present RCN/University research financing model. While equipment <100 000NOK may be funded over external projects, most needed equipment for the labs lie in the range up to 1000 000 NOK and generally has to be funded from internal sources, which are sparse. There is a continuous need of upgrading of our laboratories to meet experimental and health and safety standards.

Whenever new experimental equipment and expensive instruments are obtained, these are offered to collaborating and non-collaborating research groups as national “service platforms”. A major obstacle in the running of new service platforms is the obligation of the Department to finance the new engineer positions usually needed to run these advanced instruments on a permanent basis.

1.1.6 Training, mobility and career path

The Department’s policy for recruiting PhD students is to announce all vacancies internationally. Our aim is to recruit the very best candidates to our PhD programmes, regardless of nationality or gender. Recruitment of PhD students and post doctoral fellows over the last five years (2005-2009) has been successful. The internal distribution of PhD students follows the strategic guidelines of the faculty. The number of PhD students and post doctoral fellows with external funding is proportional to the success of the researchers in attracting externally funded projects. This indicates that the number of recruits is highly disproportional among the research groups and programmes at the Department. CEES is without doubt the most successful unit in attracting external funding for post doctoral fellows and PhDs; the number of PhDs and post docs allocated to the Marine Biology and Integrative Biology programmes, however, is currently not sufficient to maintain good recruitment policy. This is partly due to the fact that these programmes are not part of the strategic initiatives (fields) at the Faculty level during this period.

We aim to train our researchers, PhDs and post docs in an integrative and international research environment, as well as following their academic training programme at UiO; they are encouraged to be active within the national and international networks within their research fields, such as participation in appropriate national and international seminars, conferences, workshops and the like. We aim to build competence by recommending our recruits to manage their own projects and take part in writing applications for funding, as well as maintaining an active presence in other group activities such as journal clubs.

The announcement of staff positions follows the recommendations and rules stated by the UiO and the faculty. All positions are internationally announced. The Department also has an active career path policy where associate professors are guided in their scientific work and released from teaching and administrative duties for shorter or longer periods in order to qualify themselves for full professorships

In accordance with the University of Oslo’s equal opportunities policy, we invite applications from all interested individuals regardless of gender or ethnicity. We also pay special attention to qualifying female staff as professors, and for recruiting and designing

career development paths for talented young female scientists. The age and gender of the academic staff, representing altogether 23 nationalities, are presented in fig. 4. From the graphs it is clear that we are indeed successful at recruiting female candidates (see relative increase of female candidates as age goes down), but that we need to continue our efforts in order to secure a more balanced gender distribution among permanent academic staff.

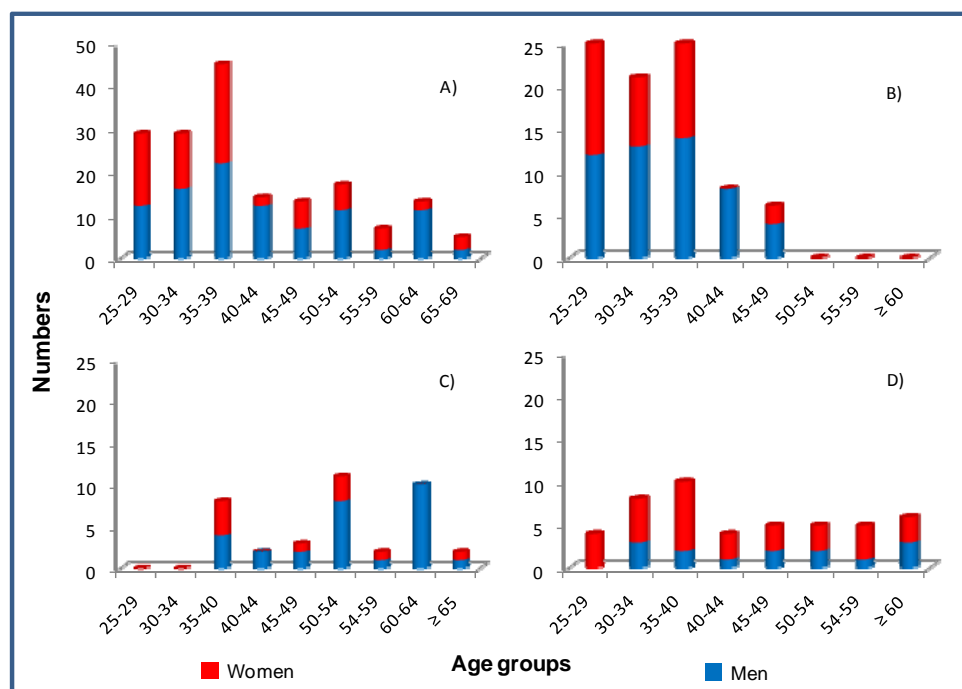


Figure 4. A) Total staff, B) temporary scientific staff, C) permanent scientific staff, D) technical-administrative staff

1.1.7 Research collaboration, including interdisciplinarity

The Department owns 109 projects funded from external sources (approx. 85 mill NOK in 2010). This includes both public and private funding from national and international parties. Through these research projects we collaborate extensively with national and international partners. Approximately 15 % of external funding obtained by the Department is relocated to our collaborators.

The Department is in charge of or taking part in several initiatives aiming at increasing interdisciplinary research.

Example within the University of Oslo:

- The Department is the project leader and initiator of the development of the **Bioportal** at University of Oslo (see above).

Examples on a national level:

- The researchers at the Department have taken active part in the "**Trippelalliansen**" between the University of Oslo, the Norwegian University of Life Sciences and the Norwegian School of Veterinary Science. Through this alliance, the three institutions are joining forces in establishing a national plan for post genome research and bioinformatics with a special focus on common marine research projects.

- **Finse Alpine Research Center**, located in the northwestern part of the Hardangervidda mountain plateau, belongs to the faculties of mathematics and natural sciences at the universities of Bergen and Oslo. The Department is in charge of running the centre.

- Both the **UTSP** (FUGE national platform) and **NSC** (Norwegian Sequencing Centre - RCN Infrastructure program) are projects owned by Dept of Biology. The Department is providing space and administrative backing for the sequencing operations.

Examples on an international level:

- The Department is member of **MarinERA**, a project funded by the ERA-Net Scheme of the EU FP6 (2004-2008). MarinERA maps and facilitates networking and research collaboration of European infrastructure and research capacities within marine RTD programs.
- CEES has just been assigned as a core member of the **EUR-OCEANS** (European Research on Ocean Ecosystems under Anthropogenic and Natural Forcings) multi-site Consortium. The Consortium is comprised of 27 institutional core members from the European Union and additional 4 invited members from non-EU countries. CEES has been given the responsibility of leading one of the Flagship projects of the consortium.
- CEES will coordinate a Nordic Centre of Excellence on Climate Change Effects on Marine Ecosystems and Resource Economics, a 68-million NOK cross-Nordic collaborative project.

Pending opportunities:

- Within the field of statistical and mathematical modelling, we work with the Department of Mathematics to develop an interdisciplinary unit (called the "**Fisher centre**"), including three permanent members (one from Biology, one from Mathematics and one new recruitment).
- The Department is a member of the **National network for plant biology research** (www.plantnorway.no) established in 2007 as a joint initiative between all universities to strengthen the quality of Norwegian plant research through coordinated actions and utilization of resources. The network submitted a proposal (2009) for a new and large research programme to RCN, has been granted support from RCN to a pre-project for a large Infrastructure research proposal called "BIOKLIMA– Large Scale Facility for Studying Climate Effects in Natural Ecosystems and Agroecosystems". Submission is due late 2011 and the economic frame is in the range of 200 - 400 Mill NOK (see www.bioklima.info). BIOKLIMA will gather the entire research environment of Norway in a unified "theme" and is a major achievement in plant sciences, regardless of the final outcome.

1.1.8 Other information of relevance to the evaluation

A brief assessment of the professional, financial and organisational strengths and weaknesses of the Department is:

Weaknesses/threats/challenges

- A low overall level of internal funding for basic research, which also is a research training conducted in an academic institution.
- The practice of funding basic science through research programs rather than through merit-based grants to researcher-initiated projects.
- Making a long-term research strategy is challenging given that grants are awarded for a relatively short periods.
- The Department needs to improve the success rate of achieving large, long-term grants, especially EU funded grants.
- The Department has encouraged the researchers to broaden the scope of research in the individual projects and to improve the indoor collaboration among researchers, but except for the CoE, the new research groups does not receive more external grants than previously.
- Microbial biology (in particular) and the study of ecosystem evolution and function are rapidly changing research areas that will need large investments in new infrastructure. We need to strengthen our ability to meet these sudden changes.
- A too rigid staff structure of in academia; new and large research projects will also need professional coordinators and networkers among the permanent faculty staff.

Strengths/opportunities

- The wide range of scientific experience, skills and knowledge in the various fields of biology among the academic staff.
- A large portfolio of external research projects.
- A common interest in further developing our integrative approach to new research questions.
- The efficient knowledge transfer between MSc students, PhD students, younger recruits (post docs) and Department staff members in our research programs.

FACT SHEET

Institution:

University of Oslo,
Faculty of Mathematics and Natural Sciences,
Department of Biology

Organisation Chart:

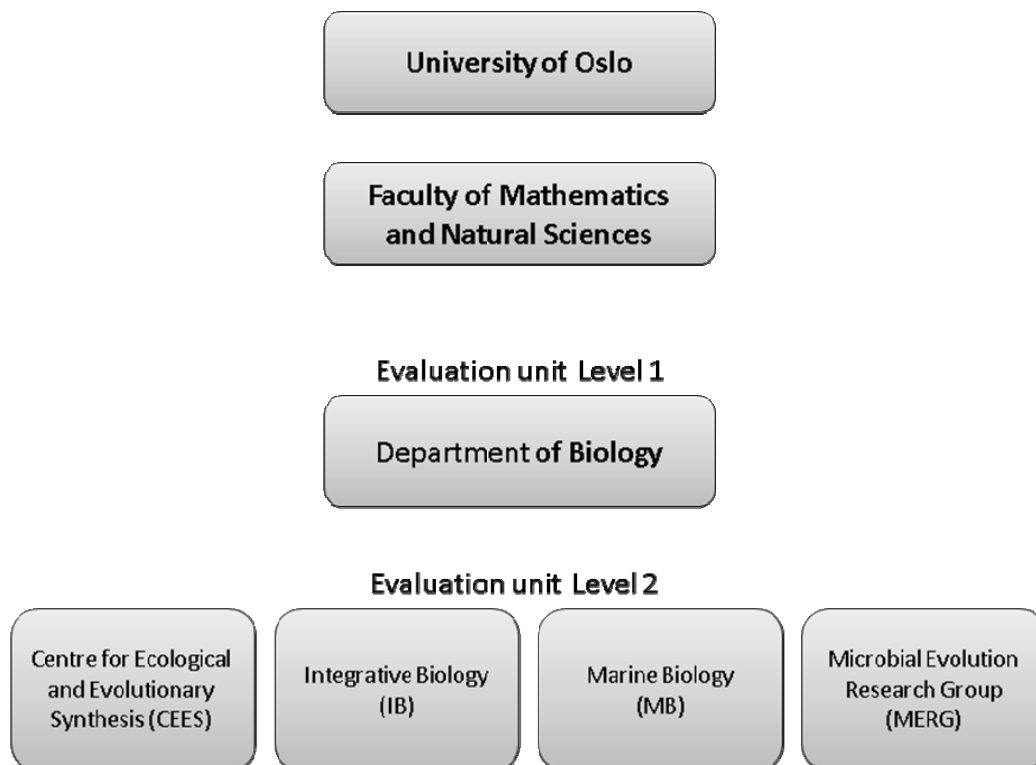


Table 1. R&D expenditures and sources of funding (1000 NOK)

<i>Type of expenditures</i>	2007	2008	2009
Institution/university funding, salaries	46.413	48.599	56.293
Institution/university funding, other current costs	36.424	41.202	43.613
Institution/university funding, instruments and equipment	2.643	2.272	2.228
Institution/university funding, total	85.480	92.073	102.134
Grants from The Research Council of Norway	38.436	45.957	51.600
Other national funding/grants (public or private)	12.127	10.231	11.898
EU grants	1.634	8.031	5.661
Other international funding/grants	2.250	2.743	439
Funding/grants, total	139.927	159.035	171.732
Total expenditures (institution/university + support/grants)	141.317	153.266	178.640
Grants as % of total expenditures	99,0%	103,8%	96,1%

Table 2. Number of graduates

<i>PhD graduated</i>	2007	2008	2009
PhD/Dr.scient	10	14	9
PhD/Dr.med			
PhD/Dr.odont			
PhD/Dr.psychol			
PhD/Dr.polit			
PhD/Dr.agric			
Dr.philos			
Others, specify			
Total			
<i>Master students graduated</i>	49	43	34

Table 3. Number of personnel by December 31. 2009, by source of funding

Positions	Institution		
	Institution/University	External	Hospital
Professor I	22	3	
Associate professor I	7	1	
Professor II	4	1	
Postdoctoral fellow	11	20	
PhD-student	32	28	
Senior Research Scientist*	0	4	
Researcher with doctoral degree**	1	17	
Clinician with PhD performing R&D and presently supervising PhD students	0	0	
Technical/administrative personell	20	6	
Others #	3 #	2 #	
Total	100	82	

Others: 5 Associate Professor II.

* Senior research scientist equals researchers formally qualified for employment as professor

** Encompasses several positions such as research scientist, chief scientist, principal scientist, researcher, senior researcher, researcher I, researcher II, researcher formally qualified for employment at associate professor level (see guidelines 2.3.5).

Table 4: Researchers submitting CV's (see guidelines 2.3.6)

Professor I, associate professor I, postdoctoral fellow, senior research scientist, researcher with PhD-degree and clinician with PhD performing R&D and presently supervising PhD students.

<i>Name</i>	<i>Position</i>	<i>Sex F/ M</i>	<i>Year of birth</i>	<i>Research unit for evaluation</i>
Barson Nicola	Postdoc	female	1974	CEES
Brinch Christian N.	Researcher	male	1973	CEES
Brysting Anne Krag	As. Prof. I	female	1959	CEES
Cadahia Luis	Postdoc	male	1977	CEES
Cromsigt Joris PGM	Researcher	male	1975	CEES
Donk Ellen van	Prof. II	female	1953	CEES
Durant Joël M.	Researcher	male	1967	CEES
Edeline Eric	Researcher	male	1977	CEES
Espelund Mari	Researcher	female	1963	CEES
Grimholt Unni	Sr Scientist	female	1960	CEES
Gundersen Hege	As. Prof. II	female	1970	CEES
Hansen Thomas F.	Professor	male	1964	CEES
Haverkamp Thomas H.A.	Postdoc	male	1973	CEES
Hessen Dag Olav	Professor	male	1956	CEES
Hidalgo Jose Manuel	Postdoc	male	1979	CEES
Hjermann Dag Øystein	Researcher	male	1967	CEES
Hjort Nils Lid	Professor	male	1953	CEES
Holen Øistein Haugsten	Researcher	male	1970	CEES
Haas Fredrik	Postdoc	male	1965	CEES
Jakobsen Kjetill S	Professor	male	1958	CEES
Jorde Per Erik	Researcher	male	1961	CEES
Knutzen Halvor	Sr Scientist	male	1973	CEES
Labra Antonieta Lillo	Postdoc	female	1963	CEES
Lampe Helene M.	Professor	female	1959	CEES
Langangen Øystein	Researcher	male	1979	CEES
Le Rouzic Arnaud	Researcher	male	1979	CEES
Liow Lee Hsiang	Researcher	female	1974	CEES
Loe Leif Egil	As. Prof. I	male	1973	CEES
Mysterud Atle	Professor	male	1969	CEES
Nederbragt Alexander Johan	Researcher	male	1972	CEES
Nesbø Camilla	Researcher	female	1970	CEES
Nielsen Anders	Postdoc	male	1971	CEES
Nilsson Anna	Postdoc	female	1977	CEES
Ohlberger Jan	Postdoc	male	1977	CEES
Olsen Esben Moland	Sr Scientist	male	1968	CEES
Ottersen Geir	Sr Scientist	male	1963	CEES
Pavlicev Mihaela	Postdoc	female	1974	CEES
Persson Jonas	Postdoc	male	1977	CEES
Poyatos Juan F	Postdoc	male	1969	CEES
Reitan Trond	Postdoc	male	1969	CEES
Rounge Trine B	Postdoc	female	1978	CEES
Rueness Eli Knispel	Researcher	female	1971	CEES
Schweder Tore	Professor	male	1943	CEES
Seligmann Herve	Postdoc	male	1966	CEES
Slagsvold Tore	Professor	male	1947	CEES
Star Bastiaan	Postdoc	male	1976	CEES
Stenseth Nils Chr. (Head of CEES)	Professor	male	1949	CEES
Stige Leif Christian	Researcher	male	1969	CEES

Storvik Geir	Professor	male	1962	CEES
Stüken Anke Corinna	Postdoc	female	1978	CEES
Sæther Stein Are	Researcher	male	1969	CEES
Sætre Glenn-Peter	Professor	male	1965	CEES
Tooming-Klunderud Ave	Postdoc	female	1972	CEES
Tristan Rouyer	Postdoc	male	1980	CEES
Trosvik Pål	Postdoc	male	1975	CEES
Viljugrein Hildegunn	As. Prof. II	female	1970	CEES
Villar Jaime Otero	Postdoc	male	1977	CEES
Vøllestad Leif Asbjørn	Professor	male	1956	CEES
Østbye Kjartan	Researcher	male	1967	CEES
Bakke Torgeir	As. Prof II	male	1945	Marine Biology
Edvardsen Bente	Professor	female	1960	Marine Biology
Eikrem Wenche	As. Prof. II	female	1957	Marine Biology
Fredriksen Stein	Professor	male	1956	Marine Biology
Kaartvedt Stein	Prof. II	male	1953	Marine Biology
Karlsen Hans-Erik	As. Prof I	male	1956	Marine Biology
Klevjer Thor	Postdoc	male	1975	Marine Biology
Røstad Anders	Postdoc	male	1972	Marine Biology
Titelman Josefin	As. Prof I	female	1973	Marine Biology
Ugland Karl Inne	Professor	male	1949	Marine Biology
Akbari Akbar	Researcher	male	1970	MERG
Bjørklund Kjell	Professor	male	1943	MERG
Carlsen Tor	Postdoc	male	1977	MERG
Haverkamp Thomas	Postdoc	male	1973	MERG
Hottola Jenni	Postdoc	female	1976	MERG
Høiland Klaus	Professor	male	1948	MERG
Kauserud Håvard	As. Prof I	male	1971	MERG
Klaveness Dag	Professor	male	1945	MERG
Kristensen Tom	Professor	male	1945	MERG
Rohrlack Thomas	As. Prof II	male	1972	MERG
Schumacher Trond (Head of Dep.)	Professor	male	1949	MERG
Shalchian-Tabrizi Kamran	As. Prof I	male	1970	MERG
Skrede Inger	Postdoc	female	1978	MERG
Stüken Anke	Postdoc	female	1978	MERG
Sønstebo Jørn	Postdoc	male	1974	MERG
Vrålstad Trude	As. Prof II	female	1970	MERG
Aarnes Halvor	Professor	male	1948	IB
Andersen Tom	Professor	male	1955	IB
Ergon Torbjørn	As. Prof I	male	1970	IB
Eriksen Aud Berglen	As. Prof I	female	1943	IB
Hestmark Geir	Professor	male	1958	IB
Holth Tor Fredrik	Postdoc	male	1978	IB
Hylland Ketil	Professor	male	1960	IB
Konestabo Heidi Sjursen	Postdoc	female	1972	IB
Leinaas Hans Petter	Professor	male	1948	IB
Sverdrup Line Emilie Tvedt	As. Prof II	female	1972	IB
Øverbø Steinar	Professor II	male	1946	IB

Date

.....

Signatures

.....

Administrative responsible

.....

Head of the institution

Two persons are not connected to any of the four Level 2 – units.

Their CV's follows on the two next pages.

Curriculum Vitae – Erika Leslie and Inger Nordal

Curriculum Vitae (November 2010) – ERIKA HAGELBERG

Sex: female **Year of Birth:** 1954 **Nationality:** British **Present position:** Professor

Previous academic positions:

Senior Lecturer, University of Otago, New Zealand (1998-2001)

University Assistant Lecturer, University of Cambridge, UK (1992-1997)

Postdoctoral Research Fellow, University of Oxford, UK (1987-1992)

Academic degree: PhD Biochemistry, University of Cambridge

Last 10 years

Most important affiliation in academic and professional committees: Member of the Scientific Steering Committee, International Commission on Missing Persons, 2005.

Most important affiliation in academic and professional committees: Member of appointment committee for professorship, University of Bergen, 2005, 2008.

PhD examiner, University of Oslo 2005.

PhD examiner, University of Geneva 2007.

Visiting professor, University of Jilin, China, 2007-

Awards: 2004-05 South Africa/Norway Research Project “Implementation of novel Y chromosome STR markers and mitochondrial DNA polymorphisms in forensic casework in South Africa”. NOK 455,000 (shared between the partners).

2008 Nansenfondet, Oslo. NOK 40,000 to fund research on human trans-Pacific contacts.

2010-2013 Norges Forskningsradet. Thanatos: dead bodies - live data. A study of funerary data from the Hellenistic-Roman-Byzantine town Hierapolis. With Prof. Johann Rasmus Brandt, University of Oslo.

Scientific review work including peer-review: Referee for journals including *Trends in Genetics*, *Forensic Science International*, *American J. Phys. Anthropol.*, *Human Biology*, and others. Reviewer research grant applications for Wellcome Trust, Marsden Trust of New Zealand, Swiss COST Action, and others.

Dissemination activities: Interviews to the press, television and radio science programmes including Science Now, Discovery, BBC World Service, Norwegian radio and television.

2001, worked with Cicada Films of London on a Channel 4 documentary about the origins of the Andaman Islanders, shown worldwide on the National Geographic Channel.

2002, participated in documentary by BBC television, on Easter Island.

2002, participated in a TV documentary made by the Discovery Channel and Natural History New Zealand, on the Elephant Man.

2005 Schrødingers katt, item on human identification in South Africa.

2007, BBC World Service radio documentary on Thor Heyerdahl.

2010, filmed with NRK, Norske Røtter.

Many public lectures and seminars, and popular science articles.

(most recent at Open Seminar “More than just bones” at Forskningsetiske komiteer 10.2010

Two pieces in Aftenposten.

No. of PhD-stud. presently under supervision as main supervisor: 1

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor:

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 3

No. of review articles and book chapters (1.1.2005–30.6.2010): 4

No. of publications in peer-r. jour. or peer-r. monographs (total career): 30

No. of review articles and book chapters (total career): 28

Three most important publications the last 10 years:

Thangaraj K., Singh L., Reddy A. G., Rao V. R., Sehgal S. C., Underhill P. A., Pierson M., Frame I. G., **Hagelberg E.** (2003) Genetic affinities of the Andaman Islanders, a vanishing human population. *Current Biology* 13, 86-93.

Hagelberg E. (2003) Implications of mitochondrial DNA recombination for human evolution. *Opinion, Trends in Genetics*, 19, 84-90

Gill P. & **Hagelberg E.** (2004) Ongoing controversy over Romanov remains. *Science*, 306: 407-10.

Curriculum Vitae (November 2010) – Inger Nordal

Sex: Female

Year of birth: 1944

Nationality: Norwegian

Present position:

Professor

Previous academic positions:

Assistant professor (1969-1974), associate professor (1974-1987)

Academic degree:

Fil. Dr. (from Uppsala University)

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 6
(of which 2 were NUFU-stipendiates, defending their theses at University of Addis Ababa)

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 25

No. of review articles and book chapters (1.1.2005–30.6.2010): 5

No. of publications in peer-r. jour. or peer-r. monographs (total career): ca 120

No. of review articles and book chapters (total career): ca 20

Three most important publications the last 10 years:

Nordal, Inger; Jonsell, Bengt; Marcussen, Thomas 2005. *Viola rupestris*: molecular analyses to elucidate postglacial migration in Western Europe. *Journal of Biogeography* 32: 1453-1459.

Nordal, Inger, BJORÅ, Charlotte S., Kwembeya, Ezekeil, G. 2010. Seed coat as straight jacket? – On seed development and dispersal in the genus *Crinum* (Amaryllidaceae). *Proceedings XVIIIth AETFAT conference [Association pour l'Etude Taxonomique de la Flore d'Afrique tropicale]*, Royal Botanic Gardens Kew: 855-864.

BJORÅ, Charlotte S.; Hoell, Gry; Kativu, Shakkie; **Nordal, Inger** 2008. New taxa of *Chlorophytum* (Anthericaceae) from southern tropical Africa with notes on their sister group relationships. *Botanical journal of the Linnean Society* 157: 223-238

SELF-ASSESSMENT – LEVEL 2

Centre for Ecological and Evolutionary Synthesis (CEES)

1.2.1 Organisation, research leadership, strategy and resource situation

How the research is organised and led, and describe the decision-making

CEES was established as a Centre of Excellence (CoE) in Oct 2007, but has existed as a centre since 2002 after receiving funding from the University of Oslo (UoO) and status as a top-tier research group from the University's Faculty of Mathematics and Natural Sciences. The centre receives an annual funding of approximately 80 million NOK in addition to the Core member salaries. As of 1 Oct 2010 CEES consists of 146 members (18 Core members; 46 researchers and postdocs; 20 tech and admin personnel; 27 PhD students; 25 Master students and 10 guests). CEES provides a truly international working environment, with more than 20 nationalities at any time.

The centre is governed on a daily basis by the Chair, Prof. Nils Chr. Stenseth, the Deputy Chair, Dr. Eli K. Rueness, and the CEES administrative team. All running issues are discussed and dealt with at weekly meetings. All our senior scientists (CEES Core) have signed personal contracts committing them to allocate most of their research time (25-75 %) to CEES and to conduct their research in accordance with the programme outlined in the centre's CoE proposal. The Core members meet on average every quarter to exchange views on issues of common concern.

CEES has a Board¹ comprised of 6 members, appointed by the Department of Biology for 3 years with the possibility of extension. The Board meets twice a year to focus on strategic and control functions as well as to manage budgets, accounts and annual reports. The centre has a Scientific Advisory Board² (SAB) with 5 members meeting annually. The primary request to the SAB is to critically assess CEES research, compare the CEES research plan with progress made, and to guide and advise should changes or additions be implemented in the plan. SAB is composed of experts that collectively cover the scientific profile of CEES. The CEES Chair and Head of Administration are part of the leader team at the Department of Biology with weekly meetings.

Regarding scientific progress within the centre, the Deputy Chair and the Chair liaise closely. The Chair attends to all daily/running matters, financial transactions and helps the centre follow its research plan. The Chair spends a substantial amount of his time conducting research, considering it crucial for leading the centre. Both the Chair and the Deputy Chair have undertaken a Scientific Management Course (Research Leader Programme by UoO).

Research³ within CEES is structured into three general and interlinked *Themes* and four focused *Colloquia*. The *Themes* are ongoing through the entire 10 year period and are: **1: The role of population structuring in adaptive evolution**, **2: The potential for adaptation** and **3: The evolution of reproductive isolation**. The *Colloquia* are 3-year projects bringing together CEES members and guest researchers (including Kristine Bonnevie Professors) in a carefully planned sequence: **1: Selection and evolvability: concepts measurements and statistics** **2: Bridging the gap between genomics and evolutionary biology** **3: Ecological and evolutionary dynamics of microbial ecosystems** and **4: Integration of ecology and evolution: a synthesis**.

Synthesis of ecology and evolution is the overall objective of the centre. Six Action Groups have recently been implemented to promote this. These groups help us to pinpoint gaps in our current understanding and to ensure that the main vision of CEES is targeted across research systems, methods and theoretical frameworks. Synthesis is further supported by allocating additional funding for joint work. The *Themes* and *Colloquia* are each led by two senior scientists and the Action Groups are led by a combination of researchers/postdocs and Core members. CEES strives to obtain a good age distribution and gender balance in all governing bodies.

A Lab Board has been established to handle administrative and strategic issues relating to the laboratories. Similarly, a Field Board administrates the allocation of technical field assistance.

¹ www.cees.uio.no/about/board/boardmandate.html

² www.cees.uio.no/about/sab/sabmandate.html

³ www.cees.uio.no/research

CEES leaders encourage members to aim for ambitious projects resulting in papers in the best journals, and assists the research teams in various ways, including finding external partners.

The composition of competence and background, age, sex, and nationality of the academic staff

By December 2009 the CEES scientific staff (excluding PhD and Master students) totalled 59 people with backgrounds within the following academic disciplines: Population Biology 23%;

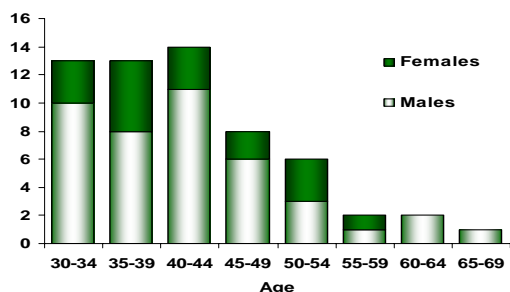


Figure 1: Number, age and sex ratio of scientific staff at CEES in 2009

Theoretical and Evolutionary Biology 20%; Statistical Modelling 17%; Microbiology 8%; Genomics 5%; Population Genetics 5%, Behavioural Ecology 5%; Bioinformatics 3%; Community Ecology 2%; Physics/Astronomy 2%; Paleobiology 2%; Economics 2%; Oceanography 2%; Immunology 2%; Taxonomy 2%; Veterinary Science 1%; Theoretical Physics 1%. 29% of these were female and the average age was 42 years (median 40 years), with staff members originating from 13 nationalities (4 continents) (Figure 1).

The strategy for publication and dissemination, including popular science

The centre aims to publish its scientific results in the most appropriate peer-reviewed international journals of the highest quality. In 2009 almost one third of CEES publications were published in high impact journals. The average Journal Impact Factor (from ISI Web of Knowledge) for our publications in 2009 was 3.84. The scientific staff also present their ongoing research at relevant regional, national and international conferences.

CEES considers collaboration with researchers both from other disciplines and other research units (nationally and internationally) important. From 2007-2010, 88% of CEES publications were co-authored by researchers outside CEES and 61% by researchers outside of Norway. CEES often communicates its work to a broader audience through various media including radio, TV and newspaper articles. Our goal is to publish an article in a Norwegian newspaper for each academic paper published in a prominent journal. In 2009 CEES featured in more than 200 national and international media items⁴.

Open Access policy: Visibility is most easily achieved through publication in prominent international journals; for journals with a narrower readership we often pay for Open Access publishing. We are of the opinion, however, that Open Access publishing is overly expensive and would welcome action at a national level regarding this. The centre's strategy on dissemination is in accordance with that of the institution/department, placing a priority on being highly visible both nationally and internationally in scientific as well as other public arenas.

The resources (human, monetary, time) of the evaluated unit

By Dec 2009 the centre consisted of 59 scientific staff (a total of 46 person-years), 27 PhD students and 20 technical and administrative staff (a total of 12 person-years).

The CEES administration consists of a highly educated team (of the 8 members, three have a doctoral degree, four a Master's degree and one a Bachelor's degree). The team is in charge of the daily handling of issues related to CEES personnel and projects, coordinating research proposals (including the budgeting), writing reports and devising contracts between UoO and external partners for running projects. It also deals with the development of the CEES website, general scientific outreach, coordinating relevant events and short courses, and dealing with non-scientific matters related to students and guest researchers (in 2009 the centre received a total of 63 guest researchers for shorter [one week] or longer [up to one year] stays).

The CEES technical staff consists of 10 technicians, all with Master's or PhD degree. They handle the daily running of the various laboratories at CEES: a DNA lab, an ABI lab and an ultra

⁴ www.cees.uio.no/news/cees-in-media

high-throughput sequencing 454/Roche platform (UTSP) (see below). The latter requires particularly specialised expertise and manpower to perform the sequencing and subsequent bioinformatic analysis; the activities, funding and organisation of the UTSP and the newly established Norwegian High-Throughput Sequencing Centre are described below.

CEES is centralised at the Department of Biology with all members having offices located within the same building since the centre's launch. The majority of offices, seminar rooms, meeting rooms, kitchen facilities and laboratories are located on the same floor. Members from other UoO departments (Dept. of Economy and Dept. of Mathematics.) are also provided with CEES office space in the building. The Faculty's professors and associate professors have 25% of their time dedicated to compulsory teaching for the Bachelor's and Master's programmes; this percentage has been reduced to allow for scientific focus during the CoE period. Researchers and postdocs do not have teaching obligations; they do, however, contribute significantly to organising several journal clubs and other discussion groups, and some also co-supervise PhD and Master students. Researchers and postdocs also play a key role in the running of the recently implemented Action Groups.

CEES has received a total annual funding of approximately 80 mill NOK in addition to the Core member salaries. In 2009 we received around 60 mill NOK from sources outside UoO. CEES has had 72 externally funded projects, 46 funded by RCN (54 mill NOK), 10 by other public based sectors (0.2 mill), 7 by commercial companies (1 mill) and 9 by international funding from the EU and UN (4.3 mill). Strategic use of the CoE funding has enabled us to obtain substantial additional resources. Based on numbers provided by RCN (Annual Report⁵ 2009, table 2.7), CEES is rated among the top CoE's with regard to acquiring additional funding from RCN (second to only one CoE for obtaining additional funding per employee, and second to another CoE with regard to additional funding per person-year). We consider this a good quality measure as such funds are obtained in keen competition and following in-depth scrutiny by international referees. The average number of publications in international journals per person-year for CEES in 2009 was 3.2.

Major research infrastructures available to the unit

Infrastructures for molecular biology and DNA sequencing. *The CEES DNA Lab*⁶ has an infrastructure consisting of an isolation lab, separate PCR facilities, post PCR, DNA sequencing labs (see ABI lab below) and a lab for class 2 security research. It contains all the basic instrumentation of a modern molecular biology laboratory as well as automated nucleic acid purification and gel electrophoresis systems. So far in 2010 there have been 45 users of the lab. This is an increase from 2009 (37 users for the entire year).

The *ABI lab*⁷ is a shared facility between the Dept. of Biology and Molecular Biosciences and is run by CEES. It is located within the CEES premises and is equipped with two ABI 3730 capillary electrophoresis sequencers, each with 48 capillaries. It functions as a service lab for various research groups and institutes at the university, as well as affiliated organisations and departments both nationally and internationally. A total of ~40.000 samples have been sequenced with an average of 3642 samples every

Box 1: The Norwegian High-Throughput

Sequencing Centre (NSC); Chaired by K.S. Jakobsen

The Norwegian High-Throughput Sequencing Centre (NSC: www.sequencing.uio.no) is currently the only platform offering the research community of Norway high-throughput sequencing (HTS) applications. It is a consolidation of the Illumina Genome Analyzer II (GA_{II}) and the 454 (Roche) sequencing platforms at the Institute of Medical Genetics (IMG) and CEES. At present, we have four HTS machines (two GS FLX [454/Roche] located at CEES and two Illumina GA_{II} at IMG). The main goal of the NSC is to be able to provide HTS services for re-sequencing, transcriptomics, metagenomics and *de novo* sequencing for the Norwegian research community and provide customized bioinformatic analyses of the data.

⁵ www.forskningradet.no/servlet/Satellite?c=Page&cid=1138785841818&pagename=ForskningradetEngelsk%2FHovedsidamal

⁶ www.cees.uio.no/research/facilities/dna-lab

⁷ www.bio.uio.no/ABI-lab

month in 2010 (the monthly average for 2009 being 2955).

The Ultra-high Throughput Sequencing Platform (UTSP): In 2008, CEES was awarded 18.3 mill NOK by the RCN to establish the Ultra High-Throughput Sequencing Platform (UTSP) under the FUGE and AVIT programmes. The platform was further strengthened through a new Infrastructure Programme grant from RCN (23 mill NOK) and consolidation with the *Illumina* sequencing platform at the Institute of Medical Genetics (IMG), Oslo University Hospital, establishing the Norwegian High-Throughput Sequencing Centre (NSC; Box 1). In 2009, 131 samples from several research groups were sequenced in 95 runs (65% more than in 2008). In 2010 the 454/Roche node experienced a sharp increase in interest and quantity of samples submitted, with the sequencing of a total of 268 different samples from 45 research groups. The majority of the sequenced samples are from Norwegian research institutes (83% of the total samples), though the number of international users is increasing (the remaining 17% of total samples are from Austria, Sweden, the Netherlands, France and Switzerland).

The recently upgraded CEES 'Ecoflux' lab for analysing basic food-web related parameters consist of a flow-through analyser for total and dissolved nutrients (N and P), a Shimadzu analyzer for total organic carbon and total organic nitrogen, and a Thermo-Finnegan analyzer for particulate C,N,P and S. We also have a FACS Calibur Flow Cytometer for estimating cell numbers and DNA-quantification, as well as facilities for running chemostats under various light and temperature regimes. There is an automatic plate-reader equipped with Nano-Drop to study fluorescence from a large number of biological samples plus DNA and RNA quantification.

The extent to which the evaluated unit's staff use research infrastructure at other institutions

CEES and the Institute of Marine Research (IMR) are in collaboration both with exchange of staff and on common research projects. *Genome research:* Researchers at CEES frequently use the FUGE bioinformatics platform in UoO's Dept. of Informatics and the University of Bergen, as well as the services provided by the *Bioportal*⁸. In setting up and running the UTSP and NSC service platforms, CEES liaised closely with the Scientific Computing Group (SCG) at USIT and have also worked with the CIGENE SNP genotyping platform at UMB. Together with the Microbial Evolution Research Group (MERG), CEES has initiated a 'laboratory facilities collaboration' allowing us to spend research funding efficiently.

1.2.2 Research activities, including interdisciplinary research and research impact

The various research activities and the research profile of the unit, including interdisciplinarity

CEES focuses on a broad spectrum of biology, primarily ecology, evolution and genomics (molecular biology). The CEES team has in-depth experience with several biological/ecological systems covering terrestrial, freshwater and marine systems. Interaction between members working on different systems is strongly encouraged (including through additional funding). Here we highlight five of CEES' research fields (refer to the CEES annual reports⁹ for additional examples): (1) **The cod genome:** The establishment of the sequencing platform placed CEES in a leading position within the field of marine functional genomics. In 2008, CEES was awarded 10 mill NOK by the RCN under the FUGE GenoFisk programme for sequencing the cod genome¹⁰. The cod genome is the first large and complex *de novo* genome to be completed using exclusively next-generation whole genome shotgun sequencing (454/Roche) technology. Combined with state of the art bioinformatics algorithms designed for maximal exploitation of this technology, CEES has successfully elucidated the first full genome sequence of an economically important fish species. Comprehensive automated annotation (performed by *Ensembl*¹¹) yielded the identification of 22,154 genes. This number is comparable to other sequenced teleosts, showing that a *de novo* genome sequence can be done using a strictly next-generation sequencing strategy, an example that

⁸ www.bioportal.no

⁹ www.cees.uio.no/about/annual-reports

¹⁰ www.codgenome.no

¹¹ <http://www.ensembl.org/info/about/intro.html>

will likely be followed in future sequencing projects. An article on the cod genome and its biological implications will soon be published, coinciding with the public release of the first, annotated version of the cod genome.

(2) **Speciation:** There are several projects at CEES focusing on the patterns and processes of speciation across several taxa including insects (e.g., African flightless bush crickets) and passerine birds (e.g., tit, flycatcher and sparrow species). A team of CEES researchers have provided a comprehensive review of ecological, behavioural and genetic studies of speciation in pied- and collared flycatchers (see the following for an overview: Sætre, G.P. & Sæther, S.A. [2010] Ecology and genetics of speciation in *Ficedula* flycatchers. *Molecular Ecology* 19: 1091-1106).

(3) **Plague:** Patterns revealed by our climatic and ecological niche models have prompted questions concerning the ecology and evolution of the plague-causing pathogen *Yersinia pestis*, a system on which CEES members have published extensively. Given the patterns of molecular evolution, CEES is actively using mathematical modelling to address questions regarding the virulence of this pathogen and whether we can expect its relative virulence to increase or decrease. These new data help determining how *Y. pestis* persists in the environment. Working within *Colloquium 3*, CEES aims to link landscape and climatic patterns to the ecology and evolution of the system.

(4) **Bacterial communities:** We have conducted chemostat experiments with bacterial communities representing main lineages of the human gut microbiota, collecting time series data on population and physiochemical variables. This community was found to spontaneously adopt the phylum level composition of the adult gut. Time series analysis identified a web of interactions which determined community development. Similar results were obtained in a study using bacterial population data from the guts of human infants. Our results indicate that relatively simple models may explain much of the structural development of gastrointestinal microbial communities (e.g., Trosvik *et al* 2010, *Environmental Microbiology*; Trosvik *et al* 2010, *ISME Journal*).

(5) **Harvest-induced evolution:** Analyzing data on 50 years of pike catches from Lake Windermere in the UK, we have documented that in periods of heavy fishing, pike tend to be smaller and devote less energy to reproduction. While natural predators normally prefer the smallest fish, humans value the largest. Hence, fishermen apply a selective pressure opposing the natural selective force. These findings suggest that fisheries managers should include the evolutionary effects of fishing in their estimates. Our current research on this system is based on earlier work including Edeline *et al* (2007), published in *PRSB* and highlighted by *Nature* as one of the most important papers of the year. These analyses demonstrate that ecological and evolutionary processes operate on similar time scales, and thus show that evolution is highly relevant when developing management regimes for natural systems. Our analyses of the data from Lake Windermere continue to yield interesting results published in high-profile journals (e.g., Ohlberger 2011, *PRSB*). The work on pike is linked to our theoretical modelling research focused on harvesting of the Atlantic cod (the doctoral thesis of Anne Maria Eikeset), and the genomics work on the same species. This work is, through one of the Action Groups, now closely linked to comparable work on harvested game populations.

How the research coheres with trends and developments in the field

We aim to be at the forefront of the trend towards integration of the sub-disciplines of biology, thereby counteracting the fragmentation seen in many research units. Considerable competence has been built up with the advance of the Norwegian High-Throughput Sequencing Centre (NSC) and the cod genome project that we plan to exploit and develop further. The availability of reference genome sequences, inexpensive genotyping chips and the

Box 2: High-throughput sequencing (HTS)

Over the past five years the development of high-throughput sequencing technologies has provided unique opportunities to accelerate biological and biomedical research. The advent of next-generation sequencing technologies, such as pyrosequencing from 454/Roche LifeSciences (www.454.com) and Illumina Genome Analyzer II (www.illumina.com) has enabled the comprehensive analysis of genomes and transcriptomes to become inexpensive, routine and widespread, rather than requiring significant production-scale efforts. Sequencing technology will improve in the near future, further revolutionizing an incredibly fast-moving field.

possibility of conducting large-scale re-sequencing efforts (Box 2) will facilitate the comprehensive cataloguing of sequence variations (SNPs) and the generation of metagenomic and epigenomic information. This is likely to shed light on genotype-phenotype relationships (and the biological implications thereof) in numerous ecologically important systems. CEES has been awarded two new projects by the RCN, “Fisheries induced evolution in Atlantic cod investigated by ancient and historic samples” and “Translating the cod genome for aquaculture”. These projects will utilise the cod genome information to conduct large-scale cataloguing of sequence variations underlying important traits of ecological, evolutionary and aquaculture relevance. It is expected that the findings will be of importance for conservation and harvesting plans, for environmental monitoring, and for the cod aquaculture industry. In essence, we can use the fisheries-induced selection patterns as naturally occurring experiments in order to detect specific adaptive trait variation relevant for the upcoming aquaculture of cod.

How the units’ applied research contributes to basic research and/or vice versa

Whilst CEES is a basic curiosity-driven unit focusing upon the integration of ecology and evolution, much of our work still has an applied value and is funded through various (more applied) funding programmes within the RCN. Good examples of this are our work on harvesting-induced evolution and the cod genome project. The latter is likely to have an impact on future cod aquaculture and vaccine development for cod. Similarly, our work on plague and climate effect on biological production has much applied value, and is recognized as such; the climatic and ecological niche models we have produced have real world application in predicting seasons and landscapes where the risk for plague is great, helping proactive allocation of resources and the prevention of plague epidemics.

The societal relevance of the research and other ways research has contributed to innovation

CEES’ research on the ecological and evolutionary effects of harvesting has resulted in the Ministry of Fishery and Coastal Affairs instigating a partnership between CEES and the Institute of Marine Research (IMR) in a Strategic Institute Programme.

The applied value of sequencing the cod genome is clear, and was verified by funding CEES received through the Aquaculture programme of the RCN. The cod genome will become a reference genome for cod and codfishes when additional specimens are re-sequenced. This will set the stage for population-oriented studies of cod, and for addressing functional questions related to fisheries and aquaculture. Our findings regarding the peculiar immune system of cod will have an impact on our understanding of immune plasticity, and serve as a model in both fish and human immunology.

Through the efforts of CEES Core member Kjetill S. Jakobsen, CEES has been instrumental in establishing MareLife¹², a non-profit organisation for promoting interactions and collaborative research between industry (e.g., MarineHarvest, Cermaq, AquaGen, AkerBiomarine and Nofima) and academia within the marine field. MareLife focuses on aquaculture, fisheries and ingredient industry, and supports projects, communication, public financial frameworks and pure commercialisation activities. It receives considerable funding from industry through memberships and sponsoring of projects as well as from Innovasjon Norge and RCN (VRI programme). The ideas behind MareLife can be seen as a parallel to the Oslo Cancer Cluster. CEES also regularly organises seminars open to the general public. We would particularly like to highlight our annual Darwin Days¹³ and Kristine Bonnevie Lecture on Evolutionary Biology¹⁴, the latter being part of the University anniversary celebrations.

¹² www.marelife.no

¹³ www.cees.uio.no/calendar/open-events/darwin-day

¹⁴ www.cees.uio.no/calendar/open-events/kristine-bonnevie-lectures

The role of the unit related to creating and establishing new industrial activities

The establishment of MareLife has been instrumental in establishing new industry projects and is also involved in supporting start ups, with 3-4 start ups initiated to date. MareLife, together with the RCN, is also involved in the process of commercialization of results from the sequencing projects. Kjetill S. Jakobsen has many years of industry experience through establishing biotechnology companies, and is CEO of the company Genpoint (now listed at the Oslo Stock Exchange as Nordiag ASA). This experience with innovation and commercialisation is valuable to CEES.

Assessment of the strengths and weaknesses of the unit

Strengths: (1) CEES hosts a large number of scientists representing various disciplines (tenured and temporary staff) relating to ecology and evolution, facilitating the integration of these two fields. (2) Many CEES members have expansive publication records (past and current), which attracts many high quality collaborators as well as helping to secure additional funding. (3) CEES possesses state of the art genetic lab facilities, combined with frontline research projects within genomics, evolution and ecology. (4) CEES attracts a large number of highly talented young people that work at the centre and continue to devote their time to the centre's research.

Weaknesses: (1) The relatively large size of CEES as a CoE presents challenges in managing the centre as a coherent research unit. Whilst we have met these challenges to date, we are constantly seeking ways to improve the integration of ecology and evolution from a broad spectrum of perspectives. (2) A large proportion of CEES' funding is "soft money", much of which covers only shorter periods of time, making planning difficult. (3) Most CEES members are on temporary contracts, greatly increasing the likelihood of them finding longer-term contracts elsewhere. (4) CEES' host institution (at all levels: University of Oslo/Faculty of Mathematics and Natural Sciences/Department of Biology) has not committed to the integration of the centre into its permanent structure.

Opportunities: (1) CEES can and does facilitate and conduct a large body of exciting and relevant scientific work. (2) CEES has repeatedly demonstrated its ability to secure additional funding and to attract excellent senior scientists as partners and longer-term visitors, as well as highly talented young scientists. (3) Through its size and dynamic structure, CEES is able to adjust to new scientific challenges with relative ease. (4) CEES has the manpower and facilities to grasp opportunities emerging within the fast-moving field of biology.

Threats: (1) The lack of a plan for how to integrate CEES' activities into the established structure of the University. This is a real threat to the future of the centre, as there are currently no plans to announce new tenured positions within the fields covered by CEES. (2) The new practice of the regulations regarding temporary employment at the host institution makes it impossible to hire temporary scientists for more than 4 years, making the further existence and development of CEES impossible. (3) Funding to CEES at the present level might not be secured. (4) If CEES is not properly integrated into the university structure, it is possible that the centre may be, in effect, split into sub-units. This would counter our efforts to synthesise and integrate ecology and evolution and thus to provide a fuller biological picture.

The distribution of scientific results/publications among the researchers

The total number of publications produced by CEES increases annually (Figure 2), as does the number of joint publications (with more than one CEES author, Figure 3 [section 1.2.4]).

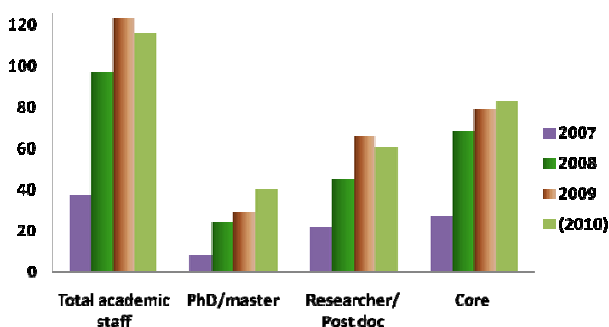


Figure 2: Total number of journal articles with one or more CEES author 2007-2009 and comparative numbers for category of scientific staff. (For 2007 publications from 1 Oct until the end of the year are included, and for 2010 only publications until 1 Oct are included.)

CEES collaborates extensively both internally and externally at the national and international level. As much as 88% of our journal articles are co-authored by non-CEES scientists, 46% are co-authored by scientists from other Norwegian institutions and 18% by co-authors from other units at the University of Oslo (including Dept. of Biology). More than 60% of our journal articles have co-authors from institutions abroad. The CEES Master and PhD students are, to an increasing degree, involved in the forefront of research. CEES Core members (mainly faculty staff) authored/co-authored 27 publications Oct-Dec 2007, 68 in 2008, 79 in 2009 and 83 Jan-Oct 2010. The average number of publications per person per person-year on CEES was 3.2.

1.2.3 Training, mobility and career path

The recruitment of PhD-students and postdoctoral fellows over the past five years (2005-2009)

CEES always announces positions as broadly (internationally) as possible, typically using *Nature jobs* and *Evolutionary Directory*¹⁵. In accordance with the University's equal opportunities policy, we always aim to appoint the very best candidate for each position, regardless of gender or ethnicity. Over the last five years PhD students supervised/co-supervised at CEES have been recruited from UoO (39%), other Norwegian institutions (16%) and internationally (45%) whilst CEES postdocs and researchers have been recruited both nationally (54%) and internationally (46%). The University's recruitment strategy (*UoO Strategy 2020*¹⁶) states that a major goal is to increase the level of international recruitment. We believe that CEES' scientific and recruitment record is in line with this goal; the average percentage of qualified international applicants to the 10 most recent positions at CEES was, for example, 64% from a total of 37 countries on 5 continents.

The policy for gender equality and the balance between men and women in academic positions

Since the application stage of the CoE, CEES has aimed for gender balance in academic positions. From Master- to PhD and postdoc levels, to high-rank academic positions, there is a continuous loss of women resulting in a male-dominated distribution among the tenured scientific staff. In order to counteract this trend we have implemented several initiatives:

(1) At least 50% of all Prof II/Assoc. Prof II positions should be filled by women. Since 2007, 4 of 8 such positions have been assigned to women. (2) Several of our young female scientists have participated in the UoO Mentor Programme which aims to support young women in their research careers. (3) CEES has appointed one full-time laboratory engineer to assist female researchers who are either pregnant, have been on maternity leave or have other care obligations. This initiative has allowed such staff to be able to focus more on scientific writing. (4) CEES has appointed women in leading/prominent positions with the intention of providing high quality female role models: these include the centre's Deputy Chair, the Chair of the CEES Board and the Chair of the Scientific Advisory Board (SAB). Two of our research *Themes* are co-chaired by women. (5) Through special funding offered by the RCN (2.5 mill NOK), we have appointed a particularly talented female researcher (Dr. Lee Hsiang Liow) and intend to employ her on a permanent basis. (6) During 2007-2009 scholarships of 2-12 months duration were awarded to 18 young female researchers to enable them to further their scientific careers. This initiative has been very successful with 4 women with a PhD degree now in postdoc or researcher positions, 4 PhD students have now completed (or will very soon complete) their PhD degree and 5 of 10 Master students have been awarded a PhD scholarship at the time of writing.

From 2007-2010, CEES has used a total of 2.5 mill NOK on gender equalising actions. Approximately 0.7 mill of these funds were 'ear-marked' transfers from UoO; for 2011 UoO has allotted an additional 0.6 mill. Within the Faculty of Mathematics and Natural Science, CEES was the unit to receive the largest allotment of these funds for at least two of the last 4 years. In 2010 CEES was invited by UoO to submit an application to the 'Gender Equality Prize' (approximately 2

¹⁵ <http://evol.mcmaster.ca/evoldir.html>

¹⁶ www.uio.no/om/strategi/Strategy2020English.pdf

mill NOK), awarded by the Ministry of Education and Research. Two such applications were submitted and we are still awaiting the outcome.

The policy for age balance in academic positions and how the policy is followed up

There is a good age distribution among the CEES scientific staff (Figure 1). The average age of the scientific staff is 42 years (median 40 years), whilst that of the tenured scientific staff is 52 years. The average age of those researchers filling leading research positions at the centre (Chair, Deputy Chair, *Theme* leaders/co-leaders and *Colloquium* leaders) is 53 years. We have paid particular attention to developing the carriers of our younger staff, aiming to cultivate a new generation of scientific researchers and leaders within the field of ecology and evolution. Our young members are typically provided with additional funding to support their work including participation in conferences and the like; indeed funding is disproportionately allocated to our younger members. We encourage our young staff to enrol in courses in research leadership/management.

The CEES Chair is actively involved in the debate on imposing limits on the length of temporary positions; more specifically, the Chair argues for the mutual benefits in being able to employ people in temporary positions as required whilst at the same time trying to secure more permanent positions for our most talented recruits.

Recruitment

CEES has not experienced any difficulties in attracting high quality candidates for its positions. The new appliance of regulations that make it difficult to hire people for more than 4 years in total will, however, cause great problems in maintaining the high calibre of our staff.

The policy for mobility and career path

CEES academic staff are encouraged to spend time abroad, preferably for longer periods. It has, however, often proven difficult to motivate people to spend longer periods in other institutions (both nationally and internationally). We try to compensate for this by providing financial support for our members to participate in international conferences as well as shorter visits abroad. Furthermore, we are successful in attracting international candidates to the centre, creating a dynamic and cosmopolitan environment. We also recruit prominent international speakers for our weekly Friday seminars, providing opportunities for our members to interact with the guests and extend our networks. CEES hires top international scientists on a temporary basis, either as visiting Kristine Bonnevie Professors (high profile scientists invited for a three year period, the first year full-time and the remainder part-time) or on a one-year, 20% basis.

Stimulating PhD-students and postdocs to become independent researchers and research leaders

Younger members of CEES are typically made responsible for the development of their project, resulting in them receiving much of the credit for the project's success and, we hope, increasing confidence and competence in the process. The newly introduced Action Groups are chaired by our PhD/postdocs, as are our journal clubs and other discussion groups. Young members are asked to actively participate in such groups and to present their results at internal and external seminars and conferences. Young members are encouraged to enrol in project management courses. In 2010 we organised our first "Youngsters' Day" ("de unges dag"), where our younger members were brought together and asked to discuss how the centre could be further developed/improved and ways CEES can take more advantage of our broad spectrum of expertise. The event was a success that we plan to run annually.

CEES is leading the newly funded Nordic Centre of Excellence (NCoE): "Climate Change Effects on Marine Ecosystems and Resource Economics"¹⁷. With a total budget of 65 mill NOK over 5 years, the centre will provide training for 16 PhDs and 4 postdocs.

¹⁷ www.cees.uio.no/news/2010/nordforsk-award.html

1.2.4 Research collaboration (national, international, industry/public sector), and interdisciplinarity **National and international research collaboration, collaboration across faculty divisions, and collaboration with industry and public sector**

CEES has a large number of national and international collaborators involved in common projects and joint publications, providing a truly cosmopolitan working environment with staff and guests at the centre at any one time representing more than 20 nationalities (a total of 30 nationalities from October 2007 to present day). During 2009 a total of 37 international guest researchers visited CEES for 1 month or more, and a further 26 for a period between 1 week and 1 month. We also recruit people from abroad to participate in workshops and seminars, including the CEES Friday seminar series. CEES members can sign up for a time-slot for discussing with the visitors, encouraging networking to secure future collaborations.

CEES is working with industrial partners to create a collaborative training programme for climate effects on emergent infectious diseases, focusing on plague and tick-borne disease dynamics; we anticipate such model systems will be applied to other infectious diseases. Furthermore, the findings generated from our cod genome work are expected to be important to conservation and harvesting plans, environmental monitoring, and the cod aquaculture industry. In 2009, CEES undertook 55 projects financed by the public sector (including RCN), 7 projects funded through private industry and 10 internationally funded projects.

The impact of national and international collaboration on the research performed

CEES collaborates extensively both internally and externally at the national and international level. The level of collaboration between CEES members on published journal articles has increased

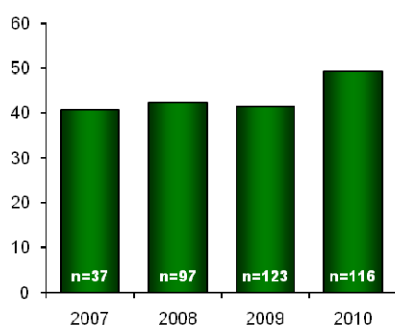


Figure 3: % Journal articles written by more than one CEES member

annually during the first period of the CoE (Figure 3). Collaboration between CEES and external scientists has also been high with 88% of our journal articles being co-authored by non-CEES scientists. CEES engages in active collaboration on a national level with 45% of its journal articles to date co-authored by scientists from other Norwegian institutions. 17% have co-authors from the other units at the University of Oslo. At an international level CEES collaborates extensively with scientists from numerous nations; more than 60% of our journal articles have co-authors from international institutions. Collaboration on projects is also extensive with approximately 20% of CEES annual expenses being transferred to external collaborators.

1.2.5 Other information of relevance to the evaluation

We have learnt much about the importance of creating a good environment for collaborative research. We consider the management of CEES to be process-oriented, as is the research itself, and anticipate the need to adapt our strategies to the scientific development of the centre. We recognise the importance of creating informal meeting/networking opportunities for CEES members, in order to enhance communication and synthesis. We host a weekly Late Lunch talk which is predominantly used for internal presentations of ideas and results and have introduced a daily communal coffee break, a weekly Happy Hour and a CEES blog. We also encourage members to take part in leisure/sporting events by providing the popular 'fun, sports and science' email list.

Non-permanent staff are vital for an integrative research centre with a limited time span such as CEES. The competence we are building is quite unique and it is important that we are able to keep our key non-permanent personnel for the duration of the CoE.

Centre for Ecological and Evolutionary Synthesis (CEES)
List of publications 01.01.2005–30.06.2010
(CEES Core members in bold)

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Veiberg, V., **Mysterud**, A., Bjørkvoll, E., Langvatn, R., Loe, L. E., Irvine, J., Bonenfant, C., Couweleers, F., **Stenseth**, N. C. 2007. Evidence for a trade-off between early growth and tooth wear in Svalbard reindeer. *Journal of Animal Ecology*. 76(6): 1139-1148.

Veiberg, V., **Mysterud**, A., Irvine, R.J., Sormo, W. & Langvatn, R. 2009. Increased mass of reticulo-rumen tissue and contents with advancing age in Svalbard reindeer. *Journal of Zoology*. 278: 15-23.

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- Østbye, Eivind; Hogstad, Olav; Østbye, Kjartan; Lien, Leif; Framstad, Erik; Breiehagen, Torgrim. 2007. Structure and dynamics of a high mountain wetland bird community in southern Norway: An 18-year study of waders and gulls. *Ornis Norvegica* 30 (1): 4-20.
- Østbye, K; Amundsen, PA; Bernatchez, L; Klemetsen, A; Knudsen, R; Kristoffersen, R; Naesje, TF; Hindar, K. 2006. Parallel evolution of ecomorphological traits in the European whitefish *Coregonus lavaretus* (L.) species complex during postglacial times. *Molecular Ecology*. 15 (13): 3983-4001.
- Østbye, T-K. K., Wetten, O. F., Klunderud, A. T., **Jakobsen**, K. S., Yafe, A., Etzioni, S., Moen, T., Andersen, Ø. 2007. Myostatin (MSTN) gene duplications in Atlantic salmon (*Salmo salar*): Evidence for different selective pressure on teleost MSTN-1 and -2. *Gene*. 403(1-2): 159-169.

Curriculum Vitae (November 2010) – Nicola Barson

Sex: Female, **Year of birth:** 1974, **Nationality:** British

Present position: Postdoc research fellow

Previous academic positions: Postdoctoral research Associate University of Cardiff, June 2003 to August 2004. Postdoc research fellow University of Oslo, May 2007 to December 2009

Academic degree: BSc Oceanography with Marine Biology (University of Southampton, UK, 1997)
MSC Ecology (University of Wales Bangor, 1998) PhD Evolutionary Biology (University of Hull, 2004)

Last 10 years

Scientific review work including peer-review: Reviewer for *Evolution*, *BMC Evolutionary Biology* and *Evolutionary Ecology*.

Dissemination activities: Conference Presentations and invited talks. *Evolutionary Ecology of Fishes: Diversification, Adaptation, Speciation*. Berlin ‘Rapid evolution mediated by plasticity but with strong constraints: contemporary adaptation to thermal shifts in European grayling.’ Talk 2009. *Evolution ’09*, Australian Evolution Society, Canberra. ‘Rapid evolution mediated by plasticity but with strong constraints: contemporary adaptation to thermal shifts in a fish.’ Talk 2009. European Society for Evolutionary Biology XII, Torino. ‘When are observations of rapid evolution to changes in temperature relevant for potential responses to climate change?’ Poster 2009. NIVA Oct 2008 - invited talk - “Early stages of adaptive divergence among grayling spawning demes in Lesjaskogsvatnet”. 12th Evolutionary Biology Meeting in Marseille. Does selection for accelerated growth result in a trade off with predator escape response in divergent grayling demes? Poster 2008. Speciation Symposium, Sheffield, Contemporary isolation-by-distance, but not isolation-by-time, among demes of European grayling (*Thymallus Thymallus*, Linnaeus) with recent common ancestors. Poster 2008. European EvoDevo Meeting, Ghent, Contemporary evolution of a trade-off between timing of developmental stages and selection for rapid growth in European grayling. Poster 2008. EAWAG/ University of Bern Seminar series, April 2008 - invited talk - “Early stages of adaptive divergence among grayling spawning demes in Lesjaskogsvatnet”. European Society for Evolutionary Biology IX meeting, Leeds Genetics of male coloration in Lake Malawi cichlid fishes. Talk. 2003. University of Western Australia, Centre for Evolutionary Biology - invited talk - ‘Rapid evolution mediated by plasticity but with strong constraints: contemporary adaptation to thermal shifts in European grayling’. Murdoch University, Centre for Fish and Fisheries Research. Oct. 2009 - invited talk - ‘Rapid evolution mediated by plasticity but with strong constraints: contemporary adaptation to thermal shifts in European grayling.’

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 6

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 6

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Barson N.J., Haugen T.O., Vøllestad L.A., Primmer C.R. 2009. Contemporary isolation-by-distance, but not isolation-by-time, among demes of European grayling (*Thymallus Thymallus*, Linnaeus) with recent common ancestors. *Evolution*, 63, 549-556. (DOI: 10.1111/j.1558-5646.2008.00554.x, <http://onlinelibrary.wiley.com/doi/10.1111/j.1558-5646.2008.00554.x/abstract>)
- Barson, N.J., J. Cable, C. van Oosterhout. 2009. Population genetic analysis of microsatellite variation of guppies (*Poecilia reticulata*) in Trinidad and Tobago: evidence for a dynamic source-sink metapopulation structure, founder events and population bottlenecks. *Journal of Evolutionary Biology*, 22, 485-497. (DOI:10.1111/j.1420-9101.2008.01675.x <http://onlinelibrary.wiley.com/doi/10.1111/j.1420-9101.2008.01675.x/abstract>,
- Barson, N.J., M.E. Knight, G.F. Turner. 2007. The genetic architecture of male colour difference between a sympatric Lake Malawi cichlid species pair. *Journal of Evolutionary Biology*, 20, 45-53. (DOI: 10.1111/j.1420-9101.2006.01228.x <http://onlinelibrary.wiley.com/doi/10.1111/j.1420-9101.2006.01228.x/pdf>)

Curriculum Vitae (November 2010) – Christian N. Brinch

Sex: Male, **Year of birth:** 1973, **Nationality:** Norwegian

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Senior researcher, Statistics Norway research department. (Current)

Academic degree: Dr. Polit (Economics), University of Oslo, 2002.

Last 10 years

Scientific review work including peer-review: Referee in Annals of Statistics, Scandinavian Journal of Economics, Korean Journal of Statistics.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 4

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 4

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- Vik, Jon Olav, Christian Brinch, Stan Boutin, Nils Chr. Stenseth, Interlinking hare and lynx dynamics using a century's worth of annual data. *Population Ecology*, 2008. 50(3): p. 267-274.
- Brinch, Christian N., "Non-parametric identification of the Mixed Hazards model with time-varying covariates", *Econometric Theory*, April 2007.
- Niclas Jonzén, Andreas Lindén, Torbjørn Ergon, Endre Knudsen, Jon Olav Vik, Diego Rubolini, Dario Piacentini, Christian Brinch, Fernando Spina, Lennart Karlsson, Martin Stervander, Arne Andersson, Jonas Waldenström, Aleksi Lehikoinen, Erik Edvardsen, Rune Solvang, Nils Chr. Stenseth, "Rapid Advance of Spring Arrival Dates in Long-Distance Migratory Birds", *Science* 312, June 2006.

Curriculum Vitae (November 2010) – Anne Krag Brysting

Sex: Female, **Year of birth:** 1959, **Nationality:** Danish

Present position: Assoc. Professor, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: 2002-2005: University lecturer (50%) at the Botanical Garden, Natural History Museum, Univ. Oslo. 2003-2005: Researcher (50% position) at the National Centre of Biosystematics, Natural History Museum, Univ. Oslo. 2002: Associated Professor (50%) at the Botanical Garden, Natural History Museums, Univ. Oslo. 2000-2003: Post Doc. at the Botanical Museum, Natural History Museum, Univ. Oslo (financed by the The Research Council of Norway). 1995-1999: Research scholar at the Botanical Garden and Museum, Univ. Oslo.

Academic degree: Dr. Scient. in systematic and evolutionary botany (Univ. Oslo, 1999) Cand. Scient. in biology (botany) (Univ. Oslo, 1994) Cand. Mag. in biology (Univ. Oslo, 1992)

Last 10 years

Most important affiliation in academic and professional committees: Deputy leader of the Dept. of Biology (2009-now); Member of the appointing committee at the Faculty of Mathematics and Natural Sciences (2009-now); Leader of Research program for Molecular Ecology and Biosystematic, Dept. of Biology (2005-2007); Member of the reference group for 'Nasjonal satsning på plantebiologisk forskning' (2008-now); Leader/member of the PhD committee at Dept. of Biology, Univ. Oslo (2005-now); Member of evaluation committees for scientific positions, MSc and PhD theses at Univ. Oslo and abroad (2002-now)

Awards: "Den gyldne pekestokken", the biology students' award for the lecturer of the year, 2007

Scientific review work including peer-review: Handling editor for *Annals of Botany* (2007-now); Subject editor for *Nordic Journal of Botany* (2007-now); Occasional reviewer for diverse international journals (2000-now): *American Journal of Botany*, *An international Journal for the Plant Sciences*, *Annales Botanici Fennici*, *Annals of Botany*, *Canadian Journal of Botany*, *FLORA*, *Folia Geobotanica*, *Journal of the Society of the British Isles*, *Molecular Ecology*, *Plant Systematics and Evolution*, *Nordic Journal of Botany*, *Regnum Vegetabile*, *Systematic Biology*, *Watsonia*.

Dissemination activities: Several guided tours, courses, public research talks and development of information material, Botanical Garden, Univ. Oslo (1995-2005); Participating at the Research Festival ('Forskningstorget') (2003 and 2006); Advisor in the Arctic group for the New Greenhouse project, Natural History Museum, Univ. Oslo (2010); Three publications in the category public outreach.

No. of PhD-stud. presently under supervision as main supervisor: 2

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 9

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 19

No. of review articles and book chapters (total career): 4

Three most important publications the last 10 years:

- Brysting AK, Oxelman B, Huber KT, Moulton V, Brochmann C. 2007. Untangling complex histories of genome mergings in high polyploids. *Systematic Biology* 56: 467-476. (doi: 10.1080/10635150701424553, <http://sysbio.oxfordjournals.org/content/56/3/467.full>)
- Brochmann C, Brysting AK, Alsos I, Borgen L, Grundt HH, Scheen A-C, Elven R. 2004. Polyploidy in arctic plants. *Biological Journal of the Linnean Society* 82: 521-536. (DOI: 10.1111/j.1095-8312.2004.00337.x, <http://onlinelibrary.wiley.com/doi/10.1111/j.1095-8312.2004.00337.x/full>)
- Brysting AK, Fay MF, Leitch IJ, Aiken SG. 2004. One or more species in the arctic grass genus *Dupontia* R. Br. (Poaceae) – a contribution to the Panarctic Flora project. *Taxon* 53: 365-382. (<http://www.jstor.org/stable/4135615?seq=1>)

Curriculum Vitae (November 2010) – Luis Cadahia

Sex: Male, **Year of birth:** 1977, **Nationality:** Spanish

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Postdoc research fellow at Lab for Molecular Systematics at the Natural History Museum in Vienna (Austria). July 2008 - March 2009. Postdoc research fellow at the Estacion Biologica de Doñana (Spain). January 2007 - June 2008. - PhD student at the University of Alicante (Spain). April 2002 - April 2006

Academic degree: Doctor in Biology. University of Alicante (Spain). 2007. BSc in Biology. University of Santiago de Compostela (Spain). 2000.

Most important affiliation in academic and professional committees: Spanish Ornithological Society (SEO)

Scientific review work including peer-review: Reviewer for: Acta Oecologica, Animal Biodiversity and Conservation, Biochemical Systematics and Ecology, Climate Research, Italian Journal of Zoology, Journal of Raptor Research, Journal of Wildlife Management, Journal of Zoological Systematics and Evolutionary Research, Wildlife Biology in Practice.

Last 10 years

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 15

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 15

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- Cadahía, L., López-López, P., Urios, V., & Negro, J.J. 2010. Satellite telemetry reveals individual variation in juvenile Bonelli's Eagle dispersal areas. *European Journal of Wildlife Research*. (DOI 10.1007/s10344-010-0391-z) (<http://www.springerlink.com/content/h2518j74q1467003>)
- Alcaide, M., Cadahía, L., Lambertucci, S. A. & Negro, J.J. 2010. Non-invasive estimation of minimum population sizes and variability of the major histocompatibility complex in the Andean condor. *The Condor* 112: 470-478. (DOI 10.1525/cond.2010.090203) (<http://www.bioone.org/doi/abs/10.1525/cond.2010.090203>)
- Cadahía, L., Pinsker, W., Negro, J.J., Pavlicev, M., Urios, V. & Haring, E. 2009. Repeated sequence homogenization between the control and pseudo-control regions in the mitochondrial genomes of the subfamily Aquilinae. *Journal of Experimental Zoology Part B* 312B: 171-185. (DOI 10.1002/jez.b.21282) (<http://onlinelibrary.wiley.com/doi/10.1002/jez.b.21282/abstract>)

Curriculum Vitae (November 2010) – Joris PGM Cromsigt

Sex: Male, **Year of birth:** 1975, **Nationality:** Dutch

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Postdoctoral fellow Mammal Research Institute, Polish Academy of Sciences, Poland, 2008 - 2009 Postdoc researcher University of Groningen, Community and Conservation Ecology group, the Netherlands, 2006 – 2008 PhD researcher University of Groningen and Wageningen University, the Netherlands, 2001 - 2006

Academic degree: Ph.D. University of Groningen, the Netherlands, 2006. M.Sc. Biology, Wageningen University, the Netherlands, 1999.

Last 10 years

Most important affiliation in academic and professional committees: Invited Academic Memberships: Member – International Scientific Advisory Board of the Mammal Research Institute, Polish Academy of Sciences, Bialowieza, Poland Member – Scientific Advisory Board for the Dutch European bison pilot introduction project

Scientific review work including peer-review: Editorships: review-editor for “African Journal of Ecology” and “Endangered Species Research” Scientific Reviewer for: Journal of Ecology, Journal of Animal Ecology, Oikos, Journal of Wildlife Management, Journal of Arid Environments, Biotropica, African Journal of Ecology, Endangered Species Research, Acta Theriologica, African Journal of Range and Forage Science, South African Journal of Wildlife Research

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 7

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 8

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Cromsigt, J.P.G.M., H.H.T. Prins, and H. Olf. 2009. Habitat heterogeneity as a driver of ungulate diversity and distribution patterns: interaction of body mass and digestive strategy. *Diversity and Distributions* 15: 513-522.
- Cromsigt, J.P.G.M., and H. Olf. 2008. Dynamics of grazing lawn formation: an experimental test of the role of scale-dependent processes. *Oikos* 117: 1444-1452.
- Cromsigt, J.P.G.M., and H. Olf. 2006. Resource partitioning amongst large savanna grazers mediated by local heterogeneity: an experimental approach. *Ecology* 87: 1532- 1541.

Curriculum Vitae (November 2010) – Ellen van Donk

Sex: Female, **Year of birth:** 1953, **Nationality:** Dutch

Present position: Professor II in Aquatic Ecology, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: 1983 - 1990. Waterboard of the Prov of Utrecht, The Netherlands. Head of the Dep of Water Res. 1990 - 1998. Univ of Wageningen, The Netherlands. Ass Prof in Aquatic Ecology 1998 - present. Netherlands Inst of Ecology (NIOO-KNAW), Nieuwersluis, The Netherlands. Head of Department of Aquatic Ecology. 2000 - 2009. Radboud Univ of Nijmegen, The Netherlands. Prof in Limnology 2009 (Nov.) - present. Univ of Utrecht, The Netherlands. Prof in Aquatic Ecology

Academic degree: 1974. BSc, Medicine (Cum Laude), Univ of Amsterdam (UoA); 1976. BSc, Biology (Ecology), UoA; 1979. MSc. Aquatic Ecology. UoA; 1983. Ph.D. in Aquatic Ecology (Cum Laude), 'Factors influencing phytoplankton growth and succession in Lake Maarsseveen'. UoA.

Last 10 years

Most important affiliation in academic and professional committees: Elected Nat Repr of Intern Society of Limnology (SIL) (1992-pres); Advisor and expert for the South Florida Water Res District (1993-pres) •Member of the Health Council of the Netherlands (1996-pres); Elected Exec Vice President of the Intern Soc of Limnology (June 2007-pres); Member of the Scientific Adv Board of the Leibniz Inst of Freshwater Ecology and Inland Fisheries (2005-pres); Member of the Scientific Adv Board of the Balaton Limnological res Inst, Hungarian Academy of Sciences (2007-pres); Member of the Scientific Adv Board of the Mondsee Limnological Inst, Austrian Academy of Sciences (2008-pres); Member of the Board of the Centre for Wetland Ecology (CWE) (2009-pres); Member of the jury of the Premi Ramon Margalef, prize in Ecology (2010-2014)

Awards: Prof (honorable) Univ of Oslo (2001-pres); Elected Fellow at Centre for Adv Study (CAS), Norwegian Academy of Science and Letters (2003/2004); Elected Member at the Board of Directors, Advancing the Science of Limn and Oceanography (2004-2007); Dresscher Prize for the best paper in Aquatic Ecol (2005); Recognition of "Outstanding Limnology and Oceanography reviewers" (2005).

Scientific review work including peer-review: •Editor-in-chief: J of Aquatic Ecology (1990-1994) •Ass Editor: Limnology and Oceanography (1994-1997), Ecosystems (1997-2000), "The Scientific World" (internet journal) (2001-pres), Freshwater Biology (2004-2009), Ecological Informatics (2005-pres), Res Letters in Ecology (2007- pres), Int J of Ecology (2008-pres) Env Economics (2010-pres) •Reviewer for more than 40 int journals: e.g. Science, Ecology Letters, Frontiers in Ecology and Environment, Ecology •Reviewer for many national and international research proposals and programs: e.g. NW0/ALW, Belgium-, Norwegian-, German-, Finish and Swedish Res Council

Dissemination activities: Several keynote and plenary lectures annually. In organisation committee for: '4th International Shallow Lakes Conference', Balatonfüred, Hungary, 2002. '4th INTECOL International Wetland Conference'. Utrecht, the Netherlands, 2004; '5th International Shallow Lakes Conference', Dalfsen, The Netherlands, 2005; Member of the Board at the International ASLO conference (Advancing the Science for Limnology and Oceanography), Santiago de Compostela, Spain, 2005 and Victoria, Canada (2006); 'International Workshop Effects of Climate Change on aquatic ecosystems-a stoichiometric perspective'. CLIMAQS, KNAW Amsterdam (2007).

No. of PhD-stud. presently under supervision as main supervisor: 7

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 8

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 44

No. of review articles and book chapters (1.1.2005–30.6.2010): 50

No. of publications in peer-r. jour. or peer-r. monographs (total career): 130

No. of review articles and book chapters (total career): 184

Three most important publications the last 10 years:

- Kagami, M., A. De Bruin, B.W. Ibelings, E.Von Elert & E.Van Donk (2007). Fungal parasites bridge the gap between large inedible diatoms and zooplankton. *Proceedings Royal Society B: Biological Sciences* 274: 1561-1566.
- Gyllström, M. L-A. Hansson, E. Jeppesen, F. Garcia-Criado, E.Gross, K. Irvine, T. Kairesalo, R. Kornijow, M.R. Miracle, M. Nykänen, T. Nöges, S. Romo, D. Stephen & E.Van Donk, (2005). The role of climate in shaping zooplankton communities of shallow lakes. *Limnology and Oceanography* 50: 2008-2021.
- Lüring, M. & E. Van Donk (2000). Grazer-induced colony formation in Scenedesmus: costs of being colonial. *Oikos* 88: 111-118.

Curriculum Vitae (November 2010) – Joël M. Durant

Sex: Male, **Year of birth:** 1967, **Nationality:** French

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: 2008-2011: Res co-PI, Mico, project funded by the Research Council of Norway (RCN); 2005-2008: Res co-PI, MaDiMa, RCN project; 2003-2005: Marie Curie Fellow, CEES-Oslo; 2002: Post-doc, EcoClim, CEES-Oslo; 2001 Centre Nat de la Rech Scient, Strasbourg; 1993-: Tenure pos: Biology and Geology prof in secondary schools (on leave since 2001)

Academic degree: 2000: Ph-D in Ecophysiology from Université Louis Pasteur of Strasbourg, France. 1991: Master in Physiology (Diplôme d'étude approfondie) from Université Claude Bernard Lyon I and Aix-Marseille II (equivalent to 2nd year of a Master). 1990: Qualified for secondary-school and first years of University teaching (CAPES).

Last 10 years

Awards: Grant NordForsk 2011-2016 'Nordic Centre of Excellence on Climate Change Effects on Marine Ecosystems and Resource Economics' Grants from RCN: 2010 - 'Response of trophic relationships in Sub-Arctic Seas to climate change'; 2010-2014 'Adaptive management of living marine resources by integrating different data sources and key ecological processes'; with IMR. 2009 'Response of trophic relationships to climate change in Sub-Arctic Seas'; 2008-2010 'Ecological effects of climate fluctuation in coupled marine-terrestrial systems'; 2006-2008 'Economically and ecologically sustainable fisheries management: optimising fish harvest while conserving seabird diversity'. Grant Marie Curie Individual Fellowship 2003-2005 'Ecological effects of climate fluctuation in coupled marine-terrestrial systems'. Best poster at the 24th International Ornithological Congress in Hamburg, 2006. Durant JM, Hjermann DØ & Stenseth NC. Ecosystem approach of the match-mismatch hypothesis. Sponsorship by Total-Fina for ClimWork workshop in Climate Change and Biodiversity in Oslo. Aurora grant 'Ecological effects of climate fluctuations', 2003. Research grant from Total-Fina, 2001. PhD thesis: Summa cum laude laureate 'Très honorable avec félicitations du Jury', 2000.

Scientific review work including peer-review: Referee for Marine Ecology Progress Series, Journal of Animal Ecology, Climate Research, Proceedings of the Royal Society, Global change Biology, Ecosystem, Oikos, Canadian Journal of Fisheries and Aquatic Science, Journal of Avian Biology, US National Science Foundation.

Dissemination activities (selected presentations): Durant et al. - ICES 2004 Bergen, Norway. Climate, match-mismatch and trophic interactions in a marine system: seabird-fish-plankton; Durant - PICES 2007 XVI annual meeting, Victoria, BC. Match-mismatch, trophic interactions and climate change; Durant et al. - Ecological Response to Climate Change; Nov. 2005 Helsinki, Finland. Match-Mismatch and Food threshold in recruitment; Durant et al. - ICES 2005 Annual Science Conference, Aberdeen, UK. Match-mismatch and Threshold for the North Sea cod recruitment; Durant et al. - ICES 2009 Annual Science Conference, Berlin, Germany. Reversing the Match-mismatch relationship: the prey point of view; Durant et al. - ICES 2010 Annual Science Conference, Nantes, France. How does exploitation of prey fish affect population growth rate in changing seas?; Durant et al. - Ecosystem Dynamics in the Norwegian Sea and the Barents Sea, 2007, Tromsø Norway. Food threshold and recruitment.

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 1 (not presently)

No. of publications i-n peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 16

No. of review articulated book chapters (1.1.2005–30.6.2010): 4

No. of publications in peer-r. jour. or peer-r. monographs (total career): 23

No. of review articles and book chapters (total career): 5

Three most important publications the last 10 years:

- Durant J.M., Anker-Nilssen T. & Stenseth N.C. 2003 Trophic interactions under climate fluctuations: the Atlantic puffin as an example. Proceedings of Royal Society, B, London 270: 1461-1466. (DOI: 10.1098/rspb.2003.2397)
- Durant J.M., Hjermann D.Ø., Ottersen G. & Stenseth N.C. 2007. Climate and the match or mismatch between predator requirements and resource availability. Climate Research 33(2): 271-283. (DOI: 10.3354/cr033271) (http://www.int-res.com/articles/cr_oa/c033p271.pdf)
- Durant J.M., Hjermann, D.Ø., Anker-Nilssen, T. et al. 2005. Timing and abundance as key mechanisms affecting trophic interactions in variable environments. Ecology Letters 8: 952-958. (DOI: 10.1111/j.1461-0248.2005.00798.x)

Curriculum Vitae (November 2010) – Eric Edeline

Sex: Male, **Year of birth:** 1977, **Nationality:** French

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: 2007-2008. Researcher at CEES. 2006-2007. Postdoc at CEES

Academic degree: 2005. PhD in Ecology. University of Toulouse-III / Cemagref Bordeaux. 2001. Master thesis in Aquatic Ecology. University of Toulouse-III / Cemagref Bordeaux. 2000. Master's degree in Biology of Populations and Ecosystems, University of Rennes-I. 1999. Bachelor's degree in Biology of Organisms and Populations, University of Rennes-I.

Last 10 years

Awards: November 2007. Researcher contract from the Research Council of Norway (RCN) in the NORKLIMA program. Project title: "Modeling ecosystems under climate change: Windermere as a model lake system". A 3 years funding for 2 full-time researchers. July 2007. Fellowship from the French Academy of Sciences in the program "Initiative Post Doc" to help French researchers working abroad coming back to France. November 2005. Post doc contract from the Research Council of Norway in the FRIMUF program. Project title: "The control of fishery-induced changes in life-history traits of pike (*Esox lucius*): combining ultimate and proximate approaches". 2 years funding for 1 full time post doctor and for experimentations. 2001. PhD contract by CEMAGREF. Project title: "Understanding watershed colonization by the European eel *Anguilla anguilla*". A 3 years funding for half a PhD salary, complemented by Région Aquitaine.

Scientific review work including peer-review: Evolutionary Applications, Journal of Fish Biology, Ecology of Freshwater Fish, Marine, Coastal and Shelf Sciences, Marine Ecology Progress Series, Aquatic Biology, Proceedings of the Royal Society B.

Dissemination activities: French "Fête de la Science"

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 12

No. of review articles and book chapters (1.1.2005–30.6.2010): 2

No. of publications in peer-r. jour. or peer-r. monographs (total career): 16

No. of review articles and book chapters (total career): 2

Three most important publications the last 10 years:

- E. Edeline. 2007. Adaptive phenotypic plasticity of eel diadromy. Marine Ecology Progress Series 341:229-232. (<http://www.int-res.com/abstracts/meps/v341/p229-232>).
- E. Edeline, T. Ben Ari, I. J. Winfield, J. M. Fletcher, J. B. James, L. A. Vøllestad, N. C. Stenseth. 2008. Antagonistic selection from predators and pathogens alters food-web structure. Proceedings of the National Academy of Sciences of the USA 105: 19792-19796. (<http://www.pnas.org/content/105/50/19792.abstract>).
- E. Edeline, T. O. Haugen, F. A. Weltzien, D. Claessen, I. J. Winfield, N. C. Stenseth, L. A. Vøllestad. 2010. Body downsizing caused by non-consumptive social stress severely depresses population growth rate. Proceedings of the Royal Society B – Biological Sciences 227: 843-851. (<http://rspb.royalsocietypublishing.org/content/early/2009/11/20/rspb.2009.1724.abstract>)

Curriculum Vitae (November 2010) – Mari Espelund

Sex: Female, **Year of birth:** 1963, **Nationality:** Norwegian

Present position: Researcher

Previous academic positions: Post-doc 1994-1998 Researcher 2007-2009

Academic degree: Dr. scient 1994

Last 10 years

Most important affiliation in academic and professional committees: PROSBIO programstyre (The Research Council of Norway), 2002-2005 Technology Transfer Office of University of Oslo, interimstyre 2003 Genpoint AS, member of board, 2000-2003.

Other professional merits: Leader of start-up biotechnology company Genpoint AS, 2000 Senior Scientist 2001-2007 Genpoint AS (now NorDiag, registered on the stock market).

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 3

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 0

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- d'Auriac MA, Refseth UH, Espelund M, Moi H, Storvold G, Jeansson S (2007) A new automated method for isolation of *Chlamydia trachomatis* from urine eliminates inhibition and increases robustness for NAAT systems. *Journal of Microbiological Methods* 70:416-423.
- Lysen J, Berthelsen HKH, Espelund M, Jeansson S, Mengshoel AT, Refseth UH (2007) Evaluation of a rapid automated assay for the isolation of *Mycobacterium tuberculosis* DNA directly from clinical samples, using magnetic particles. *International Journal of Antimicrobial Agents* 29:S572-S572.
- Shalchian-Tabrizi K, Minge MA, Espelund M, Orr R, Ruden T, Jakobsen KS, Cavalier-Smith T (2008) Multigene Phylogeny of Choanozoa and the Origin of Animals. *Plos One* 3

Curriculum Vitae (November 2010) – Unni Grimholt

Sex: Female, **Year of birth:** 1960, **Nationality:** Norwegian

Present position: Senior Scientist, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Scientist Norwegian School of Veterinary Science (NSVS) 1994-2008
Senior scientist UiO CEES 2008- now

Academic degree: Dr.Scient 1994, Norwegian School of Veterinary Science

Last 10 years

Most important affiliation in academic and professional committees: Board Member

Fish and Shellfish Immunology July 2009-June 2012

Scientific review work including peer-review: 60

Dissemination activities: 2 patents

No. of PhD-stud. presently under supervision as main supervisor: 4

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 2

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 17

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 37

No. of review articles and book chapters (total career): 4

Three most important publications the last 10 years:

- "The Major Histocompatibility Class I locus in Atlantic salmon (*Salmo salar* L.): Polymorphism, linkage analysis and protein modelling". Grimholt U., Drabløs F., Jørgensen S.M., Høyheim B., Stet R.J.M.. Immunogenetics 54; 570-581, 2002
- "MHC polymorphism and disease resistance in Atlantic salmon (*Salmo salar*); Facing pathogens with single expressed Major histocompatibility class I and class II loci". Grimholt U., Larsen S., Nordmo R., Midtlyng P.J., Kjølglum S., Storset A., Sæbø S., Stet R.J.M.. Immunogenetics 55; 210-219, 2003
- "Classification of all MHC class I U, S, and Z lineage genes in Atlantic salmon". Lukacs M.F., Harstad H., Bakke H.G., Beetz-Sargent M., McKinnel L., Lubieniecki K.P., Koop B.F. and Grimholt. BMC Genomics 2010, 11:154 (5 March 2010)

Curriculum Vitae (November 2010) – Hege Gundersen

Sex: Female, **Year of birth:** 1970, **Nationality:** Norwegian

Present position: Assoc. Professor II, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: 1999-2003: PhD student, University of Oslo (UiO) and Hedmark University College (HUC) 2003-2003: Researcher, HUC. 2004-2009: Associate Professor, HUC (50%) 2005-2007: Post doc, CEES (50%) 2008-2009: Researcher, CEES 2009-p.t: Researcher, Norwegian Institute for Water Research (NIVA) (80%) 2009-p.t: Associate Professor II, CEES (20%)

Academic degree: Bachelor: UiO, 1993 Master: UoO, 1997 PhD: UiO, 2003

Last 10 years
Scientific review work including peer-review: Referee on 6 manuscripts for “Wildlife Biology” Referee on 1 manuscript for “Forest Ecology and Management” Referee on 1 manuscript for “Journal of Applied Ecology” Four times Assessment committee for the Wildlife management fund (Viltvårdsfonden) at the Swedish Environmental Protection Agency.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 9

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 15

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- van Beest, F.M., Gundersen, H., Mathisen, K. M., Milner, J. M. and Skarpe, C. 2010. Long-term Browsing Impact around Diversionary Feeding Stations for Moose in Southern Norway. *Journal of Forest Ecology and Management* 259(10): 1900-1911.
- Nilsen, E.B., Pettersen, T., Gundersen, H., Milner, J., Mysterud, A., Andreassen, H.P., and Stenseth, N.C. 2005. Moose harvesting strategies in the presence of wolves. *Journal of Applied Ecology* 42: 389-399.
- Andreassen, H.P., Gundersen, H., and Storaas, T. 2005. The effect of scent-marking, forest clearing, and supplemental feeding on moose – train collisions. *Journal of Wildlife Management* 69: 1125-1132.

Curriculum Vitae (November 2010) – Thomas F. Hansen

Sex: Male, **Year of birth:** 1964, **Nationality:** Norwegian

Present position: Professor, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Assistant Professor, Florida State University

Academic degree: Dr. Philos. 1997

Last 10 years

Scientific review work including peer-review: Peer reviewed for most leading evolution, genetics, and ecology journals.

No. of PhD-stud. presently under supervision as main supervisor: 1

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 3

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 23

No. of review articles and book chapters (1.1.2005–30.6.2010): 3

No. of publications in peer-r. jour. or peer-r. monographs (total career): 50

No. of review articles and book chapters (total career): 7

Three most important publications the last 10 years:

- Hansen, T. F. & Wagner, G. P. 2001a. Modeling genetic architecture: A multilinear model of gene interaction. *Theor. Pop. Biol.* 59: 61-86.
- Carter, A. J. R., Hermisson, J. & Hansen, T. F. 2005. The role of epistatic gene interactions in the response to selection and the evolution of evolvability. *Theor. Pop. Biol.*: 68: 179-196.
- Hansen, T. F. and D. Houle. 2008. Measuring and comparing evolvability and constraint in multivariate characters. *J. Evol. Biol.* 21: 1201-1219.

Curriculum Vitae (November 2010) – Thomas H.A. Haverkamp

Sex: Male, **Year of birth:** 1973, **Nationality:** Dutch

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: PhD position at the Netherlands Institute of Ecology, Centre for Estuarine and Marine Ecology.

Academic degree: Msc: University of Utrecht, Utrecht, The Netherlands, 2001. PhD: University of Amsterdam, Amsterdam, The Netherlands, 2008.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 4

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 5

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Haverkamp, THA; Schouten, D; Doeleman, M; Wollenzien, U; Huisman, J and Stal, LJ. Colorful microdiversity of *Synechococcus* strains (picocyanobacteria) isolated from the Baltic Sea. *The ISME Journal* (2009) 3, 397–408. (doi:10.1038/ismej.2008.118) (<http://www.nature.com/ismej/journal/v3/n4/full/ismej2008118a.html>)
- Acinas, SG; Haverkamp, THA; Huisman, J and Stal, LJ. Phenotypic and genetic diversification of *Pseudanabaena* spp. (cyanobacteria). *The ISME Journal* (2009) 3, 31–46. (doi:10.1038/ismej.2008.78) (<http://www.nature.com/ismej/journal/v3/n1/full/ismej200878a.html>)
- Haverkamp, T; Acinas, SG; Doeleman, M; Stomp, M; Huisman, J; Stal, LJ. Diversity and phylogeny of Baltic Sea picocyanobacteria inferred from their ITS and phycobiliprotein operons. *Environmental Microbiology* (2008) 10, 174–188. (DOI:10.1111/j.1462-2920.2007.01442.x) (<http://www3.interscience.wiley.com/journal/119419897/abstract>)

Curriculum Vitae (November 2010) – Dag Olav Hessen

Sex: Male, **Year of birth:** 1956, **Nationality:** Norwegian

Present position: Professor, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Research fellow at Univ of Oslo, Research leader at Norwegian Institute for water Research (NIVA)

Academic degree: Dr. philos, Univ. Oslo, 1988.

Last 10 years

Most important affiliation in academic and professional committees: Elected member of the Norwegian Academy of Sciences and Letter (since 1998) Council, Faculty of Maths and Sciences, Univ Oslo 1985-87. Resource council, Faculty of Maths and Sciences, Univ Oslo 1985-87. Council, Biological institute, Univ. Oslo 1985-1988. Chair, Div. of Limnology, Univ. Oslo, 1993 - 96. Board, Biological institute, Univ. Oslo 1985-88 and 1993 - 96. Vice-chair, Biological institute, Univ. Oslo, 1993 -95 . Chair, Biological institute, Univ. Oslo, 1995-96 . Board, Faculty of Maths and Sciences, Univ Oslo 1993 -96 . Member of advisory groups for University of Oslo's strategi plan for environmental reserearch, 1995. Elected member of Faculty Comittée for resource allocation to Faculty Institutes 1995-96. Elected member of University board for strategy planning 1998- 1999. Member and chair of comittees at Institute of Biology for evaluation of structure and teaching at the institute. 1999. Elected member of University comittée for awards and prizes for science, popular science and teaching activities, 2000 -. Member, advisory group for future strategy for Science and education, University of Oslo, 2000 and beyond. Wice-chair, Biology Dept. 2003-2008 Board member of the university ethical committee, 2005 -. Board member, University of Oslo, 2009.

Awards: The Norwegian Resarch Councils "prize for outstanding mediation of science" 1998. Aschehougs Publishers prize for popular science writing (A. Holmeslands prize), with Th. Hylland Eriksen, 1999. Elected to give The Kilham Memorial Lecture on 29. International Congress of Limnology, Lahti, 2003. The University of Oslo prize for dissemination of Science, 2008. Riksmålsprisen, 2008 The SABIMA Norwegian Biodiversity Award, 2010 The National Academic Award (Akademikerprisen). 2010.

No. of PhD-stud. presently under supervision as main supervisor: 3

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 6

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 52

No. of review articles and book chapters (1.1.2005–30.6.2010): 6

No. of publications in peer-r. jour. or peer-r. monographs (total career): 152

No. of review articles and book chapters (total career): 12

Three most important publications the last 10 years:

- Sterner, R.W. and Hessen, D.O. 1994. Algal nutrient limitation and the nutrition of aquatic herbivores. *Ann. Rev. Ecol. Syst.* 25: 1-29
- Hessen, D.O., Ågren, G., Anderson, T., Elser, J.J. and de Reuter, P. 2004. Carbon sequestration in ecosystems: influence of stoichiometry. *Ecology* 85: 1179-1192.
- Elser, J.J., Andersen, T., Baron, J.S., Bergström, A.-K., Kyle, M., Nydick, K.R., Steger, L. and Hessen, D.O. 2009. Atmospheric nitrogen deposition distorts lake N:P stoichiometry and alters phytoplankton nutrient limitation. *Science* 326: 835 - 837.

Curriculum Vitae (November 2010) – Jose Manuel Hidalgo

Sex: Male, **Year of birth:** 1979, **Nationality:** Spanish

Present position: Postdoc research fellow

Previous academic positions: Collaboration Fellow in Ecology and Animal Biology Department, Faculty of Marine Sciences, University of Vigo, 01/11/2001 to 01/09/2002. *Fellowed for MSc by Xunta de Galicia (Spain)1 Faculty of Marine Sciences, University of Vigo, 01/10/2002, 31/12/2002.

*Postgraduate Fellow of Marine Research by Spanish Council for Scientific Research in the Institute (CSIC). Marine Research Institute (IIM), Vigo. Spanish National Council of Research (CSIC).

01/01/2003 to 31/08/2003 *Graduate fellowship from Spanish Ministry of Education (FPI program), Mediterranean Institute for Advantages Studies (IMEDEA), Spanish National Council of Research (CSIC) and University of Balearic Islands (UIB). 01/09/2003 to 30/08/2007. *Postdoctoral contract from the Research Council of Norway, Centre for Ecological and Evolutionary Synthesis (CEES), Department of Biology University of Oslo. 01/01/2008 to 30/04/2009. *Postdoctoral Intra-European Marie Curie Fellowship (IEF) from European Union (7th Framework program). Centre for Ecological and Evolutionary Synthesis (CEES), Department of Biology. University of Oslo. 01/05/2009 to 30/04/2011.

Academic degree: *Bachelor in Marine Sciences. Speciality: Environment and Marine pollution, University of Vigo. 2002 * MSc in Marine Ecology. University of Vigo. 2004. * Ph.D. in Marine Sciences. University of Vigo. 2007.

Last 10 years

Scientific review work including peer-review: REFEREE FOR SCIENTIFIC JOURNALS

Scientia Marina (3), Coastal Shelf Research (1), Fisheries Research (1), Journal of Marine Systems (1), Marine Ecology Progress Series (1), Marine and Coastal Fisheries (1).

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 7

No. of review articles and book chapters (1.1.2005–30.6.2010): 12

No. of publications in peer-r. jour. or peer-r. monographs (total career): 8

No. of review articles and book chapters (total career): 13

Three most important publications the last 10 years:

- 4. Hidalgo, M., Oliver, P., Moranta, J., Massutí, E., Guijarro, B. and Morales-Nin, B. Seasonal and short spatial patterns in European hake (*Merluccius merluccius* L.) recruitment process at the Balearic Sea (NW Mediterranean): the role of environment on distribution and condition. *Journal of Marine Systems*, 71: 367-384. 2008.
- Hidalgo, M., Massutí, E., Guijarro, B., Moranta, J., Ciannelli, L., Lloret J., Oliver, P. and Senseth N.C. Population effects and life history traits changes under phase transitions induced by long-term fishery harvesting: the case of European hake (*Merluccius merluccius* L) off Balearic Sea (NW Mediterranean). *Canadian Journal of Fisheries and Aquatic Science*, 66: 1355–1370.2009.
- Hidalgo, M., Tomás, J., Moranta, J. and Morales-Nin, B. Intra-annual recruitment events of a shelf species around an island system in the NW Mediterranean. *Estuarine Coastal and Shelf Science*, 83 227–238. 2009

Curriculum Vitae (November 2010) – Dag Øystein Hjermann

Sex: Male, **Year of birth:** 1967, **Nationality:** Norwegian

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Postdoc

Academic degree: MSc (Univ Oslo 1996) PhD (Univ Oslo 2000)

Last 10 years

Most important affiliation in academic and professional committees: Member of Sjøpattedyrutvalget (The National advisory committee on Sea Mammals) 2009- Board member of Norwegian Zoological Society 2000-2005

Awards: Project leader for the project SVIM (“Spatiotemporal variability in mortality and growth of fish larvae in the Lofoten-Barents Sea ecosystem”) awarded a total of 9.2 mill NOK (for 2010-2013) by the Research Council of Norway (NFR nr. 196685/S40)

Scientific review work including peer-review: Reviewer for the CAMEO (Comparative Analysis of Marine Ecosystem Organization) program (a partnership between NSF and NOAA) Peer-review for Journal of Animal Ecology, Oikos, Marine Ecology Progress Series, Climate Research, Ecological modelling, and others

Dissemination activities: Several opinion pieces including four in Aftenposten (Norway's major newspaper), appearance in radio

Other professional merits: Since 2000, president of the Board of BioFokus, an independent consultancy company with 15 employees at present (www.biofokus.no)

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 11

No. of review articles and book chapters (1.1.2005–30.6.2010): 2

No. of publications in peer-r. jour. or peer-r. monographs (total career): 22

No. of review articles and book chapters (total career): 3

Three most important publications the last 10 years:

- Hjermann, D.Ø., Ottersen, G. and Stenseth, N.C. 2004. Competition among fishermen and fish causes the collapse of Barents Sea capelin. *Proceedings of the National Academy of Sciences* 101: 11679-11684. (doi:10.1073/pnas.0402904101) (<http://www.pnas.org/content/101/32/11679.abstract>)
- Hjermann, D.Ø., Stenseth, N.C. and Ottersen, G. 2004. Indirect climatic forcing of the Barents Sea capelin: a cohort-effect. *Marine Ecology Progress Series* 273: 229-238. (doi:10.3354/meps273229) <http://www.int-res.com/abstracts/meps/v273/p229-238>)
- Hjermann, D.Ø., Bogstad, B., Eikeset, A.M., Ottersen, G., Gjøsæter, H. and Stenseth, N.C. 2007. Food web dynamics affect Northeast Arctic cod recruitment. *Proceedings of the Royal Society of London, B* 274:661-669. (doi:10.1098/rspb.2006.0069) (<http://rspb.royalsocietypublishing.org/content/274/1610/661.abstract>)

Curriculum Vitae (November 2010) – Nils Lid Hjort

Sex: Male, **Year of birth:** 1953, **Nationality:** Norwegian

Present position: Professor, CEES, Dep of Mathematics, Univ of Oslo

Previous academic positions: Full professor 1991- first amanuensis 1988-1991 visiting professor Oxford 1992-1993 senior research statisticians NR 1983-1988 vitenskapelig assistent UiO 1977-1983.

Academic degree: Cand. real., University of Oslo, 1977.

Last 10 years

Most important affiliation in academic and professional committees: Steering board in European Science Foundation programme "Highly Structured Stochastic Systems" (1995-2002); chairman of international evaluation committee for Bocconi University, Milano (2003); on various programme committees for international conferences and workshops; leader of Research Council of Norway BeMatA programme "Evaluation of Hierarchical Models" (2003-2006).

Awards: Cand. real. prae ceteris (citation to the King, 1977); elected member of the Norwegian Academy of Science and Letters (1999); elected fellow of the International Statistical Institute (2000); two papers (jointly with G. Claeskens) selected as "papers of the year" for the Journal of the American Statistical Association (2003); Hjort & Claeskens (jasa, 2003) elected the "fast breaking paper in the field of mathematics" by the Essential Science Indicator for August 2005.

Scientific review work including peer-review: Associate Editor for various journals, including Annals of Statistics, Journal of the Royal Statistical Society Series B, Scandinavian Journal of Statistics, Journal of Nonparametric Statistics. I referee about ten papers a year for various international journals.

Dissemination activities: I frequently give invited lectures at conferences and workshops. In addition I have given various lectures for various non-professional audiences, e.g. about my work to change the Olympic rules for sprint speedskating and about Mathematics in Duckburg.

No. of PhD-stud. presently under supervision as main supervisor: 3

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 2

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 14

No. of review articles and book chapters (1.1.2005–30.6.2010): One full book + one book where I'm among the main editors.

No. of publications in peer-r. jour. or peer-r. monographs (total career): 77

No. of review articles and book chapters (total career): One full book + two books where I'm among the main editors.

Three most important publications the last 10 years:

- Hjort, Holmes, Mueller, Walker (eds.): "Bayesian Nonparametrics" (2010), Cambridge University Press.
- Claeskens, Hjort: "Model Selection and Model Averaging" (2008), Cambridge University Press.
- Green, Hjort, Richardson (eds.): "Highly Structured Stochastic Systems" (2003), Oxford University Press.

Curriculum Vitae (November 2010) – Øistein Haugsten Holen

Sex: Male, **Year of birth:** 1970, **Nationality:** Norwegian

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Postdoc, PhD-fellow.

Academic degree: Master degree in biology (University of Oslo 2000). Dr. scient. in biology (University of Oslo 2005).

Last 10 years

Scientific review work including peer-review: I have been a referee for the following journals: American Naturalist, Behavioral Ecology, Evolution, Evolution and Human Behavior, Proceedings of the Royal Society of London B, Functional Ecology.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 4

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 7

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Holen Ø.H. & Johnstone R.A. (2004) The evolution of mimicry under constraints, *Am. Nat.*, 164, 598-613. (<http://dx.doi.org/10.1086/424972>).
- Holen Ø.H. & Johnstone R.A. (2007) Parental investment with a superior alien in the brood, *J. Evol. Biol.* 20, 2165-2172. (<http://dx.doi.org/10.1111/j.1420-9101.2007.01426.x>).
- Svernnungsen T.O. & Holen Ø.H. & (2010) Avian brood parasitism: information use and variation in egg-rejection behavior, *Evolution* 64 1459-1469. (<http://dx.doi.org/10.1111/j.1558-5646.2009.00919.x>).

Curriculum Vitae (November 2010) – Fredrik Haas

Sex: Male, **Year of birth:** 1965, **Nationality:** Swedish

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo/Lund Univ

Previous academic positions: PhD position at Lund University

Academic degree: I obtained my PhD degree 2008.

Last 10 years

Awards: December 2002 The Royal Swedish Academy of Sciences (research grant)
November 2002 The Royal Physiographic Society (research grant) November 2003
Kungliga Fysiografiska Sällskapet (research grant) November 2003 Stiftelsen Lars Hiertas
Minne (research grant) December 2003 Lund University, Fakulteternas rese- och
forskningsbidrag (travel grant) November 2006 The Royal Physiographic Society (research
grant) May 2008 Vetenskapsrådet (Postdoctoral fellowship, 2 years)
Scientific review work including peer-review: Been referee for the following journals:
Journal of Avian Biology, Journal of Ethology, Ardeola, Ornis Svecica, Animal Behaviour,
Molecular ecology.
Other professional merits: Teaching Spring 2008 Assistant course leader (Ecology, 1st
year course, Lund University) Autumn 2006 Course leader (Ecology, 1st year course, Lund
University) Autumn 2005 Course leader (Ecology, 1st year course, Lund University) 2004
– 2008 Exercises, field excursions (Ornithology, 3rd year course, Lund University) 1998 –
2003 Lectures and exercises on the use of computers, for biology students, Lund
University. 1997 – 2008 Exercises, field excursions and seminars (Ecology, 1st year course,
Lund University).

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 9

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 9

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Brodin, A. & Haas, F. 2009. Hybrid zone maintenance by non-adaptive mate choice. – *Evol. Ecol*, 23: 17-29. (DOI 10.1007/s10682-007-9173-9)
- Haas, F., Pointer, M. A., Saino, N., Brodin, A., Mundy, N. I. and Hansson, B. 2009. An analysis of population genetic differentiation and genotype – phenotype association across the hybrid zone of carrion and hooded crows using microsatellites and MC1R. – *Mol. Ecol*, 18: 294-305. (DOI: 10.1111/j.1365-294X.2008.04017.x)
- Haas, F., Knape, J. & Brodin, A. 2010. Habitat preferences and positive assortative mating in an avian hybrid zone. – *J. Avian. Biol.* 41: 237-247. (DOI: 10.1111/j.1600-048X.2009.04788.x)

Curriculum Vitae (November 2010) – Kjetill S. Jakobsen

Sex: Male, **Year of birth:** 1958, **Nationality:** Norwegian

Present position: Professor, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Associate professor, Dept Of Biology, Univ of Oslo 1989-1994

Academic degree: Cand scient 1984 dr scient (phD) 1989

Last 10 years

Most important affiliation in academic and professional committees: Head, Div. of General Genetics (UiO) 1990-1993 Head, Division for Molecular and Cell biology (UiO) 2002-03 Secretary, European Fed.of Biotechnology, WP in Applied Mol.Genetics 1997-2000 Chairman, Research Council of Norway program "Grunnleggende næringsrettet bioteknologi" (GNBIO) 2001-2008 Chairman, the National Plant Network Norway – 2009 – present Vice-dean (Life Sciences), Faculty of mathematics and Natural Sciences, UiO 2009 – present Board member Molecular Life Science (MLS), UiO 2009 – present.

Awards: Research Council of Norway - Biology Lecture - "Forskningens festaften" 1998 Darwin Price - Univ of Oslo – 2003.

Scientific review work including peer-review: Editorial board BioTechniques 1995-2006 Guest Editor J. Biotechnology 1998 Referee for a high number of journals including Science, Nature Biotechn, Nature Genetics, Cell, PNAS, PLoS, Current Biol, BMC journals, NAR, MBE, JBC, PRSB, Mol Ecol, Evol, Ecol, Eniv Microbiol, J Bact, AEM, BioTechniques, J Fish Biol, J Phycol, Protist, Microbiol, MEPS, Genetics and many more Referee: NIH, NSF, ESF, Ecohab, the Swedish-, Australian-, Austrian-, Swiss Research councils The Danish Strategic Research Council – scientific board member - 2010 - Opponent a large number of PhD evaluations and defences - UiO, UMB, UiB, NTNI, UiTø (Norway), Uppsala, Stockholm (Sweden), Århus (Danmark), Helsinki (Finland), Gent (Belgium), Sydney (Australia)

Dissemination activities: Leading the cod sequencing consortium 2009-2011 Director, Norwegian high throughput Sequencing Centre (NSC) 2009 - present Chairman, MareLife - 2006- present.

Other professional merits: Founder Genpoint AS (Oslo Stock Market exchange listed as Nordiag ASA) Founder Algene Biotech AS Chairman of the board, Genpoint AS 1998-2000 CEO, Genpoint 2000-2002 Board of directors, Genpoint AS 2002-2006 Chairman of the board, Algene Biotech 2001-2003 Scientific advisor for a number of companies including Dynal AS, GenpointAS, Nanostorage AS, Nordiag ASA, Axis Shield, Startfondet ASA.

No. of PhD-stud. presently under supervision as main supervisor: 6

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 6

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 42

No. of review articles and book chapters (1.1.2005–30.6.2010): 6

No. of publications in peer-r. jour. or peer-r. monographs (total career): 116

No. of review articles and book chapters (total career): 12

Three most important publications the last 10 years:

- Tengs T, Dahlberg OJ, Shalchian-Tabrizi K, Klaveness D, Rudi K, Delwiche CF and Jakobsen KS (2000). Phylogenetic analyses indicate that the 19' hexanoyloxy-fucoanthin containing dinoflagellates have tertiary plastids of haptophyte origin. *Mol. Biol. Evol.* 17 (4) 718-729.
- Mikalsen B, Boison G, Skulberg OM, Fastner J, Davies W, Gabrielsen TM, Rudi K, Jakobsen KS (2003) Natural variation in the microcystin synthetase operon mcyA-C and impact on microcystin production in *Microcystis* strains. *J Bacteriol* 185, 2774-2785. (DOI: 10.1128/JB.185.9.2774-2785.2003)
- Burki F, Shalchian-Tabrizi K, Skjæveland Å, Minge MA, Nikolajev S, Jakobsen KS, Pavlowski J (2007) Phylogenomics reshuffles the eukaryotic supergroups. *PLoS ONE* 2 (8) :e790 (publ. online 28 August) (DOI: 10.1371/journal.pone.0000790)

Curriculum Vitae (November 2010) – Per Erik Jorde

Sex: Male, **Year of birth:** 1961, **Nationality:** Norwegian

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Academic degree: BSc, University of Oslo, 1984 MSc, University of Oslo, 1987 PhD, Stockholm University, 1995

Last 10 years

Scientific review work including peer-review: Reviewed approx 50 manuscripts since 1.1.2005 for leading international journals within my field.

Dissemination activities: Publication in international scientific journals with peer review. Some newspaper articles.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 11

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 34

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Knutsen, H., P.E. Jorde, C. André, and N.C. Stenseth, 2003. Fine-scaled geographical population structuring in a highly mobile marine species: the Atlantic cod. *Molecular Ecology* 12: 385-394. (doi: 10.1046/j.1365-294X.2003.01750.x) (<http://onlinelibrary.wiley.com/doi/10.1046/j.1365-294X.2003.01750.x/full>)
- Jorde, P.E., H. Knutsen, S.H. Espeland, and N.C. Stenseth, 2007. Spatial scale of genetic structuring in coastal cod (*Gadus morhua*) and geographic extent of local populations. *Marine Ecology Progress Series* 343: 229-237. (doi: 10.3354/meps06922) (<http://www.int-res.com/abstracts/meps/v343/p229-237>)
- Jorde, P.E., and N. Ryman, 2007. Unbiased estimator for genetic drift and effective population size. *Genetics* 177: 927-935. (doi: 10.1534/genetics.107.075481) (<http://www.genetics.org/cgi/content/full/177/2/927>)

Curriculum Vitae (November 2010) – Halvor Knutsen

Sex: Male, **Year of birth:** 1973, **Nationality:** Norwegian

Present position: Senior Scientist IMR, (adjunct position) CEES, Dep of Biology, Univ of Oslo

Previous academic positions:

- 1183 Researcher/Professor at IMR from May 2010
- Permanent senior scientist (1110 researcher) at IMR from March 2007
- Post doc/project leader on population genetics on deep-sea fishes funded by the Research Council of Norway (01.09.04-11.11.2007)
- Post doc on a SIP program for the Research Council of Norway under supervision of Professor Nils Christian Stenseth (01.09.03-01.09.04)
- Post doc at UiO on phylogenetic analysis (mtDNA sequencing) on Atlantic cod 20.03.03-01.09.03
- Researcher fellow at the University of Oslo 01.07.99-31.12.99. Population genetic project on moths (*Operophtea brumata*)

Academic degree: Ph.D, University of Oslo 2003

Last 10 years

Most important affiliation in academic and professional committees: Delegate of an expert group: Genetic diversity in fish with focus on commercially exploited species - Island 2005

Scientific review work including peer-review: Referee: Molecular Ecology, Canadian Journal of Fishery and Aquatic Sciences, Journal of Fish Biology, Heredity, Transactions of the American Fisheries Society, the European Science Foundation (www.esf.org)

Dissemination activities: For duration of weeks: UK, Durham (at. Rus Hoelzel) Denmark, Silkeborg (at. Michael Hansen) US, Portland (Cianelli L) Sweden (Andre C)

Other professional merits:

- Leading national monitoring programmes at IMR on juvenile coastal cod, and adult cod
- Supervising several master students
- Leading several international and national projects
- Obtained substantial external funding (more than 30 mill last 5 years)
- Member and observer in ICES WG on genetics

No. of PhD-stud. presently under supervision as main supervisor: 1

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 22

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 30

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- Knutsen H, Jorde PE, André C, Stenseth NC (2003). Fine-scaled geographic population structuring in a highly mobile marine species: the Atlantic cod. *Molecular Ecology* 12, 385-394
- Knutsen H, André C, Jorde PE, Skogen MD, Thuróczy E & Stenseth NC (2004). Transport of North Sea cod larva into the Skagerrak coastal populations. *Proc. R. Soc. Lond. B* 271:1337-1344.
- Knutsen H, Jorde PE, Sannæs H, Hoelzel AR, Bergstad OA, Stefanni S, Johansen T and Stenseth NC (2009). Bathymetric barriers promoting genetic structure in the deepwater demersal fish tusk *Brosme brosme*. *Molecular Ecology* 18, 3151-3162.

Curriculum Vitae (November 2010) – Antonieta Labra Lillo

Sex: Female, **Year of birth:** 1963, **Nationality:** Chilean

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Unive de Chile, Dep of Ecol Sciences, Postdoc at Hermann M. Niemeyer's lab. 1998/2002. Univ of Oregon, Dep of Ecology and Evolution, Courtesy Research Associated, July 1, 1998- Dec. 31, 2000. P. Univ Católica de Chile, Dep of Ecology, Postdoc at Francisco Bozinovic's lab. 1999-2001. Florida State Univ, Biological Science Dep, Program in Neuroscience, Courtesy Res Ass Prof, 2004 - 2007. CEES, Univ of Oslo, Dep of Biology. Researcher. 2006 – 2008.

Academic degree: Licentiate' degree in Biological Sciences, Pontificia Univ Católica de Chile. 1988. Master's degree in Zoology, Univ de Chile. 1991. Doctoral degree in Biology, Univ de Chile 1997.

Last 10 years

Awards: Honor Registration. PUC. 1981; Academic Coll Scholarship. UCh. 1989 – 1991; Registration Scholarship. Univ. de Chile. 1989 – 1994; Meeting Ass Fellowship, Sociedad de Biología de Chile. 1991 – 1994; Dissertation Fellowship, Univ. de Chile. 1990 – 1991. CONICYT (Chilean National Comm of Scientific and Techn Res) Doct Fellowship. Chile. 1992 – 1995; Fellowship for Coll Res, Univ de Valencia, Spain. 2002; Meeting Att to Res Gordon Conf. London, England. 2002; Travel Award for Meeting Att. Int Found of Science (IFS, Sweden). 2005; Visiting Prof Fellowship. Univ Complutense de Madrid; Postgrad grant 'Determinants of physiological and behavioral variables in two species of *Pristidactylus* lizards: Phylogeny and environment', 1991 and 'Predation risk and the evolution of cryptic colorations in lizards: physiological and behavioral implications', 1994 -1995; Fondo Nacional de Ciencia y Tecnología, Chile: 'Hematology and altitudinal distribution of reptiles: controversies and perspectives'. 1991, ' Grant for Doctoral dissertation. Predation risk and the evolution of cryptic colorations in lizards: physiological and behavioral implications', 1995 and 1996 and 'Postdoctoral grant. Thermal biology of lizards of *Liolaemus* genus: Which characters present adaptive patterns to the environmental conditions?', 1999 -2002; Int Found of Science, Sweden 'Are chemical signals important reproductive isolation mechanisms of *Liolaemus* lizards?', 1999 -2002, 'Which chemical signals are more attractive, those from individuals of the same or different population?' and 2003 -2004; 'Multisensorial communication in lizards: an intra and interspecific comparison'. 2009-2011; Nati Science Found (NSF) WISC Award, Int Exchange Progr, Electrical basis for chemical communication in *Liolaemus bellii*, 2003; Planning Grant (PG, Florida State University, USA). Pheromone communication in the Chilean lizard. 2004; The Research Council of Norway Aurora programme - Mobility exchange program for research collaboration between France and Norway. 'Extinction mechanisms in small populations'. 2006.

Reviewer of: Rev Chilena de Historia Natural, Ethology, J of Herpetology, Rev Herpetológica Española, Australian J of Zoology, Beh Ecology, Beh Ecology and Sociobiol, Chemoecology, J of Chemical Ecology, FunctEcology, Biol J of the Linn Soc, J of Ethology, Zoological J of the Linn Soc, Copeia, Biochemical Syst and Ecology, Acta Zoológica Lilloana, Herpetological J, Herpetologica, Amphibia-Reptilia, Integrative Zoology. External grant reviewer for FONDECYT, Chilean res council.

Dissemination activities: Several seminars and meeting presentations each year. Part of the organizing committee of the "International Course on Experimental Approaches in Neuroethology" Santiago and Valparaíso, Chile. 2002. (For more information: www.animalbehavior.org/ABSNews/998432407/)

No. of PhD-stud. presently under supervision as main supervisor: 2 (0 completed from 2005-10)

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 11

No. of review articles and book chapters (1.1.2005–30.6.2010): 5

No. of publications in peer-r. jour. or peer-r. monographs (total career): 32

No. of review articles and book chapters (total career): 8

Three most important publications the last 10 years:

- Escobar, CA; A Labra & HM Niemeyer. 2001. Chemical composition of preloacal secretions of *Liolaemus* lizards. *Journal of Chemical Ecology* 27: 1677-1690.
- Labra, A. 2006. Chemical assessment of fighting risks: the fine-tuned responses of the lizard *Liolaemus monticola*. *Ethology* 112: 993-999 (10.1111/j.1439-0310.2006.01256.x).
- Martins, MP; A Labra; M Halloy & JT Thompson. 2004. Repeated large scale patterns of signal evolution: an interspecific study of *Liolaemus* lizards headbob displays. *Animal Behaviour* 68: 453-463.

Curriculum Vitae (November 2010) – Helene M. Lampe

Sex: Female, **Year of birth:** 1959, **Nationality:** Norwegian

Present position: Professor, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Temporary lecturer in 1983/84 and 1985, Doctoral grant, Research Council of Norway 01.07-31.12.85, Research Assistant, Research Council of Norway 01.01.-31.12.86, Post-doctoral grant, Research Council of Norway 01.01.87-31.12.89, Curator Assistant in Zoology, The Museum, University of Trondheim 01.01-31.12.90, Post-doctoral grant, Research Council of Norway 01.01.91-31.12.93, Temp. employment as Assoc Prof, Biology, UoO 01.07.93-30.09.94, Permanent employment as Assoc Prof, Biology, UoO, 01.10.94-14.09.03, Professor, Biology, UoO, 15.09.03-present (member of CEES, 01.10.07-)

Academic degree: Cand.mag.(University of Oslo, 1981), Cand.scient. (University of Trondheim, 1983), Dr.scient. (University of Trondheim, 1987)

Last 10 years

Most important affiliation in academic and professional committees: Member of committees for research ass., post doc., assoc. prof. and researcher positions; Universities of Trondheim, Oslo, Tromsø, NINA, Member of PhD committees (17 times; 5 as external examiner for University of Copenhagen (3), NTNU and UMB).

Awards: Grant from American Scandinavian Foundation in 1987, Grant from University of Oslo in 1987, Grant from Nansen Foundation 1990, 1992, 1994, 1995 and 1998, Grant from Cornell University, USA, 1996.

Scientific review work including peer-review: Referee for scientific journals: American Naturalist, Animal Behaviour, Behavioural Ecology and Sociobiology, Polar Research, Proceedings of the Royal Society of London, Referee for research councils: Israel Science Foundation, National Science Foundation – USA, Natural Sciences and Engineering (NSERC) – Research Council of Canada.

No. of PhD-stud. presently under supervision as main supervisor: 1/2

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 7

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 35

No. of review articles and book chapters (total career): 3

Three most important publications the last 10 years:

- Lampe HM, Balsby TJS, Espmark YO, Dabelsteen T, 2010. Does twitter song amplitude signal male arousal in redwings (*Turdus iliacus*)? *Behaviour* 147:353-365.
- Hauglund K, Hagen SB, Lampe HM, 2006. Responses of domestic chicks (*Gallus gallus domesticus*) to multimodal aposematic signals. *Behav Ecol* 17:392-398.
- Ward S, Lampe HM, Slater PJB, 2004. Singing is not energetically demanding for pied flycatchers, *Ficedula hypoleuca*. *Behav Ecol* 15:477-484.

Curriculum Vitae (November 2010) – Øystein Langanen

Sex: Male, **Year of birth:** 1979, **Nationality:** Norwegian

Present position: Researcher NIVA/CEES (part time), Dep of Biology, Univ of Oslo

Previous academic positions: Post. Doc. PhD student

Academic degree: PhD (Astrophysics) 2008

Last 10 years

Scientific review work including peer-review: Reviewer in American Journal of Physics, Astrophysical Journal, Journal of Fish biology.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 8

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 8

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Ohlberger, J; Langanen, O; Edeline, E; Olsen, EM; Winfield, IJ; Fletcher, JM; Ben James, J; Stenseth, NC; Vollestad, LA. 2011. Pathogen-induced rapid evolution in a vertebrate life-history trait. *PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES* 278 (1702): 35-41.
- Langanen, O; Carlsson, M; Van der Voort, LR; Stein, RF. 2007. Velocities measured in small-scale solar magnetic elements. *ASTROPHYSICAL JOURNAL* 655 (1): 615-623. (<http://iopscience.iop.org/0004-637X/655/1/615/pdf/65586.web.pdf> or <http://arxiv.org/abs/astro-ph/0611741>)
- Langanen, O; De Pontieu, B; Carlsson, M; Hansteen, VH; Cauzzi, G; Reardon, K. 2008. Search for high velocities in the disk counterpart of type II spicules. *ASTROPHYSICAL JOURNAL LETTERS* 679 (2): L167-L170.

Curriculum Vitae (November 2010) – Arnaud Le Rouzic

Sex: Male, **Year of birth:** 1979, **Nationality:** French

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: PhD thesis, CNRS, France PostDoc, Uppsala University, Sweden
PostDoc, Oslo University, Norway

Academic degree: License degree, University of Paris 6, France Master degree, University of Paris 11,
France PhD degree, University of Paris 11, France

Last 10 years

Scientific review work including peer-review: 10 reviews for journals in the field of genetics and evolutionary biology.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 15

No. of review articles and book chapters (1.1.2005–30.6.2010): 2 reviews + 1 book chapter

No. of publications in peer-r. jour. or peer-r. monographs (total career): 15

No. of review articles and book chapters (total career): 2 reviews + 1 book chapter

Three most important publications the last 10 years:

- Le Rouzic A, Carlborg O. Evolutionary potential of hidden genetic variation. *Trends Ecol Evol.* 2008 Jan;23(1):33-7. PubMed PMID: 18079017. (doi:10.1016/j.tree.2007.09.014)
- Le Rouzic A, Boutin TS, Capy P. Long-term evolution of transposable elements. *Proc Natl Acad Sci U S A.* 2007 Dec 4;104(49):19375-80. Epub 2007 Nov 26. PubMed PMID: 18040048; PubMed Central PMCID: PMC2148297. (doi: 10.1073/pnas.0705238104)
- Le Rouzic A, Capy P. The first steps of transposable elements invasion: parasitic strategy vs. genetic drift. *Genetics.* 2005 Feb;169(2):1033-43. PubMed PMID: 15731520; PubMed Central PMCID: PMC1449084. (doi:10.1534/genetics.104.031211)

Curriculum Vitae (November 2010) – Lee Hsiang Liow

Sex: Female, **Year of birth:** 1974, **Nationality:** Singaporean

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Post-Doc

Academic degree: Ph.D, University of Chicago, 2006

Last 10 years

Most important affiliation in academic and professional committees: Member: Paleontological Society, Palaeontological Association, Geological Society of America, Society for the Study of Evolution, American Society of Naturalists

Awards: Hinds Fund, University of Chicago (2001, 2002, 2003, 2004) Friday Harbor Laboratories Scholarship (Summer 2001) Santa Fe Institute Scholarship to attend the Complex Systems Summer School (2001) DooLittle Fellowship, University of Chicago (2003, 2005) Sigma-Xi Grants-in-Aid of Research (2003) Geological Society of America (2004) Grant No. 7729-04 (and recognition of exceptional merit) Woman's Board Travel Awards, University of Chicago (Summer/Fall 2005) Fellowship: Gender Balance program under the CoE mechanism in the Research Council of Norway (2009-2011)

Scientific review work including peer-review: Reviewer: Paleontological Society, Palaeontological Association, Geological Society of America, Society for the Study of Evolution, American Society of Naturalists

Dissemination activities: Invited speaker: Quantitative Paleobiology Short Course, Geological Society of America meeting, Denver, Colorado (2010); University of California, Berkeley, hosted by Tiago Quental (2010); Stanford University, hosted by Paul Harnik (2010); Imperial College, London, hosted by Thomas Ezard (2010); Department of Geology, University of Cincinnati (2010); Museum für Naturkunde in Berlin, hosted by Prof. W. Kiessling, Lichtenberg Professor of Evolutionary Paleocology (Berlin, Germany, 2009); Björn Kurtén Club, Department of Geology, University of Helsinki (2009); The Micropalaeontological Society AGM 2008 at University College London (2008); The Ecology and Evolution Departmental Seminar at the University of Chicago, Illinois, U.S.A. (2008). Invited Symposium Speaker: 'Evolutionary bangs and whimpers: methodological advances and conceptual frameworks for studying exceptional diversification' at the Society of Systematic Biologists (SSB) Annual Meeting (Moscow, 2009). Guest lecture for MASSEXTINCT group (EU funded Marie Curie project), invitation by Dr Jennifer McElwain at University College Dublin (UCD), Dublin, Ireland (12 June 2008). Panelist for Hot Topics session: "The Future of Paleontology" at NAPC 2009 (North American Paleontological Convention, Cincinnati, Ohio, 2009).

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 12

No. of review articles and book chapters (1.1.2005–30.6.2010): 2

No. of publications in peer-r. jour. or peer-r. monographs (total career): 19

No. of review articles and book chapters (total career): 2

Three most important publications the last 10 years:

- Liow, L.H., Quental T.B. and Marshall C.R. (in press) When can decreasing diversification rates be detected with molecular phylogenies and the fossil record? (Systematic Biology).
- Liow L.H., Fortelius M., Bingham E., Lintulaasko K., Mannila H., Flynn L. and Stenseth N.C. 2008. Higher origination and extinction rates in larger mammals. Proceedings of the National Academy of Sciences of the United States of America 105:6097-6102.
- Liow L. H. & Stenseth N.C. 2007. The rise and fall of species: implications for macroevolutionary and macroecological studies. Proceedings of the Royal Society of London, Series B 274: 2745–2752.

Curriculum Vitae (November 2010) – Leif Egil Loe

Sex: Male, **Year of birth:** 1973, **Nationality:** Norwegian

Present position: Assoc. Professor, Norwegian University of Life Sciences

Previous academic positions: Post Doc CEES

Academic degree: Ph.D. 2004

Last 10 years

Scientific review work including peer-review: Associate Editor for Wildlife Biology. Reviewed 38 manuscripts for 21 different international journals, including American Naturalist, Behavioural Ecology, Ecological Monographs, Journal of Animal Ecology, Journal of Applied Ecology, and Journal of Wildlife Management.

Examination activities: 2nd opponent PhD: 2009 Bård-Jørgen Bårdsen, University of Tromsø; External examiner for M.Sc.: 2004 Camilla Iversen, UMB, June 8 2007 Anne Marit Helmersen, UMB, June 8.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 21

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 26

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- Loe LE, Mysterud A, Veiberg V, Langvatn R (2009) Negative density dependent emigration of males in an increasing red deer population. Proc R Soc Lond Ser B 276: 2581-2587.
- Godvik, I.M., Loe, L.E., Vik, J.O., Veiberg, V., Langvatn, R., and Mysterud, A. 2009. Temporal scales, trade-offs and functional responses in red deer habitat selection. Ecology 90: 699-710.
- Loe LE, Bonenfant C, Mysterud A, Gaillard J-M, Langvatn R, Stenseth NC, Klein F, Pettorelli N (2005) Climate predictability and breeding phenology in red deer: timing and synchrony of rutting and calving in Norway and France. J Anim Ecol. 74: 579-588.

Curriculum Vitae (November 2010) – Atle Mysterud

Sex: Male, **Year of birth:** 1969, **Nationality:** Norwegian

Present position: Professor, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: PhD: 01.01.1996 – 31.12.1998 University of Oslo Researcher: 01.01.1999 – 30.06.1999 University of Oslo Post doc: 01.07.1999 – 11.08.2001 University of Oslo Researcher: 12.08.2001 – 31.12.2005 University of Oslo

Academic degree: Dr. scient. University of Oslo 1998 Cand. scient University of Oslo 1994

Last 10 years

Most important affiliation in academic and professional committees: Elected member of the Royal Norwegian Society of Science and Letters, member of eval. board Naturvårdsverket (5 yrs), assoc. Editor for J of Animal Ecology and Wildlife Biology, board member for Animal Conservation
Awards: Fritjof Nansen award for young scientists in 2005 awarded by the Royal Norwegian Society of Science and Letters, awarded status as “Outstanding Young Investigator” (YFF) in 2004 by the Research Council of Norway.

Scientific review work including peer-review: JOURNALS - have reviewed for 47 different journals; Acta Theriologica, American J of Undergraduate Res, American Nat, Animal Behaviour, Animal Conserv, Annales Zoologici Fennici, Appl Vegetation Science, Basic and Appl Ecol, Behavioral Ecol, Behavioral Ecol and Sociobiology, Biodiversity and Conservation, Biological J of the Linnean Society, Biology Letters, Canadian J of Zoology, Climate Res, Current Biology, Ecography, Ecol Appl, Ecol Research, Ecology, Ecol Letters, EcoScience, Ecosphere, Ethology, Evolutionary Ecol, Forest Ecol and Management, Functional Ecol, Holocene, J for Nature Conservation, J of Agricultural Systems, J of Appl Ecol, J of Animal Ecol, J of Mammalogy, J of Zoology, J of Wildlife Management, Mammalia, Mammal Review, Mammal Study, Nature, Oecologia, Oikos, Oryx, Popul Ecology, Proc of the Royal Society of London Series B, Range Ecol and Management, Wildlife Biology, Wildlife Research and Zoological Studies. OTHER REVIEW WORK 1. Research Council of Norway 2. Swiss National Science Foundation. 3. Ecology evaluation board for the Finnish Academy of Sciences. 4. Natural Environment Research Council (NERC), U.K. 5. University of Padova, Italy. 6. National Science Foundation (NSF), USA. 7. Alberta Ingenuity Award 8. South African Research Foundation, NRF. 9. Natural Sciences and Engineering Research Council of Canada (NSERC) 10. University of Sherbrooke, Canada. 11. Centrum för Miljövetenskaplig forskning 12. Naturvårdsverket, Sweden.

Other professional merits: The article (Stenseth, Mysterud et al., see publ. list.) entitled "Ecological effects of climate fluctuations" as published in the journal "SCIENCE" on AUG 23, 2002 has been determined by ISI® to be one of the most cited recent papers in the field of ENVIRONMENT/ECOLOGY by January 2004. Was presented on the web as “New Hot Paper” (<http://esi-topics.com/nhp/nhp-january2004.html>) got status as “Emerging Research Front” in August 2008 (<http://sciencewatch.com/dr/erf/2008/08augerf/>).

No. of PhD-stud. presently under supervision as main supervisor: 3

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 88

No. of review articles and book chapters (1.1.2005–30.6.2010): 1 (book ch. - several reviews included in peer review articles above)

No. of publications in peer-r. jour. or peer-r. monographs (total career): 135

No. of review articles and book chapters (total career): 2 (book ch. - several reviews included in peer review articles above)

Three most important publications the last 10 years:

- Mysterud, A., Stenseth, N.C., Yoccoz, N.G., Langvatn, R., and Steinheim, G. 2001. Nonlinear effects of large-scale climatic variability on wild and domestic herbivores. *Nature* 410: 1096-1099. (doi:10.1038/35074099) Stenseth, N.C., Mysterud, A., Ottersen, G., Hurrell, J.W., Chan, K.-S., and Lima, M. 2002. Ecological effects of climate fluctuations. *Science* 269: 1523-1528. (DOI: 10.1126/science.1071281) Pettorelli, N., Vik, J.O., Mysterud, A., Gaillard, J.-M., Tucker, C. and Stenseth, N.C. 2005. Using the satellite-derived Normalized Difference Vegetation Index (NDVI) to assess ecological responses to environmental change. *Trends in Ecology and Evolution* 20: 503-510. (doi:10.1016/j.tree.2005.05.011)

Curriculum Vitae (November 2010) – Alexander Johan Nederbragt (Lex)

Sex: Male, **Year of birth:** 1972, **Nationality:** Netherlands

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Postdoc, Senior Researcher, PhD student

Academic degree: PhD 2002 MSc 1996

Last 10 years

Scientific review work including peer-review: reviewed three papers

Dissemination activities: www.contig.wordpress.com: A blog where I describe the program 'newbler', a program for analysing data from Roche 454 sequencing GS FLX instrument. Contribute as moderator on the www.seqanswers.com/forums, username flxlex. Intervju (in Norwegian) – contribution to Biotechnology in school: 'Ti filmer om moderne bioteknologi' (Bioteknologinemnda, Naturfagsenteret), film 3: 'Gener: Hva skal vi med kunnskap om genene?', se http://www.bioteknologiskolen.no/sider/3_gener.html (2008) Contribution in NBS-nytt 32 (2), 9-14 (in Norwegian): Lex Nederbragt og Kjetill S. Jakobsen (2008): Genomsekvensering og andre "high throughput" applikasjoner ved hjelp av 454 pyrosekvensering – en ny FUGE service plattform.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 6

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 12

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Nederbragt, A.J., Rounge, T.B., Kausrud, K and Jakobsen, K.S. 2010. Identification and quantification of genomic repeats and sample contamination in assemblies of 454 pyrosequencing reads, Sequencing – 2010. (doi: 10.1155/2010/782465) (<http://www.hindawi.com/journals/seq/2010/782465.html>)
- Nederbragt, A.J., van Loon, A.E. and Dictus W.J.A.G. 2002. Expression of Patella vulgata orthologs of engrailed and dpp-BMP2/4 in adjacent domains during molluscan shell development suggests a conserved compartment boundary mechanism. Developmental Biology, 246 (2), 341-355. (doi:10.1006/dbio.2002.0653) (<http://www.linkinohub.elsevier.com/retrieve/pii/S0012160602906536>)
- Nederbragt, A.J., van Loon, A.E. and Dictus W.J.A.G. 2002. Evolutionary biology: Hedgehog crosses the snail's midline. Nature 417 (6891): 811-812. (doi:10.1038/417811b) (<http://www.nature.com/nature/journal/v417/n6891/full/417811b.html>)

Curriculum Vitae (November 2010) – Camilla Nesbø

Sex: Female, **Year of birth:** 1970, **Nationality:** Norwegian

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: 2002 - 2007 Senior Researcher Genome Atlantic. (On maternity leave August 2007 - August 2008). 2000 - 2002 Canadian Institute for Health Research Postdoctoral Fellowship, Department of Biochemistry and Molecular Biology, Dalhousie University. 1999 - 2000 Postdoctoral fellow, Department of Biochemistry and Molecular Biology, Dalhousie University.

Academic degree: Dr. Scient in Genetics. Division of General Genetics, Department of Biology, University of Oslo, Norway.

Last 10 years

Most important affiliation in academic and professional committees: Faculty member of Faculty 1000 (<http://www.facultyof1000.com/>). Member of ISME (International Society of Microbial Ecology) and ASM.

Awards: 2008 - 2012 9,213,550 Nkr YFF fellowship from the Research Council of Norway.

Scientific review work including peer-review: Referee for Molecular Ecology, Trends in Genetics, Genetics, Molecular Evolution and Phylogenetics, Journal of Fish Biology, Nucleic Acids Research, Journal of Bacteriology, Science, Journal of Fish Biology, Environmental Microbiology, Gene, Molecular Biology and Evolution, BioTechniques, ISMJ, National Science Foundation.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 13

No. of review articles and book chapters (1.1.2005–30.6.2010): 2

No. of publications in peer-r. jour. or peer-r. monographs (total career): 28

No. of review articles and book chapters (total career): 5

Three most important publications the last 10 years:

- Nesbø CL, Kumaraswamy R, Dlutek M, Doolittle WF, Foght J. Searching for mesophilic Thermotogales bacteria: “Mesotogas” in the wild. *Applied and Environmental Microbiology*, 76: 4896-4900. (<http://aem.asm.org/cgi/content/abstract/AEM.02846-09v1>)
- Nesbø CL, Dlutek M, Zhaxybayeva O and Doolittle WF (2006) Evidence for the existence of mesotogas – members of the Thermotogales adapted to low temperature environments. *Applied and Environmental Microbiology*, 72: 5061 – 5068. (<http://aem.asm.org/cgi/content/abstract/72/7/506>)
- Nesbø CL, Dlutek M, Doolittle WF (2006) Recombination in Thermotoga: implications for species concepts and biogeography. *Genetics* 172: 759-69. (<http://www.genetics.org/cgi/content/abstract/172/2/759>)

Curriculum Vitae (November 2010) – Anders Nielsen

Sex: Male, **Year of birth:** 1971, **Nationality:** Norwegian

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Academic degree: PhD Norwegian University of Life Sciences 2007 Cand. Scient University of Oslo 1998

Last 10 years

Scientific review work including peer-review: I have done peer review for several journals including: Ecology Letters, Ecology, Plant Systematics and Evolution, Forest Ecology and Management, PloSONE.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 10

No. of review articles and book chapters (1.1.2005–30.6.2010): 3

No. of publications in peer-r. jour. or peer-r. monographs (total career): 13

No. of review articles and book chapters (total career): 3

Three most important publications the last 10 years:

- Hegland, S.J., Nielsen, A., Lazaro, A., Bjercknes A.L., & Totland, Ø. 2009. How does climate warming affect plant-pollinator interactions? – Ecology letters 12(2): 184-195.
- Bjercknes A.L., Totland T., Hegland S.J. & Nielsen A. 2007. Do alien plant invasions really affect pollination success in native plant species? – Biological conservation 138(1-2): 1-12.
- Nielsen, A. & Bascompte, J. 2006. Ecological networks, nestedness and sampling effort. – Journal of Ecology 95(5): 1134-1141.

Curriculum Vitae (November 2010) – Anna Nilsson

Sex: Female, **Year of birth:** 1977, **Nationality:** Swedish

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Postdoc funded by the Swedish Research council, at the CEES.

Academic degree: Lund University, PhD 2007

Last 10 years

Most important affiliation in academic and professional committees: Evaluation committee for employing a PhD student.

Scientific review work including peer-review: 12 peer-review invitations, from 10 different international journals.

Dissemination activities: Guest at a Swedish radio program, Naturmorgon. Publishing popular scientific work in a local ornithological journal, Anser.

Other professional merits: Teaching skills at three different courses in ecology at Lund University, guest lecturing at Halmstad university, guest lecturing at a master course at University of Oslo for the last three years.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 5

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 7

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Nilsson ALK, Lindström Å, Jonzen N, Nilsson SG & Karlsson L (2006) The effect of climate change on partial migration - the blue tit paradox. *Global change biology* 12, 2014–2022. (doi: 10.1111/j.1365-2486.2006.01237.x).
- Nilsson ALK & Sandell MI (2009) Stress hormone dynamics: an adaptation to migration? *Biology letters* 5, 480-483, (doi: 10.1098/rsbl.2009.0193).
- Nilsson ALK, Knudsen E, Jerstad K, Røstad OW, Walseng B, Slagsvold T & Stenseth NC (2010) Climate effects on population fluctuations of the white-throated dipper *Cinclus cinclus*, *Journal of Animal Ecology*, in press. (doi: 10.1111/j.1365-2656.2010.01755.x).

Curriculum Vitae (November 2010) – Jan Ohlberger

Sex: Male, **Year of birth:** 1977, **Nationality:** German

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: PhD student at the Leibniz-Institute of Freshwater Ecology and Inland Fisheries and the Humboldt-University in Berlin, Germany

Academic degree: PhD from the Humboldt-University in Berlin, Germany

Last 10 years

Awards: 2008 Mikhalevich Scholarship of the International Institute for Applied Systems Analysis (IIASA) for the research carried out during the Young Scientists Summer Program.

Scientific review work including peer-review: Functional Ecology, Journal of Experimental Biology, Journal of Comparative Physiology B, Journal of Fish Biology, Journal of Experimental Marine Biology and Ecology, Marine Biology, Journal of Experimental Zoology A.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 7

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 9

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Ohlberger, J., Langangen, Ø., Edeline, E., Olsen, E. M., Winfield, I. J., Fletcher, J. M., James, J. B., Stenseth, N. C. and Vøllestad, L. A. 2010. Pathogen-induced rapid evolution in a vertebrate life-history trait. Proceedings of the Royal Society B. FirstCite (DOI: 10.1098/rspb.2010.0960)
- Ohlberger, J., Mehner, T., Staaks, G. and Hölker, F. 2008. Temperature-related physiological adaptations promote ecological divergence in a sympatric species pair of temperate freshwater fish, *Coregonus* spp. Functional Ecology 22:501-508. (DOI: 10.1111/j.1365-2435.2008.01391.x)
- Ohlberger, J., Staaks, G. and Hölker F. 2006. Swimming efficiency and the influence of morphology on swimming costs in fishes. Journal of Comparative Physiology B 176:17-25. (DOI: 10.1007/s00360-005-0024-0)

Curriculum Vitae (November 2010) – Esben Moland Olsen

Sex: Male, **Year of birth:** 1968, **Nationality:** Norwegian

Present position: Senior Scientist, IMR, (adjunct position) CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Post doc IIASA institute Austria:2002-2003 Post doc University of Oslo:2004-2005 Post doc Institute of Marine Research:2006-2007

- **Academic degree:** University of Oslo 2000

Last 10 years

Most important affiliation in academic and professional committees: Chair, working group on Marine Protected Areas, Marine Board, European Science Foundation (2009-2011).

Scientific review work including peer-review: Review of PhD thesis for James Cook University, Australia (2009).

Other professional merits: Shorlisted for a Starting Grant from the European Research Council (2009).

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 20

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 33

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- Olsen, E. M. & Moland, E. 2010. Fitness landscape of Atlantic cod shaped by harvest selection and natural selection. *Evolutionary Ecology*. Published online.
- Olsen, E. M., Carlson, S. M., Gjørseter, J. & Stenseth, N. C. 2009. Nine decades of decreasing phenotypic variability in Atlantic cod. *Ecology Letters* 12: 622–631.
- Olsen, E. M., Heino, M., Lilly, G. R., Morgan, M. J., Brattey, J., Ernande, B. and Dieckmann, U. 2004. Maturation trends indicative of rapid evolution preceded the collapse of northern cod. *Nature* 428: 932–935.

Curriculum Vitae (November 2010) – Geir Ottersen

Sex: Male, **Year of birth:** 1963, **Nationality:** Norwegian

Present position: Senior Scientist, IMR/ CEES, Dep of Biology, Univ of Oslo

Academic degree: Dr. scient oceanography Univ. Bergen 1996 Cand scient statistics Univ. Bergen 1988
Cand mag. (informatics/mathematics) Univ. Bergen 1986

Last 10 years

Most important affiliation in academic and professional committees: Member scientific steering committee of the international GLOBEC programme 2000-2005 Chair ICES Cod and climate change working group 2006-2009

Scientific review work including peer-review: Editor: Climate Research and Marine Biology. Research Guest editor special issue of Progress in Oceanography (2010 GLOBEC 3rd Open Science meeting). Guest editor special issue of Climate Research (2008 Effects of climate change on marine ecosystems). Guest editor special issue of Marine Biology Research (2011 Interaction between Norwegian Sea fish stocks and their plankton prey). Reviewer for project proposals for - UK National Environmental Research Council (NERC) - USA National Research Foundation (NSF) - USA joint National Oceanic and Atmospheric Administration (NOAA) and NSF CAMEO call - USA North Pacific Research Board Bering Sea Integrated Research Program call. Reviewer for book proposals for - American Geophysical Union (AGU) - Cambridge University Press. Reviewer for numerous journals including: Aquatic Living Resources, Biology Letters, Canadian Journal of Fisheries and Aquatic Sciences, Deep Sea Research II, Ecology, Fisheries Oceanography, Global Change Biology, ICES Journal of Marine Science, ICES Marine Science Symposia, Journal of Animal Ecology, Journal of Marine Systems, Marine Biology, Marine Ecological Progress Series, Marine Environmental Research, New Zealand Journal of Marine and Freshwater Research, Nature, Limnology & Oceanography, Oikos, Proceedings of the Royal Society of London (ser. B), Sarsia, and Science

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 16

No. of review articles and book chapters (1.1.2005–30.6.2010): 8

No. of publications in peer-r. jour. or peer-r. monographs (total career): 38

No. of review articles and book chapters (total career): 16

Three most important publications the last 10 years:

- Ottersen G, Planque B, Belgrano A, Post E, Reid PC, Stenseth NC. 2001. Ecological effects of the North Atlantic Oscillation. *Oecologia* 128: 1-14. (DOI: 10.1007/s004420100655) (<http://www.springerlink.com/content/2exblm7f0fu5rnfq>)
- Stenseth NC, Mysterud A, Ottersen G, Hurrell JW, Chan K-S, Lima M. 2002. Ecological effects of climate fluctuations. *Science* 297: 1292-1296. (DOI: 10.1126/science.1071281) (<http://echorock.cgd.ucar.edu/cas/jhurrell/Docs/science.082302.ecol.pdf>)
- Stenseth NC, Ottersen G, Hurrell J, Belgrano A, eds. Marine ecosystems and climate variation: the North Atlantic. Oxford: Oxford University Press. 252+14 p. ISBN 0 19 850748 8

Curriculum Vitae (November 2010) – Mihaela Pavlicev

Sex: Female, **Year of birth:** 1974, **Nationality:** Slovenia

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Associated researcher at the Natural History Museum in Vienna, Austria; Postdoc at the Department for Anatomy and Neurobiology at the Washington University in St. Louis

Academic degree: Masters of Math and Nat. Sciences, University of Vienna, Austria (1998); PhD University of Vienna Austria (2003)

Last 10 years

Most important affiliation in academic and professional committees: Member of the Board of Trustees of Otto Kinne foundation for supporting young scientists in Eastern Europe;

Awards: Scholarship by the Summer Institute for Statistical Genetics in Seattle, 2007 (\$1000) for courses in Bioinformatics and Coalescent theory; Travel Grant for attending the Symposium on Epistasis at Iowa State University, Ames, May/June 2007 (\$450); Erwin Schrodinger Fellowship (2 year Postdoc fellowship) awarded by the Austrian Foundation for Scientific Research (FWF; equivalent to NSF). Project Nr. J2631: Evolution of pleiotropy and morphological integration (\$35,400/year); Grant to attend the Conference of The European Herpetological Society in Bonn 2005, Austrian Scientific Society (300 €); Grant to attend the Zoological Conference in Novosibirsk 2004, awarded by the city of Ptuj, Slovenia (\$600); PhD Fellowship, awarded by the Slovenian Science Foundation in 2000 (1 year); 'Žiga Zois Scholarship' for promotion of gifted students, awarded by the Slovenian government (7 years, 1992-1999) c)

Scientific review work including peer-review: Reviewer for the Journal of Experimental Zoology; the Journal of Molecular Phylogenetics and Evolution; Biological Journal of the Linnean.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 18

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 22

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- Pavličev M, Le Rouzic AP, Wagner GP, Cheverud JM, Hansen TF. 2010. Directionality of epistasis in a murine intercross population. *Genetics* 185:1489-1505.
- Wagner GP, Kenney-Hunt JP, Pavličev M, Peck JR, Waxman D, and Cheverud JM. 2008. Pleiotropic scaling of gene effects and the "Cost of complexity". *Nature*, 452: 470-472.
- Pavličev M, Kenney-Hunt JP, Norgard AE, Roseman CC, Wolf J, and Cheverud JM. 2008. Genetic variation in pleiotropy: Differential epistasis as a source of variation in the allometric relationships between bone lengths and body weight. *Evolution* 62 (1): 199-213.

Curriculum Vitae (November 2010) – Jonas Persson

Sex: Male, **Year of birth:** 1977, **Nationality:** Swedish

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Postdoc 2008-2009

Academic degree: Phd, Uppsala University 2007

Last 10 years

Most important affiliation in academic and professional committees: I was in the postdoctoral organizing committee (4 members) and one of the group leaders of the Woodstoich 2009 workshop.

Scientific review work including peer-review: I have reviewed manuscripts for: Aquatic Biology, Aquatic Ecology, Aquatic Sciences, Ecology, Functional Ecology, Freshwater Biology, International Journal of Limnology, International Review of Hydrobiology, Journal of Great lakes research, and Limnology and Oceanography.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 7

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 8

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- Persson, J., Wojewodziec, M., Hessen, D.O. & Andersen, T. (2010) Increased risk of phosphorus limitation at higher temperatures for *Daphnia magna*. *Oecologia* online early
- Persson, J., Brett, M.T., Vrede, T. & Ravet, J.L. (2007) Food quantity and quality regulation of trophic transfer between primary producers and a keystone grazer (*Daphnia*) in pelagic freshwater food webs. *Oikos* 116: 1152-1163.
- Persson, J. & Vrede, T. (2006) Polyunsaturated fatty acids in zooplankton: variation due to taxonomy and trophic position. *Freshwater Biology* 51(5): 887-900

Curriculum Vitae (November 2010) – Juan F. Poyatos

Sex: Male, **Year of birth:** 1969, **Nationality:** Spanish

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Currently Tenured Associate Professor, Spanish National Research Council (CSIC), Madrid, Spain.

Academic degree: Bs in Theoretical Physics, Complutense University, Madrid, Spain 1992 PhD in Theoretical Physics, Complutense University, Madrid, Spain 1998

Last 10 years

Scientific review work including peer-review: Reviewer for Bioinformatics, Genome Biology, PLoS ONE, PLoS Computational Biology, BMC Systems Biology, Journal of Theoretical Biology, Trends in Genetics, Physical Review Letters, Physical Review A. Associate Editor for BMC Cancer.

Academic and Teaching experience: Honorary Professor, Biochemistry Department, Autónoma University, Madrid, Spain, Phd Course in Systems Biology, Biochemistry Department, Autónoma University, Madrid, Spain (2005-2009); MSc course in Biophysics, Nicolás Cabrera Institute, Autónoma University, Madrid, Spain (2003-2010); Summer Course in Biocomputation, 2006 Ronda, Málaga University, Spain; Winter School in Systems Biology, 2007, Bologna, Italy; MSc in Bioinformatics and Computational Biology 2008, Complutense University, Madrid, Spain; Workshop in Biomedicine, Santander February 2009, Santander, Spain.

Organization activities: Systems Biology Journal Club, 2003-2004, Spanish National Cancer Centre, Madrid, Spain; 2nd round Quantitative Biology seminars, 2006, Complutense University, Madrid, Spain; Summer School “Biophysics of Biological Circuits: from Molecules to Networks”, 2006, Autónoma University, Madrid, Spain. Scientific Committee, VII Bioinformatics and Computational Biology Conference, 2006, Zaragoza, Spain.

External Advisor. Initiative for the establishment of new Systems Biology Centres. UK Biotechnology & Biological Sciences Research Council (BBSRC) Research Initiative 2004 (Centres for Systems Biology University of Newcastle and University of Birmingham) and Research Initiative 2005 (Centre for Systems Biology University of Cambridge); Scientific Information Section, Madrid Regional Government.

No. of PhD-stud. presently under supervision as main supervisor: 4

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 1

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 9

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 23

No. of review articles and book chapters (total career): 10

Three most important publications the last 10 years:

- Guantes R., and Poyatos, J. F. (2008). Multistable decision switches for flexible control of epigenetic differentiation. PLoS Computational Biology, 4, 11, e1000235. (<http://www.ncbi.nlm.nih.gov/pubmed/17983469>)
- Poyatos, J. F., and Hurst, L. D. (2007). The determinants of gene order conservation in yeasts. Genome Biology, 8, R233. (<http://www.ncbi.nlm.nih.gov/pubmed/17983469>)
- Camas F. M., Blázquez, J., and Poyatos, J. F. (2006). Autogenous and non autogenous control of a genetic network. Proceedings of the National Academy of Sciences (PNAS), 103, 12718. (<http://www.ncbi.nlm.nih.gov/pubmed/16908855>)

Curriculum Vitae (November 2010) – Trond Reitan

Sex: Male, **Year of birth:** 1969, **Nationality:** Norwegian

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: PhD research fellow at the institute of mathematics (statistics group) at the University of Oslo.

Academic degree: Masters degree in physics (University of Oslo, 1994) PhD in statistics (University of Oslo, 2008)

Last 10 years

Scientific review work including peer-review: Some peer-reviewing, specially for the journals Stochastic Environmental Research and Risk Assessment and Water Resources Research.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 10

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 10

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- Reitan, T., Petersen-Øverleir, A. (2009) Bayesian methods for estimating multi-segment discharge rating curves Stochastic Environmental Research and Risk Assessment 5, 627-642.
- Mark Burgess and Trond Reitan (2006) <A risk analysis of disk backup or repository maintenance Science of computer programming 64-3, 312-331.
(http://www.elsevier.com/wps/find/journaldescription.cws_home/505623/description#description)
- Reitan, T., Aas, K. (2010) A New Robust Importance Sampling Method for Measuring VaR and ES Allocations for Credit Portfolios To appear in Journal of Credit Risk.

Curriculum Vitae (November 2010) – Trine B. Rounge

Sex: Female, **Year of birth:** 1978, **Nationality:** Norwegian

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: PhD, CEES, Department of Biology, University of Oslo

Academic degree: PhD, 2008 Master of Technology, 2002

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 5

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 5

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Rounge TB, Rohrlack T, Nederbragt AJ, Kristensen T, Jakobsen KS: A genome-wide analysis of nonribosomal peptide synthetase gene clusters and their peptides in a *Planktothrix rubescens* strain. *Bmc Genomics* 2009, 10:396. (doi:10.1186/1471-2164-10-396, <http://www.biomedcentral.com/1471-2164/10/396>)
- Rounge TB, Rohrlack T, Decenciere B, Edvardsen B, Kristensen T, Jakobsen KS: Subpopulation Differentiation Associated with Nonribosomal Peptide Synthetase Gene Cluster Dynamics in the Cyanobacterium *Planktothrix* Spp.1. *Journal of Phycology* 2010, 46(4):645-652. (DOI: 10.1111/j.1529-8817.2010.00856.x, <http://onlinelibrary.wiley.com/doi/10.1111/j.1529-8817.2010.00856.x/full>)
- Rounge TB, Rohrlack T, Tooming-Klunderud A, Kristensen T, Jakobsen KS: Comparison of cyanopeptolin genes in *Planktothrix*, *Microcystis*, and *Anabaena* strains: Evidence for independent evolution within each genus. *Applied and Environmental Microbiology* 2007, 73(22):7322-7330. (doi:10.1128/AEM.01475-07, <http://aem.asm.org/cgi/content/full/73/22/7322?view=long&pmid=17921284>)

Curriculum Vitae (November 2010) – Eli Knispel Rueness

Sex: Female, **Year of birth:** 1971, **Nationality:** Norwegian

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: PhD student Post doc Researcher

Academic degree: Dr. scient. 2003

Last 10 years

Most important affiliation in academic and professional committees: 2007 Organized and chaired a symposium on: Integrating Ecology and Evolution: a Synthesis. At the European Society of Evolutionary Biology (ESEB) XI meeting. (Aug 20-Aug 25) Uppsala University, Sweden.

Awards: 2004 His Majesty the King's gold medal for the best doctoral thesis at the Faculty of Mathematics and Natural Sciences.

Scientific review work including peer-review: Has served as reviewer for: Mammal reviews, Conservation Genetics Resources, Journal of Biogeography, Conservation Genetics, Proceedings of the Royal Society of London; Series B, Molecular Ecology, Journal of Wildlife Management, Fisheries Research.

Dissemination activities: Co-organizer of Darwin Day and Kristine Bonnevie Lectures each year since 2006. Written for newspapers, appeared on TV and radio. Participated in public debates.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 2

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 10

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- 2003 Rueness, E.K., N.C. Stenseth, M. O'Donoghue, S. Boutin, H. Ellegren and K. S. Jakobsen. Ecological and genetic spatial structuring in the Canadian lynx. *Nature*. 425: 69-72. 2003.
- Rueness, E.K., P.E. Jorde, L. Hellborg, N.C. Stenseth, H. Ellegren and K.S. Jakobsen. Cryptic population structure in a large, mobile mammalian predator: the Scandinavian lynx. *Molecular Ecology*. 12: 2623-3 2004.
- Stenseth, N.C., D. Ehrlich, E.K. Rueness, O.C. Lingjærde, K-S Chan, S. Boutin, M. O'Donoghue, D.A. Robinson, H. Viljugrein and K.S. Jakobsen. The effect of climatic forcing on population synchrony and genetic structuring of the Canadian lynx. *PNAS*, 101: 6056-6061.

Curriculum Vitae (November 2010) – Tore Schweder

Sex: Male, **Year of birth:** 1943, **Nationality:** Norwegian

Present position: Professor, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: 1967-69: Res ass, Dept of Mathematics, Univ of Oslo. 1968-70: Scientist, Central bureau of statistics, Oslo. 1969-71: Ass prof, Dept of Econ, Univ of Oslo. 1971-72: Ass prof, Dept of Mathematics, Univ of Oslo. 1972-74: Res and teaching ass, Dept of Statistics, Univ of California, Berkeley. 1974-81: Tenure track scholarship and Ass prof, statistics, Univ of Tromsø. 1981-83: Professor of statistics, Univ of Tromsø. 1983-84: Senior scientist, Central bureau of statistics, Oslo. 1984-: Prof of statistics (dosent/professor), dept of Economics, Univ of Oslo. 1984-86: Senior scientist (part time), Central bureau of statistics, Oslo. 1986-96 and 1998-2009: Senior scientist (part time), Norw Computing Center, Oslo. 2003- : Senior scientist (part time), CEES, Dept of Biology, Univ of Oslo.

Academic degree: PhD (UC-Berkeley 1974)

Last 10 years

Most important affiliation in academic and professional committees: 1971-72: Chairman, Norwegian stat association. 1978: Chairman of a committee under Norsk matematikkråd: The state of statistical knowledge in Norwegian science. 1986-90: Member of European Regional Committee, Bernoulli Society. 1989-: Member of the International Whaling Committee. 1991-94: Member of the steering committee for the research program on multi-species management of marine resources, Norwegian fisheries research council. 1994-2000: Member of the steering committee for the research program on Marine Resource Management, RCN. 1995-97: Convenor of the working group under the IWC Scientific Committee to review the Japanese research program of whaling under special permit. 1997: Member of a committee under the American Nat Res Council to review management and assessment of groundfish off New England, Boston. 1998-: Member of The Norwegian Academy of Science and Letters (bard member 2002-2008). 1999-2004: Invited scientist to review dolphin abundance estimates for Inter-American Tropical Tuna Commission, San Diego.

Awards: The Evelyn Fix Medal for best PhD student in statistics, UC Berkely, 1973.

Scientific review work including peer-review: Chairman of the board for Scand J of Statistics. 2000. Referee work for learned journals Ann of the inst of Math Part A, Ann of Statistics, Aquatic Living Res, Biometrics, Canadian J of Fisheries and Aquatic Sciences, Cetacean Research and Management, Computational Statistics and Data Analysis, Demography, Fish and Fisheries, Fisheries Res, Intern Statistical Revi, J of the Am Statistical Association, J of Peace Res, J of Royal Statistical Society, Psychometrica, Psychological Bulletin, Report of the Intern Whaling Commission, Sarsia, Scandinavian J of Psychology, Scandinavian J of Statistics, Scandinavian Actuarial J, Statistics, Theoretical Population Biology, The Scandinavian J of Economics, Tidskrift for samfunnsforskning. Refereeing for doctoral degrees and professorships at the Univ of Bergen, Helsinki, Lund, Oslo, Tromsø, Ørebro, Stockholm, Gothenburg, Penn State. External reviewer for Centres of Excellence in Research, Academy of Finland; International research projects: International Whaling Commission, Riksbankens Jubileumsfond (Sweden), RCN, NAVF, NFFR and NTNF (Research Councils).

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 1

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 8

No. of publications in peer-r. jour. or peer-r. monographs (total career): 81

No. of review articles and book chapters (total career): 4

Three most important publications the last 10 years:

- Schweder, T. and Hjort, N.L. 2002. Confidence and likelihood. *Scandinavian Journal of Statistics*. 29: 309-332. (DOI: 10.1111/1467-9469.00285) ([http://www.jstor.org/sici?origin=sfx%3Asfx&sici=0303-6898\(2002\)29%3A2%3C309%3ACAL%3E2.0.CO%3B2-R](http://www.jstor.org/sici?origin=sfx%3Asfx&sici=0303-6898(2002)29%3A2%3C309%3ACAL%3E2.0.CO%3B2-R))
- Skaug, H.J., Øien, N., Schweder, T. and Bøthun, G. 2004. Abundance of minke whales (*Balaenoptera acutorostata*) in the Northeast Atlantic: variability in time and space. *Can.J.Fish.Aquat.Sci.* 61: 870-886. (doi:10.1139/f04-020) (<http://rparticle.web-p.cisti.nrc.ca/rparticle/AbstractTemplateServlet?calyLang=eng&journal=cjfas&volume=61&year=2004&issue=6&msno=f04-020>)
- Schweder, T., Sadykova, D., Rugh, D., Koski, W. 2010. Population estimates from aerial photographic surveys of naturally and variably marked bowhead whales. *Journal of Agricultural Biological and Environmental Statistics*. 15: 1-19 (DOI: 10.1007/s13253-009-0002-1) (<http://www.springerlink.com/content/c763n578584332ut>)

Curriculum Vitae (November 2010) – Herve Seligmann

Sex: Male, **Year of birth:** 1966, **Nationality:** Luxemburg

Present position: Research fellow, The Department of Evolution, Ecology and Behavior, The Hebrew University of Jerusalem

Previous academic positions: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Academic degree: The Hebrew University of Jerusalem, 2003, PhD in evolutionary zoology The Hebrew University of Jerusalem, 1991, msc in plant physiology The Hebrew University of Jerusalem, 1988, bsc in biology

Last 10 years

Most important affiliation in academic and professional committees:

Awards: Rothschild fellowship 2001

Scientific review work including peer-review: For about 20 different journals.

Dissemination activities: About 40 published peer reviewed papers.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 18

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 40

No. of review articles and book chapters (total career): 2

Three most important publications the last 10 years:

- Seligmann H. 2010. Avoidance of antisense antiterminator tRNA anticodons in vertebrate mitochondria. *Biosystems* 101: 42-50 (doi:10.1016/j.biosystems.2010.04.004, http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6T2K-4YXK0HV-1&_user=626711&_coverDate=07%2F31%2F2010&_rdoc=1&_fmt=high&_orig=search&_origin=search&_sort=d&_docanchor=&view=c&_acct=C000032999&_version=1&_urlVersion=0&_userid=626711&md5=71aac7985196012f184711edc666237b&searchtype=a).
- Seligmann H., Pollock D.D. 2004. The ambush hypothesis: off frame stop codons arrest early accidental frameshifted transcription. *DNA and Cell Biology* 23: 701-705. (doi:10.1089/dna.2004.23.701).
- Seligmann H. 2008. Hybridization between mitochondrial heavy strand tDNA and expressed light strand tRNA modulates the function of heavy strand tDNA as light strand replication origin. *Journal of Molecular Biology*, 379: 188-199. (doi:10.1016/j.jmb.2008.03.066, http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6WK7-4S6P27B-1&_user=626711&_coverDate=05%2F23%2F2008&_rdoc=1&_fmt=high&_orig=search&_origin=search&_sort=d&_docanchor=&view=c&_acct=C000032999&_version=1&_urlVersion=0&_userid=626711&md5=25c613d6f3d5e36b251a8303c1737a67&searchtype=a).

Curriculum Vitae (November 2010) – Tore Slagsvold

Sex: Male, **Year of birth:** 1947, **Nationality:** Norwegian

Present position: Professor, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: 1972-78 Research fellowship, University of Trondheim, Dept. of Zoology. 1976 Museum fellowship, DKNVS Museet, University of Trondheim. 1978-83 Associate Professor (curator) at DKNVS Museet, University of Trondheim. 1984-91 Associate Professor (curator) at Zoological Museum, University of Oslo (UiO). 1991- Full professorship at Department of Biology, Division of Zoology, UiO.

Academic degree: 1972 Cand. real. in zoology, UiO. 1978 Dr. philos., University of Trondheim

Last 10 years

Most important affiliation in academic and professional committees: Editor of Journal of Avian Biology (1993-2001. Opponent at 17 public defences of doctoral thesis (Göteborg, Lund, Umeå, Leiden, Paris; Tromsø, Trondheim, UMB-Ås, Oslo).

Awards: 2006 Fridtjov Nansens belønning for fremragende forskning innen realfag og medisin (The Norwegian Academy of Science). 2006 The Darwin prize for evolutionary research (The Department of Biology, UiO). 2008 University of Oslo's Research Prize for 2008.

Scientific review work including peer-review: Reviewer for 40 different international journals, including Nature and Science.

Other professional merits: Referee for Natural Sciences and Engineering Research Council of Canada.

No. of PhD-stud. presently under supervision as main supervisor: 2

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 3

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 23

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 160

No. of review articles and book chapters (total career): 3

Three most important publications the last 10 years:

- Slagsvold, T., and B. T. Hansen. 2001. Sexual imprinting and the origin of obligate brood parasitism in birds. *American Naturalist* 158: 354-367.
- Slagsvold, T., B. T. Hansen, L. E. Johannessen, and J. T. Lifjeld. 2002. Mate choice and imprinting in birds studied by cross-fostering in the wild. *Proceedings of the Royal Society of London B* 269:1449-1455.
- Slagsvold, T. and Wiebe, K. L. 2007. Learning the ecological niche. *Proceedings of the Royal Society of London B* 274:19-23. (DOI 10.1098/rspb.2006.3663).

Curriculum Vitae (November 2010) – Bastiaan Star

Sex: Male, **Year of birth:** 1976, **Nationality:** Dutch

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Junior Scientist at Imares (Wageningen University, The Netherlands)

Academic degree: Master of Science, University of Groningen, The Netherlands, 2002 PhD, University of Otago, New Zealand, 2008

Last 10 years

Awards: 2008 PhD thesis has been recognised as being of exceptional quality, placing it amongst the top 10% percent of theses examined. 2008 Awarded the Fairlea Prize for best student paper in the Department of Zoology, University of Otago NZ\$1400,- 2004-2007 Allan Wilson Centre for Molecular Ecology and Evolution Scholarship (NZ\$60,000) 2004-2007 University of Otago Postgraduate Scholarship (NZ\$50,000) 2007 University of Otago Postgraduate Publishing Bursary (NZ\$5000) 2007 Division of Sciences Conference Funding, University of Otago (NZ\$2200)

No. of PhD-stud. presently under supervision as main supervisor: 1

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 6

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 9

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Boessenkool S., Star B., Scofield R. P., Seddon P. J. & Waters J. M. 2010. Lost in translation or deliberate falsification? Genetic analyses reveal erroneous museum data for historic penguin specimens. *Proceedings of the Royal Society of London B: Biological sciences* 277: 1057-1064.
- Star B., Trotter M. V. & Spencer H. G. 2008. Evolution of fitnesses in structured populations with correlated environments. *Genetics* 179: 1469-1478.
- Star B., Stoffels R. J. & Spencer H. G. 2007. Evolution of fitnesses and frequencies in a population with spatially heterogeneous selection pressures. *Genetics* 177: 1743-1751.

Curriculum Vitae (November 2010) – Nils Chr. Stenseth

Sex: Male, **Year of birth:** 1949, **Nationality:** Norwegian **Academic degree:** Dr. Philos 1978

Present position: Professor and founding Chair of CEES (Centre of Excellence by the RCN)

Previous academic positions:

1972-1975: Res. Ass. in the Norw. IBP (Intern. Biol. Progr).

1975-1978: Res. Ass. at the UiO (zool; pop. dyn.; evol.; ecol. mod.).

1979-1982: Ass. Prof. of Ecology at the University of Lund, Sweden (1980-1982, part-time).

1980-1989: Ass. Prof. of Population Dynamics at the UiO (from 1985 as full professor). 1990-2003: Prof. of Zoology at the UiO.

Since 2004: Res. Prof. of Ecology and Evolution at the UiO; Chair of Ecology and Evolution.

Last 10 years

Most important affiliation in academic and professional committees:

* Member of a review commission organised by NERC in UK for evaluating HEC and the merging of the earlier three institutions, ITC, IFB and IH (Feb. and March 1999).

* Member of a review commission “Quality and Renewal 2007, an evaluation of research at Uppsala University”, March 2007.

* Member of the standing panel “LS5 - Evolutionary, population and environmental biology” of the European Research Council (since 2007).

Awards: * Member of Deputy Norwegian Academy of Science and Letters – Since 1986 (President/Vice President since 2009).

* Awarded the Research Council of Norway Award for Outstanding Research (2000).

* Honorary Doctor (doctor honoris causa) of the University of Antwerpen, Belgium (2001).

* Elected fellow of the Royal Norwegian Society of Sciences and Letters, DKNVS (2002).

* Elected fellow of Academia Europaea (2005).

* Elected foreign fellow of the French Académie des Sciences (2005).

* Named Einstein Professor of the Chinese Academy of Science (2006).

* Elected foreign fellow of the Finnish Society of Sciences and Letters (2007).

* Elected fellow of the Swedish Royal Physiographic Society in Lund: an academy for natural science, medicine and engineering (2007).

Scientific review work including peer-review:

* Ass. Editor/Editor of Proceedings of the Royal Society of London; Ser. B (UK) 2005-2008.

* Editor-in-Chief of Climate Research (Germany); since 2005.

Dissemination activities: Communicate material of broad interest through newspapers and scientific magazines (including *Science* and *Nature*).

No. of PhD-stud. presently under supervision as main supervisor: 12

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 16

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 165

No. of review articles and book chapters (1.1.2005–30.6.2010): 4

No. of publications in peer-r. jour. or peer-r. monographs (total career): 464

No. of review articles and book chapters (total career): 29

Three most important publications the last 10 years:

- **Stenseth NC**, Mysterud A, Ottersen G, Hurrell JW, Chan KS and Lima M. (2002). Ecological effects of climate fluctuations. *Science* 297:1292-1296
- **Stenseth NC**, Viljugrein H, Saitoh T, Hansen TF, Kittilsen MO, Bolviken E and Glockner F. (2003). Seasonality, density dependence, and population cycles in Hokkaido voles. *Proceedings of the National Academy of Sciences of the United States of America* 100: 11478-11483
- **Stenseth NC**, Samia NI, Viljugrein H, Kausrud KL, Begon M, Davis S, Leirs H, Dubyanskiy VM, Esper J, Ageyev VS, Klassovskiy NL, Pole SB and Chan KS (2006). Plague dynamics are driven by climate variation. *Proceedings of the National Academy of Sciences of the United States of America* 103: 13110-13115

Curriculum Vitae (November 2010) – Leif Christian Stige

Sex: Male, **Year of birth:** 1969, **Nationality:** Norwegian

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: 1999-2000: Research assistant, Alpha Environm. Consultants/Univ. of Bergen 2000-2004: PhD student, Univ. of Oslo 2004-2005: Postdoc, Université de Bourgogne 2005-present: Researcher, Univ. of Oslo

Academic degree: Dr. scient. (University of Oslo, 2004)

Last 10 years

Scientific review work including peer-review: Reviewer for Aquatic Living Resources, Botanica Marina, Climate Research, Climatic Change, Environmental Modelling & Software, Environmental Pollution, Fisheries Oceanography, Fundamental and Applied Limnology, Gene, Oecologia, Proc.R. Soc. London B. Referee for PhD-thesis in Marine Science, University of Newcastle.

Dissemination activities: 2 newspaper chronicles, 2 popular science articles, interviews by media

Other professional merits: 2 invited talks at international scientific meetings (Ocean Sciences Meeting, Portland, OR, Feb. 22-26 2010 and Scanbalt Meeting, Svalbard, Aug. 18-20 2010)

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 15

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 19

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Stige LC, Ottersen G, Dalpadado P, Chan K-S, Hjermann DØ, Lajus DL, Yaragina NA, Stenseth NC. 2010. Direct and indirect climate forcing in a multi-species marine system. *Proceedings of the Royal Society of London, B.* 277: 3411-3420. (doi:10.1098/rspb.2010.0602)
- Stige LC, Chan K-S, Zhang Z, Frank D, Stenseth NC. 2007. Thousand-year long Chinese time-series reveals climatic forcing of decadal locust dynamics. *Proceedings of the National Academy of Sciences, USA* 104: 16188-16193. (<http://www.pnas.org/cgi/doi/10.1073/pnas.0706813104> (see Editors' Choice in *Science* 318 (5847); Commentary in *PNAS* 104: 15972-15973; Perspective in *Science* 318: 577-588).
- Stige LC, Stave J, Chan K-S, Ciannelli L, Pettorelli N, Glantz M, Herren HR, Stenseth NC. 2006. The effect of climate variation on agro-pastoral production in Africa. *Proceedings of the National Academy of Sciences, USA* 103: 3049-3053. (www.pnas.org/cgi/doi/10.1073/pnas.0600057103)

Curriculum Vitae (November 2010) – Geir Storvik

Sex: Male, **Year of birth:** 1962, **Nationality:** Norwegian

Present position: Professor, CEES, Dep of Mathematics, Univ of Oslo

Previous academic positions: Research scientist at Norwegian Computing Center 1987-1993

Academic degree: Master (Hovedfag) in Statistics 1986 Phd (Dr. Scient) in Statistics 1993

Last 10 years

Most important affiliation in academic and professional committees: Chair of statistical division, mathematical institute (2003-2004 and 2009) Vicechairman of mathematical institute, University of Oslo (2005-2008) Chair of organization committee for ISEC2012. Chair of organization committee for the 18. Nordic conference in Mathematical Statistics (2000). Member of program committee for the 18. Nordic conference in Mathematical Statistics (2000). Former leader of the Oslo department of the Norwegian Statistical Association. Chair of organizing committee for the 8. Norwegian Statistical meeting, June, 1995. Member of program committee for the 6. Norwegian Statistical meeting, June, 1991.

Scientific review work including peer-review: Member of 3 evaluation committees for PhD in last 5 years Member of 2 evaluation committees for ass. Prof positions in last 5 years Referee work for IEEE-SIPR, JSCE, JRSSB, SJS, IEEEGERS, IEEE-AUCO, IEEE-TGRS, ASCE_JIS, Bernoulli last 5 years.

Dissemination activities: Several talks at "Faglig-pedagogisk dag", "Åpen dag", visits to schools, and industrial companies.

No. of PhD-stud. presently under supervision as main supervisor: 1

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 2

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 7

No. of review articles and book chapters (1.1.2005–30.6.2010): 8

No. of publications in peer-r. jour. or peer-r. monographs (total career): 21

No. of review articles and book chapters (total career): 27

Three most important publications the last 10 years:

- Hirst, D; Storvik, G; Aldrin, M; Aanes, S; Huseby, RB Title: Estimating catch-at-age by combining data from different sources. Source: CANADIAN JOURNAL OF FISHERIES AND AQUATIC SCIENCES, 62 (6): 1377-1385 JUN 2005. (DOI: 10.1139/F05-026 2).
- Storvik, G Title: Particle filters for state-space models with the presence of unknown static parameters. Source: IEEE TRANSACTIONS ON SIGNAL PROCESSING, 50 (2): 281-289 FEB 2002.
- Storvik, G Title: On the Flexibility of Metropolis–Hastings Acceptance Probabilities in Auxiliary Variable Proposal Generation. Source: SCANDINAVIAN JOURNAL OF STATISTICS Article first published online: 30 AUG 2010 | (DOI: 10.1111/j.1467-9469.2010.00709.x).

Curriculum Vitae (November 2010) – Anke Corinna Stüken

Sex: Female, **Year of birth:** 1978, **Nationality:** German

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: March 2004 - August 2007: Research associate/PhD student at the Leibniz-Institute of Freshwater Biology and Inland Fisheries (IGB) Berlin, Germany; October 2007 - August 2008: Marie-Curie-Fellowship at CEES (Early Stage Research Training fellowship)

Academic degree: 2008 PhD, Brandenburg University of Technology Cottbus, Germany 2003 BSc Honours in Ecology, University of East Anglia, Norwich, UK 2002 Maitrise in Marine Ecosystems and Population Biology, Université de la Méditerranée II, Marseille, France

Last 10 years

Awards: Best experimental BSc thesis of the year (of the Biology department of the University of East Anglia, UK, in 2003). Marie-Curie EST-Fellowship at CEES, 2007-2008.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 7

No. of review articles and book chapters (1.1.2005–30.6.2010): 9

No. of publications in peer-r. jour. or peer-r. monographs (total career): 7

No. of review articles and book chapters (total career): 9

Three most important publications the last 10 years:

- Stüken, A. & Jakobsen, KSJ (2010). *Microbiology*. 2010 Aug;156(Pt 8):2438-51. Epub 2010 Apr 29. The cylindrospermopsin gene cluster of *Aphanizomenon* sp. strain 10E6: organization and recombination. (doi: 10.1099/mic.0.036988-0) PMID: 20430808
- A Stüken, Rebecca J Campbell, Antonio Quesada, Assaf Sukenik, Pawan K Dadheech, Claudia Wiedner (2009). *Journal of Plankton Research* 2009 vol. 31 (5) pp. 465-480. Genetic and morphologic characterization of four putative cylindrospermopsin producing species of the cyanobacterial genera *Anabaena* and *Aphanizomenon*. 10.1093/plankt/fbp011
- Preussel K, Stüken A, Wiedner C, Chorus I, Fastner J. (2006). *Toxicon*. 2006 Feb;47(2):156-62. Epub 2005 Dec 13. First report on cylindrospermopsin producing *Aphanizomenon flos-aquae* (Cyanobacteria) isolated from two German lakes. (doi: 10.1016/j.toxicon.2005.10.013) PMID: 16356522

Curriculum Vitae (November 2010) – Stein Are Sæther

Sex: Male, **Year of birth:** 1969, **Nationality:** Norwegian

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Researcher, CEES, Dept. of Biology, University of Oslo (July 2007 – December 2011). Post-doc, Dept. of Animal Population Biology, Centre for Terrestrial Ecology, Netherlands Institute for Ecology, NIOO-KNAW (September 2005–June 2007) Researcher, CEES, Dept. of Biology, University of Oslo (May–June 2005, April–May 2006). Post-doc (Swedish Research Council), Dept. of Evolutionary Biology, EBC, Uppsala University, Sweden (2002–2004). Visiting fellow, Lab. of Ornithology, Cornell University, New York (July–September 2004). Post-doc (Research Council of Norway), Dept. of Population Biology, EBC, Uppsala University (2000-2001).

Academic degree: PhD (dr.philos.) 1999, NTNU, Trondheim, Norway.

Last 10 years

Scientific review work including peer-review: Regular referee for journals including: Animal Behaviour; Ardeola; Avian Conservation and Ecology; Behavioral Ecology; Behavioral Ecology and Sociobiology; BMC Evolutionary Biology; Ecology; Ethology Ecology & Evolution; Evolutionary Ecology; Global Change Biology; Ibis; Journal of Animal Ecology; Journal of Zoology (London); Molecular Ecology; Oikos; Proceedings of the Royal Society of London, etc.

No. of PhD-stud. presently under supervision as main supervisor: 2

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 16

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 28

No. of review articles and book chapters (total career): 2

Three most important publications the last 10 years:

- S.A. Sæther et al. 2007. Sex Chromosome-Linked Species Recognition and Evolution of Reproductive Isolation in Flycatchers. *Science* 318: 95-97. (DOI: 10.1126/science.1141506, <http://www.sciencemag.org/cgi/content/abstract/sci;318/5847/95?maxto=show=&hits=10&RESULTFORMAT=&fulltext=stein+are+s%26ther&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>)
- S.A. Sæther et al. 2005. Direct and indirect mate choice on leks. *American Naturalist* 166: 145-157. (DOI: 10.1086/431248, <http://www.journals.uchicago.edu/doi/abs/10.1086/431248>)
- G.P. Sætre and S.A. Sæther. 2010. Ecology and genetics of speciation in *Ficedula* flycatchers. *Molecular Ecology* 19: 1091-1106 (DOI: 10.1111/j.1365-294X.2010.04568.x, <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-294X.2010.04568.x/abstract>)

Curriculum Vitae (November 2010) – Glenn-Peter Sætre

Sex: Male, **Year of birth:** 1965, **Nationality:** Norwegian

Present position: Professor, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Assistant professor, Uppsala University Researcher, University of Oslo
Post doc, University of Oslo PhD-scholar, University of Oslo

Academic degree: Dr. scient (University of Oslo 1993)

Last 10 years

Most important affiliation in academic and professional committees: member of the steering committee of FroSpects, an ESF funded research network on frontiers in speciation research

Awards: Nansens endowment price for young scientists 2000

Scientific review work including peer-review: American Naturalist, Animal Behaviour, Animal Cognition, Behavioral Ecology, Ethologia, Evolution, Hereditas, Journal of Avian Biology, Journal of Evolutionary Biology, Nature Genetics Reviews, Molecular Ecology, Molecular Biology and Evolution, Proceedings of the Royal Society of London - Series B, and Trends in Ecology and Evolution

Dissemination activities: Interviewed on National TV and radio channels, consulting expert for the popular science net site forskning.no and "the popular science program "verdt å vite" on a national radio channel

No. of PhD-stud. presently under supervision as main supervisor: 1

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 1

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 18

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 52

No. of review articles and book chapters (total career): 2

Three most important publications the last 10 years:

- Sæther SA, Sætre GP, Borge T, Wiley C, Svedin N, Andersson G, Veen T, Haavie J, Servedio MR, Bures S, Kral M, Hjernquist MB, Gustafsson L, Träff J, Qvarnström A. 2007. Sex chromosome-linked species recognition and evolution of reproductive isolation in flycatchers. *Science* 318, 95-97. (DOI: 10.1126/science.1141506)
- Sætre GP, Borge T, Lindroos K, Haavie J, Sheldon BC, Primmer C, Syvanen AC. 2003. Sex chromosome evolution and speciation in *Ficedula* flycatchers. *Proceedings of the Royal Society of London B: Biological Sciences* 270, 53-59. (DOI: 10.1098/rspb.2002.2204)
- Veen T, Borge T, Griffith SC, Sætre GP, Bures S, Gustafsson L, Sheldon BC. 2001. Hybridization and adaptive mate choice in flycatchers. *Nature* 411, 45-50.

Curriculum Vitae (November 2010) – Ave Tooming-Klunderud

Sex: Female, **Year of birth:** 1972, **Nationality:** Estonian

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: PhD student

Academic degree: 1994 - cand mag in microbiology, University of Tartu, Estland, 1998 - cand. Scient. in microbiology, University of Oslo, 2007 - PhD, university of Oslo

Last 10

Other professional merits: I have been building up the UTSP service platform at CEES.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 7

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 7

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Tooming-Klunderud A, Fewer DP, Rohrlack T, Jokela J, Rouhiainen L, Sivonen K, Kristensen T, Jakobsen KS. 2008 Evidence for positive selection acting on microcystin synthetase adenylation domains in three cyanobacterial genera. *BMC Evol Biol.* 2008 Sep 22;8:256. (doi: 10.1186/1471-2148-8-256, <http://www.biomedcentral.com/1471-2148/8/256>)
- Tooming-Klunderud, A; Mikalsen, B; Kristensen, T; Jakobsen, KS. The mosaic structure of the mcyABC operon in *Microcystis*. *Microbiology* 2008 ;Volum 154. s. 1886-1899. (DOI 10.1099/mic.0.2007/015875-0, <http://mic.sgmjournals.org/cgi/content/full/154/7/1886?view=long&pmid=18599818>)
- Tooming-Klunderud, A; Rohrlack, T; Shalchian-Tabrizi, K; Kristensen, T; Jakobsen, KS. Structural analysis of a non-ribosomal halogenated cyclic peptide and its putative operon from *Microcystis*: implications for evolution of cyanopeptolins. *Microbiology* 2007 ;Volum 153.(5) s. 1382-1393 (DOI 10.1099/mic.0.2006/001123-0, <http://mic.sgmjournals.org/cgi/content/full/153/5/1382?view=long&pmid=17464052>).

Curriculum Vitae (November 2010) – Tristan Rouyer

Sex: Male, **Year of birth:** 1980, **Nationality:** French

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: PhD student at IFREMER (Sete) in France.

Academic degree: Master of Science, Institut National Agronomique de Paris-Grignon, France. PhD

Last 10 years

Scientific review work including peer-review: Reviewed papers for: Aquatic Living Resource IICES Journal of Marine Science Nature Population Ecology Progress in Oceanography.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 8

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 8

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- Tristan Rouyer, Jean-Marc Fromentin, Nils Chr. Stenseth and Bernard Cazelles (2008). Analysing multiple time series and extending significance testing in wavelet analysis. MEPS 359: 11-23.
- T. Rouyer, J.-M. Fromentin, F. Menard, B. Cazelles, K. Briand, R. Pianet, B. Planque, and N. C. Stenseth (2008). Complex interplays among population dynamics, environmental forcing, and exploitation in fisheries. PNAS 105(14): 5420-5425.
- Nils Chr. Stenseth and Tristan Rouyer (2008). Destabilized fish stocks. Nature (News and Views) 452: 825-826.

Curriculum Vitae (November 2010) – Pål Trosvik

Sex: Male, **Year of birth:** 1975, **Nationality:** Norwegian

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Academic degree: Cand.scient. University of Oslo, 2004 Ph.D., University of Oslo, 2008

Other professional merits: Invited speaker at NMKL annual meeting 2006. Some appearances in popular press.

Last 10 years

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 8

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 8

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- Multivariate analysis of complex DNA sequence electropherograms for high-throughput quantitative analysis of mixed microbial populations. Trosvik P, Skånseng B, Jakobsen KS, Stenseth NC, Naes T, Rudi K. *Appl Environ Microbiol.* 2007 Aug;73(15):4975-83. Epub 2007 Jun 15
- Characterizing mixed microbial population dynamics using time-series analysis. Trosvik P, Rudi K, Naes T, Kohler A, Chan KS, Jakobsen KS, Stenseth NC. *ISME J.* 2008 Jul;2(7):707-15. Epub 2008 Apr 3.
- Web of ecological interactions in an experimental gut microbiota. Trosvik P, Rudi K, Strætkvern KO, Jakobsen KS, Næs T, Stenseth NC. *Environ Microbiol.* 2010 May 12. [Epub ahead of print]

Curriculum Vitae (November 2010) – Hildegunn Viljugrein

Sex: Female, **Year of birth:** 1970, **Nationality:** Norwegian

Present position: Assoc. Professor II, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Senior researcher at the National Veterinary Institute (08.01.2007 ->) Postdoc (2004 – 2007, CEES) Research scientist (2001-2002, UiO) Research assistant (2000/2001, UiO)

Academic degree: Dr. scient (2000, UiO) Cand. scient (1996, UiO) Cand. mag (1993, UiO)

Last 10 years

Most important affiliation in academic and professional committees: Member of “Epidemiology and Risk Assessment of Aquatic Animal Diseases”, - an OIE (World Organisation for Animal Health) Collaborating Centre.

No. of PhD-stud. presently under supervision as main supervisor: 1

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 11

No. of review articles and book chapters (1.1.2005–30.6.2010): 0

No. of publications in peer-r. jour. or peer-r. monographs (total career): 22

No. of review articles and book chapters (total career): 0

Three most important publications the last 10 years:

- Kausrud, K.L, H. Viljugrein, A. Frigessi, M. Begon, S. Davis, H. Leirs, V. Dubyanskiy and N.C. Stenseth 2007. Climatically-driven synchrony of gerbil populations allows large-scale plague outbreaks. Proc. R. Soc. Lond. B, 274(1621), 1963-1969 (doi:10.1098/rspb.2007.0568).
- Viljugrein, H., N.C. Stenseth, G.W. Smith and G.H. Steinbakk 2005. Density dependence in North American ducks. Ecology 86: 245-254 (doi:10.1890/04-0467).
- Stenseth, N.C., H. Viljugrein, T.F. Hansen, T. Saitoh, M.O. Kittilsen, E. Bølviken and F. Glöckner 2003. Seasonality, density dependence and population cycles in Hokkaido voles. PNAS 100 (20): 11478-11483 (doi:10.1073/pnas.1935306100).

Curriculum Vitae (November 2010) – Jaime Otero Villar

Sex: Male, **Year of birth:** 1977, **Nationality:** Spanish

Present position: Postdoc research fellow, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: PhD fellow at the Marine Research Institute from the Spanish Research Council (IIM, CSIC)

Academic degree: Graduate in Marine Biology (University of Santiago de Compostela, Spain in 2000). MSc (University of Vigo & Marine Research Institute, IIM-CSIC, Spain in 2002). PhD (University of Vigo & Marine Research Institute, IIM-CSIC, Spain in 2007)

Last 10 years

Most important affiliation in academic and professional committees: Only PhD and current Postdoc fellowship.

Scientific review work including peer-review: Reviewer of five SCI journals.

Dissemination activities: Several contributions in popular science articles.

Other professional merits: Participation in several regional, national and international research projects. Assistance to multiple conferences, seminars, courses and summer schools.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 7

No. of review articles and book chapters (1.1.2005–30.6.2010): 10

No. of publications in peer-r. jour. or peer-r. monographs (total career): 7

No. of review articles and book chapters (total career): 10

Three most important publications the last 10 years:

- González et al. (2005) Distribution of common octopus and common squid paralarvae in a wind-driven upwelling area (Ria of Vigo, northwestern Spain). *Journal of Plankton Research* 27: 271-277 (doi: 10.1093/plankt/fbi001).
- Otero et al. (2008) Bottom-up control of common octopus *Octopus vulgaris* in the Galician upwelling system, northeast Atlantic Ocean. *Marine Ecology Progress Series* 362: 181-192 (doi:10.3354/meps07437).
- Otero et al. (2009) High-frequency coastal upwelling events influence *Octopus vulgaris* larval dynamics on the NW Iberian shelf. *Marine Ecology Progress Series* 386: 123-132 (doi:10.3354/meps08041).

Curriculum Vitae (November 2010) – Leif Asbjørn Vøllestad

Sex: Male, **Year of birth:** 1956, **Nationality:** Norwegian

Present position: Professor, CEES, Dep of Biology, Univ of Oslo

Academic degree: Doctor of Philosophy: University of Oslo, Faculty of Mathematics and Natural Sciences, 1988

Last 10 years

Most important affiliation in academic and professional committees: Editor, Ecology of Freshwater Fish Contributing Editor, Aquatic Biology

Scientific review work including peer-review: Estimated c. 40 papers for review in international journals annually.

Dissemination activities: Responsible for the topic: "Fishes" in the Store Norske Leksikon

Other professional merits: Member of the Norwegian Red List committee (freshwater fishes). Member of committee overseeing the system of Nasjonale lakseelver og fjorder (evaluating system of monitoring effects and trends). Organized international symposium on: Advances in the Population Ecology of Stream Salmonids (Luarca, Spain)

No. of PhD-stud. presently under supervision as main supervisor: 7

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 41

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 109

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- Serbezov, D., Bernatchez, L., Olsen, E.M. & Vøllestad, L.A. 2010. Mating patterns and determinants of individual reproductive success in brown trout (*Salmo trutta*) revealed by parentage analysis of an entire stream living population. *Molecular Ecology* 19: 3193-3205. (doi: 10.1111/j.1365-294x.2010.04744.x)
- Edeline, E., Carlson, S.M., Stige, L.C., Winfield, I.J., Fletcher, J.M., James, J.B., Haugen, T.O., Vøllestad, L.A. & Stenseth, N.C. 2007. Trait changes in a harvested population are driven by a dynamic tug-of-war between natural and harvest selection. *Proceedings of the National Academy of Sciences* 104: 15799-15804. (doi/10.1073/pnas.0705908104)
- Haugen, T.O. & Vøllestad, L.A. 2001. A century of life-history evolution in grayling. *Genetica* 112/113: 475-491 (<http://www.ingentaconnect.com/content/klu/gene/2001/00000112/e0020001/00382349>)

Curriculum Vitae (November 2010) – Kjartan Østbye

Sex: Male, **Year of birth:** 1967, **Nationality:** Norwegian

Present position: Researcher, CEES, Dep of Biology, Univ of Oslo

Previous academic positions: Postdoc - CEES/UiO Dr. Scient - NTNU/NINA

Academic degree: Dr. Scient NTNU 2005 Cand. Scient UiO 1994

Last 10 years

Most important affiliation in academic and professional committees: CEES, NINA (Kjetil Hindar), UiB (T. Klepaker), University of Laval (L. Bernatchez), Max Planck, Plön (A. Nolte), University of Helsinki (S. McCairns), Stanford University (D. Kingsley and F. Jones).

Scientific review work including peer-review: Journals: *Evolutionary Ecology*, *Journal of Fish Biology*, *Biological Journal of the Linnean Society*, *Canadian Journal of Fisheries and Aquatic Sciences*, *Ecology*, *Ecography*, *Frontiers in Zoology*, *Molecular Ecology*, *Archivum für Hydrobiologia*. Books: 1. Chapter 1 in: “Biology of the three-spined stickleback”, (Eds. S. Östlund- Nilsson & I. Meyer), 2006, CRC Press, Taylor & Francis group, London.

Dissemination activities: I have been opponent for one master thesis in fish biology in UiB

Other professional merits: I have co-supervised the following students: Annette Taugbøl (2008>) PhD-student partly supervised by me while A. Vøllestad is her formal supervisor, Kyrre Grøtan, master student (2007-2009, grade C), Evelyn Kristensen, master student (2006-2008: grade B), Oda Bjarke, master student (2006-2008: grade A). I have supervised these three master students together with their formal supervisors being A. Vøllestad, H. Lampe, and G. Nilsson, all at UiO. In addition I have had the ideas for and written (in collaboration) two applications that were funded by RCN; one post doc (3 years) and one researcher (4 years) + one postdoc (3 years). Television appearance: 1. Threespine stickleback mating behaviour (translated). “Fiskenes Don Juan”. Ut i Naturen NRK1 26.08.08. <http://www1.nrk.no/nett-tv/natur/spill/verdi/68971> 2. *Gammarus lacustris* in a limestone cave (translated). “Grottelevende krepsdyr”. Ut i naturen NRK1 28.01.03.

No. of PhD-stud. presently under supervision as main supervisor: 0

No. of PhD-stud. completed for the period 1.1.2005–30.6.2010 as main supervisor: 0

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 14

No. of review articles and book chapters (1.1.2005–30.6.2010): 1

No. of publications in peer-r. jour. or peer-r. monographs (total career): 24

No. of review articles and book chapters (total career): 1

Three most important publications the last 10 years:

- Bernatchez, L. S. Renaut, A. R. Whiteley, D. Campbell, N. Derome, J. Jeukens, L. Landry, G. Lu, A. W. Nolte, K. Østbye, S. M. Rogers, J. St-Cyr. 2010. On the origins of species: insights from the ecological genomics of whitefish. *Philosophical Transactions of the Royal Society B* 365: 1783-1800.
- Østbye, K., P.-A. Amundsen, L. Bernatchez, A. Klemetsen, R. Knudsen, R. Kristoffersen, T.F. Næsje & K. Hindar. 2006. Parallel evolution of ecomorphological traits in European whitefish *Coregonus lavaretus* (L.) species complex during postglacial times. *Molecular Ecology* 15: 3983-4001.
- Østbye, K., T.F. Næsje, L. Bernatchez, O.T. Sandlund & K. Hindar. 2005. Morphological divergence and origin of sympatric populations of European whitefish (*Coregonus lavaretus* L.) in Lake Femund, Norway. *Journal of Evolutionary Biology* 18: 683-702.

SELF-ASSESSMENT - LEVEL 2

Integrative Biology (IB)

1.2.1 *Organisation, research leadership, strategy and resource situation*

The programme, established in its present form in 2007, is led by a research manager and comprises seven professors (including the manager), two adjunct professors, two postdoctoral fellows, three technicians, 10 PhDs and 5 external PhDs (registered at UiO, but do most of their research at other institutions). There are 2-3 meetings of the entire programme annually, a weekly seminar and (recently initiated) a social event every Friday. The distribution of resources within the programme (funds, common instruments, technical assistance) is generally decided on in plenary (scientific staff).

The background of the scientific staff in the programme is in terrestrial ecology (zoology), plant physiology, marine ecology, limnology, biochemistry and toxicology. Their current activity represents a range of research areas, such as ecophysiology, taxonomy, toxicology and ecotoxicology, life history traits, population biology, environmental modelling and ecological stoichiometry. The scientific staff is aged 38-67 (postdoctoral fellows 32, 38) and have a Norwegian background. There are six male and one female permanent scientific staff, the postdoctoral fellows are one of each sex. One professor, the two adjunct professors and a postdoctoral fellow belong to the research group in toxicology and ecotoxicology (hereafter referred to as "Toxicology"). Toxicology has been identified as a strategic research area by the Faculty ("emerging research area"). This strategic initiative includes an additional two professors from IB as well as scientific staff from the School of Pharmacy and Department of Chemistry at UiO and three researchers from NIVA.

In addition to scientific and popular publication, members of the programme are active in disseminating our science to society and using science to assist national and international processes. The programme accepts and supports the dissemination strategy of the Department of Biology and the University of Oslo, and there is an expressed goal for the programme that the articles from the integrative approach should be aimed at highly ranked general journals, and as far as possible as open access articles. Members of the programme have developed internet-based information resources (see e.g. <http://www.bio.uio.no/plfys/haa/leks/>) and contribute in national organisations and journals. There has been an increasing media involvement for toxicology over the past few years, partly linked to the chairmanship of a national commission on hazardous substances (see below). Students and staff in the toxicology group are members of the editorial group and important contributors to a popular journal, *Toksikologen* ("the Toxicologist"). The toxicology group contribute to and/or chair 2-3 meetings or seminars for a non-scientific audience annually.

Members of the research group in toxicology have chaired and contributed to a range of national and international organisations through the last decade and have contributed substantially towards supranational processes, particularly in occupational toxicology, risk assessment and marine environmental issues. This includes work in OECD, ICES, OSPAR, JRC and EU working groups and committees. A member of the programme has chaired a government-appointed commission that recently submitted its report on how to reduce exposure to hazardous substances in Norway (<http://www.regjeringen.no/nb/dep/md/dok/nou-er/2010/nou-2010-9.html?id=622877>). The research group in toxicology has been successful in securing external funding and have thus been able to maintain high activity with only one permanent scientific staff. Toxicology has received two PhD candidates through its status as strategic research area. Toxicology is one of three MSc programmes

in Biology, supervise around a third of all MSc students at the Department and the research group in Toxicology is responsible for four courses at MSc/PhD level as well as contributing in other subjects. The MSc students are viewed as a research resource and their work is generally linked up with larger ongoing projects or PhD-projects. Most of the theses are of a quality sufficient for publication in peer-reviewed literature. As will be apparent from the above, the toxicology group has been able to maintain a high profile nationally and (in selected areas) internationally, a substantial output of MSc-students and teaching as well as producing science resulting in a good number of publications in peer-reviewed journals over the past 5 years (see below; 78 papers or book chapters for one full, two adjunct professors and a postdoctoral fellow). There is a need for recruitment to the permanent staff in toxicology. Other members of IB staff have also taken on heavy teaching obligations at both BSc and MSc level, which necessarily reduces scientific output such as publications.

In addition to toxicology, research on ecological stoichiometry and studies linking life history traits to environmental variation have been successful in securing external funding and have also been granted internal PhDs. In the period 2005-2010, researchers in the Integrative Biology programme (including Toxicology) were involved in 18 RCN-funded projects (led 7) and 7 projects funded from other sources (EU, industry).

The programme has inherited and developed good facilities for elemental analyses in different matrices. Other facilities include instrumentation for more or less automated cell or particle analysis, a range of plate readers for different applications, culturing facilities for terrestrial and aquatic test organisms. IB scientific staff lead the experimental Phytotron facility and the mountain field station owned by UiO (Finse). IB researchers therefore have easy access to two of the research facilities under the Department of Biology. On the other hand the two scientific staff have not insignificant administrative tasks associated with the facilities. Current projects, particularly in toxicology, also use resources elsewhere in the Department, e.g. instruments at CEES, and facilities at IMBV, for gene expression and cell physiology studies.

The staff at the programme for Integrative Biology uses research infrastructure belonging to other departments of the Faculty (Department of Molecular Biosciences, School of Pharmacy), Norwegian research institutions (National Institute for Public Health, the Norwegian School of Veterinary Sciences, NIVA and the University of Bergen), as well as facilities at Scandinavian institutions such as the Institute of Biology, University of Copenhagen, and the Department of Terrestrial Ecology, Danish National Environmental Research Institute.

Experimental facilities at NIVAs Marine Research Station Solbergstrand, the research vessels (Trygve Braarud and Bjørn Føyn) and the field station in Drøbak are critical for projects investigating marine organisms or habitats. Espegrend Marine Research Station, belonging to the University of Bergen, is used for pelagic mesocosm studies. Facilities at the Centre of Invasion Biology, at Stellenbosch University (South Africa) are used in ecophysiological and ecological studies of terrestrial arthropods. The field stations at Abisko Scientific Research Station, Sweden, and Zackenberg Ecological Research Operations, Greenland, are important facilities for studies of climate change impacts on soil ecosystems.

1.2.2 Research activities, including interdisciplinary research and research impact

The activity of the program have high international standard in several fields, such as ecotoxicology, ecological stoichiometry, linkage between life history and effects of environmental

variations, and modelling of demographic processes in stochastic environments, with a number of contributions in highly ranked journals.

The toxicology group has over the last five years had externally funded projects on interactions between environmental stressors, effects of offshore activities and oil as well as development of biomarker methods to understand effects of contaminants in marine ecosystems. In addition, there is a current activity on developing cell based methods and methods by which to study mechanisms of oxidative stress and DNA damage. The activity in the toxicology group led to 78 publications in the period 2005-2010. In addition to analytical methods, particularly biomarkers, the group has established different experimental systems according to the scientific issue being tackled and are at the forefront in developing and using long-term fish exposure systems, caging systems, sediment mesocosms and pelagic mesocosms.

Toxicological research would by many be viewed as inherently applied, but it is also a strategy by which to investigate fundamental processes through using one or more external modulating agents. A recent project in the group has e.g. followed the maturation process of Atlantic cod and how this was affected by low concentrations of substances released by offshore oil and gas platforms. The project has resulted in new knowledge about the temporal development of symptoms relating to the exposure (important to be able to interpret observations in nature), but also about natural processes in cod. In other projects we investigate the development of oxidative stress in cell systems under various conditions, including chemical stressors. Again, a spin-off is increased understanding of fundamental processes relating to cellular defence mechanisms under different physiological states.

Ecological stoichiometry builds on the concept that all living organisms are constructed over the same general template. Recognizing that vital rates and stoichiometry are linked through the causal chain of growth rate, protein synthesis, ribosome density, and cellular P content has recently led to a partial merge between the metabolic theory of ecology and ecological stoichiometry. The main contribution to ecological stoichiometry is the focus on interactions between temperature and food stoichiometry comparing several phylogenetically distant organism groups. In the stoichiometric approach to ecology there is often a focus on how imbalances between carbon fixation and mineral nutrient acquisition in autotrophs can lead to reduced growth efficiency in herbivores. In a recent project, we explore how the same stoichiometric principles can be applied for optimizing the lipid yield in experimental biofuel reactors.

Research on linking life history to effects of environmental variation combines studies of tolerance to climate stress (ecophysiology), phenotypic plasticity in life history traits (acclimation, thermal reaction norms), phenology and spatial heterogeneity with population dynamics and species interactions. Studies are done in experimental model systems as well as in the field, with terrestrial arthropods and in freshwater systems. Climate change impact on the Arctic and sub-Arctic soil systems has been studied in a long-term project since 2001. The focus is on physiological ecology and soil biology, with experimental investigations on soil fauna, plant and microorganism interactions, decomposition processes and food web complexity. A recent project concerning blowflies on stockfish has allowed a detailed study on life cycle and phenological strategies of the fly species involved, and improved knowledge of blowfly life history has been used to develop strategies for reducing the damage on stockfish.

An overarching ambition of the programme is to include the above research areas in an integrated approach to answer fundamental questions in ecology and toxicology, such as clarifying underlying mechanisms for the vulnerability of species towards environmental changes and how individual fitness have consequences for population development. Research within the programme addresses

variations in the physical and the chemical environment, and how they may affect fundamental processes of life. Such studies have particularly included interactions between factors such as climate, habitat, nutrient stoichiometry and the influence of stressors such as oil and xenobiotics. There is an ongoing project that addresses interactions between three factors (nutrients, oil and xenobiotics) in marine systems. In order to understand the higher order effects (population and community level), the programme also incorporate habitat heterogeneity, habitat fragmentation and demographic processes into the experimental and analytical approach. The possibility to investigate links between individual performance, population growth and the dynamics of species assemblages is one of the aims of this integrative approach, being a fundamental background for understanding the effects of environmental change on natural systems, and thus contributing to the ability to predict future effects. Life history traits, such as growth rate, age and size at maturity are central response variables in our focus on phenotypic responses, but also important determinants of population responses. Species-specific differences in these responses may have great effects on species interactions, and thus on community structure and ecosystem functioning. An important challenge is to improve our understanding of direct compared to indirect effects of environmental variables and why related species may react very differently on environmental changes, and to what extent this might affect their co-existence. This clearly also has implication for invasive species. Our focus on ecosystem functioning and ecosystem services is primarily linked to questions concerning productivity in freshwater systems and in higher plants, and the interaction between soil fauna and decomposition processes in the soil. These questions will be more closely linked to our studies on species assemblages and biodiversity. The integrative approach in the studies on effects of environmental changes, with an increasing emphasis on molecular and subcellular effects is in line with current trends in this field of research. The ongoing activity in developing systems to investigate links between molecular and subcellular processes and individual fitness and further to population dynamics of a species is at the front of current research in this area. The integrative approaches, based on simple principles such as laws of mechanics, mass and energy conservation, as well as natural selection, have inspired important research trends in biology in the last decades, such as the metabolic theory of ecology and ecological stoichiometry.

The experimental nature of the research activity in the programme requires terrestrial and aquatic model systems that are well understood and amenable to manipulation. This work includes both experimental design and mathematic/statistical modelling, with model systems ranging from cell cultures to population assemblages. The scientific staff of the programme has extensive experience with experimental work on appropriate systems, e.g. collembolans, rotifers, cladocerans, selected plant species, marine fish species and sediment-dwelling organisms. There is work in progress to establish compact and flexible exposure systems, which may be designed for experimental studies at high degree of complexity, including multi species interaction and interaction between environmental variables. The chosen model organisms are currently used in experiments in simplified cultures and in micro- and mesocosms, as well as in field studies and field experiments. The expertise in molecular and cellular methods currently available in the toxicology group will be applied in approaches to understand mechanisms underlying individual responses to climate modulation, environmental stress and nutrition.

As will be apparent, a large part of the research activity within the programme concerns the effects of environmental changes on natural biodiversity and human livelihood, issues clearly relevant to society. In particular, hazardous substances, eutrophication and climate change are on the political agenda and receive attention by the media. As mentioned above, the toxicology group has contributed to national and international guidelines for environmental monitoring and are used as experts in various national and international groups.

The strength of the research programme Integrative Biology lies in the wide range in scientific experience among the scientific staff and a common interest in developing an integrative approach as described above. A challenge for the programme is to include a larger number of scientific staff in this activity. The three technicians in the programme only cover the scientific requirements of the scientific staff to some extent. There is a lack of technical assistance for the terrestrial activity not associated with the Finse field station. Over the past few years, Integrative Biology has used a major part of the internal resources to develop methods and concepts to promote integrative projects. One such projects involves collembolans and a method paper describing the quantification of DNA-damage in collembolan hemocytes by the Comet method is now in preparation. The postdoctoral fellow in toxicology, also tasked with the co-ordination of the development of molecular tools in the programme, is a strong support to this strategic direction. The programme was recently awarded a Faculty PhD which will be used to improve the understanding of links between sublethal effects in individuals and individual fitness and life history traits.

There is considerable variation in publication rate between scientific staff within the Integrative Biology programme. The permanent IB staff produced on average 2.5 peer-reviewed papers or book chapters per year in the period 2005-2010, with a range from 2 to 54 for individual researchers over the five years.

1.2.3 Training, mobility and career path

As indicated above, there has been an increasing need for of toxicologists in Norwegian society. Most graduated candidates (MSc) have until now been quickly employed in management, research institutes, consultancy or industry following graduation, which has actually made it a challenge to attract the best candidates for PhD positions.

Programme funds have been used actively in projects to develop promising MSc-candidates for possible future PhD positions. Toxicology currently has exchange agreements with the Universities of Porto, Algarve and Metz with more to follow (Erasmus agreements) and is in the process of developing a proposal for an Erasmus Mundus network with other European institutions within the area ecotoxicology/environmental chemistry. Although it is not a protected title in Norway, there is a registration system for toxicologists (EUROTOX), and courses at UiO are in practice required to achieve such registration.

1.2.4 Research collaboration (national, international, industry/public sector), including interdisciplinarity

As the publication list clearly shows, the scientific staff has a large network of collaborators.

The toxicology group has close collaboration with both human toxicological research groups and ecotoxicological research groups. In Norway main collaborators have been the National Institute for Public Health (genotoxicity), Norwegian College for Veterinary Sciences (microarray, autoradiography, reproductive toxicology), the Norwegian Institute for Water Research (toxicity testing, food-web modelling, sediment processes, analytical chemistry, passive samplers) and the University of Bergen (pelagic ecology). In addition to a well-established ICES network, including marine research institutes from most European countries with an Atlantic coastline, the group collaborates on a regular basis with colleagues at universities in Bilbao, Göteborg, Plymouth, Porto, Vigo, Stockholm and Zagreb. The toxicology group has co-ordinated different international

activities, including the BECPFLAG workshop which led to the publication of a special SETAC volume (31 peer-reviewed contributions). The group is currently co-ordinating a similar international project (ICON) based on the ICES network. Both projects have received funding from various sources, including industry and RCN, and has served to promote fundamental research as well as links between research and environmental management. Recent RCN projects have involved colleagues from Croatia, Spain and UK, and the group currently co-ordinates two WPs in an EU project with colleagues from Spain, Portugal and France. The international standing of the group has also led to publications on applications of science. National and international collaboration has ensured high-quality projects and publications in good journals (see publication list) and has been used a mechanism for exchange of methods and training of MSc- and PhD-candidates.

Originating within relatively narrow circle of limnologists, ecological stoichiometry is now recognized as an important integrative principle across a range of biological disciplines, from cell physiology to global biogeochemical cycles, and even with applications to cancer research and astrobiology. Our group has been involved with this movement from the start, which has resulted in collaboration (8-10 publications so far) with key researchers from USA, Europe, and Japan, and which has also resulted in exchanges of PhD students and reciprocal sabbaticals for scientific staff.

National collaboration on terrestrial arthropods involves Norwegian School of Veterinary Science and Institute of Health and Society, Faculty of Medicine, University of Oslo (PhD-project on the transport of tick borne pathogens with migrating birds), and the Norwegian Institute of Public Health (PhD-project on blowflies on stockfish). Through a Norway-South Africa collaborative framework there has been close integration of projects between Norway, South Africa, Sweden and France with a focus on climate adaptation, life history, population biology and biodiversity of springtails. The main partners are Centre for Invasion Biology, Stellenbosch University, Department of Ecology, Swedish University of Agricultural Sciences and Museum National d'Histoire Naturelle, Paris. This collaboration has so far resulted in 7 papers being published or accepted, and several more manuscripts are in different stages of preparation. There is also close collaboration with the University of Copenhagen and the Danish National Environmental Research Institute within the fields of soil food web dynamics, climate change effects on the soil system, and research on combined effects of toxic and climatic stress in arthropods. This collaboration has so far resulted in 10 published peer-reviewed papers.

Integrative Biology (IB)
List of publications 01.01.2005 – 30.06.2010

Listed separately for **General Integrative Biology** and **Toxicology/Ecotoxicology**

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Tollefsen, K-E, Goksøyr, A, **Hylland, K.** 2006. Assessment of cytotoxic, CYP1A inducing and estrogenic activity in waters from the German Bight and the Statfjord area of the North Sea by a suite of fish *in vitro* bioassays. In: *Biological effects of contaminants in pelagic ecosystems*. Hylland, K, Vethaak, AD, Lang, T (Eds), SETAC special volume, pp 385-396.

Uppstad H, **Øvrebø S**, Haugen A, Mollerup S. 2010. Importance of CYP1A1 and CYP1B1 in bioactivation of benzo[a]pyrene in human lung cell lines. *Toxicol Lett.*, 192: 221-8.

Aamodt, S.; **Sjursen (Konestabo), H.**; **Sverdrup L.E.**; Gudbrandsen, M.; Reinecke S.A.; Reinecke A.J; Stenersen, J. 2007. Recovery of cholinesterase activity in the earthworm *Eisenia fetida* Savigny following exposure to chlorpyrifos. *Environmental Toxicology and Chemistry*, 26:1963-1967.

CV - Halvor Aarnes

Sex: Male

Year of birth: 1948

Nationality: Norwegian

Present position: Professor (1993-present)

Previous academic positions: Research fellow 1974-1980 , Associate professor 1980-1993
University of Oslo.

Academic degree: Cand. real (1974), Dr.philos. (1979), University of Oslo

Publications for the period 2005-2010: 2 (ISIWeb)

Myhre, O., Mariussen, E., Reistad, T. Voie, Ø.A., Aarnes, H. & Fonnum, F.: Effects of polychlorinated biphenyls on the neutrophil NADPH oxidase system. *Toxicology Letters* 187 (2009) 144-148.

Aarnes, H., Eriksen, A.B., Petersen, D. & Rise, F.: Accumulation of ammonium in Norway spruce (*Picea abies*) seedlings measured by in vivo ¹⁴N-NMR. *Journal of Experimental Botany* 58 (2007) 929-94. <http://jxb.oxfordjournals.org/content/58/5/929.full>

Total career publications: Number of publications in peer reviewed journals: 29
(ISIWeb)

Three most important publications the last 10 years:

1. Myhre, O., Andersen, J.M., Aarnes, H. & Fonnum, F.: Evaluation of the probes 2'-7'-dichlorofluorescein diacetate, luminal, and lucigenin as indicators of reactive species formation. *Biochem. Pharmacology* 2003; 65: 1575-1582. Times cited: 179
<http://www.ncbi.nlm.nih.gov/pubmed/12754093>

2. Myhre, O., Vestad, T.A., Sagstuen, E.; Aarnes, H. & Fonnum, F. :The Effects of Aliphatic (n-nonane), Naphtenic (1,2,4-trimethylcyclohexane) and Aromatic (1,2,4-trimethylbenzene) Hydrocarbons on Respiratory Burst in Human Neutrophil Granulocytes. A Fluorescence and Electron Paramagnetic Resonance (EPR) Spectroscopy Study. *Toxicology and Applied Pharmacology*. 2000; 167 : 222-230 . Times cited: 23
<http://www.ncbi.nlm.nih.gov/pubmed/10986013>

3. Andersen, J.M.; Myhre, O., Aarnes, H., Vestad, T.A. & Fonnum, F. Identification of the Hydroxyl Radical and Other Reactive Oxygen Species in Human Neutrophil Granulocytes Exposed to a Fragment of the Amyloid Beta Peptide . *Free Radical Research*. 2003; 37 (3) : 269-279. Times cited: 8
<http://www.ncbi.nlm.nih.gov/pubmed/12688422>

CV - Tom Andersen

Sex: Male

Year of birth: 1955

Nationality: Norwegian

Present position: Professor (2005 -)

Previous academic positions: Associate professor (2003-2005)

Academic degree (university and year): Dr. Philos. 1993

Board member IPM/UMB (2010 -), Evaluation panel EMG, Univ. Umeå (2009), Natur i Norge-utredningen (Artsdatabanken 2007-2009), Reviewer for Limnology & Oceanography, American Naturalist, Ecology, Ecosystems, Oikos, Biogeochemistry, etc. PhD thesis reviewer Univ. Bergen, Univ. Umeå

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: 2
(Birger Skjelbred, Koji Tominaga)

- Number of PhD-students completed for the period 1.1.2005 - 30.6.2010 as main supervisor: 2
Søren Larsen (2010), Marcin Włodzimierz Wojewodzik (2010)

Publications for the period 1.1.2005 - 30.6.2010

- Number of publications in peer-reviewed journals or peer-reviewed monographs: 22

- Number of review articles and book chapters: 0

Total career publications

- Number of publications in peer-reviewed journals or peer-reviewed monographs: 57

- Number of review articles and book chapters:

Three most important publications the last 10 years

Ptacnik, R, **Andersen, T**, Brettum, P, Lepistö, L, Willén, E (2010) Regional species pools control community saturation in lake phytoplankton. Proceedings of the Royal Society B.
<http://rspb.royalsocietypublishing.org/content/early/2010/07/09/rspb.2010.1158.full>

Andersen, T, Carstensen, J., Hernandez-Garcia, E, Duarte, C. M. (2009) Ecological thresholds and regime shifts: approaches to identification. Trends in Ecology and Evolution 24: 49-57
<http://dx.doi.org/10.1016/j.tree.2008.07.014>

Ptacnik R, Solimini AG, **Andersen T**, Tamminen T, Brettum P, Lepistö L, Willén E, Rekolainen S (2008) Diversity predicts stability and resource use efficiency in natural phytoplankton communities. Proceedings of the National Academy of Sciences 105: 5134-5138
<http://www.pnas.org/content/105/13/5134.full>

CV - Torbjørn Håkan Ergon

Sex: Male

Year of birth: 1970

Nationality: Norwegian

Present position: Associate Professor and Director of Finse Alpine Research Centre

Previous academic positions: Post-doc

Academic degree (university and year): Dr. Scient. (PhD)

- 2008 to present: Director of Finse Alpine Research Centre (www.finse.uio.no)
- Aug. 2004 to 2005: Guest researcher at USGS Patuxent Wildlife Research Centre, Maryland, USA
- Review assignments for several science foundations and high impact journals, including National Science Foundation (USA), Israel Science Foundation, Journal of Animal Ecology, Ecology, Oikos, Behavioural Ecology and Climate Research.

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: 1

(+3 as co-supervisor)

- Number of PhD-students completed for the period 1.1.2005 - 30.6.2010 as main supervisor: 0

Publications for the period 1.1.2005 - 30.6.2010

- Number of publications in peer-reviewed journals or peer-reviewed monographs: 11

- Number of review articles and book chapters: 2

Total career publications

- Number of publications in peer-reviewed journals or peer-reviewed monographs: 19

- Number of review articles and book chapters: 2

Three selected publications the last 10 years:

1. **Ergon, T.**, X. Lambin, and N. C. Stenseth. 2001. Life-history traits of voles in a fluctuating population respond to the immediate environment. *Nature* 411: 1043-1045. <<http://www.nature.com/nature/journal/v411/n6841/abs/4111043a0.html>>
2. **Ergon, T.**, J. R. Speakman, M. Scantlebury, R. Cavanagh, and X. Lambin. 2004. Body mass and energy expenditure in overwintering field voles (*Microtus agrestis*): Why are voles smaller in declining populations? *The American Naturalist* 163 (3): 442-457. <<http://www.jstor.org/stable/3473332>>
3. **Ergon, T.**, Yoccoz, N. & Nichols, J. D. (2009) Estimating latent time of maturation and survival costs of reproduction in continuous time from capture-recapture data. *Modeling Demographic Processes in Marked Populations* (eds D. Thompson, E. G. Cooch & M. J. Conroy). Springer Verlag. <<http://www.springerlink.com/content/978-0-387-78150-1#section=128545&page=1>>

CV – Aud Berglen Eriksen

Sex: Female
Year of birth: 1943
Nationality: Norwegian
Present position: Head of the Phytotron, Associate professor
Previous academic positions: Assistant professor, senior research assistant
Academic degree: Master of Sciences (Cand. real.) in 1969

Member of councils/committees, last 10 years

1984-2008 Chairman and scientific head of the workshop at the Department of Biology.
1989-2000 Member of the Committee of the Division for North/South University Cooperation. One representative from each faculty at the University of Oslo.
1999 - 2003: Member (deputy) of the board of the Department of Biology, UiO.
1999- 2003: Head (deputy) of the section of Botany and Plant physiology at the Department of Biology, UiO.
2000: Norwegian representative at the 6 Management Committee Meeting, COST E6 EUROSILVA in Firenze
2001-2008 Member of the organizing committee for the XX Congress of the Scandinavian Society for Plant Physiology (2001). Member of the Election committee. Scandinavian Society for Plant Physiology
2006- Member of the project group for national network of plant biology
2009- Member of the technical group (WP4), BIOKLIMA NFR-project.
2000-2010 Member and administrator of different evaluation committees; evaluation of applicants for different academic positions. Member of adjudication committees to assess the thesis and the defence of the PhD degree (opponent and principal opponent).
2009-2010 Member of the committee for the arctic section in the new Exhibition Greenhouse; “Oase 60° Nord”, at the Natural History Museum, UiO. (Construction and building period)

Dissemination activities: I have been given lectures and have been responsible for courses in plant physiology, ecology and ecophysiology at B.Sc.-, M.Sc.- and PhD level and have been censor at exams in plant physiology and ecophysiology (B.Sc.-,M.Sc.- and PhD levels) at UiO and UMB. 38 M.Sc. students have been supervised since 1980. Guided tours and teaching programs in the Phytotron for students, pupils at grammar schools and junior secondary school.

Patent: A plant promoting composition and method for its application. Pub.no. WO/2001/049116. Pub.date 12.07.2001. *Inventores Mahrous, Nabi; Læg Reid, Marit; Eriksen, Aud Berglen*

Publications 2005-2010: eight publications in peer-reviewed journals.

Total career publications: 24 publications in peer-reviewed journals.

Three important publications:

- Ane V. Vollsnes, Aud Berglen Eriksen, Eli Otterholt, Knut Kvaal, Unni Oxaal and Cecilia M. Futsaether. 2009. Visible foliar injury and infrared imaging show that daylength affects short-term recovery after ozone stress in *Trifolium subterraneum*. *Journal of Experimental Botany*. 60 (13): 3677-3686.
- H Aarnes, AB Eriksen, D Petersen and F Rise. 2006. Accumulation of ammonium in Norway spruce (*Picea abies*) seedlings measured by *in vivo* 14N-NMR. *Journal of Experimental Botany*, 58(5):929-934.
- H. Pleijela, A. Berglen Eriksen, H. Danielsson, N. Bondesson and G. Selldén. 2006. Differential ozone sensitivity in an old and a modern Swedish wheat cultivar - grain yield and quality, leaf chlorophyll and stomatal conductance. *Environmental and Experimental Botany*; 56(1):63-71.

CV - Geir Hestmark

Sex: male

Year of Birth: 1958

Nationality: Norwegian

Present position: Professor, Dep. of Biology, Univ. of Oslo.

Academic degree: 1991 Dr. scient. degree in biology, Univ. Oslo

Previous positions:

1981. Research assistant for prof. Arne Næss, philosophy

1982-1985 Research Fellow (vit. ass) & Senior Fulbright Scholar, Universities of Oslo & Princeton, Philosophy Departments and Classics

1986-1991 Research Fellow (univ. stip.) in history of science, University of Oslo, History Dept. - 1995 Professor competence, history of science, Univ. Oslo

1991-1998 Associate professor (førsteamanuensis) in biology (ecology, evolution), Dept. of Biology, Univ. Oslo

2002 Elected Member of the Norwegian Academy of Science and Letters.

Honors: Nansen medal Norwegian Academy of Science 1992 & 2000. Freedom of Speech Honors Prize 2000.

Three recent publications

Hestmark, G., Skogedal, O. & Skullerud, Ø. 2007. Early recruitment equals long-term relative abundance in an alpine saxicolous lichen guild. *Mycologia* 99: 207-214.

Miadlikowska, J., Kauff, F., Hofstetter, V., Fraker, E., Grube, M., Hafellner, J., Reeb, V., Hodkinson, B. P., Kukwa, M., Lücking, R., **Hestmark, G.**, Garcia Ojalora, M., Rauhut, A., Büdel, B., Scheidegger, C., Timdal, E., Stenroos, S., Brodo, I., Perlmutter, G., Ertz, D., Diederich, P., Lendemer, J. C., May, P., Schoch, C. L., Arnold, A. E., Gueidan, C., Tripp, E., Yahr, R., Robertson, C., Lutzoni, F. 2006. New insights into classification and evolution of the Lecanoromycetes (Pezizomycotina, Ascomycota) from phylogenetic analyses of three ribosomal RNA- and two protein-coding genes. *Mycologia* 98:1088-1103.

Hestmark, G., Skogedal, O. and Skullerud, Ø. 2005. Growth, population density and population structure of *Cetraria nivalis* during 240 years of primary colonization. *Lichenologist* 37: 535–541.

CV – Tor Fredrik Holth

Sex: Male

Year of birth: 1978

Nationality: Norwegian

Present position: Postdoc

Previous academic positions: Researcher, Research assistant

Academic degree: PhD (University of Oslo, 2009)

Publications for the period 1.1.2005 – 30.6.2010:

Number of publications in peer-reviewed journals: 6

Total career publications:

Number of publications in peer-reviewed journals: 7

Affiliations:

2010 – present: Board member, The Norwegian Society of Pharmacology and Toxicology (NSFT)

Awards:

Best platform presentation award: 3rd Norwegian Environmental Toxicology Symposium, Apr 15-16, Bergen, Norway.

Three most important publications the last 10 years:

Holth TF, Thorsen A, Olsvik PA and Hylland K (2010). Long-term exposure of Atlantic cod (*Gadus morhua*) to produced water components: growth, reproduction and gene expression. Canadian Journal of Fisheries and Aquatic Sciences 67(10): 1685-1698.

[Http://dx.doi.org/10.1139/F10-089](http://dx.doi.org/10.1139/F10-089)

Holth TF, Beylich B, Skarphedinsdottir H, Liewenborg B, Grung, M and Hylland K (2009). Genotoxicity of environmentally relevant concentrations of water soluble oil components in cod (*Gadus morhua*). Environmental Science & Technology 43(9): 3329-3334.

[Http://dx.doi.org/10.1021/es803479p](http://dx.doi.org/10.1021/es803479p)

Holth TF, Nourizadeh-Lillabadi R, Blaesbjerg M, Grung M, Holbech H, Petersen G, Aleström P and Hylland K (2008). Differential gene expression and biomarkers in zebrafish (*Danio rerio*) following exposure to produced water components. Aquatic Toxicology 90 (4): 277-291.

[Http://dx.doi.org/10.1016/j.aquatox.2008.08.020](http://dx.doi.org/10.1016/j.aquatox.2008.08.020)

CV – Ketil Hylland

Sex: Male

Year of birth: 1960

Nationality: Norwegian

Present position: Professor, Researcher NIVA (10%)

Previous academic positions: Research Fellow (UiO; 1993), Researcher (NIVA; 1993-), Research Manager (NIVA, 1998-2001), Adjunct Professor (UMB; 1998-2002), Adjunct Professor 20% (UiO; 2002-2006), Adjunct Professor 80% (2006-2009)

Academic degree: Dr. Scient./PhD (University of Oslo, 1992)

Committees/awards/review/dissemination (selected):

Norwegian key expert/designated expert AMAP) (metals/oil); Chair, ICES/IOC/OSPAR workshops, working groups, symposia; board member, Norwegian Oceanographers Association (NHF) (2002-2008); President, Norwegian Society for Pharmacology and Toxicology (NSFT) (2005-2007); Chair, LOC, Nordic Marine Sciences Meeting, Oslo (2006); Chair, Scientific Committee, ICES Symposium on Environmental Indicators, London (2007); Member, EU GES MSFD (Task 8) (2009); Member, EU Marine Board WGPOL (2008-2009); Chair, National Commission on Hazardous Substances (Norway; Government appointed) (2009-2010). Various best poster/platform at conferences as co-author (supervisor). Reviewer for 24 journals, member editorial board Mar Environ Res, subject editor Mar Biol Res; evaluated research proposals in UK, Sweden, Denmark, Netherlands and scientific positions in Norway, Sweden, Denmark. In the period 2005-2010 on average two radiospots/year, at least one popular lecture/year and on average one meeting led/year; 10-12 public hearings/presentations, two TV- and six radiospots related to role as Chair of National Commission (see above; 2009-2010).

Supervision of PhD-students

Number of PhD-students presently under supervision: 4

Number of PhD-students completed 2005-2010: 2

Publications for the period 1.1.2005 – 30.6.2010:

Number of publications in peer-reviewed journals: 47

Number of reports: 23

Number of review articles and book chapters: 8

Total career publications:

Number of publications in peer-reviewed journals: 82

Number of reports: 52

Number of review articles and book chapters: 13

Three most important publications the last 10 years:

Holth TF, Beylich B, Skarphedinsdottir H, Liewenborg B, Grung, M and Hylland K (2009).

Genotoxicity of environmentally relevant concentrations of water soluble oil components in cod (*Gadus morhua*). Environmental Science & Technology 43: 3329-3334.

<http://dx.doi.org/10.1021/es803479p>

Hylland, K, Ruus, A, Grung, M, Green, N. 2009. Relationships between physiology, tissue contaminants and biomarker responses in Atlantic cod (*Gadus morhua* L.). J Toxicol Environ Hlth, 72: 226-233. DOI: 10.1080/15287390802539129

(<http://www.informaworld.com/smpp/section?content=a908403279&fulltext=713240928>)

Ruus, A., Schaanning, M., Øxnevad, S., Hylland, K. 2005. Experimental results on bioaccumulation of metals and organic contaminants from marine sediments. Aquatic Toxicology 72: 273-292.

<http://dx.doi.org/10.1016/j.aquatox.2005.01.004>

CV - Heidi Sjursen Konestabo

Sex: F

Year of birth: 1972

Nationality: Norwegian

Present positions:

Postdoctoral fellow, Department of Biology, University of Oslo.

Senior Academic Librarian, Biology Library, University of Oslo Library.

Previous academic and scientific positions:

2006 - 2007: Subject librarian in biology at the Biology Library, University of Oslo.

2004 - 2006: Divisional engineer/research scientist, Toxicology laboratory, Program for Toxicology and Ecophysiology, Institute of Biology, University of Oslo.

2001 - 2004: PhD student at the Botanical Institute, University of Copenhagen, and the Department of Terrestrial Ecology, Danish National Environmental Research Institute.

1999 - 2001: Researcher, Department of Terrestrial Ecology, Danish National Environmental Research Institute.

Academic degree (university and year):

PhD, University of Copenhagen, 2004

Academic and scientific affiliations 2001-2010:

Member of the Norwegian Scientific Committee for Food Safety, Genetically Modified Organisms group, 2010-2013.

Reviewer assignments, peer-reviewed journals: Applied Soil Ecology, Norwegian Journal of Entomology.

Reviewer assignments, science funding applications: Australian Antarctic Division.

Publications for the period 1.1.2005 - 30.6.2010:

Number of publications in peer-reviewed journals or peer-reviewed monographs: 4

Total career publications:

Number of publications in peer-reviewed journals or peer-reviewed monographs: 15

The three most important publications the last 10 years:

Sjursen H, Holmstrup M (2004) Direct measurement of ammonium excretion in soil microarthropods. *Functional Ecology* 18, 612-615.

<http://onlinelibrary.wiley.com/doi/10.1111/j.0269-8463.2004.00877.x/abstract>

Sjursen H, Michelsen A, Jonasson S (2005) Effects of long-term soil warming and fertilisation on microarthropod abundances in three sub-arctic ecosystems. *Applied Soil Ecology* 30, 148-161.

Konestabo HS, Michelsen A, Holmstrup M (2007) Responses of springtail and mite populations to prolonged periods of soil freeze-thaw cycles in a sub-arctic ecosystem. *Applied Soil Ecology* 36, 136-146.

CV - Hans Petter Leinaas

Sex: male

Year of birth: 1948

Nationality: Norwegian

Present position: Professor (since 1995)

Previous academic positions:

1989 – 1995 Research scientist/ Senior scientist Norwegian Institute for Nature research

1985 – 1988 Project leader (FOBO), Norwegian Research Council

1984 Research Scientist. Norwegian Research Council and Norwegian Polar Institute

1976 - 82 Research fellow (vit.ass.) Zoological Institute. University of Oslo.

Academic degree: Dr. philos.), Univ. of Oslo, autumn 1983

Affiliation in academic and professional committees etc. during the last 10 years:

- Academic committee for Arctic Biology at The University Centre in Svalbard (UNIS) (leader 2000-2003, Substitute 2004 - 2006).
- Working group for improved environmental engagement in higher education and research. (Ministry of Education, Research and Church Affairs/ Dept. of Research) (spring 2000).
- Several committees at the Department of Biology, University of Oslo.
- Member of the Faculty education committee (2006 – 2007).
- Leader of the Bachelor programme at the Department of Biology (2005 – 2007)
- Member of 3 doctoral committees and external examiner of 16 Master Theses.
- Peer-review for a number of international journals; for applications to The Swiss Research Council, National Research Foundation (South African), Norwegian Research Council, Norwegian Polar Institute, Directorate for Nature Management, and Norwegian Agency for International Development, SUM (UiO); Member of the editorial board of *Pedobiologia* 1998-
- Leader of 4 projects funded by NRC, and a University PhD-projects.
- Head of the Program for Experimental Behavioral and Population Ecological Research (2005 – 2007) and Integrative Biology Group (2008-), both at the Department of Biology, UiO

Supervision of PhD-students

- Presently main supervisor: for four PhD-students and associate supervisor for one at UiO and one in South Africa

- Not main supervisor for any student completed their PhD 1.1.2005 - 30.6.2010 (only associate supervisor for one in South Africa)

Publications for the period 1.1.2005 - 30.6.2010

- Nine publications in peer-reviewed journals.

Total career publications:

- 53 publications in peer-reviewed journals; - 7 book chapters:

The three most important publications the last 10 years

- Chown, S.L., Slabber, S, McGeoch, M.A., Janion, C., and **Leinaas, H.P.** 2007. Phenotypic plasticity mediates climate change responses among invasive and indigenous arthropods. *Proceedings of the Royal Society B-Biology sciences* 274: 2531-2537. DOI: 10.1098/rspb.2007.0772.
<http://rspb.royalsocietypublishing.org/content/274/1625/2531.full.pdf+html>
- Chown, S.L., Sinclair, B.J., **Leinaas, H.P.** and Gaston, K.J. 2004. Hemispheric Asymmetries in Biodiversity – A serious matter for ecology. *PLoS Biology* 2: 1701-1707.
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC526784/pdf/pbio.0020406.pdf>
- Ims, R.A., **Leinaas, H.P.** and Coulson, S. 2004. Spatial and temporal variation in patch occupancy and population density in a model system of an Arctic Collembola species assemblage. *Oikos* 105: 89-100. <http://onlinelibrary.wiley.com/doi/10.1111/j.0030-1299.2004.12634.x/full>

CV - Line Emilie Tvedt Sverdrup

Sex: Female

Year of birth: 1972

Nationality: Norwegian

Present position: Assistant Professor, UiO

Academic record:

PhD (Dr. scient.), Biology (Ecotoxicology), University of Oslo, 2001

MSC (Cand.scient.), Biology (Toxicology), University of Oslo, 1997

Employment record:

2008 - Assistant professor at the University of Oslo (20 %)

2005 - Senior consultant with DNV Energy, Risk Management Solutions.

2003 – 2005: Post doc position at the University of Oslo (2 years)

2002 - 2003: Consultant, Norwegian Centre for Soil and Environmental research.

Member of the Norwegian Scientific Committee for Food Safety (2005-), chair of the group “Plant protection products” since 2009.

Scientific reviews

Papers: Editorial Board member for the journal “Environmental Toxicology and Chemistry”. I regularly act as a referee for a number of other journals in my field (most frequently Environmental Science and Technology and Chemosphere).

Research proposals: Expert panel member - The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS) (97 proposals evaluated in 2008), occasional reviews for other funding bodies abroad.

Supervision of PhD-students

I worked most of my life as a consultant and I never officially had a PhD student.

Number of papers since 2005: 7

Number of papers in career: 23 in total (since year 2000)

Most important 3 since 2000:

- Sverdrup, L.E.; Linjordet, R.; Strømman, G.; Hagen, S.B.; van Gestel, C.A.M.; Frostegård, Å.; Sørheim, R. 2006. Functional and community-level soil microbial responses to zinc addition may depend on test system biocomplexity. **Chemosphere**, **65**: 1747-1754.
- Sverdrup, L.E.; Ekelund, F.; Krogh, P.H.; Nielsen, T.; Johnsen, K. 2002. Soil microbial toxicity of eight polycyclic aromatic compounds: effects on nitrification, the genetic diversity of bacteria and the total number of protozoans. **Environmental Toxicology and Chemistry**, **21**: 1644-1650.
- Sverdrup, L.E.; Nielsen, T.; Krogh, P.H. 2002. Soil ecotoxicity of polycyclic aromatic hydrocarbons (PAHs) in relation to soil sorption, lipophilicity and water solubility. **Environmental Science and Technology**, **36**: 2429-2435.

CV - Steinar Øvrebø

Sex: Male

Year of birth: 1946

Nationality: Norwegian

Present position: Chief scientist at National Institute of Occupational Health

Adjunct Professor (prof II) at the Department of Biology

Previous academic positions: Research scientist

Academic degree (university and year): Cand. Real 1973 and Dr.philos 1996

Scientific committee for Occupational Exposure Limits, European Union, DG Employment.

VKM - Faggruppe for plantevernmidler (a scientific committee for evaluation of pesticides)

Member and Chair, committee TEAN (Toksikologisk ekspertgruppe for administrative normer)

Several position in NSFT, among them Chair, Toxicology section.

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: 1

- Number of PhD-students completed for the period 1.1.2005 - 30.6.2010 as main supervisor: 0

Publications for the period 1.1.2005 - 30.6.2010 17 + reports etc

- Number of publications in peer-reviewed journals or peer-reviewed monographs: 17

- Number of review articles and book chapters: 1

Total career publications – 69 (Pubmed) 73 (ISI).

- Number of publications in peer-reviewed journals or peer-reviewed monographs: 69

- Number of review articles and book chapters: 2

Three most important publications the last 10 years

Aklillu E, Øvrebø S, Botnen IV, Otter C, Ingelman-Sundberg M. Characterization of common CYP1B1 variants with different capacity for benzo[a]pyrene-7,8-dihydrodiol epoxide formation from benzo[a]pyrene. *Cancer Res.* 2005 Jun 15;65(12):5105-11.

Sagredo C, Olsen R, Greibrokk T, Molander P, Øvrebø S. 2006. Epimerization and stability of two new cis-benzo[a]pyrene tetrols by the use of liquid chromatography-fluorescence and mass spectrometry. *Chem Res Toxicol.* 2006 Mar;19(3):392-8.

Sagredo C, Mollerup S, Cole KJ, Phillips DH, Uppstad H, Øvrebø S. Biotransformation of benzo[a]pyrene in Ahr knockout mice is dependent on time and route of exposure. *Chem Res Toxicol.* 2009 Mar 16;22(3):584-91.

SELF-ASSESSMENT - LEVEL 2

Marine Biology Program (MB)

1.2.1 Organisation, research leadership, strategy and resource situation

Background

The research in marine biology and ecology at BI represents the only research activity within this field among educational institutions in eastern Norway. For decades this took place within the sections 'Marine Zoology and Chemistry' and 'Marine Botany'. Since the previous bio-evaluation three reorganizations have been conducted. In 2002 the sections merged with the limnologists and freshwater biologists into 'Marine Biology and Limnology'. In 2005 this was split into 'Marine biodiversity' and 'Plankton biology'. In 2008 marine biologists came together in the 'Marine Biology Program' (MB). Although marine research is carried out to some extent within all four programs at BI, MB is responsible for the marine curriculum.

Organisation, research leadership and strategy

MB presently consist of 4 Professors (one obtained leave from his permanent post for 3-5 years), 2 Associate professors, 3 Professor/Associate professor II (20 or 40 % position), 2 post docs, 5 internal and 3 external PhD students, 2 technicians, 20 MSc students, and 5 Professor emeriti. Edvardsen is chair and Fredriksen deputy chair. All staff have monthly meetings where matters of strategy, economy, proposals, teaching, and use and development of common infrastructure and resources are decided. Fortnightly we hold meetings for staff and students working in the lab where practical issues are decided upon. We hold a yearly 1-2 day MB seminar where students and staff present their research.

A MB strategy and action plan for recruitment for 2008-2011 was worked out in 2008. In the last MB strategy we proposed 3 positions in prioritized order: Pelagic ecology, Benthic ecology and biodiversity, Algal systematics and biodiversity. A pelagic ecologist was hired in 2009 (Titelman). MB currently discusses the route forward and the trade offs between focusing on a few topics where we are strong today, and the need for an academically broader base for recruitment and societal need.

MB has not been included among the strategically prioritized research groups at the Faculty (MNF). This implies that for the last 4 years, MB has only been allocated 1 UiO funded PhD from the faculty, in conjunction with MERG, and 1 (internal) PhD from the Department. To become prioritized at the faculty an application for a strategic research group within Marine Life Science (MarLis) entitled 'Marine ecosystems – biodiversity, function and change' was submitted to the MNF in 2010. The consortium includes all MB staff, IB (2) and CEES (2-4) and from Micropalaeontology and Stratigraphy Program at the Department of GeoSciences (1-2). Our aim is by joint efforts to become an internationally leading research group within our focus areas.

Academic staff

The faculty members (8) undertake research and teaching within marine biology. We have backgrounds in phycology (3), marine zoecology (3), physiology (1), mathematics (1). Our main expertise is within marine pelagic ecology, benthic ecology, biodiversity and algal biosystematics. The age of permanent scientific staff range from 37-65 years with mean of 54. 40 % are female, 75 % are from Norway and 25% from Sweden. Post docs and PhD students are presently between 25-32 years, 43 % women, 57 % are from Norway, 29 % from Europe (Denmark, Germany) and 14% from Asia (Japan).

Dissemination

Our dissemination strategy accords with BI's strategy to publish as much as possible in high impact journals. We aim at ≥ 2 publications per scientist per year. We use open access options

when possible. We support yearly participation at conferences for scientists, technicians and MSc students. Together with IB we arrange weekly seminars with staff or guests as speakers. MB regularly participates in outreach activities such as 'Forskningstorget and Ungforsk'. We have appeared in TV, radio and newspapers, and published in popular scientific journals and books (not in publ. list, see CVs). A web page shows in real time the life in a fjord recorded by echo sounders (<http://www.oceanobservatory.com/news/masfjorden>). The Biological Station in Drøbak arranges field courses in marine biology (16 weeks per year) for high schools, colleges and universities in Norway and abroad. MB members have the national responsibility for marine algal taxonomy. The floras on marine algae in Norwegian (4) and English (4) produced during the last 10 years are widely used by students and scientists.

Human and monetary resources and output

MB has been hit by 'mass-retirement' over the last few years (3 since 2005) during a period of limited resources for new hires. To this adds two deceased professors (Gray -2007, Olsgard - 2010), and that one professor has left for 3-5 years to work abroad (Kaartvedt, now Prof. II in MB). To this adds that the technical staff has been reduced from 4 to 2 in the last 5 years. A renewal of faculty members is warranted to maintain a dynamic and active research environment.

MB presently supervise a large number of MSc (20 in 2010) and PhD students (6 internal, 3 external, 8 with other affiliations) and teach at all levels in Biology, Ecology and Marine Biology (participates in 12 BIO courses and is responsible for 8). MB also sustains co-ordination of a high number of externally funded projects. External funding from RCN (10 ongoing projects), EU (5; 2 ongoing projects) and from other resources (7 ongoing projects; from Nansen Foundation, Nordic Academy, NordForsk Research Network, FORMAS, Oljedirektoratet, Svalbard Science Forum, EC BONUS-EEIG) has been very good in the period 2005-2010. MB members are/have been involved in EU-projects (MARBEF /MARPLAN, PICODIV, MIDTAL, BIOMARKS, BAZOOCA). Taking into account the high loads of teaching and supervision and the increased administration due to project acquisitions and reorganisations, we consider our scientific production (142), generally in high quality international journals, to be very good in the report period. Time is generally more limiting for MB than infrastructure. Despite organisational obstacles the successful funding situation indicates that we have relevant and sought for expertise, excellent networks, a good reputation, and are reliable.

Resource situation

UiO has two **research vessels**, F/F Trygve Braarud (70 ft) F/F Bjørn Føyn (40 ft) that MB use in research and education. **State of the art equipment for water and particle analyses** such as flow cytometer, particle counter, HCN analyser, spectrophotometers, fluorometers, and autoanalysers for nutrient analyses are available at BI. 3D video and particle tracking systems for mechanistic studies of plankton are under development at MB. Excellent **molecular biological labs** are available at BI and IMBV including a high through-put sequencing facility (with 2 Roche 454), ABI sequencing service, light cyclers, and molecular labs for PCR, DNA/RNA isolation, probe development, cloning, microarray at MB. **Culture facilities** at BI are excellent with eight temperature-controlled rooms, toxin-free plankton labs, advanced light microscopes and **a unique marine algal collection** with 300 strains of micro and macroalgae. An excellent **electron microscopy laboratory** (EML) with TEMs, SEMs, microtoms, and sample preparation equipment is available at IMBV. MB is among the major users of EML. IMBV is responsible for the **aquarium facilities** with a recirculated seawater system in Kristine Bonnevis building. Karlsen (MB) heads the **Biological Station in Drøbak**, which offers access to shallow and deepwater fauna and flora, and outdoor and indoor running seawater. The

station features advanced experimental set-ups for the study of acousto-mechanical senses in fish and crustaceans in relation to anti-predator behaviour.

Equipment is largely funded from internal sources. Equipment <100 000NOK may be funded over external projects. Most needed equipment cost up to 700 000, implying that funding from RCN ('tungt vitenskapelig utstyr') is unavailable. Funding for equipment in the midrange is difficult. There is a *need of upgrade* of our laboratories to meet health and safety standards. We are seeking funding from UiO for a new CTD onboard Trygve Braarud. MB submitted an application for an Amnis high-speed imaging cytometer for automatic identification and quantification of plankton (2.5 mill) to MNF/RCN in 2010, however, we did not succeed in obtaining funding.

Infrastructure at other institutions used by MB's members:

MB members use infrastructure in the Oslo region such as NIVA's research station, Solbergstrand, and participate on cruises with vessels (e.g. R/V G.O Sars, Lance, Jan Mayen) owned by e.g. IMR and NPI. Specialized field equipment are at times rented from institutions such as NIVA (sediment corer) or IMR (remote operated vehicle, ROV). We take advantage of NIVA's Ferrybox sampling for assessment of phytoplankton dynamics and diversity. We regularly participate in larger scale experimental efforts at international academic institutions.

1.2.2 Research activities, including interdisciplinary research and research impact

Research activities

Researchers at MB have made fundamental contributions to understanding the taxonomy and systematics of marine species, interactions with each other and their natural environment, the general patterns of marine diversity and how the structure of marine assemblages relates to the functioning of such systems. This research spans not only the long coastline of Norway but extends to polar and tropical seas. We work in the field and in the lab, using observational and experimental approaches. Our expertise ranges from molecular techniques, advanced microscopy and video tracking to acoustics and community studies with extensive skills in statistical analyses and modeling. Our research is performed through externally and internally funded projects. Members are presently co-ordinating or participating in 19 externally funded (mainly RCN and EU) and 4 UiO funded projects. MB's research focus on marine pelagic ecology, benthos ecology and biodiversity and systematics.

Pelagic ecology and behaviour

Several group members work in pelagic habitats on different aspects of **plankton interactions, dynamics and diversity** (Kaartvedt, Titelman, Edvardsen, Eikrem, Ugland, Klevjer, Røstad). There is potential for further strengthening the bonds within MB in this area. Studies focus on responses of **individual** plankters, and on how plankton **community** composition and abundances varies in time and space as a function of environmental forcing.

Kaartvedt's group (incl. post docs Klevjer and Røstad) takes advantage of easily accessible, sheltered and deep fjord locations, each selected to address a particular topic, using modern **hydroacoustic methods** in novel ways. To exemplify, swimming behaviour of krill has been addressed in fjord branches with very weak currents; the effects of hypoxia on the pelagic fauna is studied in fjords with low oxygen levels; behaviour of mesopelagic fish and jellyfish is studied in fjords providing superior conditions for these respective organisms. Currently, the group compares the biology of mesopelagic fish in the oligotrophic and warm Red Sea with mesopelagic fish in the murkier and seasonally productive Norwegian waters. Research also includes krill, salps and mesopelagic fish in Antarctica, acoustic studies of fish in the hypoxic part of the Benguela current off SW Africa; and studies of plankton distribution in relation to bowhead whales in Greenland.

Since joining MB (2009) Titelman has collaborated with Kaartvedt, Ugland, Klevjer and Røstad on acoustic and ROV data sets from Kaartvedt's field efforts on deep water jellies. During the past 5 years and ongoing Titelman's research focuses on (i) small scale behavioural **interactions** in crustacean and jelly plankton, (ii) interactions between zooplankton and microbes and (iii) ecology of jellyfish. These activities involve a mix of experimental and field work, and sometimes mechanistic modelling. Titelman's involvement in international projects on e.g. the invasive *Mnemiopsis* (e.g. BAZOOCA, secured prior to joining UiO) have been productive in 2010 (6 papers), and one PhD student (Matilda Haraldsson, Univ of Gothenburg) works on "Environmental structuring of the gelatinous zooplankton populations in the Kattegat-Baltic". Ongoing research at UiO is primarily centred around theme (i). For example, one PhD student (Oda Bjærke, MB) works on 'The role of risk for mating related investments and behaviours in copepods'.

We anticipate potential for collaboration between Titelman and Edvardsen. For example, Titelman's systems for video analysis of small scale plankton interactions can also be used to study protists. The algal collection of MB can readily be used in Titelman's work. There is potential for utilizing molecular tools with Edvardsen in the zooplankton studies at large, as exemplified by the fact that Kaartvedt and Edvardsen has previously joined forces to use molecular methods in assessing predator-prey relationships and pigmentation among mesopelagic organisms (in the PhD thesis of Hege Vestheim). To study the dynamics at species level of virus, pico- and nanoplankton we combine molecular methods with advanced microscopy and flow cytometry. This, and the role of virus for phytoplankton bloom dynamics is studied by Edvardsen and Eikrem's group. One PhD (Elianne Egge) works within this framework on the RCN project HAPTODIV.

Karlsen heads the Biological Station in Drøbak, and is involved in projects evaluating reactions of fish and pelagic crustaceans to sound. He has developed a setups where **behavioural responses** can be observed (video) in response to acoustic stimuli. The aim is to understand how predation has influenced the evolution of peripheral senses in fish and zooplankton. Karlsen collaborates with colleagues at UiO (MB, IMBV) and SINTEF on impacts of seismic noise on fish and marine mammals. The aim is to understand how predation has influenced the evolution of peripheral hearing mechanisms in fish (mainly), and how behaviours of different groups of fish are affected by high intensity sound pulses such as from seismic exploration activities, monopiling etc. Karlsen heads a project documenting the abundance of *Mnemiopsis* in the Oslofjord, and also participates on a new NFR-project on the alien oyster *Crossostrea gigas*.

Benthic ecology and interactions

UiO has during the last 30 years been internationally leading in marine benthic ecology and biodiversity, and have excellent conditions to perform research in this field. Gray was in the forefront in ideas and studies on stress, disturbance and pollution in marine systems, in bringing together cause and effect relationships and in developing and using numerical methods for detecting trends. The last years Gray, together with Ugland, Olsgard and others focused on elucidating patterns of marine benthic diversity, marine pollution and trawling, biomagnification, ecosystem functioning, and in applied benthic studies. However, sadly our two professors in **soft-bottom zoo-ecology** both died and one professor in macroalgal ecology retired (Rueness 2008). Our research and supervision of students (incl. PhDs Thijs van Son, Hilde Trannum) in soft-bottom zoecology is now carried out by Bakke (20% position at UiO, 80% NIVA). Rueness is still active in the research of invasive and threatened macroalgal species revealed by molecular methods. Fredriksen conducts experimental ecological studies of **macroalgal systems** to elucidate why large areas of kelp forests have disappeared and became barren along the coast. PhD student Guri Andersen studies the decline of *Saccharina latissima*

in the Skagerrak region. Food web studies have clarified the importance of kelp as a food source and a habitat creator. During the last 10 years the role of sea grass systems for holding a high biodiversity has been explored. Scientific diving is important in these studies. In collaboration with Edvardsen and Eikrem molecular methods will be included in a newly started project on the biodiversity of sea grass systems. One PhD student (Jonas Thormar) works on biodiversity in relation to disturbance within this frame work. The studies in both kelp and sea grass systems are carried out in close collaboration with staff at NIVA.

Biodiversity and biosystematics

Ugland in collaboration with Gray and others studied patterns in biodiversity and developed a model for estimation of species abundance distributions (SADs). Ugland has mainly analysed marine soft-bottom macro fauna communities, but has more recently collaborated with most of MB (Fredriksen, Kaartvedt, Titelman, Edvardsen, Eikrem), BI and abroad on fungal, plant, macroalgal, plankton communities to study community structures and estimate species richness. His model has shown to be useful for a range of different ecosystems. Uglands research has also focused on population dynamics, biology of seals (diet, parasites and lipid compositions), fish biology, biodiversity and detection of disturbance on communities due to human activity.

Marine protist biodiversity is explored within the EU project BioMarks by Edvardsen and Eikrem's group (post doc Shuhei Ota, PhD Marit Bjorbækmo) by combining high-through-put 454-sequencing, advanced microscopy and a range of other methods. This work is conducted in collaboration with partners abroad and at MERG and IB. Edvardsen, Eikrem's group explore biodiversity of protists/algae in Southern Ocean and Arctic within BIPROPOL and AKES.

Algal/protist systematics and evolution

UiO has had an internationally leading position within marine botany. Algal taxonomy, phylogeny and evolution still harbour strong groups at the institute where Eikrem, Edvardsen and Fredriksen are central actors together with members in MERG (Klaveness, Shalchian-Tabritzi) and CEES (Jakobsen). Edvardsen and Eikrem's group have described several new microalgal species and combined morphological and molecular data to systematically place new species and to revise the taxonomy within several algal groups. We have during decades studied **harmful algae** that bloom in Norwegian coastal waters and elsewhere. These studies include morphological and genetic characterisation and phylogeny, genetic diversity and distribution, molecular probe development for detection and monitoring, culture experiments to clarify growth preferences and toxicity, and genomic analyses of genes expressed and phenotype. This research is now performed through the EU-project MIDTAL (post doc Simon Dittami) and several RCN and UiO projects.

Impact

The research corresponds well with trends and developments in our fields. This is illustrated by our participation in international projects, our publications in and review activity for high ranking journals, and our use of contemporary methodology (e.g. molecular approaches, acoustics, particle image velocimetry). We have published opinion pieces aimed at highlighting new directions for future research in benthic and pelagic ecology and molecular algal systematics.

Applied and basic research

While most of our research qualifies as basic research, we also engage in applied research focusing on effects of pollution, fisheries and other anthropogenic disturbances on marine benthic faunal communities, and on changes in kelp forests and in eel grass systems, harmful algae and development of monitoring tools. We are involved in studies and an application on

prospecting for bioactive compounds in aquatic organisms. Other projects target detection and ecosystem implications of invasive species (jellies, macroalgae, toxic algae).

Societal relevance:

Bakke chairs the national expert group that evaluates environmental impacts of offshore and gas activities. He has led the development of national guidelines for sediment risk assessment. Our research has contributed to a more sustainable management and trawling of kelp. We have contributed to knowledge on toxic algae and causes for harmful blooms, and have produced national lists of invasive and threatened macroalgae. Our basic research has implications for ecosystem understanding and thereby ultimately management of marine resources.

Industrial activities

There are no MB patents yet. Recent genomic studies and planned research within bio prospecting has raised the discussion of patenting in the future.

Strengths and weaknesses

Our main **strengths** are (1) our scientific expertise (2) our formalized collaborations and informal networks at local, national and international levels, (3) good access to funding from RCN and EU, (4) excellent access to the Oslofjord as a model system with both pristine and polluted systems and (5) good available infrastructure (6) good reputation. Our main **weaknesses** are that (1) less than 2 faculty members work within the major research areas, and that (2) our diverse research background provides an obstacle to streamlining common research arenas. On the other hand the diversity is advantageous in the research based teaching. (3) There is a general lack of UiO post docs and PhD students at MB with teaching, and research and lab administrative obligations. The production of scientific publications ranged from 1-21 per scientist (median 13) in the report period among the 10 delivering CV. Gray produced 22 during his last 2.5 years. Three produced <10. Of these, one allocates his time towards running a field station and teaching, one is at NIVA and writes mostly reports.

1.2.3 Training, mobility and career path

Between 2005 and 2009 13 PhD students and 7 post docs worked in MB. Post docs (7) and PhDs (10) are mainly funded by external projects. The faculty provided 3 positions through ‘starting packages’ or strategic funding. The shortage of positions is a larger problem than attracting interest from young people, as shown by our many MSc students. Recent graduates and Post docs often get employed at IMR and NIVA or at other Universities. Funding policies prevents planning of long-term academic career paths. Instead stochastic funding decides the fate of our candidates. Positions are advertised nationally and internationally, which is reflected in the recruitment at all levels.

1.2.4 Research collaboration

Internationally we cooperate with leading marine biological research institutes in Europe and elsewhere through our EU and national projects. Closer collaboration among MB faculty members and more international collaboration by all have taken place since the previous evaluation (cf. Gray and Ugland). We supervise PhDs from other institutes and regularly host guest scientists. MB cooperates with MERG and CEES on protist and cyanobacterial evolution and genomics, and with IB on algal physiology, plankton ecology and modelling. IB also has activity in marine toxicology, which is part of MarLis. There is well developed collaboration with NIVA in research and education, and several researchers at NIVA hold adjunct positions at UiO. We collaborate with NIVAs research group on marine benthic systems, IMR on pelagic ecology, VI on harmful algae, University of Bergen on pelagic and benthic ecology and biodiversity, NTNU, UNIS, NPI on polar biology, GI on benthic soft bottom systems, FI on marine biochemistry and IMBV on fish physiology and advanced microscopy.

Marine Biology (MB)
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Name: Torgeir **Bakke**

Sex: Male

Year of birth: 1945

Nationality: Norwegian

Present position: Associate Professor, Department of Biology, University of Oslo (20 %), Senior Research Scientist, NIVA (80 %)

Previous academic positions (after PhD): Research Assistant, Department of Marine Biology, University of Bergen (1972-1978). Research Scientist, Institute of Marine Research, Bergen (1978-1980)

Academic degree: Cand Real in Marine Zoology, University of Bergen 1972.

- **Participation in Committees** including General Secretary, Nordic Council for Marine Biology (1978-1990), Coordinator Norwegian Pollution Control Authority Expert Group on Scientific Quality Evaluation of Norwegian Offshore Environmental Monitoring (1988-present) and Expert Group on Evaluation of Eutrophication in Norwegian Fjords and Coastal Waters (1995-1998), Member of Board of the UiO Marine Biological Station, Drøbak (1988-1993), SCOR Working Group 85 on Experimental Ecosystems (1988-1990), Member of OSPAR Steering Group on the Quality Assurance of Biological Measurements related to Eutrophication (1997-2000), Independent Review Group for the decommissioning of the offshore Brent field (2007-2012). Head Scientific Manager, NIVA Marine Research Station Solbergstrand (1981-1996), Head of Department of Marine Ecology, NIVA (1991-1995).
- **Grants:** Project leader of about 60 R&D projects at NIVA funded by the Authorities, Industry and the Norwegian Research Council.
- **Dissemination** activities include about 30 oral presentations at national and international scientific conferences
- **Peer Reviewer** for ~5 international scientific journals
- **Opponent for PhD theses** in Norway (1), Sweden (1)

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: 0
- Number of PhD-students completed for the period 1.1.2005 - 30.6.2010 as main supervisor: 0

Publications for the period 1.1.2005 - 30.6.2010

- Number of publications in peer-reviewed journals: 5 (1 in 2010)
- Number of review articles and book chapters: 0

Total career publications

- Number of publications in peer-reviewed journals or peer-reviewed monographs: 24
- Number of review articles and book chapters: 18

Three most important publications the last 10 years

- **Bakke T**, Källqvist T, Ruus A, Breedveld GD, Hylland K (2010) Development of sediment quality criteria in Norway. *J Soil Sed* 10:172-178 (<http://www.sednet.org/download/4%20-%20abstract%20Bakke.pdf>)
- Ugland KI, Bjørgesæter A, **Bakke T**, Fredheim B, Gray JS (2008) Assessment of environmental stress with a biological index based on opportunistic species. *J Exp Mar Biol Ecol* 266: 169-174 (<http://dx.doi.org/10.1016/j.jembe.2008.07.021>)
- Schaanning MT, Trannum HC, Øxnevad S, Carroll JL, **Bakke T** (2008) Effects of water- and olefin-based drill cuttings on biogeochemical fluxes and macrobenthos of marine sediments. *J Exp Mar Biol Ecol* 361:49-57 (<http://dx.doi.org/10.1016/j.jembe.2008.04.014>)

Name: Bente Edvardsen

Sex: Female

Year of birth: 1960

Nationality: Norwegian

Present position: Professor, Department of Biology, University of Oslo

Previous academic positions (after PhD): Associate professor in Molecular Marine Biology, University of Oslo (2003-2007); Senior scientist in Freshwater Phycology, NIVA (2000-2007); Post-doctoral fellow in Marine Botany, University of Oslo (1996-2000)

Academic degree: Doctor Scient. in Biology, Marine Botany, University of Oslo, 1996.

Academic and Professional Achievements (last 10 years):

- Participation in *Committees* including Representative of the Board for the Norwegian Oceanographers Association (1999-2002); Representative of the Committee for Research Strategy, Faculty of Mathematics and Natural Sciences, UiO (2005-2007); Head of the Marine Biology Research Program, Department of Biology, UiO (2008-)
- Member of the *Editorial Board* of Journal of Phycology (2009-present)
- *Awarded* The Tyge Christensen Prize from the International Phycological Society and Phycologia in 2001 (Edvardsen et al 2000) and in 1999 (Larsen & Edvardsen 1998)
- *Grants:* Project leader of 5 NRC, 1 Nansen Foundation, 1 Artsdatabanken and 3 UiO projects. PI of 3 EU (BIOMARKS, MIDTAL, MARPLAN). Partner 7 NRC projects.
- *Dissemination* activities include 11 oral and 12 poster presentations at international conferences, 7 invited lectures, 9 oral and 7 posters at national scientific meetings
- *Peer Reviewer* for 11 *scientific journals*
- *Peer Reviewer* for 2 *Research Foundations* (NSF, SNSF).
- *Opponent for PhD theses* in Norway (3), France (1), Sweden (1+1 committee), South Africa (extern. examiner, 1)

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: **2**
- Number of PhD-students completed 1.1.2005-30.6.2010 as main supervisor: **2**

Publications for the period 1.1.2005 - 30.6.2010

- Number of publications in peer-reviewed journals: **14** (+ 4 in 2010)
- Number of review articles and book chapters: **2**

Total career publications

- Number of publications in peer-reviewed journals or peer-reviewed monographs: **37**
- Number of review articles and book chapters: **8**

Three most important publications the last 10 years

- **Edvardsen B**, Eikrem W, Green J, Moon-van der Staay Y, Andersen RA, Medlin LK, (2000) Phylogenetic reconstructions of the Haptophyta inferred from 18S ribosomal DNA sequences and available morphological data. *Phycologia* 39:19-35 (<http://www.phycologia.org/doi/pdf/10.2216/i0031-8884-39-1-19.1>)
- **Edvardsen B**, Shalchian-Tabrizi K, Jakobsen KS, Medlin LK, Dahl E, Brubak S, Paasche E (2003) Genetic variability and molecular phylogeny of *Dinophysis* species (Dinophyceae) from Norwegian waters inferred from single cell analyses of rDNA. *J Phycol* 43: 1054-1070 (<http://onlinelibrary.wiley.com/doi/10.1046/j.1529-8817.2003.01252.x/pdf>)
- Rohrlack T, **Edvardsen B**, Skulberg R, Halstvedt CB, Utkilen HC, Ptacnik R, Skulberg OM (2008) Oligopeptide chemotypes of the toxic freshwater cyanobacterium *Planktothrix* can form sub-populations with dissimilar ecological traits. *Limnol Oceanogr* 53:1279-1293 (http://www.aslo.org:8081/lo/pdf/vol_53/issue_4/1279.pdf)

Name: Wenche **Eikrem**

Sex: female

Year of birth: 1957

Nationality: Norwegian

Present position: Associate Professor II (20% 01.08-, 40% 03.10-), Department of Biology, University of Oslo; Research scientist, Norwegian Institute for Water Research (2006-present)

Previous academic positions (after PhD): Post Doc, University of Oslo (2001-2005)

Academic degree: Dr. Scient, Biology, University of Oslo, 1999

Academic and Professional Achievements (last 10 years):

- **Awarded** The Tyge Christensen Prize (International Phycological Society) for the best microalgal paper published in *Phycologia* during 1999 and 2000
- **Co-authored 2 books** (in Norwegian) on microalgae
- **Peer reviewer** for 3 international *scientific journals*
- **Peer reviewer for CNRS** (Centre national de la recherche scientifique), France
- **Dissemination** activities include >20 presentations at national and *international conferences* and 10 workshops
- Participated in **7 national and international cruises**
- **Member** of the **ICES** working group on Biodiversity (from 2008)
- **Grants:** Coordinated the project DNA-Barcoding; bedre og raskere artsidentifisering at NIVA (2007). Partner in PICOFUNPAC (ANR 2007-2009); Coordinator of TOXICALGAE, (Toxic algae; Diversity, Distribution and Early Warning (NRC 2010-2013). Partner in HAPTODIV: Diversity and dynamics of marine haptophytes (NRC 2009-2011). Participating in MIDTAL: (Microarray for detection of harmful algae (EU 2008-2011) and BioMarks: Biodiversity of marine eukaryotic protists (EU 2009-2011), Participating in “Nasjonalt program for kartlegging av biologisk mangfold” at NIVA

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: **1**
- Number of PhD-students completed 1.1.2005 - 30.6.2010 as main supervisor: **0**

Publications for the period 1.1.2005 - 30.6.2010

- Number of publications in peer-reviewed journals: **12** (2 in 2010)
- Number of review articles and book chapters: **1**

Total career publications

- Number of publications in peer-reviewed journals or peer-reviewed monographs: **32**
- Number of review articles and book chapters: **1**

Three most important publications the last 10 years

- Vaultot D, **Eikrem W**, Viprey M, Moreau H (2008) The diversity of small eukaryotic phytoplankton (<3 µm) in marine ecosystems. *FEMS Microbiol Rev.* 32:795-820 (<http://onlinelibrary.wiley.com/doi/10.1111/j.1574-6976.2008.00121.x/pdf>)
- **Eikrem W**, Romari K, Le Gall F, Latasa M, Throndsen J, Vaultot D (2004) *Florenciella parvula* gen. and sp. nov. (Dictyochophyceae, Heterokontophyta) a small flagellate isolated from the English Channel. *Phycologia* 43:658-668 (<http://phycologia.org/doi/pdf/10.2216/i0031-8884-43-6-658.1>)
- Shalchian-Tabrizi K, **Eikrem W**, Klaveness D, Vaultot D, Minge MA, Le Gall F, Romari K, Throndsen J, Botnen A, Massana R, Thomsen HA, Jakobsen KS (2006) Telonemia, a new protist phylum with affinity to chromist lineages. *Proc R Soc B* 273:1833-1842 (<http://rspb.royalsocietypublishing.org/content/273/1595/1833.full.pdf>)

Name: Stein Fredriksen

Sex: Male

Year of birth: 1956

Nationality: Norwegian

Present position: Professor, Department of Biology, University of Oslo

Previous academic positions (after PhD): Associate professor, Marine botany, University of Oslo (1995-2004)

Academic degree: Dr Scient in Biology, Marine Botany, University of Oslo, 1994

Academic and Professional Achievements (last 10 years):

- **Opponent for PhD:** Sweden 2 (+ 2 committees) and Denmark 1
- **Peer reviewer** for 16 international *scientific journals*
- **Peer Reviewer** for the European Commission- Directorate general JRC Joint research centre; Natural Environment research Council (United Kingdom); Villum Kann Rasmussen Fondet (Denmark); Marine Institute's Strategic Marine RTDI Programme Evaluation (Ireland); National Science Foundation (USA); The Faroese Research Council; The Norwegian Research Council
- **Dissemination** activities include, 2 oral and 6 poster presentations at international conferences. 14 oral and 15 poster presentations at national conferences/meetings. Oral presentations at workshops/meetings in France, USA, Canada.
- **Grants:** 3 NRC grant as PI, 3 as partner. Managerial group of Nordic Seagrass Network.
- **Media exposure of research:** NRK Radio/TV – 4/1
- **Evaluated candidates for employment and promotion:** Professor promotion University of Texas at Austin (USA), Research position at IMR, several PhD committees and other positions at UiO
- **Boards:** Member of several boards/committees at Department and Faculty level
- **Education:** Finished candidates: 4 cand scient and 7 MS. 1 Phd as main supervisor, 2 as co-supervisor. Ongoing: 7 MS and 2 PhD as main supervisor, 2 PhD as co-supervisor

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: **2**
- Number of PhD-students completed 1.1.2005 - 30.6.2010 as main supervisor: **0**

Publications for the period 1.1.2005 - 30.6.2010

- Number of publications in peer-reviewed journals: **8** (+ **2** in 2010)
- Number of review articles and book chapters: **1**

Total career publications

- Number of publications in peer-reviewed journals or peer-reviewed monographs: **36**
- Number of review articles and book chapters: **2**

Three most important publications the last 10 years

- **Fredriksen S** (2003) Food web studies in a Norwegian kelp forest based on stable isotope ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) analysis. *Mar Ecol Progr Ser* 260:71-81 (<http://dx.doi.org/10.3354/meps260071>)
- **Fredriksen S**, Christie H, Sæthre BA (2005) Species richness in macroalgae and macrofauna assemblages on *Fucus serratus* L. (Phaeophyceae) and *Zostera marina* L. (Angiospermae) in Skagerrak, Norway. *Mar Biol Res* 1:2-19 (<http://dx.doi.org/10.1080/17451000510018953>)
- **Fredriksen S**, de Backer A, Boström C, Christie H (2010) Infauna from *Zostera marina* (L.) meadows in Norway. Differences in vegetated and unvegetated areas. *Mar Biol Res* 6:189-200 (<http://dx.doi.org/10.1080/17451000903042461>)

Name: Stein Kaartvedt

Sex: Male

Year of birth: 1953

Nationality: Norwegian

Present position: Adjunct professor Department of Biology, University of Oslo; Professor of Marine Science, King Abdullah University of Science and Technology, Saudi Arabia (from August 2009)

Previous positions (after PhD): Professor, University of Oslo (1993-2009, associate professor 1992-1993), Department chair (2000-2003), Department of Biology, University of Oslo; adjunct professor University of Bergen (2007-2009), post-doctoral Scholar, Woods Hole Oceanographic Institution, USA (1991-1992), Research scientist, University of Bergen (1987-1991), Assistant professor (substitute) University of Bergen (1985-1986) Research Scientist Institute of Marine Research, Bergen, (1983-1984)

Academic degree: Dr. Scient., Marine Biology, University of Bergen, 1989

Academic and Professional Achievements (last 10 years):

- **Peer review** for 15 *international journals*
- **Peer review for Research Councils** in Norway, the Nordic countries, UK and US
- **Evaluated candidates for employment and promotion** at Norwegian governmental Institutions and for Universities in Norway, USA, UK and the Bahamas
- Member of > 10 **doctoral committees** both nationally and abroad
- **Board member** of the Department of Biology, Department of Pharmacy Natural History Museum, Faculty of Mathematics and Natural Sciences (all at UIO); University center of Svalbard (UNIS) (deputy)
- **Dissemination:** invited lectures, talks to the public, web pages disseminating research in real time
- **Grants:** 1 EU, 8 Norwegian Research Council
- **Media exposure of research** in national public media, including repetitive occurrences in radio and TV

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: **0**
- Number of PhD-students completed 1.1.2005 - 30.6.2010 as main supervisor: **3**

Publications for the period 1.1.2005 - 30.6.2010

- Number of publications in peer-reviewed journals: **20**
- Number of review articles and book chapters: **1** (in 2010)

Total career publications

- Number of publications in peer-reviewed journals or peer-reviewed monographs: **71**
- Number of review articles and book chapters: **2** (included in total above)

Three most important publications:

- **Kaartvedt S**, Røstad A, Fiksen Ø, Melle W, Torgersen T, Breien MT, Klevjer T (2005) Piscivorous fish patrol krill swarms. *Mar Ecol Prog Ser* 299:1-5(<http://www.int-res.com/articles/feature/m299p001.pdf>)
- Vestheim H, **Kaartvedt S** (2006) Plasticity in coloration as an anti-predator strategy among zooplankton. *Limnol Oceanogr* 51:1931-1934 (http://www.aslo.org/lo/toc/vol_51/issue_4/1931.pdf)
- **Kaartvedt S**, Klevjer TA, Torgersen T, Sørnes TA, Røstad A (2007) Diel vertical migration of individual jellyfish (*Periphylla periphylla*) *Limnol Oceanogr* 52: 975-983 (http://www.aslo.org/lo/toc/vol_52/issue_3/0975.pdf)

Name: Hans Erik **Karlsen**

Sex: Male

Year of birth: 1956

Nationality: Norwegian

Present position: Associate professor, Manager: Marine Biological Station Drøbak, Department of Biology, University of Oslo

Previous academic positions (after PhD): Research scientist, Institute of Biology, UiO

Academic degree: PhD. in biology (sensory physiology) , University of Oslo 1991.

Academic and Professional Achievements (last 10 years):

- **Participated in PhD Committees** nationally (2).
- **Joint project leader** of the **grant** “Mathematical modeling of seismic air gun noise and effects on fish behavior” (2009-2010) - Norwegian Oil Department (together with professor JM Hovem)
- **Personal projects:** “Distribution and abundance of the introduced comb jelly (*Mnemiopsis leidyi*) in the Oslo fjord” (2009) - The Directorate for Nature Conservation, Norway. “Fish behaviour and seismic noise”(2008-2009) - Norwegian Oil Department.
- **Dissemination** activities include 3 invited lectures (University of Lund, Sweden, University of Århus, Denmark, University of Bergen, Norway), and 10 presentations at meetings and conferences in 2005-2010.
- **Popular scientific disseminations (2005-2010):** . Appearance in TV (11 times), radio (aprox. 10 times) and local newspapers (20 times).
- **Peer Reviewer** for 1 scientific journal (J Exp Biol)

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: **0**
- Number of PhD-students completed 1.1.2005 - 30.6.2010 as main supervisor: **0**

Publications for the period 1.1.2005 - 30.6.2010

- Number of publications in peer-reviewed journals: **1**
- Number of review articles and book chapters: **0**

Total career publications

- Number of publications in peer-reviewed journals or peer-reviewed monographs: **22**
- Number of review articles and book chapters: **2**

Three most important publications the last 10 years

- Sand O, **Karlsen HE** (2000) Detection of infrasound and linear accelerations in fish. *Phil Trans R Soc Lond B* 355:1295-1298 (<http://dx.doi.org/10.1098/rstb.2000.0687>)
- **Karlsen HE**, Piddington RW, Enger PS, Sand O (2004) Infrasound initiates directional fast-start escape responses in juvenile roach *Rutilus rutilus*. *J Exp Biol* 207:4185-4193 (<http://dx.doi.org/10.1242/jeb.01274>)
- Dalen J, Hovem JM, **Karlsen HE**, Kvadsheim PH, Løkkeborg S, Mjelde R, Pedersen A, Skiftesvik AB (2008). Kunnskapsstatus og forskningsbehov med hensyn til skremmeeffekter og skadevirkninger av seismiske lydbølger på fisk og sjøpattedyr. Oljedirektoratet, Statens forurensningstilsyn, Fiskeridirektoratet, ISBN 82-7257-661-9.

Name: Thor **Klevjer**

Sex: Male

Year of birth: 1975

Nationality: Norwegian

Present position: Research Scientist, King Abdullah University of Science and Technology, Saudi Arabia

Previous academic positions (after PhD): Post Doc, University of Oslo, 2007-2010

Academic degree: Dr. Scient, Marine biology, University of Oslo, 2006

Academic and Professional Achievements (last 10 years):

- *Peer Reviewer* for 2 international journals

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: **0**
- Number of PhD-students completed 1.1.2005 - 30.6.2010 as main supervisor: **0**

Publications for the period 1.1.2005 - 30.6.2010

- Number of publications in peer-reviewed journals: **13**
- Number of review articles and book chapters: **0**

Total career publications

- Number of publications in peer-reviewed journals or peer-reviewed monographs: **15**
- Number of review articles and book chapters: **0**

Three most important publications the last 10 years

- **Klevjer TA**, Tarling GA, Fielding S (2010). Swarm characteristics of Antarctic krill *Euphausia superba* relative to the proximity of land during summer in the Scotia Sea. *Mar Ecol Prog Ser* 409:157-170 (<http://www.int-res.com/articles/meps2010/409/m409p157.pdf>)
- Tarling GA, **Klevjer T**, Fielding S, Watkins J, Atkinson A, Murphy E, Korb R, Whitehouse M, Leaper R (2009) Variability and predictability of Antarctic krill swarm structure. *Deep Sea Res I*. 56:1994-2012 (<http://linkinghub.elsevier.com/retrieve/pii/S0967063709001538>)
- **Klevjer TA**, Kaartvedt S (2006) In situ target strength and behaviour of northern krill, *Meganyctiphanes norvegica*. *ICES J Mar Sci* 63:1726-1735 (<http://icesjms.oxfordjournals.org/content/63/9/1726.abstract>)

Name: Anders Røstad

Sex: Male

Year of Birth: 1972

Nationality: Norwegian

Present position: Research Scientist, King Abdullah University of Science and Technology, Saudi Arabia

Previous academic positions (After PhD): Post Doc at the University of Oslo (2006-2010)

Academic degree: PhD Biology, Marine biology, University of Oslo, 2006

Academic and Professional Achievements (last 10 years):

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: **0**
- Number of PhD-students completed 1.1.2005 - 30.6.2010 as main supervisor: **0**

Publications for the period 1.1.2005 - 30.6.2010

- Number of publications in peer-reviewed journals: **8**
- Number of review articles and book chapters: **0**

Total career publications

- Number of publications in peer-reviewed journals or peer-reviewed monographs: **9**
- Number of review articles and book chapters: **0**

Three most important publications:

- **Røstad A**, Kaartvedt S, Klevjer TA, Melle W (2006) Fish are attracted to vessels. *ICES J Mar Sci* 63:1431–1437 (<http://icesjms.oxfordjournals.org/content/63/8/1431.abstract>)
- Kaartvedt S, **Røstad A**, Klevjer TA, Staby A (2009) Use of a stationary submerged echo sounder in exploring behaviour of mesopelagic fish. *Mar Ecol Prog Ser* 395:109-118 (<http://www.int-res.com/articles/theme/m395p109.pdf>)
- Kaartvedt S, Røstad A, Klevjer TA (2009) Sprat *Sprattus sprattus* can exploit low oxygen waters for overwintering. *Mar Ecol Prog Ser* 390:237-249 (<http://www.int-res.com/abstracts/meps/v390/p237-249/>)

Name: Josefin Titelman

Sex: Female

Year of birth: 1973

Nationality: Swedish

Present position: Associate Professor, Department of Biology, University of Oslo

Previous academic positions: Assistant Professor, University of Gothenburg, Sweden (2007-2009); Researcher and Post doc, University of Bergen, Norway (2003-2006); Researcher, Plymouth Marine Lab, UK (2002-2003).

Academic degree: PhD in marine ecology, Göteborg University, Sweden (granting institution) and Danish Institute For Fisheries Research (work place), 2002

Academic and Professional Achievements (last 10 years):

- **Personal award** from King Carl XVI Gustaf's 50th Birthday Fund for Science, Technology and the Environment. Sweden, 2008. External nomination procedures. 75000 SEK cash prize
- **Peer reviewer** for 14 international *scientific journals*
- **Peer reviewer** for **1 Research Council** (National Science Foundation, USA)
- Have secured **grants** from agencies including FORMAS (2 as project leader, 1 as Co-PI); EC-BONUS EEIG (project leader: P Tiselius), Umeå Marine Science center, Sweden (joint project leader w L Riemann), and the EC (Personal 3 yr Marie Curie PhD grant)
- **Evaluated candidates for employment** at Universities of Gothenburg, Bergen and Oslo
- Member of 1 **PhD evaluation committee**
- **Dissemination** activities include >16 contributions to international conferences (1 invited), several presentations at international project meetings/workshops and 4 invited lectures at academic institutions
- **Media exposure of research** in for example NRK and Forskning.no. Recent jellyfish research is exposed in for example New Scientist (Titelman & Hosia 2010: www.newscientist.com/article/dn19387-zoologger-death-by-worlds-longest-animal.html), Nature (Colin et al 2010: www.nature.com/nature/journal/v467/n7315/full/467502c.html), Alpha Galileo & EurekaAlert, AAAS

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: **2**
- Number of PhD-students completed 1.1.2005 - 30.6.2010 as main supervisor: **0**

Publications for the period 1.1.2005 - 30.6.2010

- Number of publications in peer-reviewed journals: **10** (+5 in 2010)
- Number of review articles and book chapters: **1**

Total career publications

- Number of publications in peer-reviewed journals or peer-reviewed monographs: **24**
- Number of review articles and book chapters: **1**

Three most important publications the last 10 years

- Colin SP, Costello JH, Hansson LJ, **Titelman J**, Dabiri JO (2010) Stealth predation and the predatory success of the invasive ctenophore *Mnemiopsis leidyi*. *PNAS* 107:17223–17227 Selected cover story (<http://dx.doi.org/10.1073/pnas.1003170107>)
- **Titelman J**, Riemann L, Sørnes T, Nilsen T, Griekspoor P, Båmstedt U (2006) Turnover of dead jellyfish: stimulation and retardation of microbial activity. *Mar Ecol Prog Ser* 325:43-58 (<http://www.int-res.com/articles/meps2006/325/m325p043.pdf>)
- **Titelman J**, Kiørboe T (2003) Predator avoidance by nauplii. *Mar Ecol Prog Ser* 247:137-149 (<http://www.int-res.com/articles/meps2003/247/m247p123.pdf>)

Name: Karl Inne Ugland

Sex: Male

Year of birth: 1949

Nationality: Norwegian

Present position: Professor, Department of Biology, University of Oslo

Previous academic positions: Associated Professor at Department of Biology, University of Oslo

Academic degree: Dr. Philos, Marine Zoology, University of Oslo, 1979

Academic and Professional Achievements (last 10 years):

- **Peer review** for 8 international *scientific journals* (Ecological Letters, Ecography, Journal of Biogeography, Marine Ecology Progress Series, Marine Biology, Journal of the Marine Biological Association of United Kingdom, Basic and Applied Ecology).
- **Grants:** Partner in 1 PhD program funded by NRC (2004-2007) and MARBEF project 2005–2008 including 1 Post Doc position.
- **Disseminations** 9 invited lectures & 2 oral presentations at international conferences
- Member of 3 *doctoral committees*
- **Media exposure of research** in a large number of radio and TV programs, and interviews in newspapers and various magazines
- **Author** of a children's *book* on seals that was sold in 14 000 exemplars
- Have *supervised* a total of **61 MSc students!**
- Have *supervised* 6 students for *PhD* (main supervisor for 2 and co-supervisor for 4)

Supervision of PhD-students

- Number of PhD-students presently under supervision as main supervisor: **0**
- Number of PhD-students completed 1.1.2005 - 30.6.2010 as main supervisor: **2**

Publications for the period 1.1.2005 - 30.6.2010

- Number of publications in peer-reviewed journals: **11** (+2 in 2010)
- Number of review articles and book chapters: **1**

Total career publications

- Number of publications in peer-reviewed journals or peer-reviewed monographs: **50**
- Number of review articles and book chapters: **2**

Three most important publications the last 10 years

- **Ugland KI**, Bjørgesæter A, Bakke T, Fredheim B, Gray JS (2008) Assessment of environmental stress with a biological index based on opportunistic species. *J Exp Biol Ecol* 366:169-174 (<http://dx.doi.org/10.1016/j.jembe.2008.07.021>)
- Bjørgesæter A, **Ugland KI**, Børge A (2004) Geographic variation and acoustic structure of the underwater vocalization of harbour seals (*Phoca vitulina*) in Norway, Sweden and Scotland. *J Acoustic Soc Am (JASA)* 116: 2459-2468 (<http://dx.doi.org/10.1121/1.1782933>)
- **Ugland KI**, Gray JS, Ellingsen KE (2003) The species-accumulation curve and estimation of species richness. *J Animal Ecol* 72:888-897 (<http://dx.doi.org/10.1046/j.1365-2656.2003.00748.x>)

SELF-ASSESSMENT - LEVEL 2

Microbial Evolution Research Group (MERG)

1.2.1 Organisation, research leadership, strategy and resource situation

Organisation

MERG is a prioritized research group initiated through a strategic program at the Faculty of Mathematics and Natural Sciences (MN-faculty), UiO. The main idea behind the creation of MERG was to establish a larger and coherent research group that should be capable of applying for a Centre of Excellence in Norway within 2012. The Department of Biology (BI) is our host institution as the majority of the participants have affiliation to this department.

MERG holds a unique position at MN faculty in having an extensive inter-disciplinary profile. We have scientists and students with experience from field-biology, micropaleontology, biochemistry, statistics, stoichiometry, bioinformatics, genetics, taxonomy, systematics, mycology, protistology, general microbiology, limnology, marine biology, ecology and evolutionary biology. The participants have affiliation to five different institutions, including BI, Department of Molecular Life Sciences (IMBV), Natural History Museum, The Veterinary Institute and Norwegian Institute for Water Research. The latter two are institutions outside UiO. At BI, four research groups are represented in MERG. Therefore, MERG is organized as an extensive matrix structure. This creates a lot of challenges but also a great potential for synergies that generate improved quality both in research and education.

Three years ago, MERG started up as a heterogeneous group, both with respect to research interests and ideas for the future. However, the last year's evaluations show that MERG grows into shape. All participants in MERG have during the last two years been involved in the evaluation of our activity and development of strategic plans. Joint projects, new MERG positions, and last but not least, the re-localization of MERG laboratories and offices have created an identity that forms a good basis for the further development of MERG. The evaluation process has revealed that there is an increased contentment with the current development within MERG. In particular, several of the initiatives taken during 2009 and 2010 have received good assessment. However, there are still many challenges and points for improvement. This self-assessment is mainly focusing on the activities after MERG was established three years ago, but it also includes scientific production and networks established from 2005.

Research leadership

One of the great strengths of MERG is the high degree of participation by the staff and students in strategic planning, evaluation and development of research projects.

Our research is organized into inter-disciplinary research teams with a mix of students and scientific staff that have different expertise. Because inter-disciplinary projects involve quite many people and in many ways are more challenging to manage, we have focused on improving our expertise in project management and leadership. The team-structure and tight interaction between students across the subgroups make the decision structure relatively distributed. However, we have an active leader group that takes main responsibility for facilitating the activity and the daily administration. The leader group includes Kamran Shalchian-Tabrizi (head), Håvard Kauserud (deputy head) and Kathrine Schou (responsibility for development of infrastructure).

Strategy

MERG works strategically to improve our research by creating synergies within MERG and with external collaborators. The core of our research area is microbial ecology and evolution biology. We address basic theoretical and methodological questions for a broad group of microorganisms, and aim to apply this knowledge to solve challenges within health, climate, environment, energy, and food

production. *Our research and teaching are inter-disciplinary and aim at creating synergies across a wide range of disciplines.* Our goals and visions are as follows:

Main goal

Our main goal is to achieve status as a inter-disciplinary top-tier research environment (e.g. Norwegian Centre of Excellence) at UiO within 2012.

Visions

Research:

- MERG is in the frontline of the international research within microbial ecology and evolutionary biology.
- MERG is a natural partner in Norwegian and European research projects and networks.

Service and Communication:

- MERG is a national service centre in bioinformatics and microbiology laboratories (includes collection, culturing, storage and training).
- MERG excels in communicating competence and popularizing for the public.

Teaching:

- MERG is a place for excellent teaching at master and PhD-level by the integration of research and teaching.
- MERG is the preferred national source of knowledge on microbial ecology and evolutionary biology.

Organization:

- MERG is an effective and open organization and an arena for a good working environment, as well as for innovative research and teaching.

Resource situation

MERG obtains a yearly funding of approximately 400.000 NOK per year from BI. This grant is used to maintain and develop offices, infrastructure, travel expenses and research projects. During the last two years most of this funding has been used to improve our infrastructure (offices and labs), supporting grant application processes, social activities and initiation of communication/visual profile. In addition, BI and the MN-faculty have supported us with three major grants:

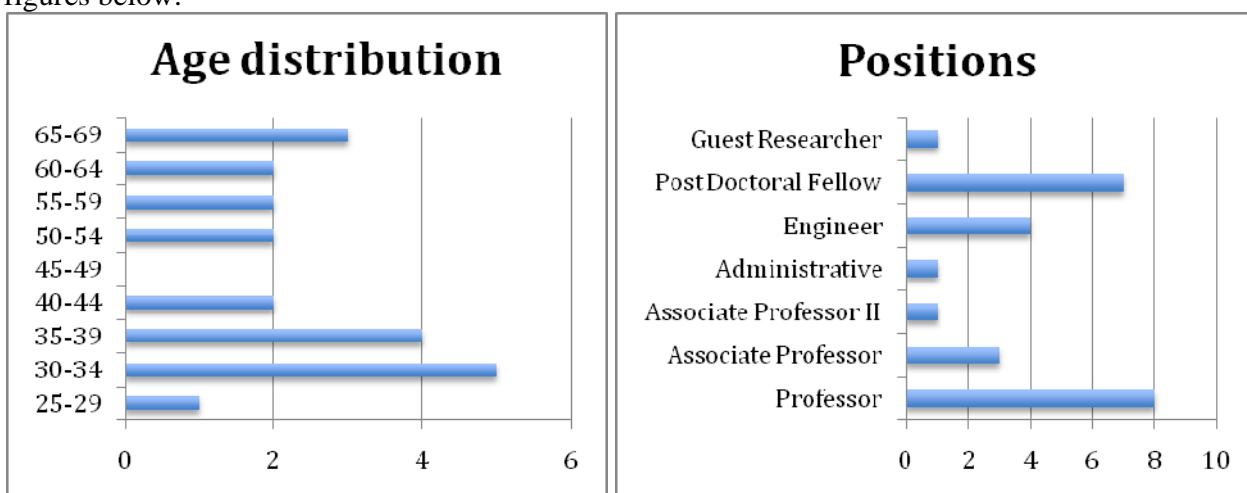
1. In 2009, MERG was granted 2.8 mill NOK for equipment to microbiology laboratories. The main idea with these labs is to provide best possible infrastructure for cultures, experiments and storage, and to provide these resources to as many researchers and students as possible across UiO, including visiting researchers and external collaborators. Most laboratories are fully renovated, making the total investment in these labs > 4 mill NOK.
2. Salary from the Department of Biology covering a three-year full time project leader (with the option of permanent employment). The person engaged in this position (Kathrine Schou) is responsible for establishing the mentioned microbiology labs and implementing quality standards and good working routines.
3. Financial support has been given from the Department of Biology for co-localization of most people in MERG. The offices have been renovated and a common seminar room and lunch room established, which has contributed substantially to improve both the social and scientific environment in the group.

Publication and dissemination strategy

MERG has the ambition of moving scientific borders by creating synergies between biological disciplines. It is our overall goal to produce scientific results that can bring the field of microbial biology, ecology and evolutionary biology steps forward on the international scene. Ultimately, the quality of our research will form the basis for applying for a CoE. It is also a goal to front development of new technology, molecular methods, imaging and cell culturing. Our strategy is to publish in general and highly ranked journals in accordance with the UiO strategy. We have in this evaluation attached references for all papers published in international peer-reviewed journals in the period 2005-2010. However, a substantial portion of these publications are resulting from projects initiated before MERG was established, often in collaboration with researchers outside MERG and as part of previous research programs. Altogether, these papers (160) reflect the scientific competence of the present MERG group. Interestingly, papers reported by MERG members the last year (i.e. papers that have a research basis in MERG), show a higher proportion of publications in general and high impact journals. For 2010 the statistics show that 35% of the articles were published in journals with higher impact factor than 3, and 23% of the articles were published in journals with higher impact factor than 5. Furthermore, more than two scientists are participating in about 60% of the published articles (46% of articles when only counting senior scientists), 55% of all posters presented on international conferences and 71% of grant applications with budgets > 4 mill NOK. The data show that newly initiated projects (i.e. posters) and future projects (i.e. grant applications) integrate to a larger extent expertise across disciplines than earlier initiated projects, revealing increased collaboration within the group and better synergies.

Conditions for research

MERG has a scientific staff of 12 (8 professors, 4 associate professors), 7 post docs, 4 engineers and 1 administrative leader. Eleven of these are female and 14 are male. In addition, we have 13 PhD fellows in the research group. Our permanent staff and post docs are mainly Norwegians, but we have people also from Germany (2), Canada (1), Holland (1), Finland (1), Iran (1) and China (1). In addition, we have two PhD fellows from India and one from China. Distribution of age and positions are shown in figures below.



One of the main challenges for MERG is our organizational structure. MERG reach over two faculties at UiO, and includes staff with primary affiliation to other research institutions outside UiO At Department of Biology MERG includes staff from different research program (i.e. CEES, Marine Biology and Integrative Biology. In the evaluation report from Department of Biology, Kjetill S. Jakobsen, Bente Edvardsen and Tom Andersen, have reported their CVs to these three units). Due to the complex organizational situation, we are continuously initiating activities to consolidate the group and involve all

participants into important processes. It has been important to avoid core and periphery structures within the research group. To a large extent we have succeeded in this work, but some researchers could be better integrated. Furthermore, since some of the MERG staff have obligations at their main host institution, we need to clarify how much time they can allocate to MERG activities. This is of crucial importance as it directly affects the conditions for scientific ambitions and production. In our view, this is an issue that needs to be addressed at the Department and Faculty level as well. Apart from this specific problem we have very good conditions for our research activity. We are especially satisfied with the numerous PhD scholarships we have obtained, the renovation and establishment of our labs and the full-time project leader position for establishment of MERG infrastructure. We have been involved in major initiatives, meetings and seminars at Faculty level. We are hence quite satisfied with the communication with the Department and Faculty but we believe that improved communication may have positive effects on the performance of the group.

Major infrastructure

MERG are responsible for developing and maintaining two major research infrastructures: Microbial laboratories and Bioportal bioinformatics services. Both are described below.

Bioportal

Bioportal is a web-based biocomputing service at University of Oslo, <http://www.bioportal.uio.no>. This infrastructure is currently the most used bioinformatics service in Norway and represents the largest HPC (high performance computing) community across any research area in Norway. Bioportal has users from all continents. The service is connected to the 454-sequencing lab at UiO, ensuring that produced data are automatically transferred from the sequencing facility to the users' Bioportal accounts. Bioportal is also used as a framework for publishing web-bioinformatics applications; two programs widely used by the scientific community have been implemented on Bioportal: AIR program package and CLOTU pipeline (both published by BMC Bioinformatics). In addition, Bioportal is used in regular courses and workshops at UiO and other universities in Norway, Sweden and Switzerland. *Hence the Bioportal infrastructure is important for both research and education at UiO.*

User statistics

Number of registered users:

- 2600 users in total
- 1500 users from UiO (from all Life Science Faculties at UiO)
- 500 users from other Norwegian Institutions:
- 600 users from other countries (all continents are represented).

Performed analyses on Bioportal:

- In 2009 we had an all-time load on the computers: 17 515 analyses done and 4,1 million CPU hours were used (or 460 CPU years).
- For 2010 the load early November was 23 000 analyses.

Output:

- More than 100 scientific papers in international peer-reviewed journals and
- Hundred students processed their data on Bioportal and used results in their theses.

Courses and workshops that used Bioportal:

- University of Oslo (Norway)
- University of Life Sciences (Norway)
- University of Geneva (Switzerland)
- University of Lund (Sweden)

Microbial laboratories

MERG infrastructure will provide laboratory facilities for experimental work, growth and storage of culturable prokaryotic and eukaryotic microorganism and cells, which complement the laboratory facilities at UiO. Most of the laboratories are in the process of being renovated and the expected completion of renovation is March 2011. Hence, the MERG laboratory infrastructure will be fully operative by March-April 2011. The infrastructure also includes protocols and training to make the facilities accessible for guest researchers and new students. Recently, 2.8 million NOK has been invested in new laboratory equipment. All laboratories have new Biological Safety Cabinets Class II and various temperature controlled culture chambers also including anaerobic-, CO₂- and light options, as well as basic equipment for imaging, storage and harvesting.

The labs are equipped to provide the best possible infrastructure for research in the fields of microbial biology, and our goal is to be attractive to the whole research community at UiO as well as external researchers. Instead of building new molecular labs, facilities that already are available, we have prioritized the development of non-existing culturing facilities. The idea is to use our resources as efficient as possible and to maximize the output from the invested infrastructure. In addition, the infrastructure is developed with the intention of creating a new arena for interaction between scientists from different research environments and across different disciplines. The new laboratories fit our ambitions to become an open and integrative research environment with strong collaboration with other research groups. The MERG infrastructure includes the following facilities:

- *Laboratory for harvesting for single cells/organisms*: Laboratory for harvesting single cells under sterile environment to prevent contamination, isolate single organisms for growth and harvesting material for further analysis by DNA/RNA/Protein analyse.
- *Eukaryote Lab*: Laboratory for growths and experiment on eukaryotic cells and organisms (not fungi). A separate lab is established for fungi to prevent contamination. In this lab, material will be harvested for further analysis by DNA/RNA/Protein analyse.
- *Mycology lab*: Laboratory for growths and experiment on sterile fungi. The lab is separated from 'environmental labs' to prevent contamination. In this lab, material will be harvested for further analysis by DNA/RNA/Protein analyse.
- *Environmental lab*: Laboratory for the study of environmental samples obtained from nature. In this lab pure cultures of e.g. fungi will be obtained and transmitted to the mycology lab. Various microscopes for studying environmental samples are included in this lab.
- *Experimental labs*: This is a laboratory for studying interactions between various microorganisms and their hosts, such as: Plants, fungi and bacteria, Parasite diversity and Cyanobacteria and fungi.

Laboratories and equipment needed in near future

To further develop the laboratories it is important to maintain good interactions with the users and to have a well funded plan for service and upgrade of the instrumentation. Ideally the laboratory facilities should also include the following equipment (no current funding available):

1. *BIOLOG with software, installation and service*: Bacterial / Yeast / Fungi Identification & Microbial Community Analysis
2. *BIOSCREEN*: Bioscreen-C Automated Growth Curve Analysis System provides a tightly controlled environment for measurement of growth of bacteria, molds, yeasts, or spores.
3. *BD InFlux Flow cytometer, with software, installation and service*
4. *Computer solutions for tracking data.*

A potential strategy to obtain funding is to participate in major infrastructure applications. This year MERG supported the IMBV application NORMIC-UIO, "A national live imaging and electron microscopy platform".

1.2.2 Research activities

Research activities and the research profile

Our research is focusing on creating synergies between disciplines and expertise in the group. Synergy has been the basis for establishing MERG and is the main criterion for how we prioritize resources within the group. To create best possible synergies we have taken the following actions:

- Improved our communicative skills and focus on leadership by 4 whole day seminars.
- Divided the research projects between teams that are composed of different expertise.
- Weekly seminars with presentation of ongoing research, and discussions.
- Established offices with large areas for integrated, project-oriented research.
- Developed a management tool called 'Jippi' that reports our activities and scientific output.

All ongoing projects are listed in our Annual plan for 2010

(<http://www.merg.uio.no/about/MERG%2520Annual%2520Plan%25202010-latest.pdf>).

Our past and ongoing research activity can be divided into the following five areas:

- *Microbial functioning:*

We use various –omics approaches (e.g. metagenomics, transcriptomics, metabolomics) to reveal the function of microorganisms in their natural habitats, and how the genomes have been shaped by the ecology of the microorganisms. For instance we use metagenomic approaches for comparing microbial diversity at the sea floor and in oil reservoirs at different sites in order to understand which organisms (and their relative proportions) and which genes (i.e.; biochemistry) are present in different deep sea sediment ecosystems and oil reservoirs. Furthermore, we study genomes and transcriptomes of cyanobacteria and eukaryote algae with particular focus on toxin producing genes and gene clusters in relation to molecular function, the ecology of the organisms and horizontal gene transfer processes. These studies also aim at understanding evolution of genes and genomic rearrangements. Toxic compounds and potential toxic algae are characterized and connected to projects for development of detection assays for harmful organisms and their compounds.

- *Microbial diversity:*

Several projects in the past have focused on revealing unknown microbial diversity (both prokaryotes and eukaryotes) by applying PCR on environmental sampled DNA, including an EU-funded project on characterizing diversity of unicellular eukaryotes and fungi. Beside marine habitats we have investigated freshwater lakes, terrestrial systems and airborne spores. We have recently moved our attention to eukaryote microorganisms that act as symbionts and parasites in plants, marine animals and planktonic heterotrophic protists. These studies have revealed a tremendously large diversity that has been unknown. We have been in the international front of the field by publishing new concepts and implementing next generation sequencing technologies. Another development is the use of whole genome amplification of single cells that are uncultivated. By picking cells from marine environments and optimizing this molecular approach we have been able to reveal both the host and symbiont diversity in selected groups of eukaryotes, and resulted in papers recently submitted (PLoS ONE and ISMEJ).

- *Phylogeny and evolutionary genomics:*

We have studied the evolutionary relationship and classification at all taxonomic levels, from species to domains of life, by using molecular and morphological data. Over the last few years we have applied phylogenomic approaches by using numerous gene sequences to resolve major questions about the Tree of Life and major transitions and innovations in the history of life. Most of these projects applied phylogenetic, genomic and transcriptomic approaches. We have investigated the relationships of supergroups and the origin of several enigmatic eukaryote lineages (Ministeria, Breviata, Telonemia and Collodictyon), resulting in articles that suggest substantial revisions of the eukaryote Tree of Life. These works also uncover evolutionary processes that have played key role in transition from unicellular to multicellular animals and plants. Furthermore we have investigated the evolution of chloroplasts, mainly secondary and tertiary plastids among dinoflagellates, which have revealed both the origin of these

plastids and the evolution of the genes and genomes of the organelles. We have investigated speciation among eukaryote and prokaryote microorganisms by investigating the phylogenetic relationships between species from different habitats. We have revealed that differences between habitats, such as fresh water and the oceans, constitute a substantial barrier that act against dispersal of microorganisms and hence is a factor that can contribute to speciation among such organisms. Furthermore, we have inferred the phylogeny of prokaryotes and identified ecotypes among cyanobacteria and habitat-specific distribution of SAR11 bacteria. Thus, several projects integrate ecological and evolutionary approaches to solve basic questions in microbial biology.

- *Microbial populations and communities:*

Microbial communities, their structure and which factors that shape the microbial communities are analyzed using novel high throughput sequencing techniques in combination with more traditional synecological approaches. Examples of such analyses include exploration of fungal communities in the plant rhizosphere, within living plants (endophytes) and within dead wood. The population and phylogeographic structure of microorganisms are studied to analyze at which spatial scales microorganism are structured and at which spatial scales microorganisms are dispersed. We study the interactions between microorganisms, such as symbiosis and parasitism, and how abiotic (e.g. climatic changes) and biotic factors (e.g. parasitism) affect and regulate the spatialtemporal characteristics of microbial populations. One of the projects aim at understanding the interaction between cyanobacterial ecotypes and chytrid fungi, and reveal specific interactions between strains of fungi and cyanobacteria.

- *Bioinformatics, molecular methods and databases:*

From the beginning MERG has focused on bioinformatics, and integrating novel computational and molecular methods into our research. We have developed several bioinformatics applications useful for ecological and evolutionary studies and databases applicable for fungal species identification. These pipelines and applications make surveys of environmental DNA and phylogenomics more feasible, including applications for identification of genes, taxa, functional annotation, gene and genome comparisons, multiple sequence alignments and multigene phylogenies. The projects have resulted in papers and publically available services. Nearly all participants have used these programs, and hence created synergies across the group. In addition, we have developed molecular methods for diversity surveys of environmental DNA samples and for genomic studies of single cell.

The societal relevance of the research

Most of our research is directly or indirectly of great relevance to the society, including projects on bloom-forming toxic cyanobacteria and dinoflagellates, mycorrhizal symbiosis, climate change, habitat fragmentation related to conservation biology, monitoring of invasive crayfish plague, deep sea metagenomes of oil reservoirs and abundance of parasites and harmful organisms. Two of our scientific staff, Trude Vrålstad and Thomas Rohrlack are affiliated with the Veterinary institute and the Norwegian Institute for Water Research which both are focusing mainly on applied science, and most of their work is therefore of relevance for the society. Furthermore we believe that fundamental new knowledge is of great interest for the general public, and we hence seek to reach out to the public with our results. We have appeared at least 10 times annually in local and national media. We have in 2010 published 10 popular scientific articles, and been in media 6 times.

How applied research contributes to basic research and/or vice versa

Several projects which are carried out by MERG include both basic and applied aspects. For example, MERG carries out research concerning which microbial endophytes that occur in plants grazed by animals, which could have implications for plant cultivation. In another project the basic genetics of the infamous dry rot fungus *Serpula lacrymans* is investigated, which could have impact on prevention and abatement of this fungus. A third example involves metagenomic analyses of bacteria in deep sea sediments. The monitoring of metabolic activity of these organisms may indicate whether oil is present

in soil below ground strata.

Give a brief assessment of the strengths and weaknesses of the unit/group.

Evaluation of our *strengths, challenges, opportunities* and *threats* for reaching our goal:

Strengths/opportunities

- MERG has gone through an integration process where separate research groups have merged into one coherent group of interacting scientists, students and technicians. This integration process has created an inter-disciplinary research group with a wide knowledge in the fields of microbial ecology and evolution. Most of the MERG participants have been directly involved in this transformation process through seminars and workshops, but more important through inter-disciplinary research projects. This has resulted in a robust organization that is ready to meet future challenges..
- Through our focus on networking and team building, there is an efficient knowledge transfer between master students, PhDs and Post Docs, which is considered one of our strengths.
- The scientific output of MERG is already considerable and has impact in fields of ecological and evolutionary microbiology. Hence, although the group involve researchers with different background, we have utilized the potential for synergy and there is a continuous search for such synergies.
- We have established cross-disciplinary research teams that supervise undergraduate students.
- 67% of all grant applications with budget < 1 mill NOK have been approved.
- We focus on efficient use of resources; we are building infrastructure for the widest possible user group and we are publishing high quality papers despite poor access to research grants.
- MERG has initiated a process to establish a Centre of Excellence together with two other prioritized research environments at MN-faculty: LaMDa and GlycoNor. We are together proposing an inter-disciplinary CoE named Centre for Integrative Microbiology, which received outstanding review by the MN-faculty. The proposal will be submitted to Research Council of Norway in 2011.

Weaknesses/threats

- One of the major challenges for MERG is to success in achieving large grants, and especially EU funding. Although we have improved our proposals radically by utilizing the expertise in the group, we have not received more grants than earlier.
- In order to succeed better we need to become more visible at the national and international research arenas by developing a communication strategy (including a visual profile), and we have to improve our strategy against EU and continue our work on the Centre of Excellence proposal for 2011.
- Microbial biology and the study of evolution of ecosystems are rapidly changing research areas. This is a major challenge to MERG and we have to strengthen our ability to meet these sudden and rapid changes. We need to improve our network to develop a strong microbial research environment at MN-faculty and establish stronger research network in the Nordic countries and Europe.
- We need to improve our molecular method skills, more specifically we should focus on:
 - Transformation and recombinant DNA technology on non-model microorganisms.
 - Culturing of non-model organisms
 - Experimental methods on living microorganisms
 - Increasing competence in bioinformatics.
- Although we have started to teach junior scientist leadership, project planning and managing, we should strengthen this aspect of our activities to better use our research network and improve the scientific quality.

Distribution of scientific results/publications among the researchers

A positive tendency within MERG is that an increasing number of people is publishing papers in international journals. For 2010 all senior scientists were authors of at least one accepted or submitted scientific paper. Similarly, nearly all PhD and postdocs were involved in at least one article in 2010. We expect that our strategy to create and use synergies will be even more visible next year as several of our recently initiated inter-disciplinary projects have just generated results where articles are submitted.

1.2.3 Training, mobility and career path

Six post docs and six of our PhD fellows are funded by external grant agencies. Seven PhD and one postdoc fellows are financed by the MN-faculty . When MERG was initiated three year ago, we had the ambition to recruit more post doc and PhD students from external grants. However, MERG has only to a limited extent succeeded with our latest grant applications. Achieving grants from the Research Council of Norway has become increasingly difficult. We have therefore initiated an EU strategy, where we have defined milestones and a plan for becoming an attractive partner for other EU research groups and to attract junior scientist through the Marie Currie Program. We also aim to obtain Marie Currie applications as a mean to support our own students for research stays abroad. We are mainly approaching EU by focusing on **EU Research Council (ERC), Cooperation, Marie Currie and technology platforms**. Our goal is to be in position to write high quality research proposals to EU late spring 2011.

The students are often staying abroad for shorter period in order to sample biological material, learning methods or plan projects. Usually all PhD and post docs have a stay abroad but the length of the stay vary from a few days to half a year. We are encouraging students to attend conferences and courses in order to build network and competence in the group. A substantial amount of our internal budget is covering travelling costs to international conferences and meetings.

It is of most importance that our PhD and post docs become independent researchers. We have therefore organized courses in process leadership, professional presentation, initiated a working group where only the post docs attend, started to educate all the junior scientists in project management and implemented project planning in the PhD research proposals. In addition, we have initiated projects where the post docs are explicitly proposed as project leaders (supported by a senior mentor), and we have given juniors leading roles in the group; they are responsible for supervising younger students, they organize seminars, workshops, courses and take active part in strategic planning and writing of grant proposals. In fact, most of the grant proposals submitted to the Research council of Norway involved post docs and PhD fellows. Hence it is our goal to teach our junior scientists all aspects of a modern team-oriented research group, making them able to establish their own research group in the future.

2.4 Research collaboration (national, international, industry/public sector)

National research network

Microbial biology network: MERG has become a part of a larger microbiology network at the MN-faculty that includes LaMDa (Dept. of Pharmacy) and GlycoNor (Dept. of Molecular Life Sciences). This network forms a good basis for the proposal for Centre of Excellence that is under preparation. Currently we collaborate with LaMDa and GlycoNor on four research projects in the field of metagenomics, genomics, microbial interactions between plants, bacteria and fungi, and organelle biology. As these collaborations have just been initiated, the scientific output is still limited, but we expect this cross-departmental collaboration to be very fruitful in the next few years.

Plant network: MERG is involved in the Plant network and proposals for large infrastructure to the Research Council of Norway. This network will likely apply for infrastructure that is highly relevant for experiments on microorganisms. MERG has obtained support for an infrastructure grant in 2009 for establishing labs for culturing, experiments and storage of microorganisms. These facilities will be made available for the Plant network so that complementary infrastructure can be built by future funding to

this network.

Bioinformatics/Biocomputing: MERG has been involved in the application for large grants for establishing biocomputing infrastructure at UiO. We participated on a proposal aiming at 200 mill NOK together with Dept. of Informatics and several other life science departments in 2009 and are currently working to establish an Extended Bioinformatics Core Facility at UiO. It is likely that one of our infrastructures, Bioportal, will become an important component of such core facility.

International research network

MERG is collaborating with scientists at leading universities in many countries (for details, see <http://www.merg.uio.no/research/collaborators/>)

Biomarks: MERG is participating in a large EU network (Biomarks) with common interest of investigating the eukaryote microbiology in marine environments. This network includes four scientists from MERG and collaborates on sampling DNA and RNA from various locations around the coast of EU and surveys the diversity by 454 pyrosequencing the obtained genetic material and using bioinformatics analyses. Our group at UiO is responsible for investigating particular protist groups and sample from the Oslofjord.

MERG is heading the Nordforsk research network '*Fungi in boreal forests*', focusing on implementation of high-throughput sequencing technologies and identification arrays for fungal ecology research. About 15 North European research groups are participants in the network, including ca. 100 researchers and students.

Beside the formal networks in Europe, we have over the last years published a number of scientific articles with collaborators across Europe, North America and Japan. These interactions have had a tremendous positive impact on our research activities. It is a major goal to keep these networks working in the future. Collaboration with research groups abroad has improved the quality of our research and increased the mobility between MERG and external institutions.

2.5 Other information of relevance to the evaluation

When MERG started up in 2007, the mission given by the MN-faculty was to build up a research group with a realistic chance of achieving status as a Centre of Excellence before 2012. MERG has from the beginning worked strategically towards this goal and is currently working intensively to develop scientific concepts and scientific network for a CoE named Centre for Integrative Microbiology (CIM). This application was developed together with two other research groups at the MN-faculty, GlycoNor and LaMDa. Our vision is to establish a new research centre in the intersection between **microbial biology, glycobiology and evolutionary biology**. Bridging the gap between these scientific areas will foster new conceptual understanding of microbial biology and together with emerging technologies in **nano-sciences** solve challenges within health, climate, energy and food production. We will promote interdisciplinary collaboration and train the next generation of scientists, educators and technology leaders. Our research will be transparent and interactive with the society, industry and educational system.

Recently, our CIM proposal was approved as one of the few CoE initiatives that will be supported and submitted from the faculty to the Research Council of Norway for the third generation CoE call in 2011. Based on our increased ability to create synergies and the approval of our CoE applications by the MN-faculty, we conclude that a main goal with the MERG initiative has been reached.

Microbial Evolution Research Group (MERG)

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- 144 **Stüken A**. 2007. Distribution of *C. raciborskii* and other neo-cyanobacteria. Chapter 5. C. Wiedner, J. Rücker, and B. Weigert (ed.), *Cylindrospermopsis raciborskii and cylindrospermopsin in the lakes of the Berlin area: Occurrences, causes and consequences*, vol. 6 Kompetenzzentrum Wasser Berlin Publication Series, Berlin, Germany.
- 145 **Sønstebo, J. H.**, R. Borgstrom, and M. Heun. 2007. A comparison of AFLPs and microsatellites to identify the population structure of brown trout (*Salmo trutta* L.) populations from Hardangervidda, Norway. *Molecular Ecology*, 16 (7): 1427-1438
- 146 **Sønstebo, J. H.**, R. Borgstrom, and M. Heun. 2007. Genetic structure of brown trout (*Salmo trutta* L.) from the Hardangervidda mountain plateau (Norway) analyzed by microsatellite DNA: a basis for conservation guidelines. *Conservation Genetics*, 8 (1): 33-44
- 147 **Sønstebo, J. H.**, R. Borgstrom, and M. Heun. 2008. Genetic structure in alpine brown trout *Salmo trutta* L. shows that indirect stocking affects native lake populations. *Journal of Fish Biology*, 72 (8): 1990-2001
- 148 **Sønstebo, J. H.**, R. Borgstrom, and M. Heun. 2008. High genetic introgression in alpine brown trout (*Salmo trutta* L.) populations from Hardangervidda, Norway. *Ecology of Freshwater Fish*, 17 (1): 174-183
- 149 **Sønstebo, JH**, Gielly L, Brysting AK, Elven R, Edwards M Haile J, Willerslev E, Coissac E, Rioux D, Sannier J, Taberlet P, Brochmann C. 2010. Using next-generation sequencing for molecular reconstruction of past Arctic vegetation and

- 150 Tamminen, T, **Andersen T**. 2007. Seasonal phytoplankton nutrient limitation patterns as revealed by bioassays over Baltic Sea gradients of salinity and eutrophication. *Marine Ecology Progress Series*, 340: 121-138
- 151 Tollefsrud MM, **Sønstebo JH**, Brochmann C, Johnsen O, Skroppa T, Vendramin GG. 2009. Combined analysis of nuclear and mitochondrial markers provide new insight into the genetic structure of North European *Picea abies*. *Heredity*, 102 (6): 549-562
- 152 Tooming-Klunderud A, Fewer DP, **Rohrlack T**, Jokela J, Rouhiainen L, Sivonen K, **Kristensen T**, **Jakobsen KS**. 2008. Evidence for positive selection acting on microcystin synthetase adenylation domains in three cyanobacterial genera. *BMC Evolutionary Biology*, 8 (256)
- 153 Tooming-Klunderud A, **Rohrlack T**, **Shalchian-Tabrizi K**, **Kristensen T**, **Jakobsen KS**. 2007. Structural analysis of a non-ribosomal halogenated cyclic peptide and its putative operon from *Microcystis*: implications for evolution of cyanopeptolins. *Microbiology*, 153 (5): 1382-1393
- 154 Tooming-Klunderud A, **Rohrlack T**, **Shalchian-Tabrizi K**, **Kristensen T**, **Jakobsen KS**. 2007. Structural analysis of a non-ribosomal halogenated cyclic peptide and its putative operon from *microcystis*: Implications for evolution of cyanopeptolins. *Microbiology*, 153 (5): 1382-1393
- 155 Tønnesen HH, Mysterud I, Karlsen J, Skulberg OM, Laane CMM, **Schumacher T**. 2010. Detection of singlet oxygen in blood serum samples of clinically healthy lambs and lambs suffering from alveld disease. *Veterinary research communications*, 34 (4): 347-357
- 156 Uhlig S, Botha CJ, **Vrålstad T**, Rolén E, Miles CO. 2009. Indole-diterpenes and ergot alkaloids in *Cynodon dactylon* infected with *Claviceps cynodontis* from an outbreak of tremors in cattle. *Journal of Agricultural and Food Chemistry*, 57 (23): 11112-11119
- 157 Vestheim H, **Edvardsen B**, Kaartvedt S. 2005. Assessing feeding of a carnivorous copepod using species-specific PCR. *Marine Biology*, 147 (2): 381-385
- 158 Vestheim H., S. Kaartvedt S **Edvardsen B**. 2005. State-dependent vertical distribution of the carnivore copepod *Pareuchaeta norvegica*. *Journal of Plankton Research*, 27 (1): 19-26
- 159 **Vik U**, Jørgensen MH, **Kauserud H**, Nordal I, Brysting AK. 2010. Microsatellite markers show decreasing diversity but unchanged level of clonality in *Dryas octopetala* (Rosaceae) with increasing latitude. *American Journal of Botany*, Volume 97 (6): 1–10
- 160 **Vrålstad T**, Knutsen AK, Tengs T, Holst-Jensen A. 2009. A quantitative TaqMan® MGB real-time polymerase chain reaction based assay for detection of the causative agent of crayfish plague *Aphanomyces astaci*. *Veterinary Microbiology*, 137 (1-2):

- 161 Wallenius T, Niskanen L, Virtanen T, **Hottola J**, Brumelis G, Angervuori A, Julkunen J, Pihlström M. 2010. Loss of habitats, naturalness and species diversity in Eurasian forest landscapes. *Ecological Indicators*, 10 (6): 1093-1101.
- 162 Wollan AK, Bakkestuen V, **Kauserud H**, Gulden G, Halvorsen R. 2008. Modelling and predicting fungal distribution patterns using herbarium data. *Journal of Biogeography*, 35 (12): 2298–2310
- 163 Yuasa T, Dolven JKL, **Bjørklund KR**, Mayama S, Takahashi O. 2009. Molecular phylogenetic position of *Hexacontium pachydermum* Jørgensen (Radiolaria). *Marine Micropaleontology*, 73 (1-2): 129-134
- 164 Yuasa T, Takahashi O, Dolven JKL, Mayama S; Matsuoka A, Honda D, **Bjørklund KR**. 2006. Phylogenetic position of the small solitary phaeodarians (Radiolaria) based on 18S rDNA sequences by single cell PCR analysis. *Marine Micropaleontology*, 59(2): 104-114

Akbar Akbari :

Sex: Male **Year of birth:** 1970 **Nationality:** Iranian
Guest Researcher, Department of Biology, UiO

Academic degrees

2008 PhD, Department of Informatics, UiO
1996 Master of Science, Department of Computer Science, UiO
1993 Master of Science, Department of Physics, UiO

Important academic and professional affiliations

- Member of the American Society for Cell Biology
- Member of IEEE - Signal Processing Society
- Member of IEEE - Engineering in Medicine and Biology Society
-

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 2

Total career publications

Peer-reviewed journals or monographs: 7

Three most important publications last ten years

- Akbari A, Marthinsen G, Lifjeld JT, Albregtsen F, Wennerberg L, Stenseth NC, Jakobsen KS. Improved DNA fragment length estimation in capillary electrophoresis. *Electrophoresis*. 2008 29(6): 1273-1285.
- Akbari A, Albregtsen F. Normalizing the background and removing the trend in one-dimensional DNA fingerprint images. *J Chromatogr A*. 2003 1014(1-2): 11-9.
- Akbari A, Albregtsen F, Lingjaerde OC. Adaptive weighted least squares method for the estimation of DNA fragment lengths from agarose gels. *Electrophoresis*. 2002 23(2):176-81.

Kjell Rasmus Bjørklund :

Sex: Male **Year of birth:** 1943 **Nationality:** Norwegian
Professor, Natural History Museum, UiO

Previous academic positions

Assistant professor in Micropaleontology, Geological Institute Dept. B, UiB
Associate professor in Micropaleontology, Geological Institute Dept. B, UiB
Associate professor in Micropaleontology, Natural History Museum, UiO

Academic degrees

1972 Cand. real., Marine Biology and Marine Geology, University of Bergen

Important academic and professional affiliations

American Geophysical Union
Geological Society of Norway
Zoosystematica Rossica (International Advisory Board)

Supervision of PhD-students

Under supervision at present
As co-supervisor: 1

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 17

Total career publications

Peer-reviewed journals or monographs: 43
Review articles and book chapters: 1

Three most important publications last ten years

- Bjørklund, Kjell R; Kruglikova, Svetlana, 2003. Polycystine radiolarians in surface sediments in the Arctic Ocean basins and marginal seas. *Marine Micropaleontology*, 49: 231-273.
- Kruglikova, Svetlana B.; Bjørklund, Kjell Rasmus; Hammer, Øyvind; Anderson, O. Roger, 2009. Endemism and speciation in polycystine radiolarian genus *Actinomma* in the Arctic Ocean: Description of two new species *Actinomma georgii* n. sp. and *A. turidae* n. sp.. *Marine Micropaleontology*, 72(1-2): 26-48.
- Demetrio Boltovskoy, Stanley A. Kling, Kozo Takahashi, and Kjell Bjørklund
World Atlas of Distribution of Recent Polycystina (Radiolaria) (PDF) (High-Resolution PDF) 13.3.18A *Palaeontologia Electronica* Vol. 13, Issue 3; 17A:8p; 230 pages.http://palaeo-electronica.org/2010_3/230/index.html

Tor Carlsen :

Sex: Male **Year of birth:** 1977 **Nationality:** Norwegian
Post Doctoral Fellow, Department of Biology, UiO

Previous academic positions

2008-present P.t. Post Doc., Department of Biology, UiO
2008 Researcher, Department of Biology, UiO
2002-2007 PhD, Natural History Museum (NHM) University of Oslo,
1999-2002 Assistant teacher, University of Oslo.

Academic degrees

2002-2007 PhD Biology, University of Oslo.
2000-2002 Cand. Scient. Biology, Mycology, University of Oslo.
1996-1999 Cand. Mag. Mathematic and Natural sciences, Biology, University of Oslo

Important academic and professional affiliations

2004 -2006 PhD-committee for biology, University of Oslo
2000 -2003 Editor and member of the editorial board for *Biolog*
2000 -2002 Editor for the journal *Firblad*

Scientific review work

Reviewer for the following journals: *Biological Conservation*, *Annals of Botany*, *Botanical Journal of the Linnean Society*, *American Journal of Botany*, and *Nordic Journal of Botany*.

Supervision of PhD-students

Under supervision at present
As main supervisor: 0 As co-supervisor: 2

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 12
Review articles and book chapters: 3

Total career publications

Peer-reviewed journals or monographs: 12
Review articles and book chapters: 3

Three most important publications last ten years

- Engh I. B., Carlsen T., Sætre G.-P., Høgberg N., Doi S., and Kauserud H. (2010) Two invasive populations of the dry rot fungus *Serpula lacrymans* show divergent population genetic structures. *Molecular Ecology* 19, 706–715
- Lihová J., Carlsen T., Brochmann C., and Marhold K. (2009) Contrasting phylogeographies inferred for the two alpine sister species *Cardamine resedifolia* and *C. alpina* (Brassicaceae). *Journal of Biogeography*, 36: 104-120
- Eidesen P.B., Carlsen T., Molau U., and Brochmann C. (2007) Repeatedly out of Beringia: *Cassiope tetragona* embraces the Arctic. *Journal of Biogeography*, 34: 1559–1574.

Thomas Hendricus Augustus Haverkamp :

Sex: Male **Year of birth:** 1973 **Nationality:** Dutch
Post doctoral fellow, Department of Biology, UiO

Previous academic positions

2002-2008 PhD-student, Netherlands Institute of Ecology, Yerseke, the Netherlands.

Academic degrees

2002-2008 PhD Biology, University of Amsterdam

1994-2001 Universiteit Utrecht Msc , Biology

Important academic and professional affiliations

2010 Research article review for the ISME journal

2010 Research article review for Aquatic Microbial Ecology.

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 4

Total career publications

Peer-reviewed journals or monographs: 5

Three most important publications last ten years

- Stomp, M; Huisman, J; Vörös, L; Pick, FR; Laamanen, M; *Haverkamp, T* and Stal, LJ. Colourful coexistence of red and green picocyanobacteria in lakes and seas. *Ecology Letters* (2007) 10, 290–298.
- Haverkamp, T; Acinas, SG; Doeleman, M; Stomp, M; Huisman, J; Stal, LJ. Diversity and phylogeny of Baltic Sea picocyanobacteria inferred from their ITS and phycobiliprotein operons. *Environmental Microbiology* (2008) 10, 174–188.
- Haverkamp, THA; Schouten, D; Doeleman, M; Wollenzien, U; Huisman, J and Stal, LJ. Colorful microdiversity of *Synechococcus* strains (picocyanobacteria) isolated from the Baltic Sea. *The ISME Journal* (2009) 3, 397–408

Jenni Hottola •

Sex: Female **Year of birth:** 1976 **Nationality:** Finnish
Post doctoral fellow, Department of Biology, UiO

Previous academic positions

2008-2010 Researcher at the University of Helsinki, Finland (part time)
2008-2008 Researcher at the Finnish Forest Research Institute (part time)
2007-2007 Researcher at the Finnish Forest Research Institute (full time)
2006-2006 Researcher at the University of Helsinki, Finland (part time)

Academic degrees

2010 PhD, University of Helsinki
2004 Master of Science, University of Oulu

Important academic and professional affiliations

2006-present Member of the Basidiomycetes working group of the Nordic Saproxylic Network
2010 Involved in Red-Listing work in Finland (Finnish Red Databook 2010)

Scientific review work

Peer review for the journals *Fungal Ecology*, *Biological Conservation* and *Conservation Biology*.

Awards and Honours

2005 Parvela prize for the best MSc thesis in botany during years
2003-2004 University of Oulu and the society "Oulun Luonnonystävien yhdistys"
2003 Master of Science of the year. Department of Biology, University of Oulu

Supervision of PhD-students

Under supervision at present
As co-supervisor: 1

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 9

Total career publications

Peer-reviewed journals or monographs: 9

Three most important publications last ten years

- Hottola, J., Ovaskainen, O. & Hanski, I. 2009. A unified measure of the number, volume and diversity of dead trees and the response of fungal communities. *Journal of Ecology* 97: 1320–1328.
- Ovaskainen, O., Hottola, J. & Siitonen, J. 2010. Modeling species co-occurrence by multivariate logistic regression generates new hypotheses on fungal interactions. *Ecology* 91: 2514-2521.
- Ovaskainen, O., Nokso-Koivisto, J., Hottola, J., Rajala, T., Pennanen, T., Ali-Kovero, H., Miettinen, O., Oinonen, P., Auvinen, P., Paulin, L., Larsson, K.-H. & Mäkipää, R. 2010. Identifying wood-inhabiting fungi with 454 sequencing - what is the probability that BLAST gives the correct species? *Fungal Ecology* 3: 274-283.

Klaus Høiland :

Sex: Male **Year of birth:** 1948 **Nationality:** Norwegian **Position:** Professor, Dep. of Biology, UiO

Previous academic positions

1995-present Professor in biology, Dept. of Biology, UiO
1994-1995 Associate Professor of biology, Dept. of Biology, UiO
1988-1994 Researcher NINA (Norwegian Institute of Nature Research)
1987-1988 Associate Professor, Økoforsk (Norwegian Institute for Ecological Research)
1982-1987 Project Leader for various environmental projects funded by Norwegian Ministry for Environmental Affairs
1976-1982 Graduate Research and Teaching Assistant, Botanical Garden and Museum, UiO

Academic degrees

1974 Cand. real., UiO
1984 Dr. philos., UiO

Important academic and professional affiliations

1996-2010 Nordic Journal of Botany, Main Section Editor for Mycology
2009 Organizer of 19th Nordic Mycological Congress, Steinkjer, Norway
2008 Editor together with Rune Halvorsen Økland (now Rune Halvorsen) for: Arctic and alpine mycology VII. Oslo: Natural History Museums and Botanical Garden, University of Oslo 2008 (ISBN 82-7420-045-4) 211 s. Sommerfeltia 31
1999-2007 Nordic Journal of Botany, Bord of Directors
2002 Co-organizer of 7th International Mycological Congress, Oslo
1990-1996 Editor of Blyttia (the journal for Norwegian Botanical Society)

Scientific review work

Referee for about 10 international journals

Awards and Honours

2008 "Formidlingsprisen" Department of Biology, UiO
2006, '03, '99 "Den gyldne pekestokk" ("The golden pointer") BFU's (Biologisk Fagutvalg) award for best teacher of the year at the Department of Biology.
1998 "Brageprisen", for scientific litterature. "Er det sopp er det liv", Landbruksforlaget. Med Leif Ryvarden
1993 "Svein Myrbergets minnepris" Norwegian Institute of Nature Research NINA in 1993 (award for popularisation of science).

Supervision of PhD-students

Under supervision at present

As main supervisor: 1

As co-supervisor: 2

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 10

Total career publications

Peer-reviewed journals or monographs: 52

Review articles and book chapters: 7

Three most important publications last ten years

- Abesha, Emnet; Caetano-Anolles, Gustavo; Høiland, Klaus. Population genetics and spatial structure of the fairy ring fungus *Marasmius oreades* in a Norwegian sand dune ecosystem. *Mycologia* 2003; Volum 95. s. 1021-1031
- Høiland, Klaus; Holst-Jensen, Arne. Cortinarius phylogeny and possible taxonomic implications of ITS rDNA sequences. *Mycologia* 2000 ;Volum 92.(4) s. 694-710
- Kauserud, Håvard; Stige, Leif Christian; Vik, Jon Olav; Økland, Rune Halvorsen; Høiland, Klaus; Stenseth, Nils Christian. Mushroom fruiting and climate change. Proceedings of the National Academy of Science of the United States of America 2008 ;Volum 105. s. 3811-3814.

Håvard Kauserud :

Sex: Male **Year of birth:** 1971 **Nationality:** Norwegian
Associate professor, Department of Biology, UiO

Previous academic positions

2002-2004 Post doc at the University of Oslo
2004-2007 Researcher at the University of Oslo

Academic degrees

2001 Dr. Scient. University of Oslo
1995 Cand. Scient. University of Oslo

Important academic and professional affiliations

2008- Member of the steering board of the Microbial Evolution Research Group (MERG)
2008- Coordinator of the Nordforsk network 'Fungi in boreal forest soils'
2005-2008 Editor of the Norwegian mycological journal *Agarica*

Scientific review work

- Referee for the journals: *Fungal Genetics & Biology*, *Microbiology*, *Molecular Ecology*, *Mycologia*, *Mycological Research*, *New Phytologist*.
- Member of two PhD committees

Supervision of PhD-students

Under supervision at present
As main supervisor: 3
As co-supervisor: 3

Number of publications for the period 1.1.2005 - 30.6.2010

For the period 1.1.2005 - 30.6.2010
Peer-reviewed journals or monographs: 21

Total career publications

Peer-reviewed journals or monographs: 35

Three most important publications last ten years

- Kauserud H, Stige LC, Vik JO, Økland RH, Høiland K, Stenseth NC. 2008. Mushroom fruiting and climate change. *Proceedings of the National Academy of Sciences USA*, 105, 3811-3814.
- Kauserud H, Svegård IB, Sætre G-P, Knudsen H, Stensrud Ø, Schmidt O, Doi S, Sugiyama T, Högborg N. 2007. Asian origin and rapid global spread of the destructive dry rot fungus *Serpula lacrymans*. *Molecular Ecology*, 16, 3350-3360.
- Kauserud H, Sætre G-P, Schmidt O, Decock C, Schumacher T. 2006. Genetics of self/nonsel self recognition in *Serpula lacrymans*. *Fungal Genetics and Biology*, 43, 503-510.

Dag Klaveness :

Sex: Male **Year of birth:** 1945 **Nationality:** Norwegian **Position:** Professor, Dep. of Biology, UiO

Previous academic positions

1992-present Professor, Department of Biology, UiO
1978-1992 Senior lecturer in limnology (doctoral equivalent accepted)
1974-1978 Lecturer in limnology, Department of Biology, UiO
1972-1973 Research fellow, NAVF (now NFR), last year at Woods Hole Oceanographic Institution
1969-1970 Teaching assistant for Trond Bråten (UiO) in Electron Microscopy
1968-1969 Laboratory assistant for Dr. Eystein Paasche

Academic degrees 1971: Cand. real. UiO 1968: Cand. mag. UiO

Important academic and professional affiliations

Presently Senior research scientist MERG, also responsible for limnology and estuarine questions
2003-present Representative in the interdepartmental committee organizing bachelor/master degrees in environmental sciences at UiO
1980-present Departmental representative in the committee for introduction of new educational system (Cand.scient - Dr.scient.)
-2001 Elected representative at the board of Department of Biology, UiO, for three periods
1997-2002 Representative at the board of Department of Biology, UiO
1995-2000 Faculty representative at UiO board for the program for ethics in science/education
1985-1986 Representative at the board, Faculty of Mathematics and Science, UiO
1985-1986 Representative at the board of Department of Biology, UiO
1980-1984 a.o. Member of Board of editorial advisors of "Phycologia"
1980-1982 On the board of editors of "Vann" (Norwegian journal)
1979-1980 Representative at the board, Faculty of Mathematics and Science, UiO
1979-1980 Representative at the board of Department of Biology, UiO
1979-1980 Chairman of committee for the teaching program at Department of Biology, UiO (responsible for all teaching given at the Department).

- Has been part of or leader of projects on aquatic productivity, physiological studies on algae, taxonomy and applied aspects (mainly with NAVF/NTNF/NRF support).

Scientific review work Referee for "Oikos", "Nordic Journal of Botany", "Polar research", "Journal of Phycology", "Phycologia", "Journal of Experimental Biology". Co-founder of "Phenology and Seasonality" 1996

Supervision of PhD-students Under supervision at present as main supervisor: 1

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 12 Review articles and book chapters: 1

Total career publications

Peer-reviewed journals or monographs: 51 Review articles and book chapters: 6

Three most important publications last ten years

- Shalchian-Tabrizi, K., Eikrem, W., Klaveness, D., Vaultot, D., Minge, M.A., Le Gall, F., Romari, K., Thronsen, J., Botnen, A., Massana, R., Thomsen, H.A. & Jakobsen, K.S. 2006. Telonemia, a new protist phylum with affinity to chromist lineages. Proc. R. Soc. B 273, 1833-1842
- Klaveness, D. & Løvholden, F. 2007. Meromictic lakes as habitats for protists: Life in the chemocline and below? In Seckbach, J. (ed.): *Algae and Cyanobacteria in Extreme Environments*, pp. 61-78. Cellular Origin, Life in Extreme Habitats and Astrobiology, Vol. 11. xxxiv+811 pp. Springer, Dordrecht.
- Burki, F., Inagaki, Y., Bråte, J., Archibald, J.M., Keeling, P.J., Cavalier-Smith, T., Sakaguchi, M., Hashimoto, T., Horak, A., Kumar, S., Klaveness, D., Jakobsen, K.J., Pawlowski, J., Shalchian-Tabrizi, K. 2009. Large-Scale Phylogenomic Analyses Reveal That Two Enigmatic Protist Lineages, Telonemia and Centroheliozoa, Are Related to Photosynthetic Chromalveolates. Genome Biol. Evol. 1, 231-238.

Tom Arne Kristensen :

Sex: Male **Year of birth:** 1945 **Nationality:** Norwegian
Professor, Department of Molecular Sciences, UiO

Previous academic positions

1994- Associate professor, Department of Molecular Biosciences, UiO
1988-1994 Researcher at the Biotechnology center and European Molecular Biology Laboratory (EMBL)
1978-1988 Research fellow at Research Institute for Internal Medicine

Academic degrees

1984 Dr. scient., UiO
1971 Cand. scient., Department of Molecular Biosciences, UiO

Important academic and professional affiliations

2005-2008 Deputy member of the Institute board, Department of Molecular Biosciences, UiO
2004 - Member of the board of the master program in biochemistry, physiology and molecular biology, UiO
2002-2003 Member of the interim steering comitee of the bachelor program “Biochemistry, physiology and molecular biology” and the amster program “Biochemistry, physiology and molecular biology”
2001-2002 Member of faculty reference group for implementing the reform of higher studies in Norway
1992- Biotechnology expert on the Board of Appeal, Norwegian Industrial Property office

Supervision of PhD-students

Number of PhD students completed for the period 1.1.2005 - 30.6.2010
As main supervisor: 1

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 11

Total career publications

Peer-reviewed journals or monographs: 54
Review articles and book chapters: 2

Three most important publications last ten years

- Rounge, T.B., Rohrlack, T., Nederbragt, A.J., Kristensen, T. and Jakobsen, K.S. (2009) A genomwide analysis of nonribosomal peptide synthetase gene clusters and their peptides in a *Planktothrix rubescens* strain. *BMC Genomics* 2009, 10:396.
- Ellefsen, S., Stensløykken, K.O., Sandvik, G.K., Kristensen T. and Nilsson, G.E. (2008) Improved normalization of real-time reverse transcriptase polymerase chain reaction data using an external RNA control. *Anal. Biochem.* 376, 83-93.
- Tveit, H. and Kristensen, T. (2001) A fluorescence-based DNA polymerase assay. *Anal. Biochem.* 289, 96-98.

Thomas Rohrlack :

Sex: Male, **Year of birth:** 1972, **Nationality:** German

1. Amanuensis, Department of Biology, UiO /Research Scientist, NIVA

Previous academic positions: Researcher, Norwegian Institute for Water Research, Postdoc, Norwegian Institute for Public Health, Postdoc, Freshwater Biological Laboratory, University of Copenhagen, Denmark, Student assistant, Section for ecology, Humboldt-University, Phd student Humboldt-University.

Academic degree: Phd in Ecology, Humboldt-University, Germany, 1999.

Scientific review work including peer-review: Assistant Editor Journal "Limnologica", referee of almost all international journals focusing on freshwater ecology and water research, several disseminations of project proposals

No. of publications in peer-r. jour. or peer-r. monographs (1.1.2005–30.6.2010): 26

No. of publications in peer-r. jour. or peer-r. monographs (total career): 37

Three most important publications the last 10 years:

- **Rohrlack, Th.**, Dittmann, E., Börner, T. and Christoffersen, K. (2001): Effects of cell-bound microcystins on survival and feeding of *Daphnia* spp. Applied and Environmental Microbiology 67: 3523-3529.
- **Rohrlack T**, Christoffersen K, Dittmann E, Nogueira I, Vasconcelos V, Boerner T (2005): Ingestion of microcystins by *Daphnia*: Intestinal uptake and toxic effects. Limnol. Oceanogr. 50: 440-448.
- **Rohrlack T.**, et al. (2008). Oligopeptide chemotypes of the toxic freshwater cyanobacterium *Planktothrix* can form subpopulations with dissimilar ecological traits. Limnology and Oceanography 53: 1279-1293.

Trond Scumacher :

Sex: Male **Year of birth:** 1949 **Nationality:** Norwegian
Professor, Department Head, Department of Biology, UiO

Previous academic positions

2003 – present	Department Head, Department of Biology, UiO
1992 – present	Professor in biology, Department of Biology, UiO
1995-1999	Vocative professorship in mycology, University of Tromsø
1987-1992	Associate professor, Department of Biology, UiO
1984-1987	Assistant professor, Department of Biology, UiO
1980-1984	Graduate research assistant and teaching assistant, Dep. of Biology, UiO

Academic degrees

1988 Dr. philos. 1977 Cand. real. 1974 Cand. med. (MD)

Important academic and professional affiliations (last 10 years)

2003-present	Department Head (elected), Department of Biology, Univ. of Oslo
2004-present	Member of National Advisory Board for “Higher education in biology”, Universitets og Høgskolerådet, Norway
2008-present	Chairman of “Kultur og Velferdsutvalget”, Univ. of Oslo
1990-present	Chairman of the Jury for “National Contest of Young Scientists, Norway”, National Research Council, Norway
1999-2009	Chairman (2 years) and member of the Board of “Stiftelsen Ungdom og forskning”, Universitets- og Høgskolerådet, Norway
2003-2005	Member of Board of Faculty of Mathematics and Natural Sciences, Univ. of Oslo
2002-2006	President of the “International Mycological Association” (IMA)
1999-2003	Member of Board of the Natural History Museum (NHM), Univ. of Oslo
1999 -2003	Leader of working group and advisory board on mycotoxins, Mattilsynet, Norway
1999-2002	Vice President and Chairman of the scientific committee, “The 7th International Mycological Congress” Oslo 11-17 August 2002, University of Oslo, Norway
2002	Evaluation board member FORMAS, Swedish Research Council, Stockholm.

Scientific review work

Referee commissions for 11 international scientific journals last 10 years.

Supervision of PhD-students as main supervisor

Under supervision at present: 1; number completed (1.1.2005 - 30.6.2010): 1

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 7; Review articles and book chapters: 0

Total career publications

Peer-reviewed journals or monographs: 78; Review articles and book chapters: 8

Three most important publications last ten years:

Vrålstad T, Myhre E and Schumacher T. 2002. Molecular diversity and phylogenetic affinities of symbiotic root-associated ascomycetes of the Helotiales in burnt and metal polluted habitats. *New Phytologist* **155**: 131-148.

Kauserud H, Sætre G-P, Schmidt O, Decock C, Schumacher T. 2006. Genetics of self/nonspecific recognition in *Serpula lacrymans*. *Fungal Genetics and Biology* **43**: 503-510.

Barkman, T., Bendiksby, M., Lim, S-H., Mat Salleh, K., Nais, J., Madulid, D., Fernando, E. & Schumacher, T. 2008. Accelerating rates of floral evolution at the upper size limit for flowers. - *Current Biology* **18**: 1508-1513.

Kamran Shalchian-Tabrizi :

Sex: Male **Year of birth:** 1970 **Nationality:** Norwegian
Associate professor, Department of Biology, UiO

Previous academic positions

2004-2006 Postdoc at University of Oslo and University of Oxford

Academic degrees

2003 Dr. scient. Department of Biology, University of Oslo

1999 Cand. scient., Division of general genetics, Department of Biology, University of Oslo

1995 Cand. mag., Department of Biology, University of Oslo

Important academic and professional affiliations

2004 – Head of the Biportal bioinformatics service platform at University of Oslo

2007 – Head of Microbial Evolution Research Group (MERG)

2007 – Associate professor at the Department of Biology, University of Oslo

2008 – 2009 Part of the research leadership program at University of Oslo

Supervision of PhD-students

Under supervision at present

As main supervisor: 2

As co-supervisor: 3

Number of PhD students completed for the period 1.1.2005 - 30.6.2010:

As main supervisor: 0

As co-supervisor: 1

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 26

Review articles and book chapters: 1

Total career publications

Peer-reviewed journals or monographs: 30

Review articles and book chapters: 1

Three most important publications last ten years

- Shalchian-Tabrizi, K., Eikrem, W., Klaveness, D., Vaulot, D., Minge, M.A., Le Gall, F., Romari, K., Thronsen, J., Botnen, A., Massana, R., thomsen, H.A. & Jakobsen, K.S. 2006. Telonemia, a new protist phylum with affinity to chromist lineages. *Proc. R. Soc. B* 273, 1833-1842
- Burki, F., Inagaki, Y., Bråte, J., Archibald, J.M., Keeling, P.J., Cavalier-Smith, T., Sakaguchi, M., Hashimoto, T., Horak, A., Kumar, S., Klaveness, D., Jakobsen, K.J., Pawlowski, J., Shalchian-Tabrizi, K. 2009. Large-Scale Phylogenomic Analyses Reveal That Two Enigmatic Protist Lineages, Telonemia and Centroheliozoa, Are Related to Photosynthetic Chromalveolates. *Genome Biology and Evolution* 1, 231-238
- Shalchian-Tabrizi K, Minge MA, Espelund M, Orr R, Ruden T, KS Jakobsen, Cavalier-Smith T, 2008, Multigene phylogeny of choanozoa and the origin of animals, *PLoS ONE* 3 (5): e2098, doi:10.1371/journal.pone.0002098

Inger Skrede :

Sex: Female **Year of birth:** 1978 **Nationality:** Norwegian
Post doctoral fellow, Department of Biology, UiO

Previous academic positions

2004-2008 PhD student, Natural History Museum, UiO

Academic degrees

2008 PhD, University of Oslo
2004 Master of Science, University of Oslo
2003 Bachelor of Science, University of Oslo

Important academic and professional affiliations

- Reviewer for in BMC Evolutionary Biology, Molecular Ecology, Conservation Genetics, Botanica Helvetica, Islandic Research Council, Journal of Biogeography

Awards and Honours

2009 NCB Young scientist price for best paper published in 2008: Skrede, Inger; Brochmann, Christian; Borgen, Liv; Rieseberg, Loren H. Genetics of intrinsic postzygotic isolation in a circumpolar plant species, *Draba nivalis* (Brassicaceae). *Evolution* 62: 1840-1851

2008 NCB Young scientist price for best paper published in 2007: Alsos, Inger; Eidesen, Pernille Bronken; Erich, Dorothee; Skrede, Inger; Westergaard, Kristine; Jacobsen, Gro Hilde; Landvik, Jon; Taberlet, Pierre; Brochmann, Christian. 2007. Frequent long distance dispersal in the changing Arctic. *Science* 316: 1606-1609

Supervision of PhD-students

Under supervision at present: As co-supervisor: 1

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 7

Total career publications

Peer-reviewed journals or monographs: 7

Three most important publications last ten years

- Skrede, Inger; Eidesen, Pernille Bronken; Piñeiro Portela, Rosalía; Brochmann, Christian. 2006. Refugia, differentiation and postglacial migration in arctic-alpine Eurasia, exemplified by the mountain avens (*Dryas octopetala* L.). *Molecular Ecology* 15: 1827-1840
- Skrede, Inger; Brochmann, Christian; Borgen, Liv; Rieseberg, Loren H. 2008. Genetics of intrinsic postzygotic isolation in a circumpolar plant species, *Draba nivalis* (Brassicaceae). *Evolution* 62: 1840-1851
- Alsos, Inger Greve; Eidesen, Pernille Bronken; Erich, Dorothee; *Skrede, Inger; Westergaard, Kristine; Jacobsen, Gro Hilde; Landvik, Jon; Taberlet, Pierre; Brochmann, Christian. 2007. Frequent long distance dispersal in the changing Arctic. *Science* 316: 1606-1609

Anne Corinna Stüken :

Sex: Female **Year of birth:** 1978 **Nationality:** German
Post doctoral fellow, Department of Biology, UiO

Previous academic positions

2007-2008 Marie Curie EST scholarship holder at CEES, UiO
2004-2007 Scientific associate at the Leibniz-Institute of Freshwater Ecology and
Inland Fisheries, Department Limnology of Stratified Lakes, Neuglobsow, Germany.

Academic degrees

2008 PhD, Brandenburg University of Technology, Cottbus, Germany
2003 Bachelor of Science (Honours) in Ecology, University of East Anglia, Norwich,
United Kingdom
2002 Maîtrise de Biologie des Populations et des Ecosystèmes Marins, Université de la
Méditerranée Aix-Marseille II, Marseille, France

Important academic and professional affiliations

2010 Research article review for Environmental Science & Technology & Limnologica.
2009 Research project proposals review for the Czech Science Foundation.
• Organizing the “write-it-right” scientific writing course, UiO

Awards and Honours

2010 Poster prize at the Bioinformatics User Forum, UiO
2007 Marie Curie Early Stage Training Scholarship to work at CEES, UiO
2003 Tony-Sims prize for the best experimental thesis of the Biology Department of 2003,
University of East Anglia, Norwich, UK.

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 7
Review articles and book chapters: 2

Total career publications

Peer-reviewed journals or monographs: 7
Review articles and book chapters: 2

Three most important publications last ten years

- Preußel, K.; Stüken, A.; Wiedner, C.; Chorus, I. and Fastner, J. First report on cylindrospermopsin producing *Aphanizomenon flos-aquae* (Cyanobacteria) isolated from two German lakes. *Toxicon* (2006) vol. 47 (2) pp. 156-62
- Stüken, A.; Campbell, R.J.; Quesdada, A.; Sulkenik, A.; Dadheech, P.K. and Wiedner, C. Genetic and morphologic characterization of four putative cylindrospermopsin producing species of the cyanobacterial genera *Anabaena* and *Aphanizomenon*. *J Plankton Res* (2009) vol. 31 (5) pp. 465-480
- Stüken, A. and Jakobsen, K.S.. The cylindrospermopsin gene cluster of *Aphanizomenon* sp. strain 10E6: organisation and recombination. *Microbiology (Reading, Engl)* (2010) vol. 156 pp. 2438-51

Jørn Henrik Sønstebo :

Sex: Male **Year of birth:** 1974 **Nationality:** Norwegian

Post doctoral fellow, NIVA

Previous academic positions

2007-2008 Post doctoral fellow, Natural History Museum, UiO

2003-2007 PhD student, Norwegian University of Life Sciences

Academic degrees

PhD, Norwegian University of Life Sciences

Cand. Scient. UiO

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 7

Total career publications

Peer-reviewed journals or monographs: 7

Three most important publications last ten years

- Sønstebo JH, Borgstrøm R, Heun M (2007a) A comparison of AFLPs and microsatellites to identify the population structure of brown trout (*Salmo trutta* L.) populations from Hardangervidda, Norway. *Molecular Ecology* 16, 1427-1438.
<http://onlinelibrary.wiley.com/doi/10.1111/j.1365-294X.2007.03256.x/abstract>
- Sønstebo JH, Gielly L, Brysting AK, Elven R, Edwards M, Haile J, Willerslev E, Coissac E, Rioux D, Sannier J, Taberlet P, Brochmann C (2010). Using next-generation sequencing for molecular reconstruction of past Arctic vegetation and climate. *Molecular Ecology Resources* 10, 1009-1018
<http://onlinelibrary.wiley.com/doi/10.1111/j.1755-0998.2010.02855.x/abstract>
- Tollefsrud MM, Sønstebo JH, Brochmann C, et al. (2009) Combined analysis of nuclear and mitochondrial markers provide new insight into the genetic structure of North European *Picea abies*. *Heredity*, 102, 549-562
<http://www.nature.com/hdy/journal/v102/n6/full/hdy200916a.html>

Trude Vrålstad :

Sex: Female **Year of birth:** 1971 **Nationality:** Norwegian **Position:** Senior scientist, National Veterinary Institute (NVI), Section of Mycology. As. professor II (20%), Dep. of Biology, UiO

Previous academic positions

- 2004-2004 Researcher in Mycology, Dep. of Biology, Univ. of Oslo, Norway.
2001–2004 Post doc in Mycology, Department of Biology, University of Oslo, Norway, and Limburgs Universitair Centrum, Belgium
2001-2002 First consultant, 7th international mycological congress (IMC7), Dep. of Biology, Univ. of Oslo, Norway
1997-2001 Doctoral research fellow in mycology, Dep. of Biology, Univ. of Oslo, Norway

Academic degrees

- 2001 Dr. scient (PhD) in Biology University of Oslo, Norway
1996 Cand. scient (MSc.) in Biology, University of Oslo, Norway

Important academic and professional affiliations

- Evaluation committee leader/member for scientific positions at the National Veterinary Institute, University of Oslo and University of Tromsø.
- Adjudication committee member for one PhD thesis (University of Oslo)
- Deputy leader of the Section of Mycology, National Veterinary Institute (since 2007).
- Main organizer of the NordForsk research training course “Identification of ectomycorrhizal fungi – from root tip to sequence” at University of Oslo, August 2004.
- Main coordinator of the 7th International Mycological Conference (IMC7) scientific program and IMC7 board member, Department of Biology, University of Oslo, Norway (2000-2002)

Scientific review work

Referee commissions for several peer review journals: Canadian Journal of Botany, New Phytologist, Molecular Ecology, Fungal Genetics and Biology, Fungal Ecology, Mycorrhiza, Mycological Research, Czech Mycology, BFPP-Knowledge and management of aquatic ecosystems, Freshwater Crayfish, Diseases of aquatic organisms

Awards and Honours

- 2002 The Faculty of Mathematics and Natural Sciences’ winner of “The Kings golden medal” (H.M. Kongens gullmedalje) for the PhD thesis “Molecular ecology of root-associated mycorrhizal and non-mycorrhizal ascomycetes”

Supervision of PhD-students

Under supervision at present as main supervisor: 1

Number of publications for the period 1.1.2005 - 30.6.2010

Peer-reviewed journals or monographs: 11

Total career publications

Peer-reviewed journals or monographs: 18

Three most important publications last ten years

- Vrålstad T, Myhre E and Schumacher T. 2002. Molecular diversity and phylogenetic affinities of symbiotic root-associated ascomycetes of the Helotiales in burnt and metal polluted habitats. *New Phytologist* 155: 131-148. (Times cited: 64).
<http://onlinelibrary.wiley.com/doi/10.1046/j.1469-8137.2002.00444.x/abstract>
- Vrålstad T, Schumacher T and Taylor AFS. 2002. Mycorrhizal synthesis between fungal strains of the *Hymenoscyphus ericae* aggregate and potential ectomycorrhizal and ericoid hosts. *Phytologist* 153: 143-152. (Times cited: 53).
<http://onlinelibrary.wiley.com/doi/10.1046/j.0028-646X.2001.00290.x/abstract>
- Vrålstad T, Fossheim T and Schumacher T. 2000. Piceirhiza bicolorata - the ectomycorrhizal expression of the *Hymenoscyphus ericae* aggregate? *New Phytologist* 145: 549-563. (Times cited: 63). <http://onlinelibrary.wiley.com/doi/10.1046/j.1469-8137.2000.00605.x/abstract>

Til: Instituttstyret ved Biologisk institutt

Sakstype: Orienteringssak

Saksnr.: O-sak 3/2011

Møtedato: 17.03.2011

Notatdato: 9.03.2011

Saksbehandler: Maren Onsrud

Sakstittel: Midtveiseevaluering av CoE – Centre for Ecological and Evolutionary Synthesis

Tidligere vedtak i saken /Plandokumenter/Henvisninger til lovverket etc.:

O-sak 11/2010

De viktigste problemstillinger:

I henhold til krav og retningslinjer for SFF'ene skal det ca 3 ½ år etter oppstart av sentrene gjennomføres en midtveiseevaluering. Denne danner grunnlag for beslutningen om videreføring av senterbevilgningen for 5 nye år. Materialet vurderes først av et ekspertpanel. Deretter skal deres uttalelse samt innsendt materiale fra CEES vurderes av en samlet evalueringskomite som er felles for alle SFF'ene fra runde II.

Midtveiseevalueringen ble sendt NFR 30. august 2010, og innsendte faktaark og selvevaluering av senteret er tidligere fremlagt for styret (O-sak 11/2010). Ekspertpanelet har nå kommet med sin foreløpige vurdering (vedlegg). Senteret er innkalt til møte med NFR 15. mars for å svare på spørsmål ifm evalueringen. Endelig avgjørelse fra NFR om finansiering for den siste 5-års perioden er ventet i juli 2011.

Vedlegg:

Midterm evaluation of one Centre of excellence, Experts' appraisal form and panel report

*The Research Council of Norway
Midterm evaluation of eight Centres of Excellence, SFF-II*

Midterm evaluation of one Centre of excellence – Experts' appraisal form and panel report

Project no.: 179569/V40 Handled by: Christin Krokene Activity: SFF (CoE)

Project Owner/ Universitetet i Oslo
(Host institution):
Project manager: Professor Nils Chr. Stenseth
Project title: Centre for Ecological and Evolutionary Synthesis (CEES)

This panel report is based on prepared background material for this centre:

A Fact sheet

B Self-evaluation

C Host institution assessment

D Plan for second five-year period, including exit strategy

[Terms of reference](#) (26 May 2010) presents the framework for the evaluation and the mandate for the evaluation committee.

[The evaluation process](#) (June 2010) cf. section 3.3.

This evaluation form is divided into five sections:

Section I: Research achievements
Section II: Organisational and administrative aspects
Section III: Research plans for the future five-year-period
Section IV: Overall assessment
Section V: Description of terms

Section I: Research achievements

(The fields to be completed expand automatically on entering a new line. Use Tab to move to next field).

I 1. Research quality (cf. Terms of reference, section 1.4.2)

Has the centre's research been at the forefront of developments in its field, leading to outstanding research results and a new understanding that has affected national and international research in the field?

Expert's assessment:

There is no doubt that some of the work produced by the centre is of the highest quality and has been published in the foremost journals and has furthered the field.

I 2. Publications (cf. A2 and B1.2)

Has the centre's publications been satisfactory, both in quality and scope?

Expert's assessment:

The centre has produced ca 110 publications per annum which given the centre's size works out at about 1 publication/ member / annum. However, the output among scientists varies considerably the number of journal publications over the Cof E period (3 and a bit years) ranges from 2-146. Nils Stenseth has co-authored 146 publications which represents 50% of the centre's output.

In terms of quality the centre has produced a number of papers in 'very high impact' discovery journals (*Nature, Science, PNAS*) although again these are mainly coming from Stenseth's group. There are a number of publications in 'specialised' journals and there is potential room for some improvement here; the culture of aiming for higher impact journals could be promoted more widely across the centre.

I 3. Milestones (cf. Agreement document, A8 and summary in B)

Has the centre reached its original milestones?

Expert's assessment:

The centre has reached its original goals and milestones.

I 4. Collaboration (cf. A5, B8, B9, C2 and C3)

Has the centre's national and international collaboration strengthened the research performed at the centre?

Expert's assessment:

The core members of staff have a number of excellent international collaborators as well as with many very good Norwegian scientists. The establishment of colloquia including funding for a visiting scientist has given the centre the opportunity to develop new collaborations which has undoubtedly strengthened the centre's research.

I 5. Researcher training (cf. A3, B3 and C1)

Has the centre's researcher training been sufficient and of an international standard?

Expert's assessment:

The number of PhD students that have successfully completed their training is excellent and the centre has an impressive record in attracting PhD students. The centre has clearly thought a lot about the training environment that it provides for the students, for example the compulsory annual conference is an excellent idea and provides a very good forum for students to hone their communication and presentation skills. The environment is also very stimulating, by organising workshops and regular seminars as well as journal clubs and by inviting many guest speakers the students have a chance to keep up to date and be close to the most recent research and top researchers.

I 6. Recruitment (cf. A3, B3 and C1)

Has the centre been able to attract good foreign researchers, doctoral students, postdocs and senior researchers?

Expert's assessment:

Yes, the centre has a number of staff from foreign countries and has attracted strong internationally renowned scientists. In 2010 more than 35% of the CEES staff were non-Norwegian.

I 7. Gender equality (cf. A4, B4 and C8)

Has the perspective of gender equality been adequately taken into account in the centre's recruitment policy? Has the special funding by RCN to improve gender equality had the expected effect? Has the centre succeeded in its objectives and measures concerning gender equality?

Expert's assessment:

The self assessment report indicates that gender equality is taken seriously by the centre, and a number of female scientists have been recruited. It is very good that the deputy director is a young female scientist especially as the number of female scientists in senior positions is relatively low.

The centre has realised the importance of exposing younger female scientists to successful senior role models and this is reflected in the general gender balance of invited speakers at, for example, the Darwin day.

Overall the centre has done very well with respect to gender equality.

I 8. Industrial, social and cultural dividends (cf. A9, B1.4 and C8)

Have the centre's research results, in addition to their scientific value, opened opportunities for important industrial, social or cultural dividends?

Expert's assessment:

The centre has its strength in basic research but many of their results clearly contribute to actual discussions and our knowledge base for predicting effects of climate change on biodiversity. Work on marine organisms, effective harvesting, on tick distribution as well as in microbial systems have most relevant implications for applied research.

I 9. Research plan (cf. A9, B introduction, B11 and C8)

Has there been changes in the research relative to the plan, and have these changes led to better research?.

Expert's assessment:

All the deviations from the research plan mentioned in the self assessment document involve additions to the research agenda mainly by including more study species. There is also one change in the research stucture which involves the recent establishment of "action groups"- these were described more fully in the plans for the next five year period and will be discussed in section III. The development of the molecular tools has been faster than anticipated which has added to the research potential.

The changes described should promote an improved research environment.

Section II. Organisational and administrative aspects (ce. Terms of reference 1.4.5 and 1.4.8)

(The experts should limit their comments to points allowing assessment based on the information provided)

II 1. Governance and organisation (cf. A6, B5, B6, C4 and C5)

Has the centre's form of governance and organisation contributed to the efficiency and quality of research?

Expert's assessment:

Both the governing board and the scientific advisory board appear to be working well in ensuring the smoooh running of the centre. In particular, the SAB have made a number of useful suggestions which have promoted more interaction and subsequent collaboration between members of the centre.

The centre seems to be very well organised and it has a very clear structure with research theme leaders.

II 2. Cooperation (cf. B8, C2. Names of Consortium participants: Agreement for the CoE article 4.3)

Has the relationship between the centre, the host institution and any partners functioned smoothly, and has the centre's research led to mutual enrichment of the overall research environment?

Expert's assessment:

There is no evidence to suggest that the centre has had anything other than a good functional relationship with the host institution which has been very supportive of the centres aims and objectives. The center seems to be well integrated into the host institution with mutual benefits. The center has lots of interactions at Oslo University (and other Norwegian Research Institutions), and the university has promised to add to the core funding for the next five years. The centre's chair and head of admin are involved in weekly meetings with the 'leader' group running the Department of Biology.

II 3. Leadership (cf. A3.1, A7.1, B5, B6, B8, B10, C5 and C7)

Has the head(s) of the centre done a satisfying job, both as a researcher(s) and a manager (s)?

Expert's assessment:

The head of the centre has excelled as a productive scientist and is clearly one of the foremost ecologists in the world. He has a very clear vision of what he would like the centre to achieve and is clearly the driving force in putting forward the CEES as one of the foremost places in the world for conducting evolutionary ecology. However, the number of projects and publications he is involved in is enormous and, he has other duties. One does wonder how he manages to achieve so much! There is the danger that he could be too overloaded. Care should be taken so that he does not become increasingly inaccessible to his staff or find it difficult to direct the centre's endeavours.

It is harder to judge Stenseth's performance as a manager, and it is difficult to know who is mainly responsible for the day-to-day management of the centre, but given Stenseth's extensive commitments one suspects that the deputy director is more involved here. However, things are currently well organised and it is clear that the management has been a success in maintaining a fully functioning and productive unit despite its large size. It may be worth noting here that there is some indication that the scientific productivity of the deputy-director may have been affected by taking on this administrative burden and, if this is the case, consideration should be given to whether the deputy director is getting enough time and support to develop her own research career.

II 4. Premises and equipment (cf. A7.2, A9, B7 and C6)

Have the premises and equipment been satisfactory?

Expert's assessment:

Yes, more than satisfactory. Notably, additional funding has been obtained for the newest biotechnology (Solexa/Illumina and 454 sequencing/Roche) and the University has provided refurbished premises (being at the same site is a real asset).

Section III. Research plan for the future five-year-period (cf. Terms of reference, Section 1.4.4 and D)

III 1. Research plan (cf. D)

Have all segments of the research plan original, ambitious, though realistic goals, or does the research plan represent an automatic continuation of ongoing research?

Expert's assessment:

The research plan represents a thoughtful and well considered advance on the original proposal. The establishment of action groups which bring together related projects seems like an excellent way of promoting more interaction between the research groups. Research plans for the future five years are exciting and not just an automatic technical extension of earlier work. The plans are original, ambitious and promising, and there is a good chance that most parts will be finished successfully and further the field. The research will also have important implications for applied research and should further the field considerably.

III 2. Methods and equipment (cf. D)

Are the proposed methods and equipment adequate and necessary?

Expert's assessment:

The centre appears to have adequate facilities to conduct the proposed research, and the centre has not requested any major items of new equipment in this future plan.

<p>III 3. Research results (cf. D)</p> <p>Will the centre's future research have a chance of producing innovative findings, and will the centre continue to be an international leader in its field?</p> <p><i>Expert's assessment:</i></p> <p>The research plans are ambitious and tackle 'big' questions which will attract widespread interest. We have no doubts that the international standing of the centre will increase and stay at the forefront of research in its field.</p>
<p>III 4. Research plan (cf. D3-8)</p> <p>Is the centre's researcher training sufficient in scope and quality, and have measures been instituted to the recruitment of younger researchers?</p> <p><i>Expert's assessment:</i></p> <p>Yes, one of the main aims of the centre is to create a stimulating and supportive environment for ensuring the recruitment of good quality students and the centre has a very good age structure. They have recruited excellent young researchers that have gone on to secure permanent positions at other places and they plan to continue with this strategy. It may be worth noting here however that the University in Oslo can apparently not guarantee further tenured positions at the end of the 10-year period.</p>
<p>III 5. Gender perspective (cf. D3)</p> <p>Have measures been instituted to ensure the gender perspective in recruitment?</p> <p><i>Expert's assessment:</i></p> <p>Yes the centre is aware of the need to create equal opportunities for women in the centre and undoubtedly plans to recruit further good female researchers.</p>
<p>III 6. International collaboration (cf. D5)</p> <p>Is the proposed international collaboration sufficient in scope and quality?</p> <p><i>Expert's assessment:</i></p> <p>Yes, the centre has a number of measures planned to promote international collaboration with top scientists in the field involving all major projects.</p>
<p>III 7. Researchers from abroad (cf. D4-5)</p> <p>Is the centre in the position to attract good researchers from abroad?</p> <p><i>Expert's assessment:</i></p> <p>Yes, this is one of the main aims of the centre. CEES is known worldwide, through their seminar schemes, guest professorships, colloquia, workshops and last but not least their research publications. There is no doubt that CEES is considered to be a very attractive place to work, as it has a critical mass of good researchers, which does not exist to the same extent in many other places in the world.</p> <p>The CEES is in a position to recruit outstanding researchers from abroad who could also hit the Nature/Science/PNAS ceiling in their publications.</p>
<p>III 8. Organisation (cf. D6)</p> <p>Will the organisation of the centre continue to translate into a high level of efficiency and good relations with the host institution and partners?</p> <p><i>Expert's assessment:</i></p> <p>The organisation seems to work smoothly and efficiently, and to our knowledge the relations with the host institution are positive and supportive. The centre has been very successful</p>

especially at attracting further funds. It is possible that if this continues its increasing size (currently there are 149 staff) may cause management problems for the host institution.

III 9. Exit strategies (cf. D7)

Have the centre and host institution made satisfactory plans for the centre's activities when the SFF-status and RCN funding expire at the end of the 10-year period? How realistic are the plans? How well do the plans accommodate the goals of taking care of the long term investment that the centre represents?

Expert's assessment:

The plans for the exit strategy are not well developed. The application states that there may be a further application for a new centre of excellence with a different agenda. The chair of the centre is concerned about the future as the host institution does not appear to have worked out a strategy for incorporating the centre's activities into the University's structure at the end of the funding period, particularly with respect to the future of the younger staff employed by the centre. It is notable that there are no plans to create further tenured posts in the fields covered by CEES.

Further thought also needs to be given to who would take on the role of directing the centre if and when the current director retires.

Section IV: Overall assessment (1/2 – 1 page) (cf. Terms of reference section 1.2 and 1.4)

Overall assessment (cf. A-D)

Please provide an overall assessment of the elements evaluated above. Indicate the most important strengths and weaknesses of the centre's achievements so far and with respect to the proposed plans for the second five year period. Please sum up your impression by applying the appropriate terms given in Section V.

Expert's assessment: Exceptionally good.

Strengths

Overall, the achievements and future aims of the centre are excellent. In particular there is a clear focus on engineering an interdisciplinary environment that tackles large conceptual issues.

The centre has an excellent international reputation, with the director being an internationally renowned scientist at the forefront of his field.

The centre's future research plans are exciting and innovative, and the long-term potential of the centre is very good.

The centre provides an excellent and dynamic working environment for young PhD students and post-docs.

Weaknesses

The centre has increased in size, and is probably now larger than is ideal. At this size it is inevitably more difficult to manage and to maintain the focus on the centre's main research priorities.

The success of the centre is heavily dependent upon Stenseth and it is of some concern that he is involved in so many activities other than directing the centre.

There is room for improvement in the quality of publications, more of the centre's staff could be aiming for publication in higher impact journals.

More thought could have gone into the exit strategy and into Stenseth's successor.

Section V: Description of terms

When summing up the overall impression (cf. Section IV), the experts are asked to apply the following set of terms for describing the level of quality:

Exceptionally good – International front position, undertaking original research and publishing in the best international journals. High productivity. Very positive overall impression of research group/centre and leadership.

Very good – High degree of originality, a publication profile with a high degree of international publications in good journals. High productivity and very relevant to international research or to Norwegian society. Very positive overall impression of research group/centre and leadership.

Good – Contribute to international and national research with good quality research of relevance both to international research development and to Norwegian problem solving. Good balance between international and national publications. Acceptable productivity. Positive overall impression of research group/centre and leadership.

Fair – The quality of research is acceptable, but international publication profile is modest. Much routine work in design and publication. Relevance and productivity of research is not exciting. No original contributions to research knowledge. Overall impression is positive but with a distinct degree of scepticism from the evaluator.

Weak – Research quality is below good standards and the publication profile is meagre. Only occasional international publication. No original research and little relevance to problem solving. No overall positive impression by evaluator.

Til: Instituttstyret ved Biologisk institutt

Sakstype: Orienteringssak

Saksnr.: O-SAK IS 4/2011

Møtedato: 17.03.11

Notatdato: 09.03.11

Saksbehandler: Trond Schumacher

Sakstittel: Virkemidler til forskning 2011

De viktigste problemstillinger:

En stor del av instituttets rammebevilgning (post 50) kommer i form av satsningsmidler og gis som en del av rammebevilgningen. Det gjelder i første rekke stipendiatstillinger, startpakker og småforskmidler. Biologisk institutt ønsker også å gi en beskjeden del av forskningsmidlene direkte til den enkelte forsker (fast ansatte) i form av publikasjonsincentiver. Dette er et internt incentiv som tas av rammen og som det er opp til instituttene selv å sette av midler til. I budsjett 2011 er avsatt kr. 8.000 pr. peer reviewed i publikasjon registrert i en biofaglig publiseringskanal i CRISTIN (nivå 1 og 2) i 2010.

Startpakker: Tildelingen skjer etter sentrale retningslinjer. Ordningen skal bidra til en mer offensiv rekrutteringspolitikk og gjøre institusjonens faste vitenskapelige stillinger mer attraktive overfor søkerne. Startpakkene utgjør som regel en 4-årig stipendiatstilling knyttet opp mot den nytilsattes fagområde, samt kr. 200 000 pr år i driftsmidler i 3 år. Biologisk institutt har i 2011 to forskere (toksikologi og marinbiologi) som nyter godt av startpakkeordningen. Disse er unndratt ordningen med småforskmidler

Småforskmidler: Tildelingen skjer etter sentrale retningslinjer. Ordningen skal gi ekstra driftsstøtte til forskere i fast vitenskapelig stilling som kan dokumentere høy forskningsaktivitet og som i åpen konkurranse om prosjektmidler fra eksterne finansieringskilder har levert eller normalt vil levere klart støtteverdige søknader. Instituttet er tildelt kr. 690.000 i småforskmidler i 2011. Disse fordeles likt til halvdel av våre fast ansatte forskere (den mest produktive halvdel på forskningssiden i foregående år) som ikke nyter godt av startpakkeordningen.

Vedlegg:

- Publikasjons- og småforsk-incentiver (deles ut på møtet)

Til: Instituttstyret ved Biologisk institutt

Sakstype: Orienteringssak

Saksnr.: O-sak IS 5/2011

Møtedato: 17.03.2011

Notatdato: 09.03.2011

Saksbehandler: Maren Onsrud

Sakstittel: Status HMS-arbeid

De viktigste problemstillinger:

- 1) Instituttet ble i januar i år bedt om å oppsummere det som er gjort etter Safetecrapporten ifm laboratoriesikkerhet generelt og ifm "Formalinprosjektet" spesielt. I notatet (vedlagt) har vi oppsummert hva vi konkret har gjennomført av tiltak ved instituttet.
- 2) Biologisk institutt og Institutt for molekylær biovitenskap ansatte sommeren 2010 felles HMS-koordinator for en periode på 2 år. Arbeidet med helse, miljø og sikkerhet ved Biologisk institutt blir svært godt ivaretatt av HMS-koordinatoren, som rapporterer kvartalsvis til instituttledelsene ved de to instituttene. Vedlagt er rapportene om HMS-arbeidet ved BIO og IMBV for 3. og 4. kvartal 2010.

Vedlegg:

Notat til MN-fakultetet 14.01.2011

HMS prosjektrapport 3. kvartal 2010

HMS prosjektrapport 4. kvartal 2010

Til: MN-fak.
v/Frank Sarnes

Dato:
14.01.2011

Generelt arbeid med laboratoriesikkerhet ved Biologisk institutt

- Ansatt HMS-koordinator for et 2-årig HMS-prosjekt (2010-2012) hvor man ønsker å løfte alt HMS-arbeide ved Biologisk institutt (og Institutt for molekylær biovitenskap), med ansvar for å få på plass gode rutiner og risikoanalyser ("risiko under kontroll") for laboratoriarbeidet ved instituttet, samt få på plass det systematiske arbeidet iht gjeldende lover og forskrifter
- Opprettet prosjektgruppe for HMS-arbeid ved instituttet (instituttene)
- Utarbeidet måldokument og handlingsplan for HMS-prosjektperioden
- Oppgradering infrastruktur (nye punktavsug, renovering av laboratorier og nye avtrekksskap, nye kjemikalieskap). Betyr både gjennomført og pågående renovering.
- Det arbeides kontinuerlig med laboratorierutiner og sikkerhetsinstrukser for å utvikle og oppdatere disse.
- Planlegging og gjennomføring av vernerunder, og evntl. stenging av laboratorier som ikke tilfredsstillt gjeldende krav
- Rominstruks med romansvarlig person er på plass for de fleste laboratorier
- Oppdatert HMS-håndbok for Biologisk institutt foreligger på norsk og engelsk
- Holdt obligatorisk ECOonline-kurs for alle ingeniører som jobber med kjemikalier
- Ajourført ECOonline stoffkartoteket, og rutiner for kontinuerlig oppdatering
- Gjennomført brannkurs og kurs i lab-sikkerhet og kjemikaliehåndtering/oppbevaring for laboratoriepersonell
- HMS og sikkerhet på lab inkludert som eget punkt i oppstartskurs for alle masterstudenter (BIO5000)
- Arbeid i lokalt LAMU, med bl.a. risikovurdering av laboratoriarbeid

- Bidratt til forprosjekt for Kjemikalieprosjektet
- Innspill til prosjektet "Undervisning i laboratoriesikkerhet" ved MN-fak

Direkte relatert til Formalinprosjektet

- Ryddet og destruert > 8000 kg med formalinfiksert materiale
- Overført historisk materiale til museene på Tøyen
- Liste over alle som arbeider med formalin, hvilke løsninger man benytter og oversikt over kurs hvor det brukes formalin
- Dosimetermålinger av all aktivitet hvor man eksponeres for formalin, og også dosimetermålinger på studiesamlingen og i lagerrom
- Fått på plass ekstra punktavsug på aktuelle laboratorier
- Erstattet formalin med andre mindre toksiske stoffer der dette har vist seg mulig
- Tydeligere presisering av sikkerhetsinstruks og bevisstgjøring ved arbeid med formalin

Formalinprosjektet ble nedlagt i instituttets LAMU 26.11.09 (V-sak 13/2009), på bakgrunn av at fakultetet startet Kjemikalieprosjektet. Sluttrapport for formalinprosjektet, utarbeidet av professor Stein Fredriksen, oversendt F-AMU.

Prosjektrapport - periode 9/8 – 30/9 2010

Prosjekt:

HMS-koordinering for Biologisk institutt og IMBV, Universitetet i Oslo

Tidsperiode: Aug 2010 – Aug 2012



Innledning

Etter innflytting på kontor og begynte orientering, startet jeg for fullt i jobben 9/8-2010.

August og september har vært benyttet til å gjøre seg kjent på instituttene og få en best mulig oversikt over aktivitetene i KB-bygget. Jobbmessig er jeg mao inne i en planleggings- og analysefase som skal munne ut i mer konkret kartlegging og gjennomføring av tiltak.

Arbeidsoppgaver som HMS-koordinator

Klargjøring, drøfting og spesifisering av arbeidsoppgaver har ikke vært mulig med nærmeste overordnede ennå. Jeg forholder meg derfor til UiOs sentrale beskrivelse av HMS-koordinator- funksjonen, samt til utlysningsteksten for stillingen.

Iflg UiOs hjemmesider (http://www.uio.no/for-ansatte/ansatt/arbeidsmiljo/nettverk_lokale_hms_koordinatorer/):

- ”Formålet med Lokal HMS-koordinator-funksjonen er å **bistå leder med å ivareta sitt HMS-ansvar**. Dekan, instituttleder, museumsdirektør, bibliotekdirektør, senterleder og fagavdelingsdirektør har det overordnede ansvaret for HMS-arbeidet ved egen enhet.
- **Hvilke arbeidsoppgaver som er delegert til den lokale HMS-koordinator, må avtales mellom leder og den lokale HMS-koordinator**. Ulike enheter har ulike særtrekk og behov som vil avgjøre hvilke oppgaver som vil være aktuelle for Lokal HMS-koordinator”.

Stillingsbeskrivelse i utlysningstekst:

- **Prosjektleder/HMS-koordinator-funksjonen:**
- Ansvar for gjennomføring av et proaktivt og systematisk HMS-arbeid
- Tilse at HMS-arbeidet ved Biologisk institutt og Institutt for molekylær biovitenskap utføres innenfor rammene av gjeldende lover og regler
- Utvikle kontinuerlige opplæringsplaner for HMS ved instituttene
- Ha overoppsyn og kontroll med instituttenes (og underliggende sentres) kjemikaliehåndtering
- Oppfølging av forbedringstiltak som fremkommer i internkontroll
- **Arbeidsoppgaver:**
- Tydeliggjøre rapporterings- og kommunikasjonslinjer
- Utvikle klare rutiner og prosedyrer
- Planlegge og gjennomføre internkontroll og oppfølging (vernerunder)
- Informere om og sørge for at alle ansatte har lest og er inneforstått med innholdet i instituttenes HMS-håndbøker
- Koordinere HMS/sikkerhetsundervisningen for studenter, slik at de har tils trekkelig kunnskap til å utføre laboratoriearbeidet på en sikker måte
- Innkjøp av HMS- og førstehjelpsutstyr. Bistå ved utplassering.
- Organisere kjemikaliehåndtering, herunder fjerning av gamle kjemikalier.

Orienteringer og besøksrunder

- Orientering, omvisning og møter med ledende verneombud (LVO) ved begge institutter, samt prosjektleder på MERG.
- Møter/omvisning med alle øvrige verneombud:
 1. BIO: Integrativ, Marin, CEES, Sentralverkstedet, Fytotronen, Admin
 2. IMBV: VO 2. etg, Dyreavd., Admin
- Samtaler med Kristian Prydz og FE Johansen.

Oppsummering av HMS - prosjektet per 30/9-2010:

Nedenfor er en oversikt over observasjoner og kartlegging per i dag, samt forslag til hva som bør gjøres. I løpet av første halvdel av oktober bør en HMS - prosjektgruppe være i funksjon. Dette er viktig for nyttige innspill i arbeidet, prioriteringer og gjennomføring av tiltak. Jeg håper på tilbakemelding fra BIO slik at jeg snarest kan gå i gang med å opprette gruppa.

Sak:	Kommentarer/vurdering:
LAMU	BIO: 1 møte 2010 IMBV: 0 møter 2010 BIO: Jeg venter på innspill fra inst.leder/kontorsjef. IMBV: To møter er avtalt for høsten 2010. Jeg er sekretæt for LAMU. Felles LAMU: Er planlagt fom 2011 iflg info fra IMBV.
Oppfølging av vernerunder	BIO: 2 vernerunder gjennomført vår 2010. Avventer prosjekt i samlokalisering for videre planer. IMBV: Det er gjennomført en vernerunde våren 2010. Status for oppfølging vil bli gjennomgått på LAMU-møtet 1/10, samt fulgt opp videre ut over høsten.
HMS-håndbøker (No/eng)	BIO: Oppdatert HMS-håndbok - 2010, etter mal fra MN-faks håndbok. Bare norsk utgave. Den spesielle informasjonen fra BIO må oversettes til engelsk. MNs HMS - håndbok finnes også på engelsk. IMBV: Har ikke oppdatert HMS-håndbok, bare sikkerhetsinstrukser. Gruppe bør nedsettes for utforming av ny HMS-håndbok etter mal fra MN/BIO. Må også lages i engelsk utgave.

	Forslag: Oversetterjobb må gjøres - mulige kontakter og midler ved UiO sentralt?
HMS-nettsider (No/eng)	<p>BIO: Er fjernet fra nettet i forbindelse med innføringa av nye nettsider. . I hvert fall seler av informasjonen må også være på engelsk.</p> <p>IMBV: Finnes ikke. Det må utformes nye HMS-nettsider i ny nettmal. I hvert fall seler av informasjonen må også være på engelsk.</p> <p>Forslag: Utformes over samme lest for begge institutter, og samordnes med andre inst. Ved MN.</p>
HMS-opplæring (No/eng): <ul style="list-style-type: none"> - Studenter - Ansatte - Ledelse - Bekreftelse- rutiner - Risikoanalyser - Førstehjelp, brann og krisehåndtering - Kommunikasjon - allmøter 	<p>BIO/IMBV:</p> <ul style="list-style-type: none"> - Masterstud: info på intro kurs - Ansatte/Phd: opplæring og oppfølging i program-gruppene, men dette varierer nok en del. - Ledelse: ? HMS-kurs ved UiO - Bekreftelse på kjenneskap til HMS-rutinene gjøres, men bør se op det er godt nok - Risikoanalyser: mangler opplæring her - Førstehjelp mv: Noe forekommer, men tilfeldig og ikke satt i system - Kommunikasjon/allmøter: Få allmøter og dårlig oppmøte ved begge inst. Iflg den informasjonen jeg har fått <p>Forslag:</p> <ul style="list-style-type: none"> - Info til Bachelor-stud må avklares - Master/ansatt/Phd: må følges opp og samordnes vs prosjekt ved Mn-fak. - Ledelse: UiOs HMS-kurs bør gjennomføres - Bekreftelse: Nye og sikrere rutiner for bekreftelse av lest og akseptert rutiner på lab må innføres. - Risikoanalyser: Her er det en stor jobb å gjøre ved begge institutter. Viktig med samkjøring for å hindre dobbeltarbeid, samt prioriteringer for å ta det viktigste først. - Førstehjelp mv.: System rundt gjennomføring av slike kurs må innføres. Dette bør særlig gjelde ansatte som har ansvar for feltaktiviteter, lab mv. - Kommunikasjon/allmøter: En kommunikasjonsplan for HMS-info bør utformes – hva bør formidles når og på hvilken måte.
Kjemikaliehåndtering	<p>BIO/IMBV:</p> <ul style="list-style-type: none"> - Lagring av kjemikalier er kommet bra i orden ved BIO, men kan bli bedre bla ved Fytotronen. - Ved IMBVer det mer variabelt, men flere grupper/lab-er har

<ul style="list-style-type: none"> - Risikovurderinger - Avfall 	<p>behov for bedre lagring og nye kjemikalieskap. Kjemikalier bør ikke stå i åpne hyller på åpne lab-er der "alle og enhver" kan komme inn.</p> <ul style="list-style-type: none"> - Til delts dårlig merking av løsninger på lab-ene. - Permer for datablad skal være på plass på alle lab-er/grupper, men var ikke lett synlig alle steder ved IMBV. Stort sett greit vedr oppdatering etter den informasjon jeg har fått. - Risikovurderinger for lab-er/lab-prosedyrer er ikke gjort - Avfallshåndteringen: stort sett ok, men noe usikkerhet her. <p>Forslag:</p> <ul style="list-style-type: none"> - Gjennomgang av alle lab-er og vurdering for riktig kjemikalielagring. Innkjøp av nødvendige kjemikalieskap og montering i samarbeid med TA. Gamle, ulovlige kjemikalieskap må fjernes. - Rutiner for merking av flasker med løsninger og lignende må klargjøres for ansatte/studerter. - Stoffkartoteket og oppdatering: de som jobber med dette må få opplæring i forhold til innføring av nye regler fra 1/12 2010. (Reach/CLP) - Arbeidet med risikovurderinger må i gang ved begge institutter – her må en samarbeide for rasjonelle løsninger. - Klargjøring av avfallshåndtering for enkelte.
<p>Strålevern</p> <ul style="list-style-type: none"> - Kartlegging - Risikovurdering - Tiltak 	<p>IMBV:</p> <ul style="list-style-type: none"> - Bare bruk av radioaktive isotoper på IMBV. - Det må avklares om radioaktive isotoper er kartlagt, lab-er for dette mv. Strålevernrapporter ok? - Risikovurderinger må utarbeides <p>Forslag: Utarbeidelse av risikovurderinger, arbeidsrutiner og tydelig merking av rom. Samarbeid med strålevernsansvarlig ved begge institutter.</p>
<p>Lagring av gass i KB-bygget</p> <ul style="list-style-type: none"> - Kartlegging - Risikovurdering - Tiltak 	<p>BIO: Kartlegging av gassbeholdere ble gjort 2009 IMBV: Uklart om det er kartlagt ved IMBV</p> <p>Tisikovurderinger er ikke gjort.</p> <p>Forslag:</p> <ul style="list-style-type: none"> - Kartlegging av alle gassbeholdere – må vite hvor disse står til enhver tid - Vurdering av om en kan samle gassbeholdere – slippe å ha dem spredt på så mange lab-er. - Risikovurderinger må gjøres i forhold til lagring/samlagring av ulike gassbeholdere. - Gjennomgang av rommerking for å sikre at dette er ok, for eksempel vs brannfolk som skal inn i bygget.

<p>Avtrekkskap</p> <ul style="list-style-type: none"> - Kartlegging av effekt - Tiltak 	<p>BIO/IMBV:</p> <ul style="list-style-type: none"> - Etter hva jeg har forstått er det en stund siden det er gjort en systematisk gjennomgang av alle avtrekk ved KB-bygget. - Vernerunde på BIO vår 2010 avdekket feil ved varselamper. <p>Forslag:</p> <ul style="list-style-type: none"> - Gjennomgang av alle avtrekk, varselamper, luftgjennomstrømning - Etablere rutiner for jevnlig målinger , for eksempel hvert andre år
<p>Støymålinger</p> <ul style="list-style-type: none"> - Kartlegging - Tiltak 	<p>BIO/IMBV:</p> <ul style="list-style-type: none"> - Støyproblemer observert på noen lab-er med mange instrumenter, samt ved Fytotronen og Akvarieavd. - Yrkeshygieniker ved HMS-avdelinga er i gang med målinger. <p>Forslag:</p> <ul style="list-style-type: none"> - Bruk av verneutstyr må innskjerpes - Evt andre anbefalinger fra yrkeshygieniker må gjennomføres. (Bis helsemessig oppfølging av eksponerte ansatte.) - Innkjøpere bør være klar over at støy og varme kan være et problem ved mange instrumenter – bør be om støy/varme-data før innkjøp.
<p>Rominstruks og risikoanalyser</p> <ul style="list-style-type: none"> - Merking 	<p>BIO/IMBV:</p> <ul style="list-style-type: none"> - Finnes på mange rom ved begge institutter, men det er også mangler - Uklare ansvarsforhold og forståelse av dette: faglig ansvar, men teknisk "kontaktperson" - Risikoanalyser er ikke gjort <p>Forslag:</p> <ul style="list-style-type: none"> - Gjennomgang slik at alle aktuelle rom får en rominstruks - Klargjøring av ansvarsforhold, teknikere bør få tydeliggjort sitt ansvar - Risikoanalyser bør gjøres – rom med problemprosedyrer først
<p>Orden og renhold</p>	<p>BIO/IMBV:</p> <ul style="list-style-type: none"> - Mange steder problem med renhold ved begge institutter - Særlig problem på seminarrom: dårlig renhold, folk rydder ikke etter seg, og INGEN har ansvar for disse rommene. Det er ikke hyggelig å komme inn i rom med søppel og rot

	<p>før en eksamen eller prøveforelesning.</p> <p>Forslag:</p> <ul style="list-style-type: none"> - Husøkonomen må følge opp vaskere for bedre renhold - Begge institutter må bli enig om ansvarshavende for seminarrom. - Sette opp slikt for orden på seminarrom, samt be forelesere gi beskjed om at det skal være orden og stoler/bord skal settes på plass.
Generell avfallshåndtering og ytre miljø	<p>BIO/IMBV:</p> <ul style="list-style-type: none"> - Ikke helt klare rutiner for alle <p>Forslag:</p> <ul style="list-style-type: none"> - Tydelig formidling av rutiner, samt sikre at nye ansatte blir informert.
Energibruk - miljøeffekter	<p>BIO/IMBV:</p> <ul style="list-style-type: none"> - Har ikke informasjon på dette området ennå
<p>Kriseberedskap og branninstruks mv.</p> <ul style="list-style-type: none"> - Brannøvinger/Brannkurs - Trening i krisehåndtering - HMS -ansvar vs studenter (§1.6) 	<p>BIO/IMBV:</p> <ul style="list-style-type: none"> - Brannkurs for teknikere er gjennomført - Ikke system for gjennomgang av brannkurs etter hva jeg er kjent med - For få brannansvarlige i hver etasje? – Hva med ansatte/studenter i rullestol når heisen ikke kan brukes? - Er så langt ikke kjent med kriseplaner og trening i disse. - Noe uklare forhold rundt juridisk ansvar vs studenter – dette må avkalres vs sentrale miljøer ved UiO – jfr AML § 1.6. <p>Forslag:</p> <ul style="list-style-type: none"> - System for gjennomføring av brannkurs for ansatte - Klargjøring av beredskapsplaner og trening i håndtering av dette for ledergruppene – bør implementeres dersom det ikke er i system i dag. - UiOs juridiske ansvar vs studenter må avklares og være tydelig innad og utad.
<p>Psykososialt arbeidsmiljø</p> <ul style="list-style-type: none"> - Oppfølgingsamtaler/ medarbeidersamtaler - Kompetanseplaner - Samspillsregler - Kartlegging av arbeidsmiljø - Organiseringen ved instituttene - Allmøter 	<p>BIO/IMBV:</p> <ul style="list-style-type: none"> - Her har jeg ikke rukket å danne meg et klart bilde ennå, men: - Det virker som enkelte er utelatt når det gjelder medarbeidersamtaler/utviklingssamtaler, eller at disse forekommer svært sjelden og kanskje ikke etter hensikten? - Noen har etterspurt tiltak for bedre samspillsregler og oppførsel på arbeidsplassen. - Allmøter er lite i bruk ved begge institutter, og har vært

<ul style="list-style-type: none"> - Teambuilding-aktiviteter 	<p>info-møter og i liten grad dialogmøter.</p> <ul style="list-style-type: none"> - Enkelte grupper har gode sosiale tiltak og teambuildingaktiviteter mens andre nok hener langt etter. Kanskje trenges det støtte og oppfølging fra ledelsen? - UiO sentralt jobber for tida med arbeidsmiljøundersøkelser – kommer i 2011? <p><u>Forslag så langt:</u></p> <ul style="list-style-type: none"> - System for oppfølgingsamtaler for alle ansatte og klare ansvarsforhold – hvem er nærmeste overordnede? - Allmøter eller seminarer bør brukes for formidling av viktig felles informasjon til alle ansatte – viktig med muligst for dialog. - Viktig med involvering i prosesser slik at ingen føler seg forbigått.
<p>Innkjøp av HMS-utstyr</p> <ul style="list-style-type: none"> - Førstehjelp - Annet sikkerhetsutstyr 	<p>BIO/IMBV:</p> <ul style="list-style-type: none"> - Ok mange steder, men bør gjennomgås. <p><u>Forslag:</u></p> <ul style="list-style-type: none"> - Systematisk plan for gjennomgang, supplering og ansvar for førstehjelpsutstyr. - Anskaffelse av nødvendig sikkerhetsutstyr for eksponerte ansatte så snart som mulig 4. kvartal.

Gjennomførte tiltak:

- IMBV: Stenging av kjølerom ved undervisningslab 2. etg: Er nå ordnet av TA.
- BIO: Brannjør til nødaggregat for hele KB-bygget – Fytotronen: Etter påtrykk til TA ble det startet reparasjon av usikra dør uke 38. Døra hadde stått åpen med forsterkingspilar i flere år.
- IMBV: Dyreavdelinga: Behov for og ønske om nødvendig arbeidstøy er tatt opp med instituttleder samt i LAMU
- BIO/IMBV: Befaring er utført. Støymålinger er i gang. HMS-avdelingen følger opp belastede personer med helsesjekk, samt gir råd om nødvendig verneutstyr for ansatte i Dyreavdelinga og Fytotronen.
- BIO/IMBV: Teknikerforum for begge institutter – informasjon om HMS-arbeidet og liten spørreundersøkelse.
- BIO/IMBV: Kurs i lab-sikkerhet og kjemikaliehåndtering/oppbevaring er avtalt med Vidar Blekastad for teknisk ansatte begge institutter. Vil mest sannsynlig bli gjennomført i november.

Veien videre:

- 1) Prosjektgruppe opprettes første halvdel av oktober: Viktig for å sette mål for arbeidet, for innspill, samhandling og gjennomføring av tiltak. Forslag til deltakere i gruppa:
 - a. To fast vit ansatte: K. Prydz og ? fra BIO

- b. To unge fast vit ansatte/ el. Midlertidig ansatte: ? og ?
 - c. Begge ledende verneombud: Cecilie M. og Bård M.
 - d. To studentrepr. – fast eller delvis med for rådslagning i studentrelaterte saker
 - e. Prosjektleder: BKP
- 2) LAMU – arbeidet:
- a. IMBV: to møter planlagt høst 2010
 - b. BIO: Ennå intet avklart for høsten 2010
- 3) HMS-økonomi: Som prosjektleder trenger jeg informasjon om og avklaringer i forhold til HMS – budsjett.
- a. Hva er satt av?
 - b. Til hvilke ting: Sikkerhetsutstyr, førstehjelp mv?
 - c. Andre tiltak i HMS-arbeidet?

Prosjektets milepælplan

Presenteres neste kvartal etter opprettelse av prosjektgruppe og prioriteringer i denne.

HMS - samhandling ved UiO forøvrig

- MN-fak HMS-koordinatormøte: Et første møte gjennomført 24/8. Det vil bli satset på ca en samling per mnd for praktisk samordning av HMS-arbeidet ved MNs institutter. Instituttkoordinatorene var også ønsket som en rådgivingsgruppe for MN-fakultetets HMS-koordinator.
- HMS-koordinator –nettverket v/ UiO: Møte 30/8 med presentasjon av universitetets nye Strategiske plan og fokus på HMS i denne.
- Deltakelse i planleggingsgruppa for UiOs LAMU-seminar 26. nov 2010, første møte 17/9.
- HMS-koordinator –nettverket v/ UiO: Møte 20/9 med presentasjon av universitetets strålevernsarbeid v/ stålevernskoordinator EA Hult.

Annet utført arbeid

- Utformet innspill til høringsrunde for "HMS-strategi 2010-2013" fra MN-fakultetet.
- Utformet søknad om likestillingsmidler til prøveprosjektet: *"Tilrettelegging av arbeidssituasjon for gravide stipendiater for mer likestilt gjennomføring av forskningsarbeidet i stipendiatperioden"*.

Egen kompetansebygging

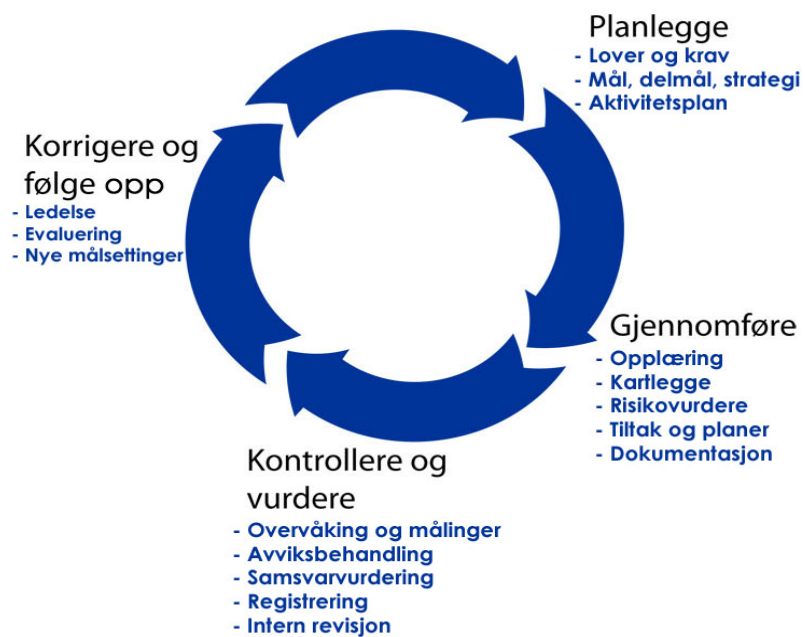
- ECO-online – grunnkurs (19. aug, 5 timer), v/ ECO-online
- Strålevernkurs – 3 dager (7.-9.sept), v/ Kjemisk institutt, UiO

2. Prosjektrapport; 1. oktober – 31. desember - 2010

Prosjekt:

HMS - koordinering for Biologisk institutt og IMBV, Universitetet i Oslo

Tidsperiode: Aug 2010 – Aug 2012



Innledning

Ledermøte ved Biologisk institutt 4. oktober 2010, ga klarsignal for opprettelse av en HMS – prosjektgruppe/rådgivingsgruppe. En slik gruppe vil være viktig i det videre HMS - arbeidet blant annet for økt informasjonstilfang, for råd vedrørende prioriteringer og for gjennomføring av ulike tiltak.

HMS - koordinator og prosjektgruppen vil foreslå og avklare mål, tiltak og prioriteringer med instituttleder/-ledelsen ved BIO og IMBV som har det overordnede ansvaret for alt HMS-arbeidet ved begge institutter, og dermed myndighet til å gjøre endelige valg og prioriteringer av arbeidet.

HMS - prosjektgruppen ble opprettet medio oktober og har hatt fem møter. Det er utarbeidet forslag til måldokument for HMS - arbeidet ved BIO og IMBV og likeledes forslag til handlingsplan for prosjektperioden 2010-2012. På bakgrunn av dette utarbeidet HMS - koordinator forslag til HMS - handlingsplan for 2011. Det er også utført kartleggingsarbeid av ulike HMS - forhold i perioden.

Innhold:

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1 - Deltakere i prosjektgruppen:

	Navn:	Arbeidssted:
<i>Fast vit. ansatt:</i>	Kristian Prydz	Prof., IMBV
	Stein Fredriksen	Prof., BIO
<i>Midlertidig vit. ansatt:</i>	Paul Grini	Forsker/gruppeleder, IMBV
	Monica H. Solbakken	PhD, CEES, BIO
<i>Ledende verneombud:</i>	Bård Mathiesen	IMBV
	Cecilie Mathiesen	MERG, BIO
<i>Student representanter/ fagutvalget (observatør):</i>	Sunniva Stette	IMBV
	Maria Kristine Svendsen	BIO

2 - Møter i prosjektgruppen:

Dato:	Hovedtema som ble diskutert:
15/10	Viktigste HMS-prioriteringer, HMS-informasjon, HMS-kartlegging.
29/10	HMS-opplæring, nettinformasjon seksuell trakassering, kjemikalielagring
12/11	Formål, visjon, mål og strategi for HMS-arbeidet ved BIO/IMBV 2010-2012.
25/11	Handlingsplan for prosjektperioden 2010-2012.
16/12	Status i arbeidet, forslag HMS-handlingsplan 2011, ryddedag biologibygget 2011

3 - Gjennomførte tiltak og kartlegginger 4. kvartal – 2010:

- Utarbeidet forslag til:
 - "Visjon–mål–strategi" - dokument for HMS-arbeidet ved BIO/IMBV.
 - Handlingsplan for HMS-prosjektet 2010-2012.
 - HMS – handlingsplan for 2011.

- Kurs i lab-sikkerhet og kjemikaliehåndtering/-oppbevaring for teknisk ansatte, v/ Vidar Blekastad, Kjemisk institutt
- Kartlegging støybelastede arealer biologibygget, v/ yrkeshygieniker Jan Hatlemark – vernetiltak: hørselsvern. Sluttrapport er lovet 5. Januar 2011.
- Verneutstyr til Fytotronen; hørselsvern og ansiktsvern.
- Dyreavdelinga: Ren og uren avd. - Vernetiltak: Anbefaling om anskaffelse og bruk av arbeidstøy i samråd med ansvarlig veterinær.
- Kartlegging alle kjøle- og fryserom, BIO/IMBV, med anbefalte tiltak: Rapport for BIO ble sendt ledelsen 17. november. Tilsvarende rapport for IMBV skulle sendes instituttledelsen fra ledende VO Bård Mathiesen.
- Studentforeningsrom 1. etg: I samråd med husøkonomen/TA og studentene selv: Klargjøring av ordensregler ved bruk av UiO-arealer.
- Befaring alle seminarrom, PC-rom og lesesaler: Nye oppslag om orden og ryddighet i samarbeide med tegneavdelingen, blir hengt opp medio jan. 2011. Notat sendes ledelsen uke 1, 2011.

4 - Status vs første kvartalsrapport i HMS-prosjektet:

Sak:	Vurdering vs HMS-rapport for 3. kvartal 2010:
LAMU	<ul style="list-style-type: none"> • Det er gjennomført 2 LAMU-møter ved begge institutter høsten 2010 • Felles LAMU: Er vedtatt i styrene for begge institutt fom 1. jan 2011
Oppfølging av vernerunder	<ul style="list-style-type: none"> • Status for oppfølging av vernerunder gjennomgått i LAMU for begge inst. • Oppfølging som planlagt for enkelte tiltak høsten 2010. • Nye vernerunder gjennomføres våren 2010 i regi av felles ledelsen, felles LAMU og HMS-k.
HMS-håndbøker (No/eng)	<ul style="list-style-type: none"> • BIO: Spesiell tekst for BIO er oversatt til engelsk av Amesto (UiO-avtale). Småkorreksjoner i norsk og engelsk HMS-håndbok gjøres før opptrykk jan-2011. • IMBV: Det jobbes med å utforme ny HMS-håndbok med basis i dagens "sikkerhetshåndbok" og BIOs håndbok. Planlagt ferdig jan/febr 2011. Teksten må deretter oversettes. • Engelsk utgave MN-fakultetet: Til dels dårlig engelsk spåk og ikke i harmoni med UiO sentralt. Dette er påpekt for fakultetet, men foreløpig intet gehør for "språkvask" av teksten.
HMS-nettsider (No/eng)	<ul style="list-style-type: none"> • Arbeidet med nye nettsider er noe utsatt, ment ferdigstilt tidlig mars 2011. • Nye HMS-nettsider utformes over samme lest for begge institutter, og samordnes med andre inst. ved MN i løpet av jan/febr - 2011.
HMS-opplæring (No/eng):	<ul style="list-style-type: none"> • Info til Bachelorstudentene: Nytt opplegg på gang fra MN-fak. Når dette er klart må vi sikre at egen HMS-undervisning blir

	<p>oppdatert.</p> <ul style="list-style-type: none"> • Master/ansatt/Phd: Egne opplegg må utformes våren 2011 etter at en har fått kjennskap til føringene i MN-fakultetets prosjektrapport som skulle være levert medio desember 2010. • Teknikerforum: Gjennomført kurs i kjemikaliehåndtering v/ Vidar Blekastad, Kjemisk inst. • Førstehjelp: Noen fra BIO/IMBV deltok på kurs i regi av MN-fakultetet 4. kvartal. • Andre punkter fra forrige rapport: Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet 2010-2012.
<p>Kjemikaliehåndtering</p> <ul style="list-style-type: none"> • Lagring • Merking – Reach • Stoffkartotek • Risikovurderinger • Avfall 	<ul style="list-style-type: none"> • Stoffkartoteket og oppdatering: nye regler fra 1/12-2010. (Reach/CLP): Deltakelse på ECOonline-seminar for en gruppe fra BIO november 2010. • Arbeidet med risikovurderinger: har startet ved begge institutt, og konkretiseres 1. kv 2011. • Klargjøring av avfallshåndtering: er gjort i forhold til enkelte ansatte. Dette bør trolig formuleres tydeligere for alle ansatte. • Andre punkter fra forrige rapport: Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet 2010-2012.
<p>Strålevern</p> <ul style="list-style-type: none"> • Kartlegging • Risikovurdering • Tiltak 	<ul style="list-style-type: none"> • Arbeidet med risikovurderinger: har startet ved begge institutt, og konkretiseres 1. kv 2011. • Behov for kontrakt isotoparbeid BIO/IMBV: Henvendelse er sendt ledelsen ved BIO for klargjøring av kontrakt for arbeid med isotoper ved IMBV. Uavklart hvordan saken står. • Andre punkter fra forrige rapport: Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet 2010-2012.
<p>Lagring av gass i KB-bygget</p> <ul style="list-style-type: none"> • Kartlegging • Risikovurdering • Tiltak 	<ul style="list-style-type: none"> • Arbeidet med risikovurderinger: har startet ved begge institutt, og konkretiseres 1. kv 2011. • Andre punkter fra forrige rapport: Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet 2010-2012.
<p>Avtrekkskap</p> <ul style="list-style-type: none"> • Kartlegging av effekt • Tiltak 	<ul style="list-style-type: none"> • Kartlegging av avtrekksskap som kan fjernes: Både ved BIO og IMBV er det laget en oversikt over avtrekksskap som kan fjernes fra kontorarealer mv. Dette vil gi bedre kapasitet i avtrekkskanalene. Notat om dette sendes ledelsen jan-2011 • Andre punkter fra forrige rapport: Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet 2010-2012.
<p>Støymålinger</p> <ul style="list-style-type: none"> • Kartlegging • Tiltak 	<ul style="list-style-type: none"> • Kartlegging av støybelastede områder i biologibygget: er utført av yskeshygieniker. Rapport er lovet 5. januar 2011. • Verneutstyr: Innkjøpt for bruk i støybelastede områder. • Andre punkter fra forrige rapport: Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet

	2010-2012.
Rominnstruks og risikoanalyser <ul style="list-style-type: none"> Merking 	<ul style="list-style-type: none"> Arbeidet med risikovurderinger: har startet ved begge institutt, og konkretiseres 1. kv 2011. Klargjøring av ansvarsforhold: behovet er tatt opp på LAMU-møter og ledermøter, samt i Teknikerforum. Bør også følges opp i 2011. Andre punkter fra forrige rapport: Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet 2010-2012.
Orden og renhold	<ul style="list-style-type: none"> Vaskerutinene er løftet: Husøkonomen har innført hyppigere vaskerutiner ved biologibygget høsten 2010. Dette bør følges opp for å sikre gjennomføring. Befaring alle seminarrom, PC-rom og lesesaler: Er gjennomført. Notat foreligger jan – 2011. Oppslag om orden og renhold: er utarbeidet, og henges opp uke 2, 2011. Andre punkter fra forrige rapport: Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet 2010-2012.
Generell avfallshåndtering og ytre miljø	<ul style="list-style-type: none"> Bestemmelser rundt spesialavfall: f.eks dyreskrotter, er avklart, og vil bli implementert i instruks og informasjon til ansatte. Andre punkter fra forrige rapport: Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet 2010-2012.
Energibruk - miljøeffekter	<ul style="list-style-type: none"> Er foreløpig ikke avklart. Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet 2010-2012.
Kriseberedskap og branninstruks mv. <ul style="list-style-type: none"> Brannøvinger/Brannkurs Trening i krisehåndtering HMS -ansvar vs studenter (§1.6) 	<ul style="list-style-type: none"> Brannkurs på lab. for teknikere er gjennomført. For få brannansvarlige i hver etasje? – særlig gjelder dette IMBV: Ledende VO følger opp og sørger for forbedringer. Noe uklare forhold rundt juridisk ansvar vs studenter er tatt opp vs MN-fakultetet, men svar mangler. Dette må etterspørres – jfr AML § 1.6. Andre punkter fra forrige rapport: Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet 2010-2012.
Psykososialt arbeidsmiljø <ul style="list-style-type: none"> Oppfølgingssamtaler / medarbeidersamtaler Kompetanseplaner Samspillsregler Kartlegging av arbeidsmiljø Organiseringen ved 	<ul style="list-style-type: none"> Videre avklaringer og planlegging sammen med ledelsen er nødvendig på dette området. Viktig med involvering i prosesser slik at ingen føler seg forbigått. Andre punkter fra forrige rapport: Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet 2010-2012.

instituttene <ul style="list-style-type: none"> • Allmøter • Teambuilding-aktiviteter 	
Innkjøp av HMS-utstyr <ul style="list-style-type: none"> • Førstehjelp • Annet sikkerhetsutstyr 	<ul style="list-style-type: none"> • Anskaffelse av nødvendig sikkerhetsutstyr for eksponerte ansatte, hørselsvern og ansiktsvern er ordnet for Fytotronen og Dyreavd. • Andre punkter fra forrige rapport: Det vises til vedtatt HMS-handlingsplan for 2011 og handlingsplan for HMS-prosjektet 2010-2012.

5 - Prosjektets måldokument, handlingsplan og HMS-handlingsplan 2011:

Måldokument:

Forslag til måldokument for HMS-prosjektet ble sendt ledelsen 25. november. Etter innspill fra styret ved BIO ble følgende forslag til langsiktig visjon for HMS-arbeidet ved instituttene formulert:

HMS-visjon:

"Både ansatte og studenter skal glede seg hver dag til å komme til BIO/IMBV fordi de har et trygt og sikkert arbeidsmiljø som inspirerer til forsknings- og studieinnsats.

- Gjennom felles ansvar, involvering og medvirkning skapes det trivsel ved instituttet/ene."

Følgende mål for HMS-arbeidet er utarbeidet for prosjektperioden, 2010-2012:

- 1) *Sørge for at norske lover, forskrifter innen HMS-området blir fulgt, likeledes UiOs egne bestemmelser på området.*
- 2) *Instituttens HMS-regler, rutiner og prosedyrer skal være kjent og følges opp av ansatte og studenter. (90% av alle laboratorier skal gjennomgå vernerunder våren 2012 uten anmerkning.)*
- 3) *Et velfungerende system for risikovurdering (m/tilpasset beredskap) er etablert og innarbeidet som naturlig del av all forsknings- og undervisningsaktivitet.*
- 4) *Det er oppnådd aksept for, og en observerer en holdningsendring hos ansatte og studenter til at et velfungerende HMS-arbeid er avgjørende for den samlede virksomheten ved BIO/IMBV.*
- 5) *Fysisk infrastruktur er løftet og legger til rette for økt sikkerhet i laboratoriene, blant annet gjennom forsvarlig lagring, håndtering og avfallsbehandling av kjemikalier, gasser, isotoper og biologisk aktivt materiale.*
- 6) *Det er oppnådd en klargjøring av ansvarsforhold ved instituttene, og samhandling og involvering bidrar til økt trivsel og glede i hverdagen for ansatte og studenter.*
- 7) *I alt virke ved BIO/IMBV skal en ha en bevisst, etisk holdning i forhold til ytre miljø.*

Handlingsplan for prosjektet:

Forslag til handlingsplan ble oversendt ledelsen 25. november.

HMS-handlingsplan for 2011:

Forslag til HMS-handlingsplan for 2011, i standard skjema fra UiO, ble oversendt ledelsen

29. november. Nytt utkast ble oversendt 16. desember, og instituttleder ved IMBV sendte endelig HMS-handlingsplan for 2011 til fakultetet av dagen etter.

Valgte fokusområder for HMS i 2011 er:

- **Risikovurdering**
- **HMS- og sikkerhetsopplæring**

6 - Nødvendige avklaringer og veien videre i HMS – arbeidet:

Nødvendige avklaringer:

For det videre HMS-arbeidet og for at det skal være mulig å nå oppsatte mål ser jeg det som viktig å få avklart følgende:

- Budsjettrammer for HMS-arbeidet
- Avtale om faste møtetidspunkt med instituttledelsen
- Avtale om deltakelse på ledermøter ved instituttene
- Samarbeidsform og planlegging rundt tiltak for bedring av psykososialt arbeidsmiljø ved instituttene
- Samarbeidsform for utvikling av god HMS-opplæring og kommunikasjon til ansatte og studenter

Veien videre i HMS – arbeidet:

Valgte fokusområder for HMS-arbeidet i 2011, *Risikovurdering* og *HMS- og sikkerhetsopplæring*, legger føringer for prioriteringer av det videre arbeidet i HMS-prosjektet. Prosjektgruppen vil fortløpende ta tak i prioriterte arbeidsoppgaver, og har satt opp følgende møteplan:

Planlagte møter i HMS- prosjektgruppen våren 2011:

Dato:	Hovedfokus:
Uke 3	Risikovurderinger og sikker jobbanalyser. Prosedyrer. – Pilot?
Uke 7	Nye HMS – nettsider.
Uke 11/12	Laboratoriesikkerhet, avtrekkskap og kjemikalier. Prosedyrer.
Uke 15	Kartlegging av psykososialt arbeidsmiljø, og tiltak. Evaluering av pilot for risikovurdering.
Uke 19	HMS – opplæring. HMS-brosjyre i lommeformat.
Uke 24	Status i prosjektet og evt.

HMS-handlingsplanen for 2011 og samlet plan for prosjektperioden vil bli fulgt opp og evaluert kvartalsvis i forbindelse med prosjektrapportene.



7 - Diverse informasjon fra 4. kvartal 2010:

- **HMS - samhandling ved UiO forøvrig**
 - MN-fakultetets møter for HMS - koordinatorene: 24/8, 6/10, 1/12
 - HMS - koordinator – nettverket v/ UiO:
 - o 30/8 – Ny strategiplan for UiO – betydning for HMS-arbeidet.
 - o 20/9 – Strålevern ved UiO.
 - o 6/12 – HMS-policy ved UiO.
 - Møter med husøkonomen: Jevnlig, ved behov
 - TA - lokalt: Jevnlig, ved behov
 - UiOs LAMU-seminar, 25. november: HMS-k og flere VO.

- **Annet utført arbeid**
 - Utformet innspill til prosjektgruppe for "Standard i sikkerhetsundervisning for masterstudenter og ansatte" MN-fakultetet.
 - HMS – kartlegging felles Teknikerforum - sept 2010

- **Egen kompetansebygging**
 - *Sikker håndtering av gass* (5. okt), v/ AGA AS, IF – Sikkerhetssenter, Hobøl
 - *Votex – publisering* (6. okt, halv dag), MN –fakultetet, UiO
 - *Konflikthåndtering, trakassering og mobbing* (17. nov) v/ HMS-seksjonen UiO
 - *Førstehjelpskurs* (18. nov), v/ Norsk Luftambulans i regi av MN-fakultetet
 - *ECOonline – nye retningslinjer, miniseminar* (23. nov.), v/ ECOonline, Oslo

8 - Oppsummering per 31/12 – 2010:

Rammeverket for alt HMS – arbeid ved BIO/IMBV og UiO er norske lover og forskrifter på området, med *Arbeidsmiljøloven* og *Internkontrollforskriften* som de mest sentrale. Derfor er det første av målene for HMS-arbeidet ved instituttene å:

- 1) *Sørge for at norske lover og forskrifter innen HMS-området blir fulgt, likeledes UiOs egne bestemmelser på området.*

Høsten 2010 har hatt fokus på kartlegging, mål og handlingsplaner. Nå skal planene omsettes i mer konkret handling. Målene er ambisiøse på flere områder og vil by på utfordringer. Det vil kreve at alle krefter ved begge institutt jobber godt sammen for å løfte HMS-arbeidet, likeledes at en samhandler med MN-fakultetet og UiO sentralt. Gjennom felles ansvar, involvering og medvirkning skal det skapes økt trivsel ved instituttene, og en skal komme noen skritt nærmere vår felles visjon for HMS:

"Både ansatte og studenter skal glede seg hver dag til å komme til BIO/IMBV fordi de har et trygt og sikkert arbeidsmiljø som inspirerer til forsknings- og studieinnsats".

Det viktige HMS-arbeidet som gjøres nå skal bringe BIO og IMBV inn i framtiden og sikre instituttene et godt, attraktivt arbeids- og studiemiljø og dermed et konkurransefortrinn om dyktige studenter og ansatte.



Til: Instituttstyret ved Biologisk institutt

Sakstype: Orienteringssak

Saksnr.: O-Sak IS 6/2011

Møtedato: 17.03.2011

Notatdato: 8.03.2011

Saksbehandlere: Lise Bøkenes og Glenn-Peter Sætre

Sakstittel: Undervisningssaker

- Nedleggelse av emnet BIO4220/9220 Naturlig utvalg og tilpasinger. Emnet legges ned og ble undervist siste gang høsten 2010. Studenter som har tatt emnet kan avlegge eksamen t.o.m. høsten 2012

Vedlegg: Svar på søknad om nedleggelse av emnet 4220/9220

Til:
Lise Bøkenes

Dato: 25.01.2011
Saksnr.: 2008/7151HALLE

Svar på nedleggelse av emnet BIO4220 Naturlig utvalg og tilpasninger

Emnene BIO4220 og BIO9220 Naturlig utvalg og tilpasninger er terminert i FS med siste semester for undervisning høsten 2010 og siste semester for eksamen høsten 2012. Dere legger inn informasjon i emnebeskrivelsene om siste semester for undervisning og eksamen, jeg endrer status til nedlagt emne i vortex.

Med hilsen

Yvonne Halle
Seniorkonsulent

Dokumentet er elektronisk produsert og godkjent ved UiO i tråd med UiOs reglement for elektronisk godkjenning.

Saksbehandler:
Yvonne Halle
22856346, yvonne.halle@matnat.uio.no