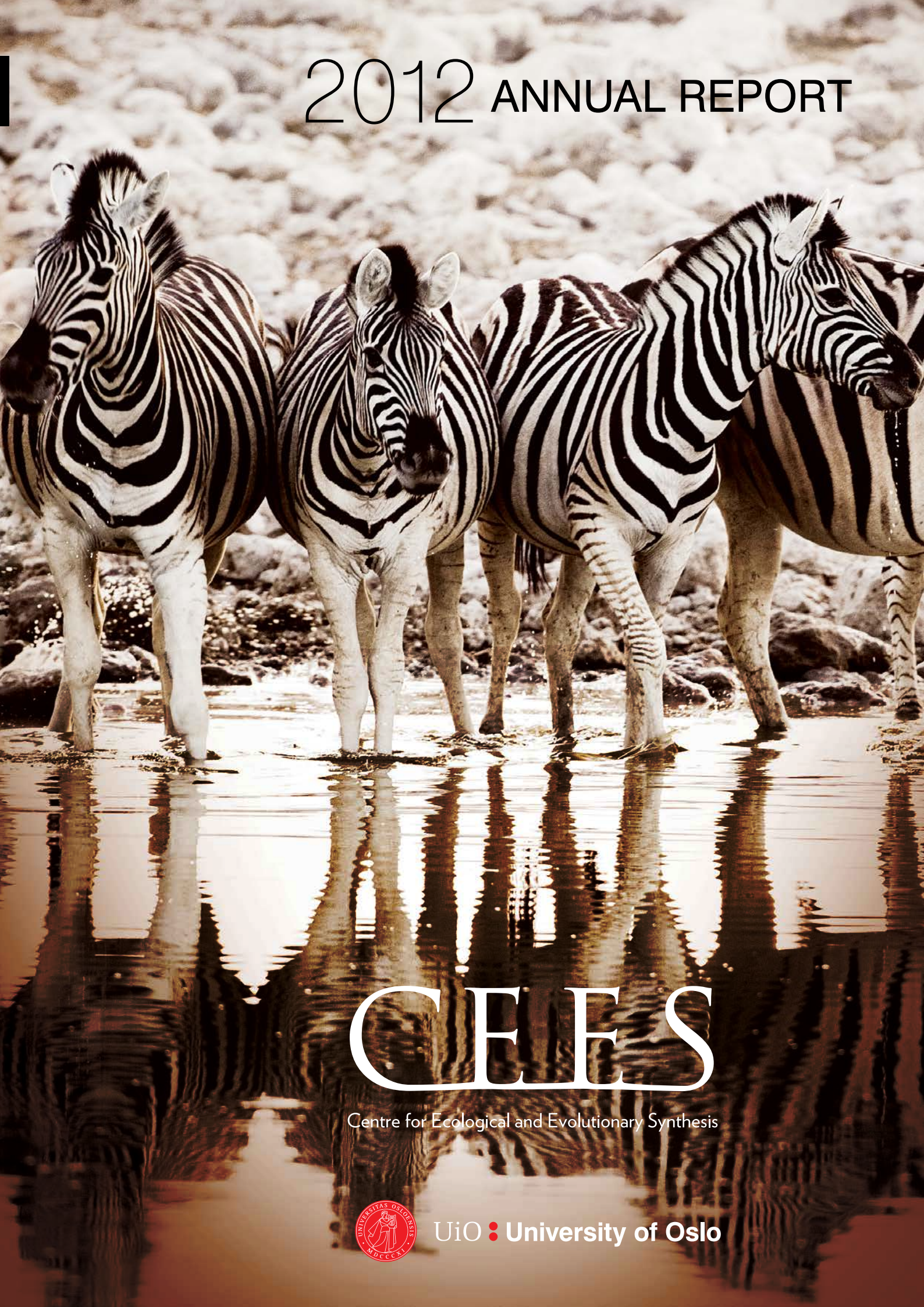
2012 ANNUAL REPORT



CEES

Centre for Ecological and Evolutionary Synthesis

UiO : University of Oslo

The Centre for Ecological and Evolutionary Synthesis (CEES) combines a broad spectrum of disciplines (such as population biology, statistical and mathematical modelling, and genomics) to foster the concept of ecology as a driving force of evolution via selective processes, with a corresponding influence of evolutionary changes on ecology.

Sheeps grazing in Hol, Norway © Helga Bårdsdatter Kristiansen

Cover picture: Plains zebra at the Okaukuejo Waterhole, Etosha National Park © Yathin Krishnappa

CEES IN BRIEF

In 2012, CEES consisted of 164 members (including core staff, postdocs and researchers, PhDs, research assistants, technical and administrative staff, and Masters students). In addition, 27 guests stayed for more than one month, and 25 guests for less than one month. The members and guests represented 26 nationalities. The Centre has a core group of 18 employees (two are employed by the Department of Mathematics, one by the Department of Economy and one by the Institute of Marine Research). One employee is a visiting scientist at the University of Alberta, Canada, and one Kristine Bonnevie Professor (from the Norwegian University of Life Sciences) has been working with us. CEES is chaired by Professor Nils Chr. Stenseth.

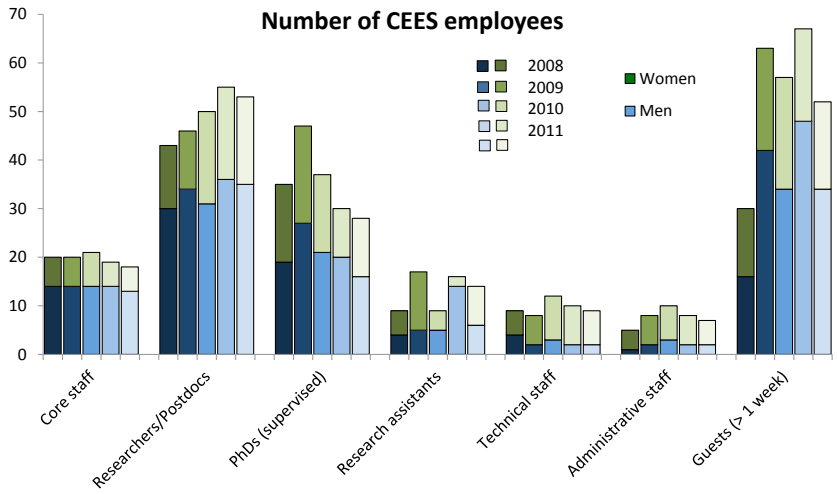
CEES supervised 35 Master and 28 PhD students in 2012, and was also involved in the teaching of 10 PhD/Master courses and 3 Bachelor courses. 4 new PhD students were employed, and 2 PhD students and 12 Masters students completed their degrees. The CEES graduate school held its annual conference at Holmen Fjordhotell, with 126 delegates.

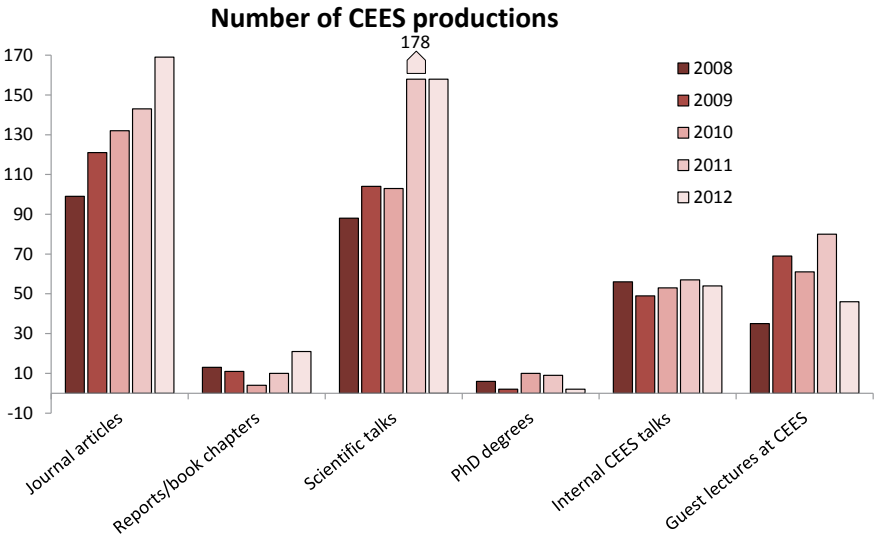
Approximately 62 MNOK of the total 2012 budget of 131 MNOK came from the 51 externally funded research projects conducted by CEES in 2012. Most of these were funded through the Research Council of Norway. CEES is also involved in various EU-funded projects. 13 new projects were started in 2012.

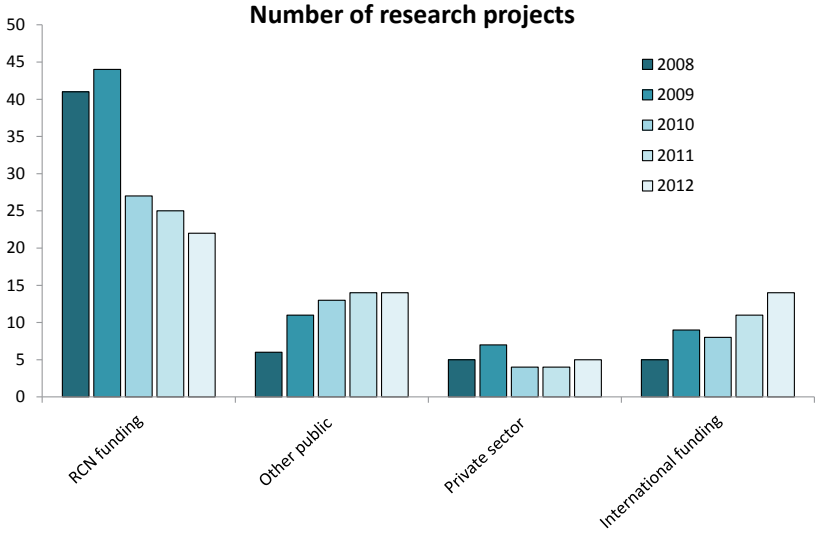
CEES members published 169 articles in peer reviewed journals and 21 books/book chapters/reports in 2012. The majority of these results lie within the core scope of CEES. 158 talks at conferences were given. The Centre hosted 46 guest speakers, primarily from abroad.

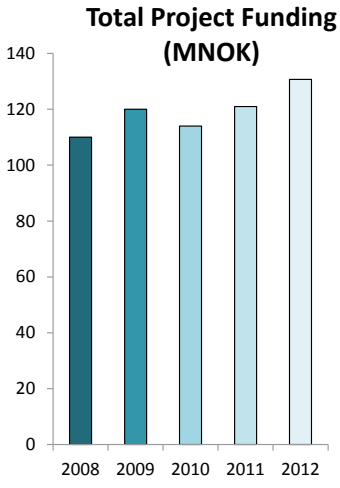
The work of CEES is structured into *Colloquia* and *Themes*, the former being focused projects each lasting for three years and the latter consisting of on-going, long-term work that is accommodated within the Centre. The *Themes* are *Theme 1*: The role of population structuring in adaptive evolution. *Theme 2*: The potential for adaptation. *Theme 3*: The evolution of reproductive isolation. The topics of the *Colloquia* are as follows: *Colloquium 1*: Selection and evolvability: Concepts, measurements and statistics. *Colloquium 2*: Bridging the gap between genomics and evolutionary biology. *Colloquium 3*: The ecology and evolution of infectious diseases with an environmental reservoir (refocused relative to the original proposal to create a greater scientific impact using the expertise at CEES). *Colloquium 4*: Integration of ecology and evolution: A synthesis.

CEES IN BRIEF CONT.









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1 THE CHAIR'S COMMENTS

The year of 2012 was another good and productive year for CEES. The number of publications in good journals is impressive and continues to increase. CEES has also exposed the public to exciting science through high visibility in the media. In 2012, CEES consisted of 164 members (including core staff, postdocs and researchers, PhDs, research assistants, technical and administrative staff, and Masters students), and had a total annual budget of approximately 131 MNOK. Altogether, these conditions permit a broad range of expertise without intellectual fragmentation, resulting in CEES functioning as a unified Centre.

The annual Scientific Advisory Board (SAB) meeting in September was also highly encouraging. The message from the SAB members is that we continue to develop along a very good trajectory, steadily improving our performance. It is indeed very encouraging to hear that the SAB members feel that we have greatly matured since they first met us in 2007. The SAB also emphasised the exceptional work carried out by our many talented young researchers (PhD students, postdocs, and other young scientists). For me this is very encouraging, as our philosophy has been to help the young researchers to take advantage of opportunities (e.g. funding opportunities) so as to further develop their carriers – and by so doing help the Centre to become an exciting scientific institution and an attractive work place. Thanks to the very good social environment that has evolved at CEES, a good cooperative attitude has developed with extensive sharing of ideas and expertise. Altogether, this has resulted in a highly ambitious group of young researchers – which in turn attracts more highly talented people. To the young researchers, I would like to say thanks for making it a great pleasure to chair CEES. It is hard but very rewarding work; through your efforts I am learning new things almost every day – new insight into the field of ecology and evolution (and the interrelations between the two).

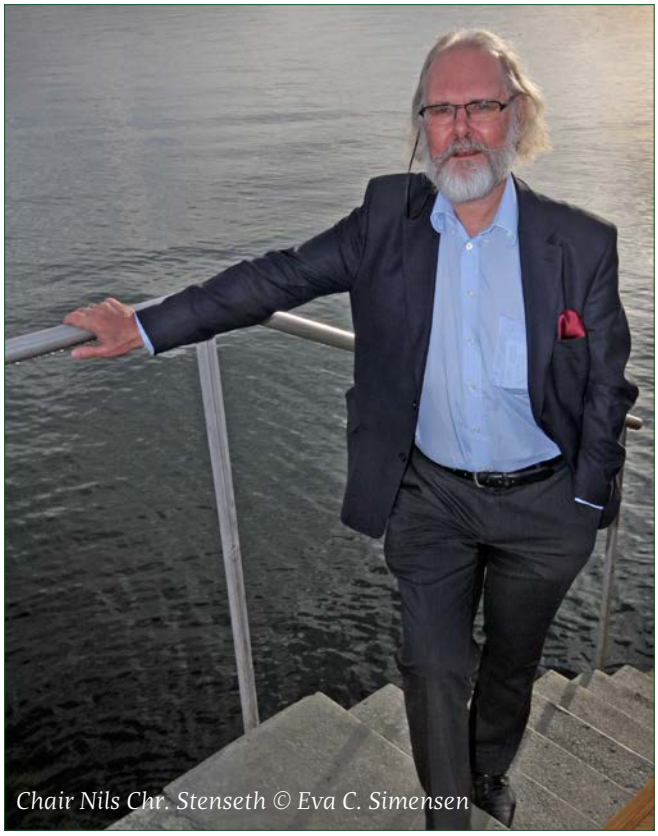
Our work aimed at merging genomics and evolutionary biology continues. The completion of the sequencing of the cod genome (in 2011) has provided us with unique opportunities to further study biologically relevant questions related to Atlantic cod (*Gadus morhua*). We are pursuing this in several ongoing projects – in collaboration with various strong international groups. In a paper by Star and Jentoft in *BioEssays* in August 2012, our discovery of the unusual immune system of Atlantic cod was further discussed within an evolutionary perspective. As a key part of this work, we are merging molecular and genomic information to ecological and evolutionary theoretical work at the Centre (e.g. Rouyer *et al. Ecology Letters* July 2012). In 2012 a large research grant was awarded to further our marine functional genomics research. The Aqua Genome project, funded over the RCN's BIOTEK2021 programme, will receive 40 million NOK over the next four years, to follow in the footsteps of the 1000 Genomes Project, by sequencing one thousand genomes of both cod and salmon from a variety of locations and populations. I would like to thank and congratulate all internal and external parties that have contributed to the grant proposal.

We have strong activity within the field of theoretical evolutionary biology. Some of our work is purely theoretical – helping us to frame our more empirically focused questions. Among the papers of last year, I would like to highlight the study of Ohlberger *et al.* published in *The American Naturalist* in December 2012. Using a mathematical model, they show that cannibalistic behaviour within a species leads to changes in the distribution of individuals between juveniles and adults, which can alter the conditions for the invasion of competitors or predators. The study thereby highlights that cannibalism has the potential to promote biological diversity by facilitating coexistence with other species in the food web. This is indeed a theoretical study, helping us to frame our empirical questions.

Bringing in palaeontological data. Another focal point of our combined theoretical and empirical research includes the study of palaeontological data: if we are to synthesise ecology and evolution, we need this long-term perspective. Among the studies taking such an approach are those of Liow and coworkers, e.g. the paper by Hannisdal *et al.* published in *Global Change Biology* in October 2012.

We work in essentially all ecological environments – terrestrial, marine and freshwater. This year I would also like to highlight our work within the freshwater system, and in particular our work on the brown trout (*Salmo trutta*), linking demography and population genetics (and biology). Highlights include the studies by Serbezov *et al.* published in *Evolutionary Applications* in September 2012 and in *Genetics* in June 2012, as well as the study by Vøllestad *et al.* published in *Canadian Journal of Fisheries and Aquatic Sciences* in August 2012. In the latter study, the identification of a strong between-site genetic differentiation for young age classes demonstrates the significance of small scale genetic structure (the pattern in the genetic makeup of individuals) within a population, i.e. inducing a higher degree of genetic variability through genotype-environment correlations. As with much of the other work being carried out within the Centre, these studies illustrate the power of combining field-based and laboratory-based work within a solid theoretical framework.

Work within our *Colloquia* is progressing very well and serves increasingly as a gluing-together mechanism: more and more members of CEES are involved in *Colloquium 2* (Evolutionary biology and genomics) and *Colloquium 3* (The ecology and evolution of infectious diseases within an environmental reservoir). The former Colloquium is coming towards the end of its three year period, whereas the latter is just getting started. I would like to thank Stig W. Omholt (Kristine Bonnevie Professor), Sissel Jentoft, and Kjetill S. Jakobsen for their great work in chairing the *Colloquium 2* work. The final Colloquium, *Colloquium 4* (Integration of ecology and evolution), is also getting started: the focus within this Colloquium is work on the Red Queen coevolutionary dynamics. It has had a flying start thanks to two larger grants from the Research Council of Norway. I will return to the work being conducted within the latter two Colloquia in future annual reports.


Chair Nils Chr. Stenseth © Eva C. Simensen

Visibility is important – be it in the scientific literature or in the broader media. Publishing good papers in good journals, and delivering good lectures and meetings, are of key importance. However, it is an added value to be

1 THE CHAIR'S COMMENTS

featured through special commentaries and front covers of journals within which our papers are published. In 2012, three of our papers were featured on front covers of major journals: Kyrre L. Kausrud *et al.* in *Biological Reviews* (Vol. 87), Bastiaan Star and Sissel Jentoft in *BioEssays* (Vol. 34) and Kjetil L. Voje *et al.* in *Evolution* (Vol. 67). All of these are good papers in good journals. Congratulations to you all!

Our visibility beyond the science community is also steadily increasing. Two examples of the many open events we have held are Darwin Day on February 13, and the Kristine Bonnevie lecture on evolutionary biology, which was organised as an integrated part of the university's anniversary celebration on September 2. The former event had sexual selection as the topic, and the latter covered "Genes, evolution, and the origins of social behavior" (delivered by Cori Bargmann). Our other events, such as the talk held by Steven Pinker on "The better angels of our nature: Why violence has declined" and Carl Zimmer's "A planet of viruses", were also visited by many. The latter was organised at the public venue the House of Literature in Oslo. Such public events contribute to the communication of evolutionary biology, far beyond the community of scientists.

Members of CEES were awarded prestigious prizes and otherwise recognised. The Marie Curie postdoc project of Manuel Hidalgo (who spent 3 years with us and is currently at Centre Oceanogràfic de Balears, Spain) was highlighted as a success story of the EU office administrating the Marie Curie programme. Stephanie Carlson (who altogether spent about one year with us and is currently at the University of California at Berkeley) was shortlisted for the prestigious Marie Curie Promising Research Talent Award, awarded to earlier Marie Curie candidates. Congratulations to both Manuel and Stephanie. Asbjørn Vøllestad was awarded this year's Darwin prize for work within evolutionary biology. Asbjørn is not only an excellent scientist but also a very good teacher; he conveys his knowledge in an excellent way to his students and colleagues. Thanks Asbjørn. I was also pleased myself to be awarded the Research Council of Norway's prize for communicating science to the public. This award is very much thanks to the great team we have at CEES, and we could not have achieved it without them.

The Norwegian Sequencing Centre (NSC): The Norwegian Sequencing Centre (NSC), with CEES as one of two equal partners, continues to provide national and international users with services within deep sequencing technology. The sequencing of the cod genome put us at the forefront of marine functional genomics, and the sequencing and bioinformatics expertise built up at NSC/CEES is widely recognised. NSC manages to keep pace in this fast evolving field. The acquisition of the PacBio RS and Ion Proton in 2012 not only greatly reduces the time needed for the processing of the samples, but also makes available to us a near complete, and nationally unprecedented, range of technologies.

Promoting the young researchers: The success of our young members contributes very much to the success of CEES. They are increasingly active – not the least through the various versions of the Late Lunch Talks (LLTs). Three types of talks exist: Regular (held on a

weekly basis), PUB talks (held on a monthly basis), and Concept Battle (held occasionally). The over 40 talks at the CEES Annual Student Conference in October were a joy to watch, and the already high level of the presentations is increasing every year. These activities, run and dominated by the young researchers, contribute profoundly to the Centre and the gluing together of the members: they keep the Centre operating as one unit. I greatly appreciate these events.

Nordic Centre for Research on Marine Ecosystems and Resources under Climate Change (NorMER): This Centre continues to develop very nicely and contribute profoundly to the activities within CEES – and extends much of our activities to a Nordic platform. Within NorMER, there is an even stronger focus on the Young Researchers – a focus which also influences CEES. CEES, including NorMER, has become a truly interdisciplinary incubator for new ideas and alliances, and the young researchers have been crucial in making this happen. I am very happy to see this development.

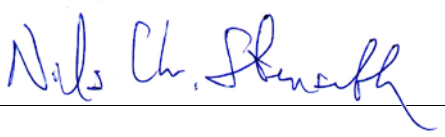
Socially, CEES is also further developing in very good directions. The morning coffee every day (with free high quality coffee and tea) is a great mechanism for bringing people together – as is the Happy Hour late Friday afternoon.

David Brillinger, statistician from the University of California, Berkeley, US, left the SAB in 2012. I would like to thank him a lot for all the work done for us from the very start of the Centre: he has all the time made sure that we apply statistical methods solidly anchored within the statistical community. Thanks, David.

Olivier Gimenez, biostatician at Center for Functional and Evolutionary Ecology (CEFE), France, is replacing David: I welcome you to the SAB and CEES. I am definitely looking forward to working together with you, with the aim of steadily making CEES a better institution.

Following the merging of our host, the Department of Biology, with the Department of Molecular Biosciences, our new host from 2013 will be the **Department of Biosciences**. I would like to express my gratitude to Trond Schumacher for great support both as the Department Head and as a CEES Board member: Although we have not always agreed, your contributions have been crucial to CEES. I would also like to welcome Finn-Eirik Johansen as the Head of the new Department and as a new member of the CEES Board: I very much look forward to cooperating with you.

In sum: Thanks to everyone contributing to the success of CEES – you are a great group of people – colleagues and friends. You all play key roles in the further development of CEES. Finally – thanks to the CEES administrative team: you're fantastic.



2 MANAGEMENT AND ADMINISTRATION

CEES is established as a Centre of Excellence (CoE) by The Research Council of Norway (RCN). It is hosted by the Department of Biology* under the Faculty of Mathematics and Natural Sciences at the University of Oslo (UiO). RCN and UiO are the main financial contributors and constitute the final reporting entities that define the guidelines under which the Centre operates.

Administrative structure

Chair	Prof. Nils Chr. Stenseth
Deputy Chair	Dr. Sissel Jentoft (Senior Adviser)
Administrative team	Dr. Gry Gundersen (Adviser), Kari B. Rygg (Adviser), Tore Wallem (Adviser), Camilla M. Tømta (Higher Executive Officer, until May), Camilla S. Thomsen (Executive Officer, from November) and David Hope (Executive Officer, August–December).
Lab Board	Ass. Prof. Anne Brysting (Leader), Prof. Kjetill S. Jakobsen, Dr. Kathrine Schou, Nanna Winger and Dr. Ave Tooming-Klunderud.
Administrative Leader of Fieldwork Resources	Prof. Atle Mysterud

The Centre is run on a daily basis by the Chair, the Deputy Chair and the CEES administrative team. Running and strategic issues are dealt with at weekly meetings. The Chair and Deputy Chair communicate on a daily basis regarding scientific progress within the Centre. In order to facilitate the running of CEES, and to provide a good cooperative relationship with its host (the Department of Biology*), weekly meetings are conducted where the Head of Department, the Head of Administration at the Department, the CEES Chair and a representative from the CEES administration are all present. In addition to these weekly meetings, the administration at CEES meets with the administration at the department twice a month. These meetings are led by the Head of Administration at the Department.

The CEES administrative team is responsible for the daily running of the Centre, which includes: employments, the CEES budget and accounting, budgeting and coordinating funding proposals (RCN, EU and other), annual reporting (RCN, EU and other), media and external communication, facilitating a good reception and stay for the CEES guest researchers, maintenance of the CEES website, and implementing the different CEES arrangements like weekly seminars, conferences, workshops and public lectures. The administrative team also organises all CEES meetings; i.e. monthly Core meetings, bi-annual Board meetings and annual SAB meetings, including taking minutes from these. Most of the general correspondence with the University, the Department, the RCN and the media goes through the CEES administration.

The CEES Chair has from September 2011, in accordance with the Deputy Chair and the administrative staff, chosen a so-called “flat organisational structure” where the responsibilities formerly associated with the Head of CEES Administration are now divided among different persons in the administrative team. Human Resources are for instance Gry Gundersen’s responsibility, while finances and budgeting are Kari B. Rygg’s responsibility. Thus, each member of the administrative team has the primary responsibility for selected tasks, and all members of the administrative team contribute towards tasks associated with the daily running of the Centre. This organisational model functions very well, due to

the high level of competence among the administrational staff and their frequent interaction with the Chair and Deputy Chair at CEES.

The CEES Core consists of the faculty members that have committed to allocating their research time to the Centre. The Core serves as an advisory group for the Chair. Several Core members are *Theme* and *Colloquia* leaders, and are responsible for the scientific progress within their respective *Themes*/*Colloquia.*

The formal administrative support required for students (from the Bachelor to the PhD level) is provided by the department at which the students are enrolled, which is the Department of Biology* for the most part. The general IT support is provided by the Department of Molecular Biosciences*.

Throughout 2012, the CEES administration has been a part of the planning of the merging of the two departments, the Department of Biology and the Department of Molecular Biosciences, to form the Department of Biosciences from 1 January 2013. We look forward to collaborating with our new host from 2013 onwards.

*Following the merging of our host, the Department of Biology, with the Department of Molecular Biosciences, our new host from 2013 will be the Department of Biosciences (mn.uio.no/ibv).

Fieldwork in Lofoten © Wendy Turner and Yathin Krishnappa

The Board and the Scientific Advisory Board

The CEES Board is an administrative body that meets twice a year (9 March and 11 October in 2012) to focus on strategic and control functions as well as approving budgets, accounts and annual reports.

The CEES Scientific Advisory Board (SAB) has been appointed by the CEES Board. The SAB has annual meetings (10–11 October in 2012), and gives invaluable feedback on the research carried out at CEES.

For more details, including the boards mandates, see the CEES website.

Reidun Sirevåg © Painting by Svein Bolling, photo by Eirik Furu Baardsen

Comments by the Board Chair: Reidun Sirevåg

As in previous years, the Board has met twice in 2012. In addition to discussing economic matters, the major issues have been the organisation of administration, the further plans for the development of CEES, and attracting possible financial sources for the years to come.

The Centre is quite large, and so is the collective economy. The Board is very pleased with the way the economy and budget have been handled by administration, which has undergone reorganisation during 2012. As a result, a research coordinator has been hired and will start his work early in 2013.

During 2012, the mother institute, the Department of Biology, has been involved in a merger with its sister department, the Department of Molecular Biosciences. In this process the role of CEES, and especially the role of its administration, was discussed. The merger was completed at the end of the year, and no apparent difficulties have transpired.

The contribution of the Research Council of Norway (RCN) to CEES represents only 10% of the total budget. It is therefore of importance for the continuation of the main activities of CEES that financial sources are secured. The exit strategy, the maintenance of present activities, and the fate of CEES in the years to come have been discussed by the Board and also by the SAB. In its report, the SAB expressed some concern about the future opportunities of the many young scientists at CEES: the Board has noticed that the Chair never seems to rest with regard to this important issue.

Much time and energy are allocated towards the hunt for financial resources. The involvement in the Nordic Centre for Research on Marine Ecosystems and Resources under Climate Change (NorMer) is an example of new resources and activities in this respect. However, it is also an example of how the funding as such influences the direction of science. In the case of NorMer, the direction is marine research.

The present activities of CEES will be crucial for the future development of the whole field of ecology and evolution, and the scientific fields of the CEES members are broad and diverse. It is therefore not surprising that they take an interest in the ongoing decision making processes related to future scientific development and plans. There has been a certain discontent among the core members of CEES regarding internal communications, and the flow of information in general. This important issue has been resolved to a large degree by having more frequent and regular meetings of the Core members and the Chair. This in turn has led to more extensive cross-talk, cooperation, and sharing of experience and expertise. Thus, the expertise and knowledge obtained from the cod sequencing project, genomics and its tools, have been applied as well to other species, such as sparrows. Furthermore, late lunch seminars have been initiated and serve as a platform for interaction.

In the past years, CEES has played an important and significant role in presenting biology to the general public. This has been achieved through public lectures, by inviting eminent speakers and scientists such as Richard Dawkins, Steven Pinker, and Jared Diamond. These events have been highly appreciated by a broad and large audience.

In summary, CEES behaves like any other ecosystem. It consists of various populations, interacting more or less with each other and changing over time, depending on the habitat and physical environment.

The Board	Specialisation and home institution
Chair: Reidun Sirevåg	Microbiologist, University of Oslo
Sven-Axel Bengtson	Ecologist, Lund University, Sweden
Tyge Greibrokk	Professor at the Department of Chemistry and member of the Board of the Faculty of Mathematics and Natural Sciences, University of Oslo, Norway
Rolf A. Ims	Ecologist, University of Tromsø, Norway
Trond Schumacher	Chair of the Department of Biology, University of Oslo, Norway
Bernt Øksendal	Mathematician, CoE Centre of Mathematics for Applications, University of Oslo, Norway

The Scientific Advisory Board	Specialisation and home institution
Chair: Rita R. Colwell	Microbiologist, University of Maryland, US
David R. Brillinger (Until September 2012)	Population biologist, Imperial College, London, UK
Tim Coulson	Statistician, University of California, Berkeley, US
Olivier Gimenez (From October 2012)	Biostatician, Center for Functional and Evolutionary Ecology (CEFE), France
Edward J. Feil	Microbiologist, University of Bath, UK
Barbara Mable	Evolutionary Biologist, University of Glasgow, UK
Anne Magurran	Behavioral Ecologist, University of Washington, Seattle, US
Gordon H. Orians (Corresponding member)	Evolutionary Biologist, University of Washington, Seattle, US

Comments by the Scientific Advisory Board Chair: Rita R. Colwell

The SAB reviewed the progress of CEES over the past year and determined that it was clear that new technology is being incorporated effectively into the research of CEES faculty, staff, and students. This includes population genetics, epigenetics, adaptive genetics, and metagenomics. Furthermore, the SAB concluded that CEES is on the right track in its main lines of research, notably in its work on the cod. A suggestion for future research might be the evolution of cooperation and selection, perhaps including social structures at the microbial level. One consideration is that CEES must attend more forcibly to the integration of evolution and ecology, the stated major theme of CEES. Without question, the overall progress of CEES is excellent.

Significant improvement was noted by the SAB in the student presentations in this review. All were judged to be very good, with the work on integrating community ecology with evolutionary biology judged to be both innovative and fully focused on the central theme of CEES. Clearly, CEES is attracting excellent graduate students, whose future needs to be considered. The SAB recommends that CEES pay attention to future prospects of its talented young researchers, specifically in allowing them to publish their own work and build their career dossiers. A special meeting between female faculty, staff, students, and the SAB was very informative. This led to the recommendation that CEES consider the issues of family demands, perhaps establishing a child care centre, and creating a stronger environment for young researchers (both women and men) to foster creative thinking and independence, allowing expression of their own ideas.

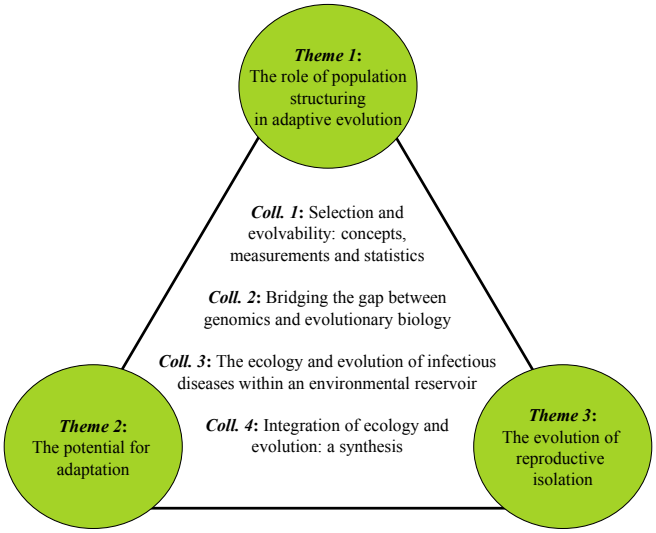
The SAB concludes that CEES has developed exceedingly well and now represents a mature and highly productive operation. With an eye to the future, CEES should strengthen its links with the different research groups in the faculty of Medicine, as well as with the faculty of Mathematics and the Natural Sciences. Young researchers would benefit from an exchange programme between CEES and other research teams in Norway and abroad.

In summary, CEES has had an excellent year, evidenced by its publications in strong peer-reviewed journals, project development, and the stimulating and creative environment palpably obvious to the SAB members.

3 SCIENTIFIC ACTIVITY

Organisation of the research

CEES takes on numerous research objectives with an ecological and evolutionary synthesis, using old and new data from the field and the lab. The research is organised around three intertwined Themes. *Theme 1:* The role of population structuring in adaptive evolution. In 2012 CEES focused on the effects of habitat fragmentation on early stages of genetic diversification and the ecology of microbial communities. *Theme 2:* The potential for adaptation. Research in 2012 dealt with human induced evolution, e.g. effects of size-selective hunting and fishing. *Theme 3:* The evolution of reproductive isolation. CEES' efforts addressed genetic aspects of reproductive isolation. Within each research Theme, there is integration of ecological and evolutionary thinking. In order to avoid the pitfalls associated with integrative work, such as conceptual and semantic confusion, and to promote communication across the various research fields (that each have their own limiting assumptions), the *Themes* are addressed through four multidisciplinary *Colloquia*, each of three-year duration. Each *Colloquium* constitutes an excellent setting for highly qualified staff and visiting scientists, with experience from a wide range of biological and methodological systems, to collaborate and thus contribute to the overall objectives of the Centre. The topics of the *Colloquia* are as follows: *Colloquium 1:* Selection and evolvability: Concepts, measurements and statistics. *Colloquium 2:* Bridging the gap between genomics and evolutionary biology. *Colloquium 3:* The ecology and evolution of infectious diseases with an environmental reservoir (refocused relative to the original proposal to create a greater scientific impact using the expertise at CEES). *Colloquium 4:* Integration of ecology and evolution: A synthesis.

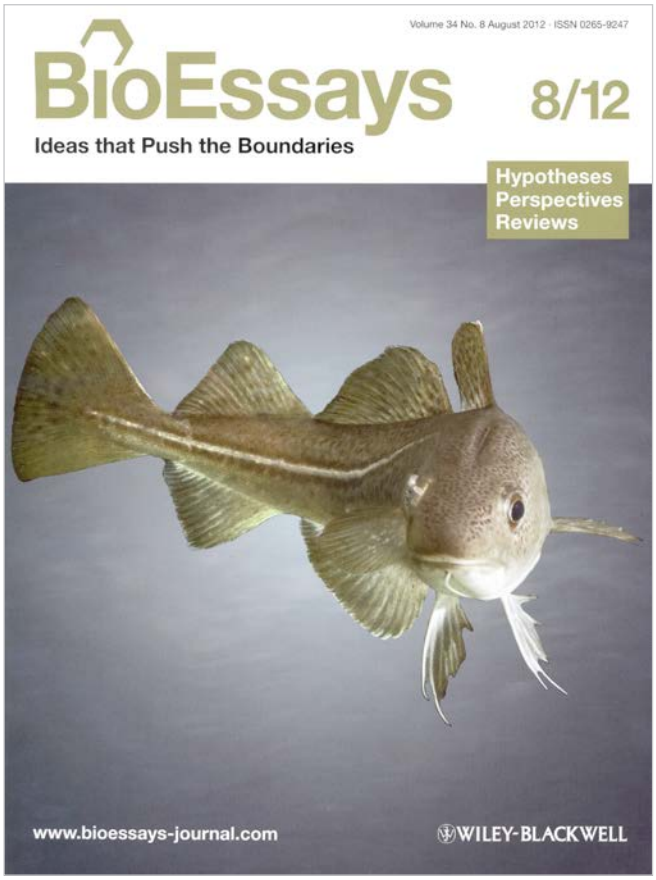


Scientific highlights in 2012

The evolution of the immune system of Atlantic cod

In 2011 we published a first version of the Atlantic cod (*Gadus morhua*) genome, which highlighted fundamental differences in the immune system of Atlantic cod. In contrast to other jawed vertebrates, Atlantic cod does not contain the genes essential for the function of the major histocompatibility complex (MHC) II, whereas other immune genes (e.g. MHC I and Toll-like receptor (TLR) genes) are far more numerous than expected. These expansions in other immune genes are an indication that Atlantic cod relies relatively more on these genes for its immune response.

Nevertheless, so far, Atlantic cod is the only vertebrate in which these observations have been made, hence we cannot exclude the possibility that the loss of MHC II is not functionally connected to the expansions of the MHC I and TLR genes. It is crucial for our understanding of the evolution of this unusual immune system that we comprehend if and how these



Star and Jentoft was featured on the front cover of BioEssays.

phenomena are connected. We discussed these ideas in a hypothesis paper (Star and Jentoft, *BioEssays* 2012), which was featured on the front cover of BioEssays. In this paper several lines of research are proposed that can further enhance our understanding of the evolution and functionality of the immune system of Atlantic cod. In fact, this paper provided the basis for a new research proposal entitled "Functional and comparative immunology of a teleost's world without MHC II", which was awarded funding through the FRIMEDBIO programme of the Research Council of Norway (RCN). This programme is highly competitive, and had an approval rate of less than 7 % in 2012.

The aims of the research proposal are three-fold: First, the group will sequence a range of teleost lineages to investigate the evolutionary origin of the Atlantic cod immune system. The aim will be to associate biological or environmental factors to the loss of MHC II, and to investigate the necessity for alternative immunological strategies to emerge. Second, through in vitro and in vivo immunological experiments, the group will provide a deeper understanding of the basic function of this immune system, potentially uncovering novel immune functionality at the gene or pathway level. The final aim is to investigate whether the loss of MHC II has an effect on the composition of the microbial community in teleosts, which would emphasise the important role of host-pathogen co-evolutionary dynamics. This last effort has already resulted in a manuscript investigating the diversity of the community composition of intestinal microbiota in individual Atlantic cod specimens, which has currently been submitted to *BMC Microbiology*. Overall, the ongoing work at CEES will generate a deeper understanding about the diversity and evolution of the vertebrate immune system, widening a perspective that has so far been restricted by the preferential use of mammalian model systems.

Summarised by Bastiaan Star and Sissel Jentoft.

Further Reading:

Star, B., Nederbragt, A. J., Jentoft, S., *et al.* (2011) The genome sequence of Atlantic cod reveals a unique immune system. *Nature*, 477, 207–210.

Star, B., Jentoft, S. (2012) Why does the immune system of Atlantic cod lack MHC II? *BioEssays*, 34 (8), 648-651.

Star, B., Haverkamp, T. H. A., Jentoft, S., Jakobsen, K. S. Submitted to *BMC Microbiology*. Next generation sequencing shows high variation of the intestinal microbial species composition in Atlantic cod caught at a single location.

Small-scale movement and population structure in stream-living brown trout

Many animals move among habitats, and even small-scale dispersal of individuals between habitat patches may have strong implications for population dynamics and structure. Movement and gene flow have been studied extensively for a large number of taxa, but usually at large geographic scales and over long time periods. Usually, the studies are based either on mark-recapture methods or by using genetic inferences.

Here, we use long-term mark-recapture data combined with extensive genotyping and parentage assignment to investigate the importance of small-scale location change of resident brown trout (*Salmo trutta*) in a small stream (1500 m). The data cover ca. 10 years of observations.

During the first summer, juvenile fish dispersed downstream (mean displacement 200 m), with smaller juveniles dispersing longer distances. Downstream movement was also predominant during the first winter. Older fish moved little, but they tended to move slightly downstream during winter and slightly upstream during summer. In total, this limited (small range) dispersal resulted in a significant isolation-by-distance (IBD) structure for young fish, but not for older age groups or for mature fish. This IBD-signal indicates that pairs of trout of the same cohort that are found close together tend to be more genetically similar than pairs that are far apart. Overall, between-site genetic differentiation was stronger for the younger age classes, and the signal decayed with age, indicating that the genetic structure observed in the stream is mainly driven by spatial aggregation of close relatives.

Sampling of trout in Bellbekken, Norway
© L. Asbjørn Vøllestad

Aggregation of close kin in space may expose different families to variable selection and may even lead to genotype–environment correlations. This may lead to increased genetic variability within the population, even if some variation is lost locally.

Summarised by L. Asbjørn Vøllestad.

Further Reading:

Vøllestad, L. A., Serbezov, D., Bass, A., Bernatchez, L., **Olsen, E. M., Taugbøl, A.** (2012) Small-scale dispersal and population structure in stream-living brown trout (*Salmo trutta*) inferred by mark–recapture, pedigree reconstruction, and population genetics. Canadian Journal of Fisheries and Aquatic Sciences, 69, 1513-1524.

Cannibalism may alter food web structure and ecological diversity

Cannibalism is a surprisingly common phenomenon in nature. Cannibalistic behaviour is exhibited by a variety of animals in aquatic and terrestrial ecosystems, including organisms as diverse as insects, mites, snails, sharks, fishes, frogs, reptiles, birds, and mammals. Previous studies have mainly looked at the effects of cannibalism on the species itself, such as changes in growth and mortality rates. We were interested in the consequences of this behaviour for other species in the food web that directly prey upon or compete with a cannibalistic species.

We developed a mathematical model describing the biomass dynamics of a consumer species in which juveniles and adults, the two life-stages of the population, feed on different resources. Additionally, adults may show cannibalistic behaviour by preying upon conspecific juveniles. We then analysed if the presence of cannibalism facilitated or hampered the invasion by direct predators or competitors into the food web.

Our results show that cannibalism within a population leads to a change in the distribution of individuals or biomass between the life-stages (here juveniles and adults), which alters the conditions for the invasion and persistence of direct competitors or predators. The findings suggest that cannibalism has the potential to promote biological diversity through facilitating coexistence within a community.

The study is one of the first to investigate the broader implications of cannibalistic behaviour, and highlights how ecological interactions within species can have profound effects on other components of the food web. It further indicates that cannibalistic interactions may determine how food webs respond to human impacts such as size-selective exploitation, which has the potential to reduce cannibalism between exploited adults and their juvenile prey.

Summarised by Jan Ohlberger.

Ohlberger, J., Langangen, Ø., Stenseth, N. C., Vøllestad, L. A. (2012) Community-level consequences of cannibalism. *The American Naturalist* 180 (6), 791-801.

Allometry: Evolving trait or neglected constraint?

The increasing awareness of slow and sluggish evolution has made it interesting for biologists to look for factors that hinder evolution in natural populations. One reason why organisms may fail to adapt can be due to how individual traits are constrained by genetic correlations. Correlations among traits are the foundation for the early-suggested hypothesis explaining why many traits of an organism scale with overall size according to simple power laws, commonly referred to as allometric scaling relationships.

Allometric scaling relationships are usually very similar across related taxa. One suggested explanation for this similarity of scaling is that it ensures functional trait-size combinations in organisms of different sizes. An alternative explanation is that development of the common *Bauplan* of organisms puts constraints on the ability of traits to change and evolve independently of each other. Although allometry as a concept within the study of morphology and evolutionary biology was formulised almost a hundred years ago, many of the hypotheses relating to whether allometry may constrain trait evolution remain substantially untested, due to various conceptual and statistical misunderstandings.

We have started to formalise hypotheses for how allometry may constrain trait evolution. Part of this work is to reanalyse hundreds of empirical estimates of within-species allometries from various taxa, to investigate if and how such scaling relationships evolve. We have used new developments within phylogenetic comparative methods to test specific hypotheses of whether allometric scaling relationships are shaped by adaptation, and at which rate this adaptive process proceeds. Results so far indicate that allometric scaling relationships evolve on million-year time scales, but that the adaptive process is slow. Such slow-evolving trait relationships may constrain the independent evolution of traits on shorter time scales. The constraining effect of allometry is exemplified by our finding that freshwater threespine stickleback (*Gasterosteus aculeatus*) populations originating 15,000 years ago have diversified in phenotypic directions predictable from allometric scaling relationships.

Summarised by Kjetil Lysne Voje.

Voje et al. was featured on the front cover of Evolution.

Further reading:

Voje, K. L., **Hansen, T. F.** (2012). Evolution of static allometries: adaptive change in allometric slopes of eye span in stalk-eyed flies. *Evolution*, 67, 453–467.

Voje, K. L., **Mazzarella**, **A. B.**, **Hansen**, **T. F.**, **Østbye, K.**, Klepaker, T., **Bass, A.**, **Herland**, **A.**, **Bærum, K. M.**, Gregersen, F., **Vøllestad, L. A.** Submitted to *Journal of Evolutionary Biology*. Allometric constraints on adaptive radiation in sticklebacks.

Voje, K. L., **Hansen T. F.**, Egset, C. K., Bolstad, G. H., Pélabon, C. (in prep.). Allometric constraints and the evolution of allometry.

Colloquium 3: The ecology and evolution of infectious diseases with an environmental reservoir

Bacterial pathogens such as *Yersinia pestis* (plague) and *Bacillus anthracis* (anthrax) are excellent model organisms to study the effects of ecology on genetic evolution outside of the laboratory. Both pathogens can cause large-scale lethal epidemics in their wildlife host populations and can persist within an area for long periods of time (either in the soil or in vector species). Therefore, they are likely to exert a sufficiently strong enough selection pressure on host population dynamics, host innate resistance, and/or their own virulence, that the effects of this selection pressure are detectable in their genome. Studies on *Francisella tularensis* (tularemia) and *Borrelia* spp. (Lyme disease) tie in with the plague and anthrax work to develop theoretical studies on the evolution of virulence.

Work on Colloquium 3 is funded in part through the **European Research Council (ERC) Advanced Grant** of Dr. Barbara Bramanti: *The medieval plagues: ecology, transmission modalities and routes of the infections*, the **RCN NORKLIMA** grant *Climate Changes and Zoonotic Epidemiology in Wildlife Systems* (ZEWS), and the **MLS PhD grant** *Evolution of the host immunity and immune responses to plague*.

Plague: The rich body of historic documentation of plague outbreaks is combined at CEES with climate-dependent ecological factors, to provide the broader phylogeographic context in which to interpret medieval human plague epidemiology and ancient DNA sequencing data. Furthermore, the co-evolution between the plague bacterium and its rodent hosts is studied in terms of immunogenetics and host population dynamics. Studying plague throughout its full biological range - from its molecular interactions within rodent hosts to the role of these same rodents in the pandemics of the last millennia - generates fundamentally new insights into plague dynamics.

Anthrax: *B. anthracis* is another potentially extremely virulent pathogen that has primarily been studied within its hosts and in laboratory settings, but little is still known about the environmental stages of its life cycle. Yet the long periods the bacteria spends outside of the host is crucial to its transmission and epidemiology. Our work therefore focuses on the persistence, behaviour and transmission routes of *B. anthracis* outside of its hosts, and on developing models for the resulting epidemiology and impact on host species.

TAroB: The Archive of Bio-organisms (TAroB) is a collaboration between CEES and the Department of Informatics at UiO, aimed at making an integrative database link-

Kyrre L. Kausrud sampling Anthrax in Etosha National Park, Northern Namibia

ing system. The purpose is to facilitate research needing an ecologically annotated genetic sequence database, linking existing genetic toolkits with common ecological tools. By explicitly linking genetic information to time, space, and environment, the enormous advances in genetics and genomics can be harnessed by ecologists, epidemiologists, and theoretical evolutionary biologists who are not geneticists themselves. In addition, geneticists are enabled and encouraged to link their work to natural systems.



Summarised by W. Ryan Easterday, Kyrre L. Kausrud and Boris Schmid.

Further reading:

Ben-Ari, T., Neerinckx, S., Agier, L., Cazelles, B., Xu, L., Zhang, Z., Fang, X., Wang, S., Liu, Q., **Stenseth, N. C.** (2012) Identification of Chinese plague foci from long-term epidemiological data. *Proceedings of the National Academy of Sciences* 109 (21), 8196-8201.

Ruete, A., Yang, W., Bärring, L., **Stenseth, N. C.**, Snäll, T. (2012) Disentangling effects of uncertainties on population projections: climate change impact on an epixylic bryophyte. *Proceedings of the Royal Society B: Biological Sciences* 279 (1740), 3098-3105.

Schmid, B. V., Jesse, M., Wilschut, L. I., **Viljugrein, H.**, Heesterbeek, J. A. (2012) Local persistence and extinction of plague in a metapopulation of great gerbil burrows, Kazakhstan. *Epidemics* 4 (4), 211-218.

Easterday, W. R. (2012) Anthrax: Evolutionary approaches for genetic-based investigative tools. PhD Thesis: University of Oslo.

Turner, W. C., Imologhome, P., Havarua, Z., Kaaya, G. P., Mfune, J. K. E., Mpofu, I. D. T., Getz, W. M. (2013) Soil ingestion, nutrition and the seasonality of anthrax in herbivores of Etosha National Park. *Ecosphere* 4 (1), art13.

Colloquium 4: Integration of ecology and evolution: Palaeobiology and the Red Queen Hypothesis

Integrating ecology and evolution is a central activity at CEES. Species distributions and taxon relative abundance, as observed from the fossil record, are the result of both ecological and evolutionary processes. An area of active research at CEES in 2012, continuing into 2013, has been to understand the drivers leading to such long-term patterns. A team of CEES researchers and associates found that changes in atmospheric CO_2 drove the evolution of body size and controlled the commonness and geographic extent of an ecologically important group of marine plankton (coccolithophores) over the last 50 million years (Hannisdal *et al. Global Change Ecology* 2012).

Together with an international team of marine biologists and palaeobiologists, Liow, a researcher at CEES, contributed to a prominent review that summarised what we know about background extinction rates of different clades of marine organisms, and the implications of these varying rates for marine conservation today (Harnik *et al. Trends in Ecology and Evolution* 2012). In addition, Liow was selected to contribute to an international meeting, held at Oxford University, to identify 50 priority questions to guide the future palaeoecological research agenda. Because the fossil record is so complicated, careful modelling of both biological and geological (including sampling) processes are vital. In a technical publication describing the simultaneous estimation of occupancy and sampling, Liow showed the utility of importing approaches developed in statistical ecology into palaeontological analyses (Liow *Paleobiology* 2013).

Research directly catered to the Red Queen hypothesis continues at CEES, where we have now started to study competitive overgrowth in fossil colonial encrusting bryozoan, in collaboration with Paul Taylor at the Natural History Museum in London. Theoretical and experimental (bacterial) approaches continue to be developed, to tease apart contributions of biotic interactions and environmental forcing to evolutionary changes.

Summarised by Lee Hsiang Liow.

Further reading:

Liow, L. H. (2013) Simultaneous estimation of occupancy and detection probabilities: an illustration using Cincinnatian brachiopods. *Paleobiology*, 39 (2), 193-213.

Hannisdal, B., **Henderiks, J.**, **Liow, L. H.** (2012) Long-term evolutionary and ecological responses of calcifying phytoplankton to changes in atmospheric CO_2. *Global Change Biology*, 18 (12), 3504-3516.Harnik, P. G., Lotze, H. K., Anderson, S. C., Finkel, Z. V., Finnegan, S., Lindberg, D. R., **Liow, L. H.**, Lockwood, R., McClain, C. R., McGuire, J. L., O'Dea, A., Pandolfi, J. M., Simpson, C., Tittensor, D. P. (2012) Extinctions in ancient and modern seas. *Trends in Ecology and Evolution*, 27 (11), 608-617.

Fischer, B., **Liow, L. H.**, **Stenseth, N. C.** (in prep.) Asymmetric ecological interactions and Van Valen's Red Queen.

Taylor, P. D., Wilson, M. A. (2003) Palaeoecology and evolution of marine hard substrate communities. *Earth-Science Reviews*, 62, 1-103.

© Halvor Knutsen

Etosha National Park, Northern Namibia © Kyrre L. Kausrud

4 EDUCATION AND RESEARCH TRAINING

CEES aspires to provide excellent education and training facilities for our students to supply outstanding candidates for future positions. Our host Department as well as other units of the University deliver the basic education to our bachelor and master/PhD programmes. In 2012 CEES's permanent scientific staff contributed to the teaching of 3 Bachelor courses and 10 Master/PhD courses. 35 master students were supervised by CEES members, and 12 completed their degrees in 2012. We provide a stimulating research environment for our students by organising workshops, regular seminars and journal clubs, and frequently inviting prominent scientists as speakers.

The student conference at Holmen Fjordhotell

The CEES Annual Student Conference is a compulsory event that provides a good forum for students to hone their communication and presentation skills in a professional setting. This year the conference was held 22–23 October at Holmen Fjordhotell with 126 delegates. Including a few talks by senior scientists, 50 talks were given at the conference.

The social environment at CEES is in part enhanced by weekly friendly floorball matches © CEES

Journal Club and discussion group

CEES arranges several different Journal Clubs, e.g. the Discussions on Epigenetics and Transgenerational inheritance (9 sessions in 2012), the Evolutionary Ecology Forum (9 sessions in 2012). Participating students select relevant papers that focus on scientific challenges within the field of ecology and evolution. The Journal Clubs encourage critical reading of scientific papers and provide an opportunity for students to keep updated in their field of study, as well as in related scientific fields, thereby also promoting synthesis within the Centre.

Late Lunch Talks (LLT)

The Late Lunch Talk seminar series is a forum where employees, visiting scientists and students at CEES present and discuss their work and ideas. The format is informal, with the objective being the facilitation of stimulating, topical discussions. There are three types of LLT: Regular (most common), PUB talks (a monthly collection of recent CEES publications – first event in October) and Concept Battle (an exercise where basic concepts and buzz words in biology are scrutinized – organised occasionally). 13 sessions were held in 2012.

Delegates at the Annual CEES Student Conference, Holmen Fjordhotell © CEES

Excerpt from the NorMER annual report for 2012.

Nordic Centre for Research on Marine Ecosystems and Resources under Climate Change
A Nordic Centre of Excellence administered by CEES.

NorMER brings together the expertise of leading research groups from all Nordic countries, and several North American institutions, to implement a collective and multidisciplinary research strategy to explore the biological, economic, and management consequences of global climate change on fisheries resources. It will achieve this through a unique programme of primary research, implemented by PhDs and Postdocs in a system of collaborative projects, with a focus on the Atlantic cod *(Gadus morhua)*. Though our Nordic focus is on cod, this research is intended to be a platform to extend this knowledge to other marine systems.

The aims of NorMER are:

1. Perform effect studies to: *(1)* evaluate climate effects on Nordic marine ecosystems, *(2)* Build new tools for predicting biological consequences of climate change, and *(3)* quantify impacts on profit, employment, and harvesting.

2. Create an effective training environment for young researchers.

3. Develop a team of outstanding global quality.

4. Link to industry and policy managers.

5. Update marine ecosystem management policies to sustain healthy fisheries.

Comments from the Chair of NorMER, Nils Chr. Stenseth (excerpt)

We have been through our first full year as a 'Nordic Centre for Research on Marine Ecosystems and Resources under Climate Change' (NorMER), a Nordic Centre of Excellence focusing on training Young Researchers (PhDs and Postdocs) within the topic of how climate change is affecting marine systems – from ecology and evolution, to economics and management. Although our perspective is general, we are focusing on cod *(Gadus morhua)* as our model organism because we believe this will make it easier to integrate the different disciplines involved within NorMER: all NorMER members will have one common marine system over which they can combine and apply their diverse expertise. Having observed the developments during the first year, I feel confident that we are on the right track relative to our ambitions of being a truly Nordic Centre of Excellence. First of all, we have secured good funding. Second, we have established an excellent team of Young Researchers (YR) – both PhDs and Postdocs. Third, there is an excellent interdisciplinary interaction among the YR. Fourth, the 10 core partner nodes work well together to develop a well-integrated virtual centre. Fifth, we are being provided with good feedback from our Centre Advisory Panel (CAP). NorMER is indeed developing into a successful, fully integrated pan-Nordic centre. Already after only one year, we see clearly how NorMER creates a platform for growing a new generation of interdisciplinary Young Researchers with experience in combining physical, biological, social and economic aspects of marine ecosystem science and management. These interdisciplinary Young Researchers are being trained by specialists of various disciplines in a collaborative environment. This is being achieved, in part, through visits lasting for several months at partner institutions. Besides providing PhD students and Postdocs with valuable interdisciplinary training, this shared exchange with scientists from the collaborating institutions in the Nordic countries will contribute to bringing our various scientific groups closer together. In addition, the Young Researchers are organising activities among themselves – activities which will further develop their interdisciplinary training and their scientific collaboration skills. Altogether, this will lead to, I am confident, a stronger Nordic position on leading scientific endeavors both in Europe and globally.

The report can be read in full at normer.org.

5 SCIENTIFIC OUTREACH

An important goal of CEES is to communicate its research and findings, as well as to increase the appreciation and understanding of science. Our aim is to reach both Norwegian and international audiences.

A central part of our scientific outreach is the open seminars with high-profile researchers and communicators of science, held both on the university's campus and at public venues such as Oslo's House of Literature (Litteraturhuset). For the seventh year in a row, the annual events of Darwin Day and the Kristine Bonnevie Lectures on Evolutionary Biology were held, the latter constituting a regular part of the university's annual anniversary day. In 2012, the topic for Darwin Day (13 February) was sexual selection, and featured lectures by Göran Arnqvist, Manfred Milinski, Jane M. Reid, and Stephen M. Shuster. The Kristine Bonnevie Lecture by Cori Bargmann (31 August) focused on "Genes, evolution, and the origins of social behavior", and was preceded by the lecture "Telling the Stories of Science" by science journalist Carl Zimmer.

Carl Zimmer also gave the talk "A Planet of Viruses" at the House of Literature (1 September), and Steven Pinker drew a huge crowd to his lecture on "The better angels of our nature: Why violence has declined" (14 March). We organised Pinker's lecture at the university, together with the Science Library, the Norwegian Academy of Science and Letters, and CSCW – Centre for the Study of Civil War (PRIO).

Our Friday and Extra seminars are also open to the public, although they are more technical and aimed at researchers and students. In 2012, 29 such seminars were held.

The members of CEES are accessible to the media, and are encouraged to contribute their comments on issues of public concern when their expertise is applicable. The press coverage of research conducted at CEES is conveyed through a broad array of both national and international media, including newspapers, magazines, radio, television, and web-based information channels. Several CEES members, though not mentioned here by name, contribute extensively towards communicating their research. The two most media profiled persons in 2012 were Nils Chr. Stenseth and Dag O. Hessen. Together they had more than 200 media appearances, most of them in newspapers and magazines, but they also appeared in other media channels such as TV and radio. Nils Chr. Stenseth's efforts were rewarded in September with the Research Council of Norway's Excellence in Communication of Science Award. Stenseth's focal paper this year was the article "Drought-induced decline in Mediterranean truffle harvest", published in *Nature Climate Change* (Büntgen et al., with Stenseth as the last author). Much of Hessen's media attention revolved around the book he co-authored with Inger Nordal and Thore Lie to celebrate the 100 year anniversary of the first female professor in Norway: "Kristine Bonnevie. Et forskerliv". Two other CEES core members also excelled with a number of media appearances in 2012 – namely, Atle Mysterud and Glenn-Peter Sætre. They enlightened both Norwegian and international readers on a variety of topics, but especially on ungulates/hunting (Atle Mysterud) and evolutionary biology (Glenn-Peter Sætre).

Carl Zimmer at the House of Literature © CEES

Nils Chr. Stenseth receives RCN's Excellence in Communication of Science Award from The Minister of Education and Research, Kristin Halvorsen. To the left is conférencier Petter Schjerven. © CEES

6 GENDER EQUALISING STRATEGY

Gender balance in high-rank academic positions is a priority for both the Research Council of Norway (RCN) and the University of Oslo. CEES has implemented several guidelines to counter the attrition of women at all levels, from Masters students to tenured scientific staff, and all stages in between. Our strategy to attract and keep female scientists is based on optimising the conditions for our female students, and emphasising female role models.

To optimise conditions for female scientists who may temporarily be unable to perform their activities in the lab, UiO funding has been secured for a lab technician designated specifically to assist female scientists. Several female PhD students, postdocs, researchers, and faculty staff have been assisted during 2012: Monica Hongroe Solbakken (PhD student), Anke Stüken (postdoc), Eli Rueness (researcher) and Anne Brysting (associate professor).

Furthermore, we have continued our dedication to awarding scholarships for transitional engagements, enabling female candidates to further their scientific careers. In 2012, nine women received such support from CEES, for periods ranging from 1–12 months. One female with a Master's degree was granted a stipend to qualify for a PhD position (Ane Mari Bjørnæs), one female was granted a stipend in order to finish her PhD degree (Lise Heier), and five females (Barbara Fischer, Adriana Hernandez-Aguilar, Lee Hsiang Liow, Eli Rueness and Yngvild Vindenes) received transitional funding while working on obtaining a researcher or postdoc position. Of the latter group, three have now obtained a postdoc or researcher position at CEES, and one will soon submit a researcher application to the RCN.

Both the CEES Board and the Scientific Advisory Board are chaired by female scientists. The Deputy Chair is female, two of the three Themes are co-chaired by female scientists, and one of the four Colloquia will be chaired by a female scientist. CEES has three female Associate Professor IIs employed in 20% positions (Hege Gundersen, Jorijntje Henderiks, and Hildegunn Viljugrein). These researchers have also been involved in supervising students and have participated in both international and internal scientific meetings and conferences, as well as the CEES journal clubs. Through their many activities at CEES, these female scientists are good motivators and role models for our female (and male) students.

More than 30 females signed up for the CEES "Women only" meeting in September to discuss gender-based challenges with the SAB Chair Rita R. Colwell (right), SAB members Barbara Mable and Anne Magurran, and the Board Chair Reidun Sirevåg. © CEES

7 AWARDS AND HONOURS

Lauren Rogers

was awarded a Burgen Scholarship. The award was presented at the Academia Europaea Annual Conference in Bergen, Norway. These awards are given to early stage scholars at the post-doctoral level who show great potential in their respective fields. Candidates for this award were nominated by the Norwegian members of the Academia Europaea, and selected by a panel of scholars. The Burgen Scholarship award covers all costs of attending the Academia Europaea Annual Conference (held in Bergen, Sept. 2012).

Barbara Fischer

received The Golden PEG Award 2011 from the University of Lund. The award is handed out by the Theoretical Population Ecology and Evolution Group at the University of Lund, Sweden. There are two categories of this award: one for young scientists, one for senior scientists. Barbara received the 'Rookie of the Year' award for her PhD thesis entitled 'Evolution of Plastic Life-Histories' and for the subsequent publications from her thesis.

Halvor Knutsen

received the best publication award by the Institute of Marine Research (IMR, Norway) for the article «Are low but statistically significant levels of genetic differentiation in marine fishes 'biologically meaningful'? A case study of coastal Atlantic cod» (Knutsen *et al.*, *Molecular Ecology* (2011), 20 (4), 768–783).

Halvor Knutsen (to the right) and IMR Research director Einar Svendsen. © Kjartan Mæstad/imr.no.

Nils Chr. Stenseth

was awarded the Research Council of Norway's Excellence in Communication of Science Award. The Award was handed out by The Minister of Education and Research, Kristin Halvorsen, at the Research Council annual Evening of Excellence (*Forskningens festaften*) 19 September. Stenseth was also re-elected to the alternating position of Vice President/President of the Norwegian Academy of Science and Letters (6 December). The two year term involves one year as Vice President and a year as President. Having served in 2012 as President, he will move to the Vice President position for 2013. In 2014 Stenseth will return to the position as President of the Academy.

8 EXPERIMENTAL FACILITIES

CEES manages dedicated labs for DNA/RNA isolation, separate PCR facilities, and post PCR and Sanger DNA sequencing laboratories (such as the ABI lab).

The CEES DNA lab is a molecular research core facility and is fully equipped for DNA and RNA extraction from various types of bacteria, protists, algae, fungi, and animal and plant tissues (including blood, faeces, and ancient DNA). It contains all the basic instrumentation of a modern molecular biology laboratory, including equipment for gene cloning, genomic libraries, real-time PCR, DNA/RNA quantification, and chip-based analysis of DNA, RNA, and protein. The annual turnover of the CEES DNA lab was 397 000 NOK in 2012, and 60 researchers used the lab. The CEES DNA lab is open to users from the Department of Biology, and is at present actively used by CEES and the Microbial Evolution Research Group (MERG).

The ABI lab is a DNA sequencing core facility shared between the Department of Biology and the Department of Molecular Biosciences. The lab is situated at CEES and functions as a sequencing service lab (Sanger sequencing) for all research groups at the Department of Biosciences, as well as other institutes at UiO, within Norway, and abroad. The ABI-service lab has operated since July 2005.

The ABI lab is a fully equipped laboratory with two ABI PRISM® 3730 Genetic Analysers, each with 48 capillaries and providing DNA sequencing and fragment analysis. The ABI lab implemented automated dye-terminator removal protocol in 2009, based on paramagnetic beads and a Biomek® 3000 Laboratory Automation Workstation. We also have ten different PCR-machines, shared by the CEES lab, including three Eppendorf master cycler ep gradient S and a MJ Research Tetrad PTC-225 Thermo Cycler. The annual turnover of the ABI-service lab exceeded 1 MNOK in 2012, and approximately 28 000 samples were sequenced.

Facilities provided by external parties

Facilities provided to CEES members by external parties include the Alpine Research Centre at Finse, the Biological Research Station at Drøbak, the Flødevigen Research Station, the Landscape Ecology Field Station of Evenstad, the University of Oslo research vessels, the Aquarium and animal facilities, the Phytotron, and the Bioportal.

8 EXPERIMENTAL FACILITIES

NORWEGIAN SEQUENCING CENTRE

The Norwegian Sequencing Centre (NSC) has two equal partners (two nodes): the Centre for Ecological and Evolutionary Synthesis (CEES) at the Department of Biosciences at the University of Oslo, and the Department of Medical Genetics (DMG) at Oslo University Hospital and the University of Oslo.

NSC provides services within all different applications of deep sequencing technology, e.g. *de novo* sequencing, exome sequencing, sequencing of ancient DNA and other degraded DNA samples, as well as transcriptome-, miRNA-, amplicon-, bisulphite- and chromatin immunoprecipitation (ChIP)-sequencing. Services include project advice, sample preparation, and running the sequencing reactions on our DNA sequencers. In addition, we provide a limited amount of "generic" bioinformatics services. For more advanced projects, users of specific bioinformatics services are referred to core facilities in bioinformatics, or to research collaborations when appropriate. Projects are handled on a "first come – first served" basis. Submission of projects is handled through our website (sequencing.uio.no) where there is one mailbox covering both nodes to help assure that the optimal technology is applied for each project type.

Funding of NSC through the INFRAstructure programme (RCN), as well as UiO's programme for advanced scientific equipment (AVIT), has made it possible to keep up with the very rapid development within high throughput sequencing (HTS), for example by implementing new instruments and technologies (e.g. PacBio RS, Ion Torrent PGM and Ion Proton). At present, we have the following instruments that represent the major sequencing technologies available: 2 x Roche 454 (GS-FLX), 1 x Illumina HiSeq 2000, 1 x Illumina HiSeq 2500, 2 x Illumina MiSeq, 1 x Pacific Biosciences RS, 1 x Ion Torrent PGM, and 1 x Ion Proton. The HiSeq instruments are the workhorses with large sequencing capacities, while the MiSeq and the PGM are well suited for smaller sequencing projects and have the benefit of faster turn-around times. In addition, the NSC has a multitude of automation equipment (such as Hamilton, Beckmann Biomek FXs, Beckmann SpriWorks and Pippin Prep).

In 2012, a total of about 1500 different samples have been run at NSC, altogether representing samples from more than 100 research groups, mostly from Norway, but also from several other European countries (see the figure for more information). A bulk part of the total samples has been run on the Illumina platform (HiSeq/MiSeq), however there is still a high demand for 454-sequencing – and so for the time being it is the best option for amplicon sequencing of PCR products longer than 200-300 bp. A key advantage is that we can provide users with the full range of different applications at our Centre. Overall, the number of users of NSC services is steadily growing.

The HTS technology development is moving ahead quickly, and we have carried out several important upgrades on our different instruments. Such upgrades are crucial for continuously providing "state-of-the-art" service. In that respect, one of the two 454 sequencers has been upgraded to provide extra long reads (750 bp – 1000 bp). Further, there have been multiple upgrades of the PacBio RS technology since we first purchased the instrument, i.e. both with regards to the instrument and chemicals/kits – resulting in longer reads (mean ~3-3.8 kb and up to 25 kb). An important factor for a successful implementation of the PacBio technology has been ongoing in-house projects, such as sequencing the Atlantic cod genome with PacBio (to 10x coverage) – with the aim of improving the assembly statistics. This has given valuable hands-on-experience with the PacBio technology and bioinformatics analyses of such data.

Outreach: As an annual event we arrange a one day seminar entitled "High-throughput Sequencing – Applications and Analyses", and invite international high profile lecturers within the field of deep sequencing. This year's event took place on the 6th of December. Further, we have been involved in organising two courses held here at UiO in collaboration with the Computational Life Science initiative (CLSi), the FUGE Bioinformatics platform and the Norwegian Genomics Consortium. For more information please see: sequencing.uio.no/news.

Summarised by Sissel Jentoft and Kjetill S. Jakobsen.

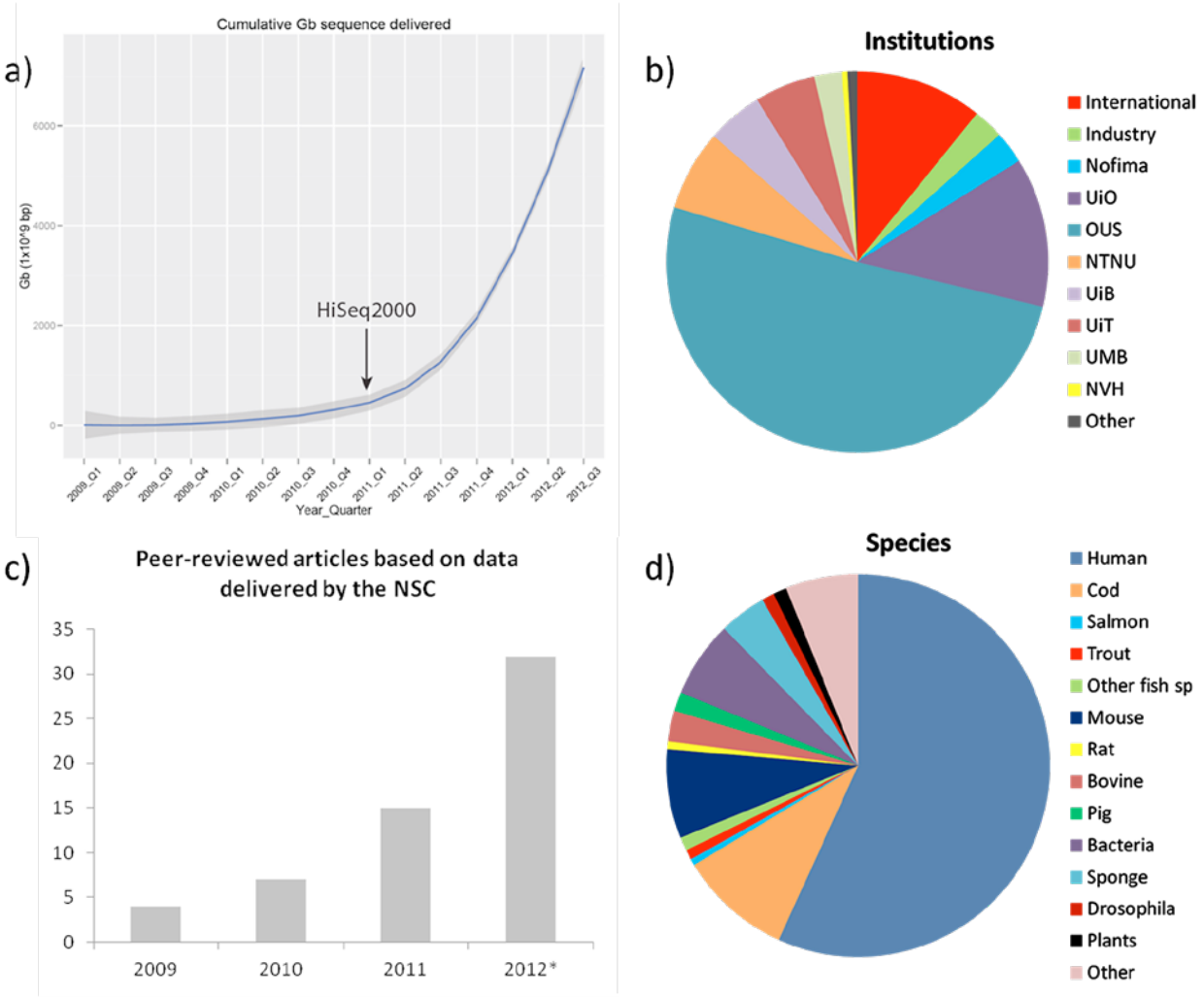


Figure: Overview of sequencing activities at NSC. *a) Cumulative gigabases of sequence produced per quarter, b) Distribution of institutional background of users (samples): UiO = University of Oslo, OUS = Oslo University Hospital, NTNU = Norwegian University of Science and Technology, UiB = University of Bergen, UiT = University of Tromsø, UMB = Norwegian University of Life Sciences, NVH= Norwegian Veterinary Institute. c) Yearly number of peer-reviewed articles based on data delivered by the NSC. d) Distribution of species (samples) sequenced.*

9 COMPUTATIONAL AND BIOINFORMATIC RESOURCES

Bioinformatics is growing at CEES. An increasing number of researchers are generating large 'digital' datasets that need to be analysed using sophisticated bioinformatics tools.

Infrastructure
At CEES, we use a combination of self-owned servers, and CPU hours we applied for on the UiO supercomputer 'Abel' (previously called 'Titan'). This maximises flexibility for CEES researchers in choosing the right resource for their project. Memory-intensive applications can be run on our own servers, while CPU-intensive applications can be submitted to Abel and therefore do not take up valuable time on the servers. The servers CEES owns (see below) are attached to the Abel system. This means users can seamlessly access the same programmes and disks on the self-owned servers, as well as on Abel. For storage ('project disk space') we rent space from the University Center for Information Technology (USIT) (attached to Abel) at UiO, rather than buy and administer our own.

Hardware
Starting with the project to sequence and assemble the genome of Atlantic cod in 2009, CEES has invested in its own hardware for computation. These servers are hosted and maintained by the High Performance Computing (HPC) group of USIT. The following computational infrastructure is available to CEES: (i) two servers with 24 CPUs and 128 GB of RAM, and around 1 TB disk space; (ii) two high-memory servers with 64 CPUs and 512 GB of RAM, and around 24 TB disk space each. On the university computer cluster Abel, we have allocations for CPU-intensive computations totalling more than 2.5 million CPU hours. CEES bioinformaticians use 15 TB of project disk space with another 10 TB disk space for long-term archival of data at Norstore, the national Norwegian infrastructure for archiving of digital scientific data.

Organisation
The bioinformaticians are organised through a mailing list and occasionally meet to discuss common interests or papers. There is a wiki containing a growing number of articles dealing with the practicalities of using the resources at CEES, tips and tricks, etc. Although the day-to-day administration of the servers and disk space is the responsibility of USIT, there is still a considerable overhead for CEES staff. Aspects of this include applying for, and reporting on the use of, CPU hours on Abel; correspondence with USIT on required software and interruptions of the servers; feedback to CEES users; administration of the user base, mailing lists, and instructing new users.

Help desk
In the spring of 2011, a CEES help-desk on molecular methods and bioinformatic data analysis was initiated, and at the end of the year consisted of two people with backgrounds in bioinformatics, as well as one person specialising in molecular wet-lab issues. So, from January 2012 the CEES help-desk has been fully operational and available to all CEES members. The help desk has so far contributed to one published paper (Westengen *et al. Plos ONE* 2012).

Projects
Examples of projects requiring large computational resources and large amounts of disk space are: (i) eukaryote genome sequencing projects; (ii) the RAD-seq platform at CEES (SNP detection and genotyping by sequencing); (iii) transcriptomics analysis pipelines for species with a draft reference genome.

Courses
Continuing the success of previous courses (Unix and perl), the following two internal courses were organised in 2012: (i) an introductory course in using the Unix command line for CEES researchers; (ii) a course in python programming. Furthermore, on initiative from CEES bioinformaticians, Software Carpentry (software-carpentry.org) gave a so-called Bootcamp at UiO (September 2012).

Summarised by Alexander Nederbragt

Further Reading:
Westengen, O. T., **Berg, P. R.**, Kent, M. P., **Brysting, A. K.** (2012) Spatial structure and climatic adaptation in African maize revealed by surveying SNP diversity in relation to global breeding and landrace panels. *PLoS ONE*, 7 (10). doi:10.1371/journal.pone.0047832.

Kjetill S. Jakobsen in front of The Pacific Biosciences RS, source of new sequencing data to be analysed using HPC resources.

10 FINANCES

Accounting principles

CEES funding is derived primarily from RCN sources (approximately 12 MNOK in core funding per year), supplemented by funds from UiO (2 MNOK per year plus funding for several positions), and other sources defined as own funding. Our own funding can be divided into the sub categories: funding from RCN projects; funding from international projects; funding from other public sector based projects, and private sector based projects.

Expenditures are sub-categorised into salary costs, indirect costs, equipment, travel and representation, R&D services, and other expenses (composed mainly of operational expenses for laboratory and fieldwork).

In addition to revenues and expenditures that are accounted for, we also have those that are not accounted for. These are mainly defined as the expenditures of those personnel that work within CEES, but receive their salaries from other parties. The value of these services is calculated using official UiO budgeting procedures.

In this report we present the accounting figures for 2012, and the budget for 2013.

Plains zebra at the Okaukuejo Waterhole, Etosha National Park © Yathin Krishnappa

Revenues and expenditures 2012/Budgeted revenues and expenditures 2013

Total funding			Accounted revenues		Revenues not in account
	2012	Budget 2013	Figures 2012	Budgeted figures 2013	Revenues not in account 2012[1]
RCN-CoE	11 657	11 100	11 657	11 100	
UiO	29 016	8 120	9 625	8 120	19 391
RCN – CEES related projects	29 448	39 287	29 448	39 287	
Other public sector based projects	6 836	5 555	6 836	5 555	
International funding	41 493	13 240	13 933	13 240	27 560
Private sector based projects	885	935	885	935	
Transferred revenues	11 395	10 660	11 395	10 660	
Total funding	***130 732***	***88 897***	***83 781***	***88 897***	***46 951***

Accounted expenses 2012 (Acc 12)/Budgeted expenses 2013 (Bud 13)

	Total		RCN-CoE		UiO		RCN projects		Other public sector based pro.		International funding		Private sector based projects	
	Acc 12	Bud 13	Acc 12	Bud 13	Acc 12	Bud 13	Acc 12	Bud 13	Acc 12	Bud 12	Acc 12	Bud 13	Acc 12	Bud 13
Salary expenses	38 627	43 016	9 511	8 288	5 411	5 300	12 439	19 577	4 732	3 583	5 947	5 789	587	479
Indirect costs	11 125	10 388	1 378	1 160	1 024	1 271	5 391	5 387	1 533	1 357	1 501	1 016	298	197
R&D services	4 449	10 828					4 449					10 828		
Equipment	7 654	0	13		34		7 583		12				13	
Running costs	10 008	17 119	598	1 401	1 544	3 312	5 774	10 307	925	1 125	1 156	952	12	22
Travel and representation[2]	1 258	0	410		848									
Total	***73 121***	***81 352***	***11 910***	***10 849***	***8 861***	***9 884***	***35 636***	***35 271***	***7 202***	***6 065***	***8 604***	***18 585***	***910***	***698***

Expenses not in account 2012 (Nacc 12)

	Nacc 12	Bud 13	Nacc 12	Bud 13	Nacc 12	Bud 13	Nacc 12	Bud 13	Nacc 12	Bud 13	Nacc 12	Bud 13	Nacc 12	Bud 13
Salary expenses	30 510				11 541						18 969			
Indirect costs	16 441				7 850						8 592			
Total[3]	***46 951***				***19 391***						***27 561***			

Balance 2012/Budgeted balance 2013

	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013
Revenues	119 336	78 237	11 657	11 100	29 016	8 120	29 448	39 287	6 836	5 555	41 493	13 240	885	935
Transf. revenues	11 395	10 660	30	-223	999	1 764	5 476	-711	1 330	965	3 553	8 882	7	-18
Total expenses	120 072	81 352	11 910	10 849	28 251	9 884	35 636	35 271	7 202	6 065	36 165	18 585	910	698
Balance	***10 660***	***7 544***	***-223***	***29***	***1 764***	***0***	***-711***	***3 305***	***965***	***455***	***8 882***	***3 537***	***-18***	***219***

All figures are given in 1000 NOK.
1) Not posted revenues for 2012. These are mainly defined as the efforts of those personnel that work within CEES, but receive their salaries from other parties
2) Travel and representation is included in running costs for all funding sources except RCN-COE and UiO
3) Not posted expenditures for 2012

11 APPENDICES

CEES-members

Core scientific staff

Name	Nationality	Position	Period	Funding 2012	CEES share (%)
Brysting, Anne K.	Norway	Assoc. Professor	Oct. 2007–	UiO-Bio	75
Grimholt, Unni	Norway	Researcher	Oct. 2007–Mar. 2013	RCN	100
Hansen, Thomas F.	Norway	Professor	Oct. 2007–	UiO-Bio	75
Hessen, Dag O.	Norway	Professor	Oct. 2007–	UiO-Bio	75
Hjort, Nils L.	Norway	Professor	Oct. 2007–	UiO-Math	25
Jakobsen, Kjetill S.	Norway	Professor	Oct. 2007–	UiO-Bio	75
Lampe, Helene M.	Norway	Professor	Oct. 2007–	UiO-Bio	75
Mysterud, Atle	Norway	Professor	Oct. 2007–	UiO-Bio	75
Nesbø, Camilla L.	Norway	Researcher	Oct. 2007–	Univ of Alberta/RCN	83
Omholt, Stig	Norway	KB Professor	Sep. 2010–Aug. 2012	UMB/RCN-CoE, CIGENE	33
Ottersen, Geir	Norway	Senior Scientist	Oct. 2007–	IMR	25
Schweder, Tore	Norway	Professor	Oct. 2007–Jan. 2013	UiO-Econ	65
Slagsvold, Tore	Norway	Professor	Oct. 2007–	UiO-Bio	75
Stenseth, Nils Chr.	Norway	Professor, CEES Chair	Oct. 2007–	RCN-CoE	100
Storvik, Geir	Norway	Professor	Oct. 2007–	UiO-Math	38
Sætre, Glenn-Peter	Norway	Professor	Oct. 2007–	UiO-Bio	75
Viljugrein, Hildegunn	Norway	Researcher	Oct. 2007–Feb. 2014	UiO-Bio	20
Vøllestad, L. Asbjørn	Norway	Professor	Oct. 2007–	UiO-Bio	75

Postdocs and Researchers

Name	Nationality	Position	Period	Funding 2012	CEES share (%)
Bailey, Richard Ian	United Kingdom	Postdoc res. fellow	Aug. 2011–Aug. 2014	RCN	100
Boessenkool, Sanne	The Netherlands	Researcher	Dec. 2012–Nov. 2014	RCN	100
Cadahia, Luis	Spain	Postdoc res. fellow	May 2011–Apr. 2013	EU-MC*	100
de Muinck, Eric	USA	Researcher	Feb. 2012–Jun. 2012 Jul. 2012–Aug. 2012	RCN-CoE	40 100
Diekert, Florian K.	Germany	Postdoc res. fellow	Oct. 2011–Oct. 2015	Nordforsk	100
Durant, Joel Marcel	France	Researcher	Oct. 2007–Dec. 2014	RCN	100
Easterday, William Ryan	USA	Postdoc res. fellow	Jan. 2012–Dec. 2014	RCN-CoE, UiO-Bio	100
Eikeset, Anne Maria	Norway	Postdoc res. fellow	Aug. 2010–Jul. 2013	RCN	100
Falk-Petersen, Jannike	Norway	Researcher	Nov. 2012–Feb. 2013	UiO-Bio	100
Fischer, Barbara	Austria	Researcher	Oct. 2010–Mar. 2015	RCN-CoE, UiO-Bio	100
Gautestad, Arild Olsen	Norway	Researcher	Jan. 2011–Dec. 2012	RCN-CoE	20
Gerecht, Andrea Cornelia	Germany	Postdoc res. fellow	Jan. 2011–Dec. 2013	RCN	100
Gundersen, Hege	Norway	Researcher	Dec. 2008–Apr. 2013	RCN-CoE	20
Haverkamp, Thomas H.A.	The Netherlands	Postdoc res. fellow	Jun. 2012–Jun. 2014	RCN	100
Hedfors, Ida	Norway	Postdoc res. fellow	Jan. 2010–Aug. 2012	RCN	100
Henderiks, Jorijntje	The Netherlands	Researcher	Jun. 2010–Dec. 2013	RCN-CoE	20
Hernandez-Aguilar, Raquel Adriana	Mexico	Researcher	Mar. 2011–Dec. 2012	RCN-CoE	10
Hjermann, Dag Ø.	Norway	Researcher	Oct. 2007–Aug. 2013 Jan. 2015–Dec. 2015	RCN-CoE	100 30
Holen, Øistein H.	Norway	Researcher	Oct. 2007–Dec. 2013	RCN-CoE	100
Hutchings, Jeffrey	Canada	Researcher	Sep. 2010–Dec. 2015	RCN-CoE	20
Jorde, Per Erik	Norway	Researcher	Oct. 2007–Dec. 2014	RCN-IMR	50
Kausrud, Kyrre	Norway	Researcher	Jul. 2010–Mar. 2013	RCN-CoE	40
Kjesbu, Olav Sigurd	Norway	Researcher	Sep. 2012–Aug. 2015	Nordforsk	20
Knudsen, Endre	Norway	Postdoc res. fellow	May 2011–May 2014	RCN	100
Knutsen, Halvor	Norway	Researcher	Oct. 2007–Dec. 2015	RCN	20

Labra, Antonieta	Chile	Postdoc res. fellow	Aug. 2009–Jan. 2014	RCN-CoE	100
Lagesen, Karin	Norway	Postdoc res. fellow	Feb. 2010–Feb. 2013	RCN-CoE	100
Langangen, Øystein	Norway	Researcher	Sep. 2010–Aug. 2013	RCN-Akvaplan-NIVA AS	100
Linden, Torsten A.	Sweden	Postdoc res. fellow	Apr. 2012–Mar. 2014	MC*	100
Liow, Lee Hsiang	Singapore	Researcher	Oct. 2007–Dec. 2013	RCN-CoE, RCN	100
Martinsen, Lene	Norway	Postdoc res. fellow	Oct. 2007–Jun. 2014	RCN	100
Nederbragt, Alexander	The Netherlands	Researcher	Oct. 2007–Dec. 2013	RCN	100
Nielsen, Anders	Norway	Postdoc res. fellow	Jul. 2009–Jun. 2012	RCN	100
Nilsson, Anna	Sweden	Postdoc res. fellow	Mar. 2010–May 2013	RCN	100
Ohlberger, Jan	Germany	Postdoc res. fellow	Apr. 2009–Jul. 2012 Aug. 2012– Dec. 2013	RCN, VISTA	100
Olsen, Esben Moland	Norway	Researcher	Oct. 2010-Dec. 2015	RCN	20
Reitan, Trond	Norway	Postdoc res. fellow	Feb. 2009–May 2012	RCN-CoE	100
Richter, Andries Peter	Germany	Postdoc res. fellow	Mar. 2010–Apr. 2013	RCN-CoE, EU- MC*	100
Rogers, Lauren	USA	Postdoc res. fellow	Aug. 2011–Jul. 2015	Nordforsk	100
Rounge, Trine B.	Norway	Postdoc res. fellow	Aug. 2008–Apr. 2012	RCN	100
Rueness, Eli Knispel	Norway	Researcher	Oct. 2007–Jun. 2006	RCN-CoE	45
Salzburger, Walter	Austria	Researcher	Sep. 2012–Aug. 2015	RCN-CoE	20
Schmid, Boris	The Netherlands	Postdoc res. fellow	Jan. 2012–Mar. 2014	MC*	100
Star, Bastiaan	The Netherlands	Postdoc res. fellow	Sep. 2008–Aug. 2013	RCN	100
Stige, Leif Chr.	Norway	Researcher	Oct. 2007–Aug. 2013	RCN	100
Svennungsen, Thomas O.	Norway	Postdoc res. fellow	Aug. 2011–Aug. 2013	RCN-CoE	100
Sæther, Stein Are	Norway	Researcher	Oct. 2007–Nov. 2012	RCN, CoE	100
Trosvik, Pål	Norway	Postdoc res. fellow/ Researcher	Oct. 2008–Mar. 2012	UiO-Bio, RCN	100
Trucchi, Emiliano	Italy	Postdoc res. fellow	Feb. 2011–Jan. 2015	EU-MC*	100
Vindenes, Yngvild	Norway	Researcher	Apr. 2011–Dec. 2013	RCN-CoE	100
Whittington, Jason	USA	Researcher	Jan. 2010–Dec. 2015	RCN, Nordforsk	100
Wojewodzic, Marcin	Poland	Researcher	Oct. 2007–Mar. 2013	RCN	100
Østbye, Kjartan	Norway	Researcher	Mar. 2011–May 2014	RCN	50

** Marie Curie Individual Fellowship*

PhD students

Name	Nationality	Position	Period	Funding 2012	CEES share (%)
Atickem, Anagaw Meshesha	Ethiopia	Research fellow	Oct. 2008–Aug. 2012	Quota Scheme, RCN-CoE	100
Baalsrud, Helle	Norway	Research fellow	Sep. 2012-Aug. 2016	UiO-Bio	100
Berg, Paul Ragnar	Norway	Research fellow	Oct. 2010–Sep. 2014	UiO-Bio	100
Elgvin, Tore Oldeide	Norway	Research fellow	Jul. 2011–Jun. 2014	RCN	100
Heier, Lise	Norway	Research fellow	Oct. 2007–	None	
Helberg, Morten	Norway	Research fellow	Sep. 2010–Aug. 2013	RCN	100
Hermansen, Jo Skeie	Norway	Research fellow	May 2011–Apr. 2014	UiO (MLS)	100
Husek, Jan	Czech Rep.	Research fellow	Oct. 2008–Sep. 2012	UiO-Bio	75
Jalal, Marwa	Norway	Research fellow	Sep. 2010–Aug. 2013	RCN	100
Kassie, Addisu Mekonnen	Ethiopia	Research fellow	Aug. 2011–Jul. 2014	Quota Scheme	100
Kvile, Kritina	Norway	Research fellow	Aug. 2012–Jul. 2015	Nordforsk	100
Liljegren, Mikkel M.	Norway	Research fellow	Oct. 2012–Sep. 2015	RCN	100
Malmstrøm, Martin	Norway	Research fellow	Jan. 2009–Dec. 2012	UiO, EMBIO	75
Mazzarella, Anna Virginia B.	USA	Research fellow	Nov. 2010–Nov. 2013	RCN	100
Mewicha, Berihun G.	Ethiopia	Research fellow	May 2009–Dec. 2013	Quota Scheme	100
Moe, Therese Fosholt	Norway	Research fellow	Aug. 2007–Mar. 2012	RCN	100
Orr, Russell	Norway	Research fellow	Feb. 2007–Jan. 2013	UiO-Bio	100
Qviller, Lars	Norway	Research fellow	Sep. 2010–Aug. 2014	UiO-Bio	75
Rivrud, Inger Maren	Norway	Research fellow	Sep. 2008–Feb. 2013	UiO-Bio	75
Romagnoni, Giovanni	Italy	Research fellow	Sep. 2011–Aug. 2015	Nordforsk	100
Siddiqui, Huma	Norway	Research fellow	Oct. 2007–	None	
Solbakken, Monica H.	Norway	Research fellow	Jun. 2010–May 2014	RCN	100
Taugbøl, Annette	Norway	Research fellow	Oct. 2008–Sep. 2012	UiO-Bio	75
Trier, Cassandra	Norway	Research fellow	Oct. 2012-Sep. 2016	UiO-Bio	100
Tørresen, Ole Kristian	Norway	Research fellow	Sept. 2011–Aug. 2015	UiO-Bio	75
Voje, Kjetil Lysne	Norway	Research fellow	Aug. 2008–Dec. 2012	RCN-CoE	75
Westengen, Ola	Norway	Research fellow	Sep. 2008–Aug. 2012	UiO-SUM	50
Stanley, Sarah	Ireland	Research fellow	Aug. 2012–Oct. 2012	RCN	100

Research Assistants

Name	Nationality	Position	Period	Funding 2012	CEES share (%)
Bass, Arthur	USA	Research Assistant	May 2011–	RCN	50
Birkeland, Siri	Norway	Research Assistant	Short term	RCN-CoE	
Bjørnæs, Ane Mari	Norway	Research Assistant	Dec. 2012–Mar. 2013	RCN-CoE	100
Blix, Anna	Norway	Research Assistant	Short term	RCN	
Bleka, Øyvind	Norway	Research Assistant	Short term	RCN	
Bårdsdatter, Helga	Norway	Research Assistant	Short term	RCN	
Dahlberg, Barbro Kristina	Norway	Research Assistant	Short term	RCN	
Hegdal, Håvard	Norway	Research Assistant	Jan. 2012–Mar. 2012	RCN-CoE	50
Heier, Lise	Norway	Research Assistant	Jan. 2012–Jan. 2012	RCN-CoE	100
Hope, David	Canada	Research Assistant	Apr. 2012–Aug.2012	ISEC2012	100
Krishnappa, Yathin Shivanappa	India	Research Assistant	Sep. 2012–Apr. 2013	RCN-CoE	50
Meshesha, Anagaw Atickem	Ethiopia	Research Assistant	Aug. 2012–Dec. 2012	RCN-CoE	80
Paziewska, Anna	Norway	Research Assistant	Short term	RCN-CoE	
Vladyslava, Hostyeva	Ukraine	Research Assistant	Jan. 2012–Jan. 2013	RCN	15

Administrative and technical support staff

Name	Nationality	Position	Period	Funding 2012	CEES share (%)
Bakke, Hege Gilbø	Norway	Staff Engineer	Jan. 2008–Dec. 2013	RCN	100
Gaup, Hege Junita	Norway	Senior Engineer	Jun. 2008–May 2012	UiO	100
Gundersen, Gry	Norway	Adviser	Oct. 2007–	UiO-Bio	100
Herland, Anders	Norway	Staff Engineer	Jan. 2008–	UiO-Bio	100
Hope, David	Canada	Executive Officer	Aug. 2012–Dec. 2012	RCN-CoE	100
Jentoft, Sissel	Norway	Senior Adviser	Jun. 2009–Aug. 2014	RCN-CoE, RCN	100
Nerli, Emelita	Norway	Senior Engineer	Oct. 2007–	UiO-Bio	50
Rygg, Kari Beate	Norway	Adviser	May 2008–	UiO-Bio	100
Siddiqui, Huma	Norway	Senior Engineer	Jul. 2011–May 2012	UiO	50
Skage, Morten	Norway	Senior Engineer	May 2008–Apr. 2014	UiO-Bio	100
Steen, Nanna Winger	Norway	Staff Engineer	Oct. 2007–	UiO-Bio	100
Thomsen, Camilla Signe	Denmark	Executive Officer	Nov. 2012–Nov. 2014	RCN-CoE	100
Tooming-Klunderud, Ave	Norway	Senior Engineer	Feb. 2011–Jan. 2014	UiO-Bio	100
Tømta, Camilla Maria	Norway	Higher Executive Officer	Oct. 2010–May 2012	UiO-Bio	100
Wallem, Tore	Norway	Adviser	Dec. 2007–	RCN-CoE	100
Hansen, Marianne Heléne Selander	Norway	Senior Adviser	Jan. 2012–Dec. 2012	RCN, UiO-Bio	100

Guests of CEES in 2012

Longer research visits (more than one month)

Name	Nationality	Home institution	Period
Burnett, Nicholas	USA	University of California	Mar.–May 2012
Carim, Kellie	USA	University of Montana	Sep.–Dec. 2012
Catarino, Diana	Portugal	University of the Azores	Feb.–Apr. 2012
Crawford, Jeremy Chase	USA	University of California-Berkeley	Jun.–Dec. 2012
de Muinck, Eric	USA	The Norwegian Institute of Health	Oct.–Dec. 2012
Eroukhmanoff, Fabrice	French	University of Lund	Jan.–Dec. 2012
Evakow, Ann	Germany		Oct.–Dec. 2012
Ezcurra, Myriam	Spain	University of Granada	Feb.–Sep. 2012
Feng, Jianfeng	China	Nankai University	Feb. 2012–Jan. 2013
Govindoorazoo, Morghan	France	University of Paris-Est Créteil	Apr.–Jun. 2012
Jeppsson, Tobias	Sweden	SLU-Swedish University of Agricultural Sciences	Feb.–Dec. 2012
Junge, Claudia	Germany	University of Oslo-CEES	Nov.–Dec. 2012
Lambert, Elliott	France	University of Joseph Fourier	Jan.–May 2012
MacNeill, Keeley	USA	University of Nebraska	Aug.–Jun. 2012
Nielsen, Anders	Norway	University of Life Sciences	Jul. 2012–Jun. 2013
Ohlberger, Jan	Germany	VISTA	Jul. 2012–Jul. 2014
Ottesen, Vibeke	Norway	University of Oslo	Jun. 2012–Jun. 2013
Pettersen, Ruben	Norway	University of Oslo-CEES	Jan. 2011–Dec. 2012
Reygondeau, Gabriel	France	Centre de recherches Halieutique (CRH) in Sète and Laboratoire océanographique de Villefranche sur mer (LOV)	Sep.–Oct. 2012
Roa, Archana M.	India	The University Centre in Svalbard	Aug. 2011–Dec. 2012
Roost, Jan Vander	Belgium	University of Bergen	Feb.–Jun. 2012
Solvin, Thomas	Norway	University of Oslo-CEES	Jan.–Jun. 2012
Traba, Amada Perez	Spain	University of Perpignan Via Domitia	Nov. 2011–Nov. 2013
Tran, Tri-Tinh	USA	University of California-Berkeley	May 2012–Jul. 2012
Turner, Wendy	USA	University of California-Berkeley	Jan. 2012–Nov. 2013
Wiebe, Karen L.	Canada	University of Saskatchewan	Mar.–Apr. 2012
Xi, Xiao	China	Zheijang University	Aug. 2011–Aug. 2012

Short term guests (more than one week, less than one month)

Name	Nationality	Home institution	Period
Blackburn, Jason K.	USA	University of Florida	Nov.–Dec. 2012
Blenckner, Thorsten	Sweden	University of Stockholm-SRC	Jun. 2012
Bradbury, Ian	Canada	University of Newfoundland	Jun. 2012
Brown, Charles Titus	USA	Michigan State University	Dec. 2012
Colwell, Rita	USA	University of Maryland/ Johns Hopkins University	Aug.–Sep. 2012
Dalpadado, Padmini	Norway	Institute of Marine Research	Nov. 2012
Edeline, Eric	France	University Paris 6	May 2012
Gavrilets, Sergey	USA	University of Tennessee	Oct.–Nov. 2012
Getz, Wayne	USA	University of California-Berkeley	Nov.–Dec. 2012
Gray, Sienna	United Kingdom	University of Strathclyde	Nov.–Dec. 2012
Hanel, Reinhold	Germany	GEOMAR – Evolutionary Ecology of Marine Fishes, Hamburg	Jun. 2012
Hart, Jane K	United Kingdom	University of Southampton	Aug. 2012
Hutchings, Jeffrey	Canada	Dalhousie University	Jun. 2012 Aug.–Sep. 2012
Kwiatkowski, Marek	Switzerland	University of Neuchâtel	Jun. 2012
Le Rouzic, Arnaud	France	Institut de recherche pour le developpement	Jun.–Jul. 2012
Llope, Marcos	Spain	The Spanish Institute of Oceanography, Puerto Pes	Jun. 2012
Magurran, Anne	United Kingdom	University of St. Andrew	Sep. 2012
Meller, Kalle	Finland	University of Helsinki	Oct.–Nov. 2012
Orians, Gordon H.	USA	University of Washington	Sep. 2012
Otero Villar, Jaime	Spain	Instituto de investigaciones Marinas	May–Jun. 2012
Postlethwait, John	USA	University of Oregon	Dec. 2012
Rebernig, Carolin Anna	Austria	University of Vienna	Feb. 2012
Roth, Olivia	Germany	GEOMAR – Helmholtz-Zentrum für Ozeanforschung, Kiel	Jun. 2012
Shuster, Stephen Milbourn	USA	University of California-Berkeley	Feb. 2012
Supraha, Luka	Croatia	University of Uppsala	Nov. 2012

Research projects

RCN projects

Name	Project leader	Funding	Start	End
Statistical tools for studying genetic architecture	Hansen, Thomas F.	RCN	2007	2012
Phytoplankton size: Climate adaption and long-term evolution	Henderiks, Jorijntje	RCN	2010	2013
Genome size, cell size and growth, searching for the casual links	Hessen, Dag O.	RCN	2010	2013
Spatiotemporal variability in mortality and growth of fish larvae in the Lofoten-Barents Sea ecosystem	Hjermann, Dag Ø.	RCN	2010	2013
Ultra-high throughput sequencing platform	Jakobsen, Kjetill S.	RCN	2007	2012
Translating the cod genome for aquaculture	Jakobsen, Kjetill S.	RCN	2010	2014
Norwegian High-Throughput Sequencing Centre	Jakobsen, Kjetill S.	RCN	2010	2013
Genetic architecture in Drosophila-The role of the Y chromosome in gene expression across the genome	Martinsen, Lene	RCN	2011	2014
Land: Long-term ecological effects of sheep grazing in alpine ecosystems and its integration with management.	Mysterud, Atle	RCN	2008	2012
The ecology and economy of sheep production under climate change	Mysterud, Atle	RCN	2009	2012
LAND: Partial migration of red deer and tick distribution at the altitudinal colonization border (TickDeer)	Mysterud, Atle	RCN	2011	2014
Biogeographic and population analyses of Thermotogales bacteria from hydrocarbon-rich environments	Nesbø, Camilla	RCN	2008	2015
Functional genomics of phenotype plasticity of cod: a national consortium - GENOFISK	Stenseth, Nils Chr.	RCN	2007	2012
Match-mismatching of trophic levels as a structuring force of ecosystems	Stenseth, Nils Chr.	RCN	2008	2012
Flexibility and constraints in animal movement pattern: ecology, evolution and annual cycles	Stenseth, Nils Chr.	RCN	2010	2014
Fisheries induced evolution in Atlantic cod investigated by ancient and historic samples	Stenseth, Nils Chr.	RCN	2011	2014
International Statistical Ecology Conference 2012 (ISEC2012)	Stenseth, Nils Chr.	RCN	2012	2012
ADCAP – Strengthening the adaptive capacity of institutions in fisheries	Stenseth, Nils Chr.	RCN	2012	2015
Bringing together evolution and ecology – Bringing together evolution and ecology through the Red Queen Perspective	Stenseth, Nils Chr.	RCN	2012	2016
On the evolutionary genomics and behavioural ecology of homoploid hybrid speciation in Passer sparrows	Sætre, Glenn-Peter	RCN	2011	2014
Modelling ecosystems under climate change: Windermere as a model lake system	Vøllestad, L. Asbjørn	RCN	2008	2012
Tracking signatures of adaptive diversification during postglacial colonization: the build-up of genomic isolation in three spine stickleback	Vøllestad, L. Asbjørn	RCN	2010	2014

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Other public sector based projects				
Name	**Project leader**	**Funding**	**Start**	**End**
Platform for Viral Aqua medicine	Grimholt, Unni	RCN/NVI	2008	2012
Application of a new principle to combat infectious salmon anemia (ISA)	Grimholt, Unni	RCN/NVI	2011	2014
Forecasting ecological effects of climate change: integrating functional and correlative models (FECIMOD)	Hessen, Dag O.	RCN/NINA	2011	2012
High throughput sequencing of deep sea metagenomes 6503	Jakobsen, Kjetill S.	Statoil/ VISTA	2009	2012
Managing ecosystem services in low alpine cultural landscapes through livestock grazing	Mysterud, Atle	RCN/NTNU Museum of Natural History and Archaeology	2012	2014
PITRO III – Gr2 – Ecological modelling, interdisciplinary methodology and climatic variation in Africa	Stenseth, Nils Chr.	SIU	2009	2012
Comparison of Marine Ecosystems of Norway and the US (MENU II)	Stenseth, Nils Chr.	RCN/IMR	2009	2012
Investigations of population structure in shrimp (Pandulus borealis) in the North Atlantic – (POPBOREALIS)	Stenseth, Nils Chr.	RCN/IMR	2010	2012
ADMAR Adaptive management of living marine resources by integrating different data sources and key ecological processes	Stenseth, Nils Chr.	RCN/IMR	2010	2015
Sustainable shrimp fishing	Stenseth, Nils Chr.	RCN/IMR	2012	2012
Assessment of the effects of oil exposure on the population dynamics and abundances of Atlantic cod and haddock using state-space models – VISTA 6159	Stenseth, Nils Chr.	VISTA	2012	2014
Codflict: Managing Skagerrak cod – Managing resource and area conflicts in the coastal zone, exemplified by cod on the Skagerrak coast	Stenseth, Nils Chr.	RCN/IMR	2012	2015
Norwegian Marine Data Centre (NMDC)	Stenseth, Nils Chr.	RCN/IMR	2012	2022
Smolt emigration – Smolt emigration timing: a global model	Vøllestad, L. Asbjørn	NVE	2012	2013

Nest of the pied flycatcher (Ficedula hypoleuca) from our long term nestbox study on breeding biology of this long distance migrant © Helene Lampe

Private sector based projects				
Name	**Project leader**	**Funding**	**Start**	**End**
Development of a new model for studying polyploid plant evolution: Scurveygrasses (Cochlearia)	Brysting, Anne Krag	Nansenfondet	2012	2013
Subproject Nitramines in soil and freshwater	Hessen, Dag O.	Technoloy Centre Mongstad DA/Dept of Chemistry	2011	2012
Combined effects of ocean acidification, climate change and oil related discharges	Hjermann, Dag Ø.	RCN/IRIS	2010	2013
IRIS: Link populations to food-chain in an Integrated Model System	Hjermann, Dag Ø.	RCN/IRIS	2012	2015
SYMBIOSES – Constructing an integrated modelling framework for decision support in ecosystem-based management: case study Lofoten/ Barents Sea	Stenseth, Nils Chr.	RCN/ Akvaplan-NIVA	2011	2014

International projects				
Name	**Project leader**	**Funding**	**Start**	**End**
PIEF-GA-2009-235962 EVOLBIRD – Demographic strategies under climate variation: a study on Arctic and Antarctic seabirds	Stenseth, Nils Chr.	EU	2010	2012
EUR-OCEAN Flagship – Developing seasonal and spatial food web models through novel statistical modelling – tools for constructing scenarios under future global change (EcoScenarios)	Stenseth, Nils Chr.	EUR- OCEANS	2010	2012
Research Training Course: Effect Studies and Adaptation to Climate Change	Stenseth, Nils Chr.	Nordforsk	2011	2012
PIEF-GA-2009-255326 Timing of bird migration under climate change: phenotype plasticity, microevolutionary response or both? – (BirdClimChange)	Stenseth, Nils Chr.	EU	2011	2013
PIEF-GA-2009-252252 Evolutionary response of two African Rodent species (Hystrix sp) to climate changes: the study of the past as an estimate of the future – (REHYSTERIX)	Stenseth, Nils Chr.	EU	2011	2013
PIEF-GA-2010-274356 – Social complexity in Resource Management (SoCoRm)	Stenseth, Nils Chr.	EU	2011	2013
PIEF-GA-2010-273986 Climate-induced phenological change and its consequences for bird populations (Bird Populations)	Stenseth, Nils Chr.	EU	2011	2014
PlagueEco2Geno – Reconstructing the imprint of ecology on the genetic phylogeography of the Plague in Central Asia and China	Stenseth, Nils Chr.	EU	2012	2015
Climate Change Effects on Marine Ecosystems and Resources Economics – TFI NCoE Programme	Stenseth, Nils Chr.	Nordforsk	2011	2016
Plague and natural hosts – evolutionary interactions ESF	Stenseth, Nils Chr.	European Science Foundation	2012	2013

Seminars with invited speakers

Name	Seminar title	Date
Tengs, Torstein	Using high throughput sequencing to look for unknown pathogens	14 December
Reusch, Thorsten	Evolutionary adaptation to global change? Examples from the base of the marine food web	7 December
Getz , Wayne	A Computational Population Modeling Platform for Linking the Inner and Outer Worlds of Organisms	30 November
Huse, Geir	Predator-prey dynamics of planktivorous fish – a spatial approach	23 November
Gavrilets, Sergey	Evolution of mate choice: the trick behind the magic trait	2 November
Gilman, Tucker	Using models to predict evolution in response to environmental change	26 October
Nakamichi, Reiichiro	Directed graphical modeling of gene expression profile underlying salmonids reproductive behavior	5 October
Willerslev, Eske	Hunting Our Molecular Past	21 September
Seligmann, Hervé	Cryptic genes and genetic codes in mitochondria	7 September
Kwiatkowski, Marek	On Genetic Specificity in Symbiont-Mediated Host-Parasite Coevolution	29 June
Miller, Jason R.	De novo genome assembly with the Celera Assembler software	22 June
Hutchings, Jeffrey A.	Genetic variation in phenotypic plasticity in fishes	15 June
Kuparinen, Anna	Life-history approach to evolutionary adaptation and recovery of Atlantic cod	15 June
Bossdorf, Oliver	Ecological and evolutionary plant epigenetics	8 June
Seehausen, Ole	Evolutionary dynamics of species diversity in fish – an interdisciplinary research program in ecology, evolution and conservation	1 June
Eide, Arne	Smart fishing and stock conservation. On the limits of improved fish finding capacity and its contribution to resource conservation	11 May
Andersson, Leif	Domestic animals – a treasure trove for genome biology	4 May
Ostfeld, Richard S.	Biodiversity Loss and the Rise of Emerging Zoonotic Diseases	27 April
Berenbrink, Michael	Charting Deep Time – Evolutionary Physiology of Vertebrate O2 Transport Systems	20 April
Aksnes, Dag Lorents	Competition between fish and jellyfish	13 April
Fossheim, Maria	Ocean Acidification in the Arctic – challenges and knowledge gaps	23 March
Koppang, Erling Olaf	A novel lymphoid tissue – T cell aggregates in the salmonid gill	9 March
Slate, Jon	The evolutionary genetics of conspicuous polymorphisms in Soay sheep	24 February
Merliä, Juha	Evolution and differentiation in the oceans – panmixia revisited?	17 February
Kooijman, Bas	Add my pet, a data and parameter collection revealing adaptive trends in evolutionary energetics	10 February
Wright, Jonathan	Sex, Showing-Off & Relatedness in Helping Decisions of the Cooperatively Breeding Bell Miner	3 February
Ciannelli, Lorenzo	Nonadditive and nonstationary properties in the spatial distribution of a large marine fish population	27 January
Roberts, Neil	Climate change and the Plague of Justinian	20 January
Undlien, Dag	Hunting for the "missing heritability" in human disease	13 January

Tricks and techniques for confidently assembling metagenomes. Blindern, Oslo, 7 December
Workshop by C. Titus Brown.

Norwegian Sequencing Centre (NSC) one-day seminar. High-throughput Sequencing: Applications and Analyses. Blindern, Oslo, 6 December	
Name	**Presentation title**
Stenseth, Nils Chr.	Welcome and opening remarks
Postlethwait, John H.	Fish in the cold: Antarctic fish, spotted gar, and the teleost genome
Nederbragt, Alexander J.	A different kettle of fish entirely: bioinformatic challenges and solutions for whole de novo genome assembly of Atlantic cod and Atlantic salmon
Brown, C. Titus	Building better genomes, transcriptomes, and metagenomes with improved techniques for de novo assembly - an easier way to do it
Lyle, Robert	High-throughput sequencing and human genetics
Parham, Peter	Evolution of major histocompatibility complex class I genes in humans and other placental mammals
Undlien, Dag E.	Discussion and closing remarks

The Annual CEES Student Conference and Banquet. Blindern, Oslo, 22–23 October
The talks are listed in the appendices (Production – Talks)

High Throughput Sequencing technologies and bioinformatics analysis, Blindern, Oslo, 8–19 October
A two week course providing knowledge of high throughput sequencing technologies and the analysis of data from various sequencing platforms and applications. Organised by NSC. (Now a regular course: INF-BIO9120)

NorMER Annual Meeting. Helsinki, Finland, 1–7 October
1–3 October NorMER Course in Bio-economics (Mandatory for NorMER PhDs and PDs) 4–5 October in Helsinki, Finland (For all NorMER members) 5–7 October Workshop (NorMER PhDs and PDs) Visit the NorMER website for more details.

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Launch of Pacific Biosciences sequencing: Open seminar on the occasion of the launch of the PacBio services at the Norwegian Sequencing Centre. Blindern, Oslo, 20 September	
Name	**Presentation title**
Stenseth, Nils Chr.	Welcome and opening remarks
Eckholm, Jenny	Applications of the PacBio® RS
Nederbragt, Alexander J.	The best of both worlds: Combining PacBio with short read technology for improved de novo genome assembly
Jakobsen, Kjetill S.	Closing remarks

Software Carpentry “Bootcamp”, Oslo, September
Workshop by Karin Lagesen and Alexander J. Nederbragt

A Planet of Viruses, The House of Literature, Oslo, 1 September
Open lecture by Carl Zimmer

High Throughput Sequencing technologies and bioinformatics analysis, Blindern, Oslo, 8–19 October
A two week course providing knowledge of high throughput sequencing technologies and the analysis of data from various sequencing platforms and applications. Organised by NSC. (Now a regular course: INF-BIO9120)

The Kristine Bonnevie lecture 2012. Blindern, Oslo, 31 August	
Name	**Presentation title**
Ottersen, Ole Petter	Opening remarks
Zimmer , Carl	Telling the Stories of Science
Stenseth, Nils Chr.	Introduction of Cori Bargmann
Bargmann, Cori	Genes, evolution, and the origins of social behavior
Nordal, Inger	Kristine Bonnevie, Norway's first female professor. A 100 year anniversary

International Statistical Ecology Conference: ISEC 2012. Sundvolden Hotel, Krokkleiva, 3–6 July

Visit the CEES website for the programme.

Three workshops were held in conjunction with the conference:
1. AD Model Builder, Finse, 30 Jun.–1 Jul. at Finse
2. Population genetics and statistics, Sundvollen, 2–3 Jul.
3. Model selection, Sundvollen, 3 Jul.

Course in python programming, Oslo, June

Course by Karin Lagesen.

UNIX course for beginners, Blindern, Oslo, 22 May

Course by the local IT department.

Applications of High-Throughput sequencing, Blindern, Oslo, 21–25 May

A one week course covering most applications of High-Throughput sequencing. Organised by NSC.

Young Researchers Day (De unges dag), The Norwegian Academy of Science and Letters, Oslo, 15 March

An event for CEES' non-permanent scientific staff (PhD students, post docs, and researchers).

The better angels of our nature: Why violence has declined. Blindern, Oslo, 14 March.

Open lecture by Steven Pinker. Co-organised with The Science Library, The Norwegian Academy of Science and Letters and CSCW – Centre for the Study of Civil War (PRIO). Panel discussion with Scott Gates and Vibeke Ottesen.

Darwin Day 2012. Blindern, Oslo, 13 February

Name	Presentation title
Stenseth, Nils Chr.	Opening remarks
Shuster, Stephen M.	Darwin and sexual differences
Milinski, Manfred	The evolution of mate choice
Reid, Jane M.	The deception of monogamy: the evolution of multiple mating in the wild
Arnqvist, Göran	Sexual selection and the evolution of genitalia

Production

Contributors affiliated with CEES in bold.

Articles in peer-reviewed journals

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Elise Håvelsrud, Othilde. 29 March. Characterization of prokaryotic communities and metabolic potential in seafloor sediments influenced by natural hydrocarbon seepage. Supervisors: **Hessen, D.O.**, Andersen, T.

Moe, Therese Fosholt. 23 March. Nuisance growth of Juncus bulbosus in lakes and rivers- experimental and observational studies. Supervisors: Kristensen, T., **Jakobsen, K.S.**, Rike, A.G. (main supervisor).

Talks

Aalvik I.M. Spatial ecology of Atlantic cod in a nearshore habitat. *CEES Annual Student Conference 2012*. 22–23 October.

Arce Gonzales, F. The spatial pattern of small mammals (voles and lemmings) distribution at Finse. *CEES Annual Student Conference 2012, Norway*. 22–23 October.

Baalsrud, H.T. Characterization of antifreeze proteins in teleost lineages two poles apart: a unique example of convergent evolution. *CEES Annual Student Conference 2012, Norway*. 22–23 October.

Berg, P.R. Populasjonsgenomikk på torsk – et verktøy for identifisering av viktige genomiske regioner for oppdrettsnæringen. *Programkonferansen Havbruk 2012, Stavanger, Norway*. 16–18 April.

Berg, P.R. Ecological genomics of Atlantic cod (Gadus morhua) – adaptive responses to changing selection regimes. *CEES Annual Student Conference 2012, Norway*. 22–23 October.

Blix, A. Feedback processes in grazing ecosystems: are sheep grazing in alpine habitats affecting long-term use and productivity? *CEES Annual Student Conference 2012, Norway*. 22–23 October.

Brandrud M.K. Polyploidy and ecotype variation in the Cochlearia officinalis complex. *CEES Annual Student Conference 2012*. 22–23 October.

Brysting, A.K. Revisiting Müntzing's classical textbook example of allotetraploid Galeopsis tetrahit – using molecular tools. *International Conference on Polyploidy, Hybridization and Biodiversity, Pruhonice, Czech Republic*. 7–10 May.

Carim, K. Testing Conservation Guidelines from Genetic Theory in Imperiled Trout Populations. *CEES Annual Student Conference 2012, Norway*. 22–23 October.

Crawford, J.C. Exploring the Evolutionary Consequences of Sociality: A Next-Generation Approach. *CEES Annual Student Conference 2012, Norway*. 22–23 October.

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de Muinck, E. Genome comparisons of infant Escherichia coli isolates. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Diekert, F.K. Estimates of economic gains from better management depend strongly on the biological modeling assumptions and the selectivity pattern. *16th Biannual Conference of the International Institute for Fisheries and Trade (IIFET), Dar-es-Salaam, Tanzania.* 16–20 July.

Diekert, F.K. Hunting: How social institutions shape selection pattern. *19th Annual Conference of the European Association of Environmental and Resource Economists (EAERE), Prague, Czech Republic.* 27–30 June.

Elgvin, T.O. Sorting out the sparrows. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Fischer, B. Eco-evolutionary dynamics and the Red Queen. *Department Seminar, Department of Theoretical Biology, University of Vienna, Austria.* 23 March.

Fischer, B. The evolution of age-dependent plasticity. *Golden PEG Award, University of Lund, Sweden.* 8 May.

Fischer, B. Why is childbirth so hard in humans? *Department Seminar, Department of Theoretical Biology, University of Vienna, Austria.* 3 December.

Fleming, M. Vertebral counts in salmonids. *CEES Annual Student Conference 2012.* 22–23 October.

Gerecht, A.C., Henderiks, J. How does phosphorus limitation impact coccolith size and morphology? *Gordon Research Conference on Marine Microbes, Lucca, Italy.* 24–29 June.

Gerecht, A.C., Henderiks, J. How does phosphorus limitation impact coccolith size and morphology? *Protist 2012, University of Oslo, Norway.* 29 July–3 August.

Gundersen, H. The effect of wave and current exposure on kelp (Laminaria hyperborea) structure and associated algae and fauna communities. *European Marine Biology Symposium (EMBS), Arendal, Norway.* 3–7 September.

Gundersen, H. The effect of wave and current exposure on kelp (Laminaria hyperborea) structure and associated algae and fauna communities. *Havet og Kysten (Norges forskningsråd) forskerseminar, Oslo, Norway.* 24 October.

Gundersen, H. HvalerKoster-piloten. Et prosjekt under "Hav møter land". Workshop: *Milöövervakning – Visuella metoder, Göteborgs universitet, Uddevalla Sweden.* 10–11 December.

Gundersen, H. Using GAM models to predict soft sediment diversity – modeling reference condition along the Norwegian coast. *MAREANO conference, Trondheim, Norway.* 17–18 October.

Gundersen, H., Hjermann, D.Ø. The Norwegian Coastal Monitoring Programme (1990 –p.t.): Effects of eutrophication and climatic change on rocky bottom macro algea and sessile fauna. *The 47th European Marine Biology Symposium (EMBS), Arendal, Norway.* 3–7 September.

Gundersen, H. Nature Index of Norway – spatial predictive modelling of soft sediment reference conditions along the Norwegian coast. *European Marine Biology Symposium, Arendal, Norway.* 3–7 September.

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Gundersen, H. Soft bottom communities and responses to climatic change and eutrophication in Skagerrak during a period of twenty years. *The 47th European Marine Biology Symposium (EMBS), Norway.* 3 – 7 September.

Halvorsen, K.A.T. Fishery induced evolution of male reproductive tactics in corkwing wrasse (Symphodus melops). *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Hansson, T.H. Phenotypic Plasticity in threespined stickleback (*G.aculeatus*). *CEES Annual Student Conference 2012.* 22–23 October.

Haverkamp, T.H.A., Jakobsen, K.S. Comparative analysis of microbial diversity of pockmark sediments of the Oslo Fjord. *ISME 14, Copenhagen, Denmark.* 19–24 August.

Helberg, M. Is optimal seabird monitoring scale at colonial, regional or global level? An evaluation of the use of mark-sight-resight methods. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Hermansen, J.S. Hybrid speciation in sparrows. *National Research Council – Institute of Marine Sciences, Lesina, Italy.* 6 February.

Hermansen, J.S. Reproductive barriers in a hybrid species system. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Hernandez-A., R.A. What can savanna chimpanzees tell us about human evolution? *Museo de la Evolucion Humana & CENIEH, Burgos (Atapuerca), Spain.* 4 July.

Hessen, D.O. Long-term trends in carbon, nutrients and stoichiometry in Norwegian coastal waters: evidence of a regime shift. *Helgoland Roads 50 -year symposium, Helgoland, Germany.* 17–20 September.

Hessen, D.O. Long-term changes in carbon and nutrient biogeochemistry in Skagerrak. Bjerknes Getawai. Bjerknes Getaway, *Geilo, Norway.* 16–18 January.

Holen, Ø.H. Disentangling taste and toxicity in aposematic prey. *ISBE 2012 (the 14th International Behavioral Ecology Congress), Lund University, Sweden.* 12–18 August.

Husek, J. Tracking environmental phenology by natal dispersal in a passerine bird. *CEES Annual Student Conference 2012, Norway.* 22 – 23 October.

Håll, J.P. Linking light and productivity in lakes to zooplankton biodiversity and biomass. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Jalal, M. DNA condensation, genome size, and nuclear volume of Daphnia. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Jeppsson, T. Populationsutvecklingen hos långhorningar i Sverige – en historisk utblick baserad på fynddata. *Årsmöte, Entomologiska Föreningen Östergötland, Linköping, Sweden.* 19 February.

Jeppsson, T. The Use of Historical Collections to Estimate Population Trends. *3rd European Congress of Conservation Biology, Glasgow, United Kingdom.* 28 August–1 September.

Junge, C. All-in! A comprehensive, multidisciplinary approach to unravel the population structure of a classic bycatch deepwater shark, E. spinax. *European Elasmobranch Association (EEA) Annual Scientific Conference, Milan, Italy.* 22–25 November.

Junge, C. The use of molecular tools for taxonomy and population monitoring. *ENSSMAL (Ecole Nationale Supérieure des Sciences de la Mer), Algiers, Algeria.* 22–27 June.

Junge, C. Using molecular tools for shark conservation. *ENSSMAL (Ecole Nationale Supérieure des Sciences de la Mer), Algiers, Algeria.* 22 June.

Jørgensen M.H., Lagesen, K., Brysting, A. K. Using high-throughput sequencing to investigate evolution of self-incompatibility genes in the Brassicaceae: strategies and challenges. *PlantBio 2012, Oslo, Norway.* 17–18 October.

Kassie, A.M. Comparative behavioural ecology and phylogeography of the Bale monkey (Chlorocebus djamdjamensis) in southern Ethiopia. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Khalsa, S.D.K. Genetic diversity in sorghum and its associations with cultural and ecological variables in Tanzania, Africa. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Knutsen, H., Jorde, P.E., Olsen, E. M. Postglacial isolation of the Mediterranean Centroscymnus coelolepis reveals the importance of the Pillars of Hercules as geographical barrier for deep sea sharks. *13th Deep-sea Biology Symposium, Wellington, New Zealand.* 6–10 December.

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Knutsen, H. Lobster reserves in coastal Skagerrak: a field laboratory for science and management. *Symposium EMBS Arendal, Arendal, Norway.* 3–7 September.

Knutsen, H. Havforskningsinstituttet, Forskningsstasjonen Flødevigen – stasjonens historie og pågående aktiviteter. *Nordisk Råd, sekreteriattreff, Arendal, Norway.* 23 December.

Knutsen, H. Post glacial recolonization in Scandinavian waters present and historical patterns. *Norway.* 16–17 April.

Knutsen, H., Olsen, E.M. Gadid genetics and connectivity. *Transatlantic cod gadid workshop, Seattle, USA.* 18–19 October.

Knutsen, H., Jorde, P.E. Population structure in leading edge and rear end in a northwards shifting species, the corkwing wrasse, Symphodus melops. *World 6th Fishery Congress, Edinburgh, United Kingdom.* 7–11 May.

Knutsen, H., Olsen, E.M. Fine-scaled population structure in Atlantic cod. *Transatlantic cod symposium, University of Oregon, Newport, USA. 5–7 March.*

Knutsen, H., Jorde, P.E. Unravelling The Population Structure Of aphanopus carbo: a Multididciplinary Appro. *6th World Fishery Congress,Edinburgh, United Kingdom.* 7–11 May.

Kvile, K.Ø. Climatic influences on zooplankton dynamics in Lofoten and the Barents Sea. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Labra, A. Individual differences in antipredatory and exploratory behavior in an Iguanid lizard. *9º Congresso Nacional de Etologia University of Lisboa, Portugal* 12–13 April.

Lagesen, K. Potential for use of next generation sequencing NGS to detect GMO in food and feed. *18th ENGL plenary meeting, EC Joint Research Centre, Ispra, Italy.* 4–5 December.

Lampe, H.M. Observasjoner sett fra et fugleperspektiv. *Fagseminar ved Radiumhospitalet, Forskningsbygget Radiumhospitalet, Oslo, Norway.* 26 September.

Lindén, A. Analyzing coloured covariates with density dependent population models. *Extra seminar, Swansea University, United Kingdom.* 1 November.

Lindén, A. Autocorrelated covariates in AR-models can be problematic. *3rd International Statistical Ecology Conference – ISEC 2012, Norway.* 3–6 July.

Liow, L.H. Temporal changes in origination and sampling probabilities of carnivores. *2012 GSA: Annual meeting and exposition, Charlotte, North Carolina, USA.* 4–7 November.

Llope, M. Resilience and thresholds in the Baltic Sea ecosystem. *ICES Annual Science Conference 2012, Bergen, Norway.* 17–21 September.

Llope, M. Regime shifts and resilience in a eutrophic marine ecosystem: the Kattegat as a case study for ecosystem management. ICES Annual Science Conference 2012, *Bergen, Norway.* 17–21 September.

Llope, M. The Baltic Sea regime shift, can it flip *back? Effects of Climate Change on the World's Oceans, Yeosu, South Korea.* 15–19 May.

Malmstrøm, M. The 60+ teleost genome project. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Mazzarella, A.V.B. Allometric constraints influence the evolution of freshwater sticklebacks: A comparative study of a stickleback radiation. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Meisingset, E.L. Red deer movements in relation to roads and targeting mitigation efforts to reduce risk of deer-vehicle collisions. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Mekonnen, A. Comparative behavioural ecology and phylogeography of the Bale monkey (*Chlorocebus djamdjamensis*) in southern Ethiopia. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Mewicha, B.G. Analysing diets of larger mountain herbivores based on DNA metabarcoding of faeces. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Moksnes, J. Character displacement in beak morphology of sympatric sparrows. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Mysterud, A., Viljugrein, H. Deer keds (Lipoptena cervi): Infestation intensity, habitat selection and effect on moose (Alces alces). *Joint WDA EWDA conference, Lyon, France.* 22–27 June.

Mysterud, A. Ecological, social and economic benefits from commercialization of red deer hunting in Norway. *HUNT Conference, Ciudad Real, Spain.* 28 February–28 March.

Mysterud, A. Using LiDAR to predict hiding cover – an important determinant of predation risk for roe deer. *SilviLaser 2012, Vancouver, Canada.* 16–18 September.

Nederbragt, A.J. A different kettle of fish entirely: bioinformatic challenges and solutions for whole de novo genome assembly of Atlantic cod and Atlantic salmon. *4th annual seminar of the Norwegian Sequencing Centre, Oslo, Norway.* 6 December.

Nederbragt, A.J. Experiences with Combining PacBio with Short Read Technology for Improved de novo Assembly of Complex Genomes. *PacBio User Meeting, London, United Kingdom.* 19 November.

Nederbragt, A.J. Experiences with Combining PacBio with Short Read Technology for Improved de novo Assembly of Complex Genomes. *4th Next Generation Sequencing Congress, London, United Kingdom.* 15–16 November.

Nederbragt, A.J. High-throughput sequencing og behovet for tungregneressurser. *Åpning av det nye tungregneanlegget 'Abel', Oslo, Norway.* 4 October.

Nederbragt, A.J. New High Throughput Sequencing technologies at the Norwegian Sequencing Centre – and beyond. *Computational Life Science initiative seminar series, Oslo, Norway.* 29 August.

Nederbragt, A.J. The best of both worlds – Combining PacBio with short read technology for improved de novo genome assembly. *PacBio launch seminar of the Norwegian Sequencing Centre, Oslo, Norway.* 20 September.

Nederbragt, A.J. The bioinformatics of sequencing and assembling genomes – with a focus on the Atlantic cod and salmon genome projects. *MBV-INFX410 course, Oslo, Norway.* 27 November.

Nederbragt, A.J., Tørresen, O. K., Lagesen, K., Rounge, T. B., Star, B., Tina, K.G., Berg, P.R., Jentoft, S., Jakobsen, K.S. Challenges and Opportunities for Improving the Atlantic Cod Genome Assembly and Annotation. *Plant and Animal Genomes XX, San Diego, USA.* 14–18 January.

Nederbragt, A.J., Tørresen, O.K., Skage, M., Tooming-Klunderud, A., Hansen, M.H.S., Jentoft, S., Omholt, S.W., Jakobsen, K.S. The long jump: Long distance mate pairs and long PacBio reads for the Salmon Genome Project. *1st International Conference on Integrative Salmonid Biology (ICISB), Oslo, Norway.* 17 –20 June.

Nesbø, C.L. Discovery and Characterization of the First Prophage in Thermotogales: a Tailed Bacteriophage Predicted to Infect Thermosipho and Thermotoga. *112th General Meeting of American Society for Microbiology, San Francisco, USA.* 16–19 June.

Nesbø, C.L. Mesotoga lineages: important bacterial constituents of the 'rare biosphere' in polluted environments. *ISME 14: The Power of the Small, Copenhagen, Denmark.* 19–24 August.

Nielsen, A. Outfield grazing as a way of utilizing and sustaining semi-natural Ecosystems. *The Annual Meeting of the Ecological Society of America, Portland, USA.* 5–10 August.

Nilsson, A. Stochastic demography in fluctuating environments: theory and empirical patterns. *Norway,* 23–27 April.

Nilsson, A. Making use of extracted phenology data: analyzing 35 years of dipper breeding phenology. *Phenology 2012 – Future climate and the living earth. University of Wisconsin, USA.* 10–13 September.

Norum, J.K. Roe deer and predation". *CEES Annual Student Conference 2012. 22–23 October.*

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Ohlberger, J. Biomass overcompensation revealed by long-term time series data from Windermere. *British Ecological Society (BES) Annual Meeting, Birmingham, United Kingdom.* 17–20 December.

Ohlberger, J. Cannibalism effects on species interactions and community structure. *Department seminar, Umeå, Sweden.* 16 October.

Ohlberger, J. Community-level consequences of cannibalism. *Ecological Society of America (ESA) Annual Meeting, Portland, USA.* 6–10 October.

Ohlberger, J. Ecological and evolutionary responses to size-selective mortality caused by a disease outbreak in Windermere perch. *University of Umeå, Sweden.* 17 October.

Ohlberger, J. Ecological and evolutionary responses to size-selective mortality caused by a disease outbreak in Windermere perch. *Leibniz Institute of Freshwater Ecology and Inland Fisheries, Berlin, Germany.* 24 May.

Olsen, E.M. Marine protected areas and recruitment in coastal populations: an ecological and evolutionary perspective. *47th European Marine Biology Symposium, Arendal, Norway.* 3–7 September.

Olsen, E.M., Halvor, K. The Flødevigen Beach seine survey. *Transatlantic cod symposium, Oregon University, Newport, USA.* 5–7 March.

Ottersen, G. Environmental effects on fish populations: Some principles, some examples, and comparisons between large ecosystems from the Mediterranean to the Barents Sea. Wrapping up of the IDEADOS project. *International workshop on environment, ecosystems, demersal resources and fisheries.* Palma de Mallorca, Spain. 14–16 November.

Ottersen, G. Svingninger i klima og økologiske effekter. Økologisk historie i Nordsjøen og Skagerrak. *Workshop initiert av MD og organisert av NIVA og HI, Norway.* 27 September.

Ottersen, G., Stige, L.C. Climate effects on Barents Sea ecosystem dynamics. *Late lunch talk, Oslo, Norway.* 26 November.

Ottersen, G., Stige, L.C., Durant, J.M., Stenseth, N.C. Comparison across 42 North Atlantic fish stocks of temporal patterns in recruitment dynamics, including the role of spawning stock biomass and temperature. *ICES ASC M:11. Bergen, Norway.* 20. September.

Ottersen, G. Elendig rekruttering av øyepål og tobis i 2010 og 2011 – hva skjer i Nordsjøen? *Fiskebåt sitt Tobis- og øyepålseminar. Bergen, Norway.* 11. September.

Ottersen, G. Nordsjøen: Status og lærdommer fra historiske endringer i økosystemet. *Havforskningsinstituttets møte om økosystembasert forvaltning, Bergen, Norway* 16 May.

Ottersen, G. Latitudinal changes in marine resources, exploitation and society within the Nordic and adjacent Seas. *Effects of climate variation on young fish, Nordic Climate-Fish 2nd Conference, Risør*, Norway. 15–17 August.

Ottersen, G. Nordsjøen: Rekruttering til viktige fiskebestander – kunnskap og kunnskapsmangler. *Møte med Fiskeri- og kystministeren. Flødevigen, Arendal, Norway.* 5 June.

Ottersen, G. Sea fisheries- and integrated marine environment management. Lecture Bio4150, Department of Biology UiO, Norway. 16. April.

Ottesen, V.K. Do evolutionary psychological predictions of risk factors for filicide apply to Norway? *CEES Annual Student Conference 2012.* 22–23 October.

Præbel, K. Ongoing work on the effect of invasion of vendace on reproductive isolation between whitefish morph-pairs in Lake Skrukkebukta and talk about my PhD objectives. *University of Laval, Quebec City, Canada.* 22 October–17 January.

Præbel, K. Trans-Arctic dispersal of Gadus chalcogrammus Pallas, 1814? *International Polar Year, Montréal 2012, Canada.* 22 April.

Præbel, K. Alternative trophic niche adaptations as an evolutionary promoter for divergence between sympatric deep water morphs of Arctic charr. *7th International Charr Symposium, University of Moscow, Russia. 3–6* September.

Præbel, K. Incipient ecological speciation in northern salmonids. *Norwegian University of Science and Technology (NTNU), Trondheim, Norway.* 2 February.

Præbel, K. Early speciation into dark side of life. *Institutt for Arktisk og Marin Biologi, University Tromsø, Norway.* 21 November.

Præbel, K. Diversity of whitefish populations in northern Fennoscandia. *Research Open Day (instituttseminar).* 21 November.

Qviller, L. Tick loads and the parasite avoidance hypothesis. *CEES Annual Student Conference 2012.* 22–23 October.

Richter, A.P., Eikeset, A.M., Stenseth, N.C. Optimal management under fleet constraints – the case of Northeast Arctic cod. *19th EAERE conference, Prague, Czech Republic,* 27 – 30 June.

Richter, A.P. The economic repercussions of Fisheries Induced evolution. *16th Biennial IIFET Conference, Dar-es-Salaam, Tanzania.* 16–20 July.

Richter, A.P. Contagious cooperation, temptation, and ecosystem collapse. *Monte Verità Conference on Sustainable Resource Use and Economic Dynamics – SURED 2012, Zürich, Switzerland.* 4–7 June.

Rivrud, I.M. Towards sustainable trophy hunting: No evidence of a long term negative trend (1881 –2008) of red deer antler sizes with restricted trophy hunting in Hungary. *ESA2012: 97th annual meeting of the Ecological Society of America.* 5 – 10 August.

Roberts, A.J. Characterization of a new Ophthalmosaurid ichthyosaur from the Upper Jurassic of Spitsbergen. *CEES Annual Student Conference 2012.* 22–23 October.

Rogers, L. Climate and population density drive changes in cod body size. *Academia Europaea Annual Conference, Norway.* 11–13 September.

Rogers, L. Linking climate variability to Atlantic cod population dynamics along the Norwegian *Skagerrak coast. ICES/PICES Conference for Early Career Scientists, Mallorca, Spain.* 24–27 April.

Romagnoni, G. Brugde Project: the Norwegian Basking Shark Database. *European Elasmobranch Association conference, Milano, Italy.* 22–25 November.

Romagnoni, G. Marine Protected Areas as a management tool: are we doing it right? *CEES Annual Student* Conference 2012. 22–23 October.

Schweder, T. Causal sufficiency and Markov Completeness. *SINAPE – Simpósio Nacional de Probabilidade e Estatística, Universidade Federal do Piauí, Brasil.* 20 July–3 August.

Schweder, T. Confidence distributions and confidence likelihood: distributional inference without priors. *XX SINAPE, Brazil.* 30 July–3 August.

Shala N.K. A multigenerational experimental study with the freshwater cladoceran *Daphnia. CEES Annual Student Conference 2012.* 22–23 October.

Slagsvold, T. Citizen science. Citizen science. *Max Planck Institute of Ornithology, Germany.* 30 November.

Slagsvold, T. Social learning in birds studied by cross-fostering in the wild. *Seminar at Edward Grey Institute of Field Ornithology, United Kingdom.* 30 November.

Solbakken, M.H. Life without MHC-II, a dive into the immune system of Atlantic cod. *CEES Annual Student Conference 2012.* 22–23 October.

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Stenseth, N.C. En dør til Darwin – Peter Christian Asbjørnsen i arbeid. *Ibsenmuseet.* 22 January.

Stenseth, N.C. Being a successful early-career researcher. PHD FORUM: A CAREER IN ACADEMIA – IS IT SOMETHING FOR ME? *Grønt auditorium, Rikshospitalet.* 20 March.

Stenseth, N.C. Intellectual harassment, The problem – and how to avoid it. *Frokostseminar i regi Forskerforbundet ved UiO.* 28 March.

Stenseth, N.C. En forskningspolitikk for framragende forskning. *Innspillskonferansen til Forskningsmeldinga, Oslo, Norway.* 28 March.

Stenseth, N.C. The Oslo Priority Talk 2012- Research Leadership and the RCN Bioevaluation-2011. *The Research School of Odontology, Oslo, Norway.* 11 April.

Stenseth, N.C. Hvordan skape betingelser for å drive internasjonal attraktivt forskning. *Forskerforbundet ved Veterinærinstituttet, Oslo, Norway.* 12 April.

Stenseth, N.C. Scientific knowledge and its application. *VISTA scholar meeting, Oslo, Norway.* 5 May.

Stenseth, N.C. Fremragende formidling av fremragende forskning – og hvordan få det til? *En dag med Det Norske Videnskaps-Akademi i Litteraturhuset, Oslo, Norway.* 5 May.

Stenseth, N.C. Ecological Impact of Climate Change in Arctic Regions. *Opening of the Polar Research in the LEA'BIOSENSIB, Monaco.* 15 May.

Stenseth, N.C. BIOLOGY: Long-term times series in Ecology. *Opening of the Polar Research in the LEA'BIOSENSIB, Monaco.* 15 May.

Stenseth, N.C. Bringing Ecology and Evolution together. *Delegation from Brazil visiting Oslo, Norway.* 29 May.

Stenseth, N.C. Fra FUGE til BIOTEK2012. *Forskningsrådet, Oslo, Norway.* 21 June.

Stenseth, N.C. Prioriteringer i forskning. *Universitetssykehus, Oslo, Norway.* 21 June.

Stenseth, N.C. IUBS presidency talk. *ISEC 2012, Sundvolden, Norway.* 3 July.

Stenseth, N.C. Opening and welcoming remarks to ISEC 2012: Mathematics and statistics in evolutionary biology. *ISEC 2012, Sundvolden, Norway.* 3 July.

Stenseth, N.C. Ecological Effects of Climate Change. *NCS IUBS plenary lecture, IUBS China.* 5 July.

Stenseth, N.C. Challenges for the Marine Environment during the coming decades. *47th European Marine Biology Symposium. Arendal, Norway.* 7 July.

Stenseth, N.C. The Lemming Cycle and Climate. *The 13th Rodens et Spatium conference, Rovaniemi, Finland.* 17 July.

Stenseth, N.C. CEES, NorMER and the KBBE 2013 call. *KBBE meeting, Paris, France.* 13 August.

Stenseth, N.C. Fisheries Induced Evolution in Atlantic Cod Investigated by Ancient and Historic Samples. *Forskning for fiskeri – knowledge for the Future, Trondheim Spektrum, Norway.* 15 August.

Stenseth, N.C. En forskningspolitikk for de lange linjene: Forskning og samfunn – samspill i praksis. Konferanse om Forskerforbundet og Universitets- og høgskolerådet (UHR), *Litteraturhuset, Oslo, Norway.* 16 August.

Stenseth, N.C. Large-scale spatial variation: effects of climate variation. *Ecology and Evolution of Parasites and Infections, University of Antwerp.* 22 August.

Stenseth, N.C. The Importance of Health, Security & Academic Partnerships Countering Emerging Biological Threats. *International Peace Research Institute (SIPRI), Stockholm, Sweden.* 30 August.

Stenseth, N.C. Dynamics of plague outbreak: results of time-series modeling. *Plague and natural hosts-evolutionary interactions ESF workshop, Oslo, Norway.* 31 August.

Stenseth, N.C. The Chair's annual report (2012): CEES status and the path forward. *SAB-meeting 2012. Oslo, Norway.* 10–11 September.

Stenseth, N.C. Satellite meeting in connection with Personalized Cancer Care Symposium. *DNVA, Oslo, Norway.* 11 September.

Stenseth, N.C. Forskning og samfunnsutfordringer: Er programforskning løsningen? *DNVA, Oslo, Norway.* 11 September.

Stenseth, N.C. Adapting to Climate Change: ecological dynamics, evolutionary change and management adaptations. *The Academia Europaea meeting, Bergen, Norway.*13 September.

Stenseth, N.C. From Darwin to 1953 – and beyond. *Horizon in Molecular Life Science (MLS), Oslo, Norway.* 24–25 September.

Stenseth, N.C. Linking ecology, evolution and economics. *Michel Serres Institute, Lyon, France.* 27 September.

Stenseth, N.C. NorMER- NCS Presentation. *CAP-Board, Helsinki, Norway.* 2 October.

Stenseth, N.C. Welcome to the ESF-LESC Exploratory Workshop on "Plague and Natural Hosts – Evolutionary Interactions". *Oslo, Norway.* 8 October.

Stenseth, N.C. Asbjørnsen og Darwin. *Vitenskapsmuseet, Suhmhuset, Trondheim.* 17 October.

Stenseth, N.C. Økologiske effekter av klimaendringene. *Videnskaps-Salong, Oslo, Norway.* 18 October.

Stenseth, N.C. NorMER-Tackling Uncertainties of Climate Change Effects on the Marine Ecosystem-the COD Case. *TRI conference 2012, Helsinki, Norway.* 29–30 Oktober.

Stenseth, N.C. NorMER-Tackling Uncertainties of Climate Change Effects on the Marine Ecosystem. *Milen-Agent Based Modeling course, Oslo, Norway.* 5 November.

Stenseth, N.C. Grunnforskning som forutsetning for innovasjon. *Hotel Bristol, Oslo, Norway.* 6 November.

Stenseth, N.C. en oversikt over dets aktivitet. *DNVA, Oslo, Norway.* 7 November.

Stenseth, N.C. NorMER-The annual reporting to SAB. *SAB Meeting 2012, Copenhagen Denmark.* 8 –9 November.

Stenseth, N.C. Bedre forskningsformidlere, og mer kritiske journalister. *Edderkoppen teater, Oslo Norway.* 13 November.

Stenseth, N.C. The Kavli Prize lecture-Transatlantic Science Week 2012. *Rice University, Houston, United States.* 14 November.

Stenseth, N.C. Abel Prize Seminar-Transatlantic Science Week 2012. *Rice University, Houston, United States.* 16 November.

Stenseth, N.C. The Kavli Prize lecture-Capital Science Evening. *Carnegie Institution for Science, Washington DC, United States.* 28 November.

Stenseth, N.C. Hva er et SFF? Erfaringer fra CEES og råd om søkeprosessen. *Universitetet i Agder, Campus Grimstad, Norway.* 3 December.

Stenseth, N.C. Verdien av (FUGEs) strategiske grep innenfor marin bioteknologi, "The Genome Sequence of Atlantic Cod – the Discoveries and Future Perspectives in Linking Ecology, Evolution and Genomics". *FUGE, Oslo, Norway.* 8 March.

Stige, L.C., Langangen, Ø., Stenseth, N.C., Hjermann, D.Ø. Statistical analysis of fish larvae distributions: incorporation of information from hydrodynamic modeling of transport. *International Statistical Ecology Conference, Norway.* 3–6 July.

Stige, L.C. Secondary productivity in the Barents Sea—role of phytoplankton and climate effects. *ICES CM 2012/M:10, San Diego, USA.* 17–21 September.

Stüken, A., Orr, R., Jakobsen, K.S. Is sxt gene copy number related to saxitoxin synthesis? *Marine Microbes, Lucca Italy.* 23–29 June.

Svennungsen, T.O. Epigenetikk – en utfordring for Darwins teori? Naturhistorisk museums populærvitenskapelige søndagsforedrag. 15 April

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Svennungsen, T.O., Holen, Ø.H. Transgenerational transmission of information in an autocorrelated world. *14th International Behavioral Ecology Congress (ISBE 2012), Lund, Sweden.* 12–18 August

Svoen M.E. Population dynamics of *Silene acaulis* in the high arctic. *CEES Annual Student Conference 2012.* 22–23 October.

Sørdalen, T.K. Multiple paternity assessment and paternity assignment in European lobster (Homarus gammarus). *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Taugbøl, A. Osmoregulatory differences in a salt and a freshwaterpopulation of Threespine Sticklebacks. *CEES Annual Student Conference 2012.* 22–23 October.

Taugbøl, A., Mazzarella, A.V.B. Sperm motility in marine and freshwater sticklebacks, breeding environment as a prezygotic barrier? *Stickleback 2012, Bainbridge Island, USA.* 29 July–3 August.

Taugbøl, A., Mazzarella, A.V.B. Sperm motility in marine and freshwater sticklebacks, breeding environment as a prezygotic barrier? *EMPSEB 18, Finland.* 25–30 September.

Tesaker, M.R. Male plumage colour and its role in reproductive isolation in Passer sparrows. *CEES Annual Student Conference 2012.* 22–23 October.

Thrane, J.E. The effects of light and temperature acclimation on resource allocation in planktonic organisms. *CEES Annual Student Conference 2012.* 22 – 23 October.

Turner, W.C. Synergistic effects of seasonal rainfall, parasites and demography on fluctuations in springbok body condition. *Savanna Science Network Meeting, Kruger National Park, South Africa.* 4–9 March.

Tørresen, O.K., Nederbragt, A. J., Lagesen, K., Jentoft, S., Jakobsen, K.S. Improving the cod genome with the use of multi-platform sequencing data. *Genome Informatics, Norway.* 6–9 September.

Vik, U. Bistorta vivipara and its microbial plant root partners. *CEES Annual Student Conference 2012, Norway.* 22–23 October.

Viljugrein, H. Multi-source analysis reveals latitudinal and altitudinal shifts in range of Ixodus ricinus at its northern distribution limit. 13th *International symposium on Veterinary Epidemiology & Economics, Norway.* 20–24 August.

Vindenes, Y. Climate warming and evolutionary demography of pike. *Workshop on evolutionary demography, Max Planck Institute of Demographic Research, Germany.* 6–8 June.

Vindenes, Y. Integral Projection Modeling (IPM) reveals effects of temperature change on the stochastic demography and population dynamics of pike (Esox lucius). *ISEC 2012, Norway.* 3–6 July.

Vindenes, Y. Predicting the impacts of climate change on populations with demographic models. *Opening of the polar research centre (LEA* BIOSENSIB), Monaco. 15–16 May.

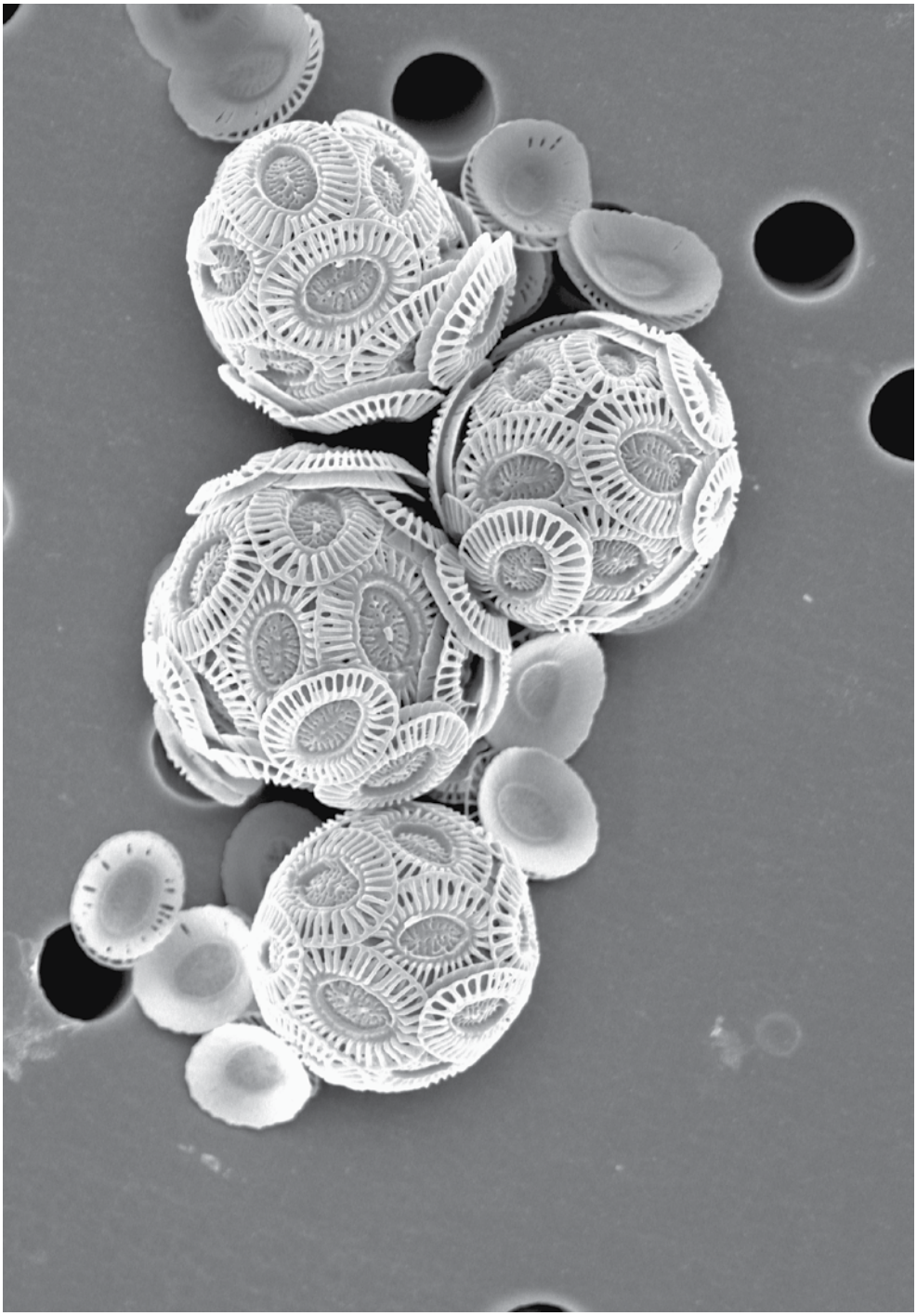
Vøllestad, L.A. Atlantisk laks i Norge. Om fangststatistikken. *Norske Lakseelvers Årsmøte 2012, Norway.* 14 April.

Vøllestad, L.A. Beyond population genetics: new technologies offer new opportunities. *Ecology & Conservation of Freshwater Fish, Porto, Portugal.* 28 May–2 June.

Vøllestad, L.A. Evolutionary dynamics of brown trout in small streams. *Lunsjseminar at NIVA, Norway.* 27 March.

Vøllestad, L.A. Understanding life-history variation in salmonids: new opportunities. *1st International conference on Integrative Salmonid Biology, Norway.* 17–20 June.

Wiig, E. Armoured to the bone. *CEES Annual Student Conference 2012.* 22–23 October.



A strain of Emiliania huxleyi, a coccolithophore species, isolated locally from the Oslo fjord
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Springboks in the Kalahari © Yathin Krishnappa

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