

NordForsk

magazine | 2011

– Nordic eScience will make a difference!

Juni Palmgren, Professor,
Stockholm University



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NordForsk

Cornelis Vis: Meeting Grand Challenges

Bengt Sundelius: Nordic cooperation on societal security

Jørn Olsen: Stress during pregnancy may affect the child's health

Gudmund Hernes: The greatest revolution in ideas since Copernicus!

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Approaching Grand Challenges the Nordic way

Placing today's developments in perspective, the Grand Challenges of our time are visible along several main lines – economic instability, climate change, pandemics and security threats. The size and complexity of these challenges are linked to instant or long-term effects which might occur with unequal strength in different parts of the world. One main problem is that, while the drivers behind the grand challenges are global and complex, contemporary research and innovation instruments are in most cases national and sector-based. This calls for improved and more ambitious coordination of research and innovation initiatives, and the Nordic lessons learned so far make us believe that it is possible to contribute to solving global challenges through regional collaboration.

In the coordinated efforts crucial for facing today's challenges, NordForsk is a unique platform for coordination of regional contributions based on Nordic added value. This means that the effects of cooperation could be defined in terms of benefits and strengths. Nordic benefits are achieved when the results of Nordic collaboration in research and innovation are put to use in society for the public good. Examples of benefits from Nordic collaboration are improved medical treatment or prevention of public health problems, ability to promote green growth and adapt to climate change which might include extreme weather conditions.

Nordic strengths are built on processes for quality assurance such as peer-review and the creation of critical mass in small or scattered areas with great potential for creating benefits. The flagship with regard to strength is the Nordic Centres of Excellence based on a real common pot. Finally, a precondition for Nordic strengths is the existence and continuous creation of common cultural values and trust, alongside a low degree of political-administrative fragmentation. All the above constitutes the basis for organisations such as NordForsk to act as a legal entity with the mandate and ability to move from policy to action in a pragmatic way.

In 2011, NordForsk decided to focus on larger and more strategic initiatives. The priorities for the period 2011 – 2014 fall within the areas of research infrastructure collaboration, building Nordic-EU relations, funding of research collaboration,

providing policy analysis and communicating the results. Several of the concrete initiatives are presented in this magazine. The Nordic eScience Globalisation Initiative and the Nordic Data Grid Facility are hosted by NordForsk from autumn 2011. The sharing of infrastructure across borders and access to data constitutes Nordic strength. The Nordic region has competence within the health sector and possesses data and health registers from a large number of the population. Such registers contain both social and biological data, e.g. data on employment rate, level of education, human genome and health conditions. In sum, the Nordic countries possess a gold mine of registers resulting in the possibilities for urgently important multidisciplinary knowledge production in response to grand challenges. When this treasure is fully exploited it can be used to prevent lifestyle diseases, improve medical treatment and accomplish social innovations, e.g. in the labour market and the educational system.

The Nordic countries are highly knowledge-intensive societies. The performance and international attractiveness at all levels of the educational systems are therefore a political priority. In the autumn 2011, NordForsk starts a large initiative within Educational research. The purpose is to strengthen the knowledge about our educational systems which among broad groups of policy makers is considered to be of crucial importance for the future.

All in all, the Nordic countries have favourable regional conditions for research collaboration and for transferring and contributing to the use of this knowledge on a regional and global level. The ambition is that NordForsk in close cooperation with stakeholders can further develop already started and new initiatives, and in this way provide a basis for turning the Grand Challenges of our time into opportunities and progress with the help of knowledge.

*Gunnel Gustafsson, professor
Director of NordForsk*

*Guðrún Nordal, professor
Chair of the NordForsk Board*



Guðrún Nordal, Chair of the NordForsk Board and Gunnel Gustafsson, NordForsk Director. Photo: Terje Heiestad

Leif Eriksson

Illuminating the research landscape

Who is carrying out research, and on what topics? What findings are being produced? How is this research funded? How significant is the Nordic region in the scope of research? NordForsk has now initiated research landscape analyses to answer these questions and more.

A research landscape is a description of the research activities and policies within a given geographic region. Since research is often funded through tax revenues, a region tends to coincide with a nation, state or, in the case of Europe, with the EU member states. The Nordic region, however, has a long tradition of cooperation through the Nordic Council of Ministers, and thus represents an interesting geographical region to analyse.

– In order to reflect the complexity of a research landscape, a number of different analytical methods may need to be applied, the results of which can sometimes be perceived as abstract. But grouping the results geographically can make the

connections clearer, explains senior adviser Leif Eriksson, who is in charge of NordForsk's landscape analyses.

Background knowledge is vital

Many organisations within the Nordic region have been working to describe the research landscape, but usually from the perspective of a single country. Descriptions may be based on simple, direct data such as the number of professors or publications, or may involve more complex indicators. One of the challenges is to combine data from different studies and countries. This requires in-depth background knowledge of the countries and how their public administrations function, how they fund research, as well as the extent and focus of private funding.

Complex picture

Simply having access to data about the various components, however, is not enough; understanding and interpreting the research landscape requires insight into the relationships between them in an overall perspective. Prioritisation at dif-

ferent levels within the research community needs to be made more visible and included, such as how cooperation between universities is to be carried out. Data is available from many high-quality network studies that have been carried out.

– This is a complex picture to illuminate, requiring an understanding of how the details interrelate with one another. After all, the objective is to describe a dynamic interaction, not a static relationship, adds Eriksson.

Better research and better conclusions

The intent of this type of analysis is to aid decision-makers and researchers in determining where research efforts should be invested – including whether to allocate funding for certain research areas, and if so which projects, or whether to increase allocations to a certain group, for instance researchers who have recently completed their doctorate degrees. Landscape analyses should also identify the research areas with added value in the Nordic context.

A vital component of this work is to disseminate findings as well as provide easy access to analyses and descriptions while keeping these up to date.

Strategically innovative

Research landscape analysis represents a new task for NordForsk, originating in the current organisational strategy and set to expand during the 2011-2014 strategy period. Since the landscape analyses involve both innovation and an increase in activities within NordForsk, additional personnel with experience from government ministries and research councils has been sought. Dr Leif Eriksson has joined NordForsk from the ranks of the Swedish Research Council in Stockholm.

NordForsk is a small, independent organisation well-suited to conducting this type of analysis. Activities will be developed under the auspices of NordForsk, and the existing cooperation and coordination within the Nordic region will make it possible to generate reliable analyses. Coordination at the international level will also be needed to give the analyses a broader international perspective.



Leif Eriksson. Photo: Terje Heiestad



Juni Palmgren

The pieces are falling into place

– We are now seeing many pieces falling into place with regard to Nordic collaboration on eScience and eInfrastructure, says Professor Juni Palmgren, head of the steering group for the eScience globalisation initiative. She has been involved in the process from the very start, and takes us back in time.

– After five years of effort, we are happy to see that the Nordic eScience globalisation initiative has started. Meanwhile, the decision has been taken that NordForsk will host the cooperation organisation for eInfrastructure – Nordic eInfrastructure Cooperation (NeIC).

In 2006 the Nordic Council of Ministers appointed an ad-hoc eScience Work Group to propose a joint Nordic strategy, with a focus on collaborative activities that would generate Nordic added value. With her interest in both Nordic cooperation and eScience, Professor Palmgren readily took on the task of leading the group when asked to do so.

– It was a very interesting – but very intense – period, she recalls, and there were divergent views as to where we were going and why. The group's report was completed in summer 2007, and the professor remembers the strenuous last few days, working at her cabin, using a refrigerator as a desk. The strategy report is still used to illustrate the beginnings of Nordic cooperation on eScience.

Take the research councils hostage!

– Take the research councils hostage, recommended the work group. – That should get the ball rolling! Shortly thereafter NordForsk established the eNORIA-group, whose task was to formalise the process of drawing up a larger initiative. It took quite a bit of time, however, from the establishment of eNORIA to the realisation of the eScience globalisation initiative. The establishment of the globalisation initiative clearly reflects the overall Nordic political agenda. Moreover, the researchers have long been working with these issues in substantive terms, explains Professor Palmgren. – Finland, Norway, Sweden, NordForsk and the Nordic Council of Ministers have allocated funding to the initiative. I'm convinced that it's only a matter of time before Denmark and Iceland also join in, she adds.

Both eScience and eInfrastructure

Europe is expanding its pan-European projects – such as the European Grid Infrastructure – to encompass more and more fields of research, and the Nordic countries are taking similar steps. The Nordic Data Grid Facility is being developed into a broader cooperation organisation for eInfrastructure for data storage and high performance computing (HPC), which has been dubbed the Nordic eInfrastructure Cooperation (NeIC). This brings together essential eInfrastructure components for key areas of science within the NordForsk framework. – We are certain that Nordic cooperation on eScience and eInfrastructure will generate added value. And now we have come so far that we can begin to translate ideas into action, says an enthusiastic Professor Palmgren.

– We have every opportunity to make a difference. And it goes without saying that such sophisticated infrastructure must extend beyond national borders – it must be Nordic, European, global.

Nordic researchers will solve problems

According to Professor Palmgren, the current focus areas of the eScience globalisation initiative – research on the environment/ climate and health – are areas in which the greatest benefit can be derived at the Nordic level. – Today, data in these areas is widely dispersed and heterogeneous, and it is stored in different places and at different levels. Harmonising and standardising those data will be a major challenge, but the time is ripe to do so and it must be done across national borders. These areas represent enormous potential for progress, and Nordic researchers must work together to find solutions to pressing problems. Our job is to facilitate the process.

Juni Palmgren is Professor at Stockholm University, Visiting Professor at Karolinska Institutet, Distinguished Professor at the University of Helsinki, and Secretary General for Research Infrastructures at the Swedish Research Council.

One of the first reports to identify the potential for developing eScience into a third pillar of research was published in the US in 1995. Since then, the field has made meteoric progress.

What is eScience?

– It used to be that we researchers had to basically be content with working in one of two ways: We could perform experiments or we could develop theories. Now we have a third option, which is based on the use of data-based tools to model or simulate complex phenomena and to analyse large data sets. The meteorologists were the first to utilise these new tools, but now the ‘third pillar of research’ is sparking off a major transformation in all scientific fields, explains Professor Sverker Holmgren.

There are two slightly different directions in eScience. One of these is based on the use of models to study topics such as the weather or the movements of migratory birds. The other direction is based on collecting large amounts of data from the European Organisation of Nuclear Research (CERN), for example, or from sensors in the Arctic to analyse the data and find connections that otherwise would have been concealed.

Studies models

The basis for all eScience is that the researchers use mathematical or statistical methods to build a data-based model of the phenomenon they want to study. For instance, the meteorologists collect data on the weather as it is today and then they try to calculate what the weather will be like tomorrow. Another example is researchers who create a digital model of a heart and then add a digital model of a new heart medication. It is much better to discover serious side effects in a software program than in an experiment on live humans.

– There are many experiments that we don’t want to do, should not do or cannot do in real life, but now we can use eScience’s tools to do them anyway. It is not possible, for example, to conduct an experiment with a supernova explosion or

an environmental catastrophe – it *has* to be simulated, Holmgren adds.

The spectacular progress made in eScience in recent years is due in part to the increasing speed of computers. But the computers have also become more difficult to use, partly because they contain a growing number of parallel processors. It is a challenge to write programs that work well on computers like these, and it is difficult to write programs that can analyse large amounts of data. This is why the researchers must continually work to develop methods, and this means in turn that their expertise is a vital resource. We have that expertise in the Nordic region, says Holmgren.

Professor Holmgren says that the young field of eScience is already entering a new phase, after only 15 years in existence. Many researchers are now so familiar with the data-based tools

that they want to go a step farther. They are no longer talking just about studying phenomenon or analysing data, but also about using the research results as a basis for decision-making, including in the policy sphere. But this requires even more of us

because we need to know how sound our results are. For example, what happens to the results if the conditions change slightly? How good is the data that has been entered? After all, we are working with models, and models are not the same as reality, Holmgren emphasises.

Sverker Holmgren. Photo: Terje Heiestad



Sverker Holmgren

Bolstering the role of Nordic eScience

The Nordic region has achieved a strong international position in the field of eScience, as the Nordic countries have been conducting research independently of each other. – We have good reason to expect outstanding results when the Nordic countries join forces to launch a large-scale collaboration in this area, says Professor Sverker Holmgren.

On 1 September 2011, Sverker Holmgren assumed his new position as programme director for the new NordForsk eScience Globalisation Initiative, which will provide funding to interdisciplinary Nordic research projects and researcher training in the field of eScience. The Nordic national research councils, along with NordForsk and the Nordic Council of Ministers, have allocated a total of NOK 120 million over a four-year period. The funding will be a supplement to the ongoing national allocations. – There are many Nordic projects, but there are not too many with a lot of money to distribute. This new initiative shows that policymakers in the Nordic region have come to understand the importance of eScience, states a pleased Holmgren.

Significant potential

Holmgren is optimistic about the future outlook for Nordic eScience. – The Nordic region has managed to achieve a leading position in eScience and the related research infrastructure even though the Nordic countries have mainly been conducting research independently of each other. Up until now, the Nordic countries have specialised in different areas, but it is also the case that these areas of specialisation largely complement one another. Now we will unite the Nordic expertise within the framework of the globalisation initiative. We are very optimistic about this new effort. The initiative can help to bolster the international position of the Nordic regions in eScience even further, says Holmgren.

The globalisation initiative will focus primarily on research in the areas of the environment and climate change as well as on health and the social preconditions for health. Research training will also be a key area of activity, and the development

of software and other tools for use within eScience will be another crucial area. In addition, the initiative will be closely linked to important components of the research infrastructure in the field, which includes high-performance computers, federated databases and ICT grids. The Nordic countries already have a well-developed computer network among the research institutions, so the initiative will not allocate resources to this.

Rapid development

The steering group for the initiative held a preparatory meeting even before the director had come on board. – This is an area that is developing rapidly, so it is important to draw up a work programme and issue the first funding announcements as quickly as possible, Holmgren explains.

According to Holmgren, perhaps the greatest challenge for Nordic eScience will be to put together research groups that have genuine interdisciplinary expertise. – Almost every eScience project requires interdisciplinary expertise if it is to truly make significant advances. For instance, climate model researchers should not only work with programmers, mathematicians, statisticians and model experts, but also cooperate with social scientists and others who study the impacts of climate change. Most important of all, however, the globalisation initiative must provide funding to Nordic research projects that the individual countries could not implement on their own, Dr Holmgren explains.

The new programme director completed his doctoral degree at Uppsala University in 1993. – The job as programme director is very interesting for me personally because I get the chance to use my experience as a researcher and my extensive network of contacts in the Nordic region and internationally in a new way. I am also very pleased that the job allows me to continue as an active researcher, says Professor Holmgren.

Sverker Holmgren is Professor of scientific computing at Uppsala University and Director of Swedish National Infrastructure for Computing (SNIC).

eInfrastructure supports Nordic top-level research

eScience, together with its foundation eInfrastructure, has become the third pillar of scientific investigation, alongside theory and physical experiments. eInfrastructure is used extensively by researchers who work with simulations, modelling and data analysis.

The Nordic countries have longstanding traditions within both eScience and eInfrastructures. Moreover, projects such as the Nordic DataGrid Facility will pave the way for future eInfrastructure collaboration with a wider scope.

What special advantages do we have in the Nordic countries in terms of eInfrastructure?

Belsø: The Nordic countries share many common features. We are small, wealthy countries having little to offer this world, which others cannot provide almost equally well, but at a significantly lower cost. However, our population is well-educated and is able to manage a complex political context better than most others. We have the advantage of understanding the importance of research and development (R&D) as well as information and communication technology (ICT) and are willing and able to do something about it. We are in a position where we can provide good examples of collaborative efforts to the rest of Europe.

Koski: We also have a geographical advantage: Cold climate makes it more cost efficient to run data centres. I agree with René that the Nordic countries are also well organised and have a high-quality educational system, making relative competence in ICT high. It is also often easier to agree on collaboration between Nordic countries due to their similar targets and existing joint activities – this can lead to synergy effects giving higher quality at lower cost.

How can we use the benefits best to support research in the Nordic countries?

Koski: Quality of eInfrastructure is one of the main competitive factors today due to the increasing impact of computational science. In the Nordic countries we can share infrastructure to support Nordic top-level research, but also try to do some kind of profiling in different areas and exchange resources.

Belsø: I agree with Kimmo. The Nordic countries must increase investments in complex R&D and its supporting eInfrastructures. Between our countries, we must pursue joint

investments, specialisation and division of labour, even when it means painful reorganisation and shifts in funding recipients.

Can the Nordic countries learn from each other and/or take advantage of the differences of the national structures?

Belsø: By joining forces the Nordic countries can share experiences, utilise each other's strength positions, remedy weaknesses, and engage in joint operations and developments so as to stand at least equal among European peers. In many cases we have already formed our alliances and can use them on the European scene.

Koski: And after all, the systems are not so different. The national systems are organised differently in the Nordic countries, but it does not prohibit us from learning or prevent collaboration. Increasing interaction such as summer schools or exchange of students/post-docs are valuable ways to learn from each other.

How do we create Nordic added value vis-à-vis Europe and the rest of the world?

Belsø: With cooperation, otherwise the Nordic strategic technology opportunities are repeatedly missed and efforts are duplicated. NordForsk can provide secretariat support as well as coordination, and can facilitate policy agreements, thereby strengthening our Nordic alliances.

Together, our capabilities surpass those of Europe's biggest countries in terms of technology proficiency and policy influence.

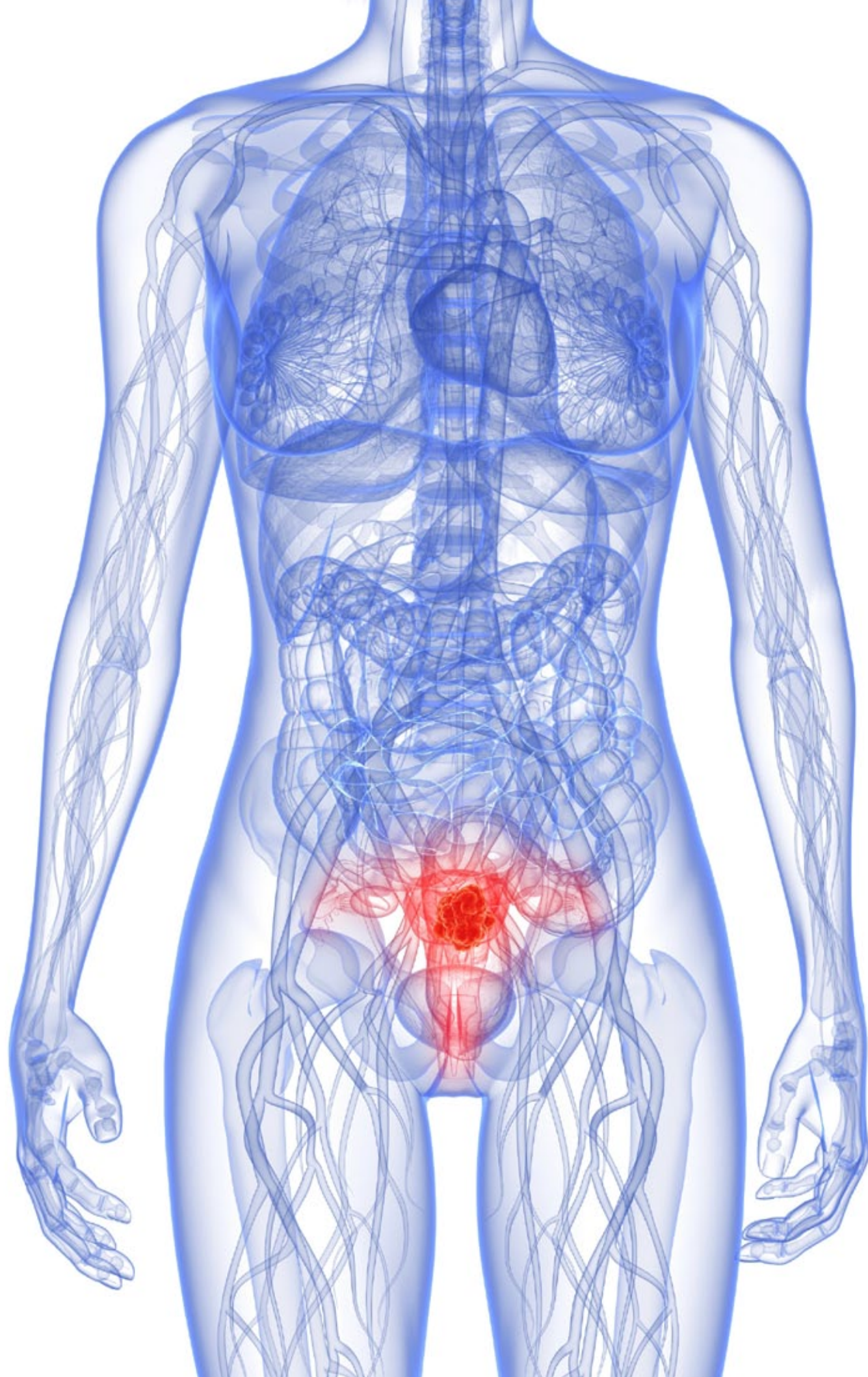
Koski: It is also clear that by being active in Europe we can influence the decision making in eScience to fit to small and medium-sized countries, such as the Nordic countries, as well. We have great potential to collaborate to make an impact, and it is very important to have a well-organised national eInfrastructure of adequate quality. NordForsk as the host of NeIC can play a major role, together with the personnel working in NeIC, steering board decisions, funding bodies and others.



Photo: Terje Heiestad

Kimmo Koski, (left) Managing Director, CSC - IT Center for Science, Finland

René Belsø, (right) Director of the Danish Center for Scientific Computing (DCSC)



Magnus Stenbeck/Elisabeth Rynning

Registry-based research saves lives – the EU must act

The EU is preparing a new Data Protection Directive that has made many Nordic researchers react. – Under the first draft of the new directive, we risk losing the opportunity to carry out research that could save many human lives, warns Magnus Stenbeck.

When 200 Nordic and Baltic health scientists met in Reykjavik in June 2011 to discuss epidemiology and registry-based health research in the Nordic region, a workshop was financed by NordForsk. A decision was made by the participants to write an open letter to European decision-makers. – We are also planning to submit articles to journals such as European Journal of Public Health and British Medical Journal, because this is a truly serious matter we are facing, says Associate Professor Magnus Stenbeck. – The EU risks adopting legislation that could threaten the extraordinary Nordic registry and biobank-based research that has already saved many human lives – and can save even more in the future.



Magnus Stenbeck

Working out the new directive

The first EU Data Protection Directive, from 1995, contained provisions designed to protect personal data uniformly in all EU member states. However, the directive contained an exemption allowing countries to establish their own regulations, which in practice has limited the opportunities to exchange personal data for research purposes.

The guidelines for a new directive, which were made public in November 2010, were intended to facilitate the exchange of data. But they also contained a recommendation that could end up requiring the active consent of individuals each time their personal data is to be used for research purposes, which would reduce the value of any data exchanged. – Then we would lose the possibility of having ethics committees assess research proposals on behalf of the public, says Stenbeck. – In practice, it is impossible to ask several hundred thousand people for their consent on using personal data in research – essentially putting an end to registry and biobank-based research on large groups of people, as has been carried out in the Nordic region up to now.

Life-saving research

Nordic researchers have used biobanks and health registries to devise a mass screening procedure for cervical cancer based on cell samples. Estimates indicate that each year, cell sample testing in Sweden alone could spare 1 000 women from contracting cervical cancer by detecting cell changes in its early, treatable stages. This would save the lives of roughly 350 women in Sweden annually, which extrapolates to roughly 20 000 fewer deaths per year if all the EU member states were to introduce general screening.

The first draft of the EU directive has drawn criticism from private individuals, organisations, governments and authorities; a revised proposal is planned for autumn 2011.

– Following that, it will take at least a year for the proposal to reach the EU Parliament for a final decision, so in the meantime, urges Dr Stenbeck, we need to seize the opportunity to influence the EU system. The Nordic countries have uniquely comprehensive biobanks and health registries. Their value in research is well-documented.



Elisabeth Rynning

Professor Elisabeth Rynning, who heads the NordForsk-funded Nordic Network for Research in Biomedical Law, agrees that this is a vital issue in which Nordic researchers should get involved. – Advances in information technology have created new opportunities for exchanging information. – At the same time, the professor points out, – the focus on protecting the integrity of the individual has sharpened.

So it is necessary to find a new balance between collective and individual interests.

Professors Jan-Eric Litton and Joakim Dillner are heading a new Nordic project to study how colon cancer can be detected in its early stages and to document that biobanks and health registries save human lives (see article). If the final EU directive wording is too rigid, it will make it difficult to carry out these kinds of studies.

Associate Professor **Magnus Stenbeck** of Karolinska Institutet's Department of Clinical Neuroscience is also Director of the Database Infrastructure Committee (DISC).

Elisabeth Rynning is Professor of Medical Law at Uppsala University's Faculty of Law.

Jan-Eric Litton/Joakim Dillner

Nordic model for future health research

Until recently, Nordic research employing biobanks and health registries has primarily been nationwide in scope. Now, researchers in the Nordic countries are pooling their resources in a new Nordic project to study how to detect colon cancer in its early stages – and to document how biobanks and health registries can be used to save human lives.

Colon cancer is a serious disease contracted by roughly 15 000 people in the Nordic region each year. Mortality is very high for patients beginning treatment too late. But when this cancer is detected in its early stages, physicians can usually bring patients back to health. – Colon cancer is therefore an ideal subject for documenting that the Nordic biobanks and health registries can be valuable for lifesaving research, says Professor Jan-Eric Litton, at Karolinska Institutet's Department of Medical Epidemiology and Biostatistics (MEB).

Resources for unique research

The Nordic countries have resources that provide a basis for unique research: this includes biobanks containing blood and other biological samples donated by a large portion of the population, as well as comprehensive health registries that keep track of persons with a variety of serious illnesses. – From the health registries we can identify roughly 10 000 people in the Nordic region who have developed colon cancer – and we can study the blood samples they donated perhaps 10-15 years earlier, when they were still healthy, explains Professor Joakim Dillner, also at MEB.

– There are several factors that can be identified in blood samples as early markers of cancer development, explains Dillner. – Certain metabolic trace elements are often detectable in the blood several years before a patient is diagnosed with cancer. Moreover, analyses of DNA, a person's «genetic material», can identify genetic risk factors associated with increased probability to develop cancer. RNA which is transcribed from the DNA provides the cells in the colon with information on how to grow. Using new techniques we can profile and quantify

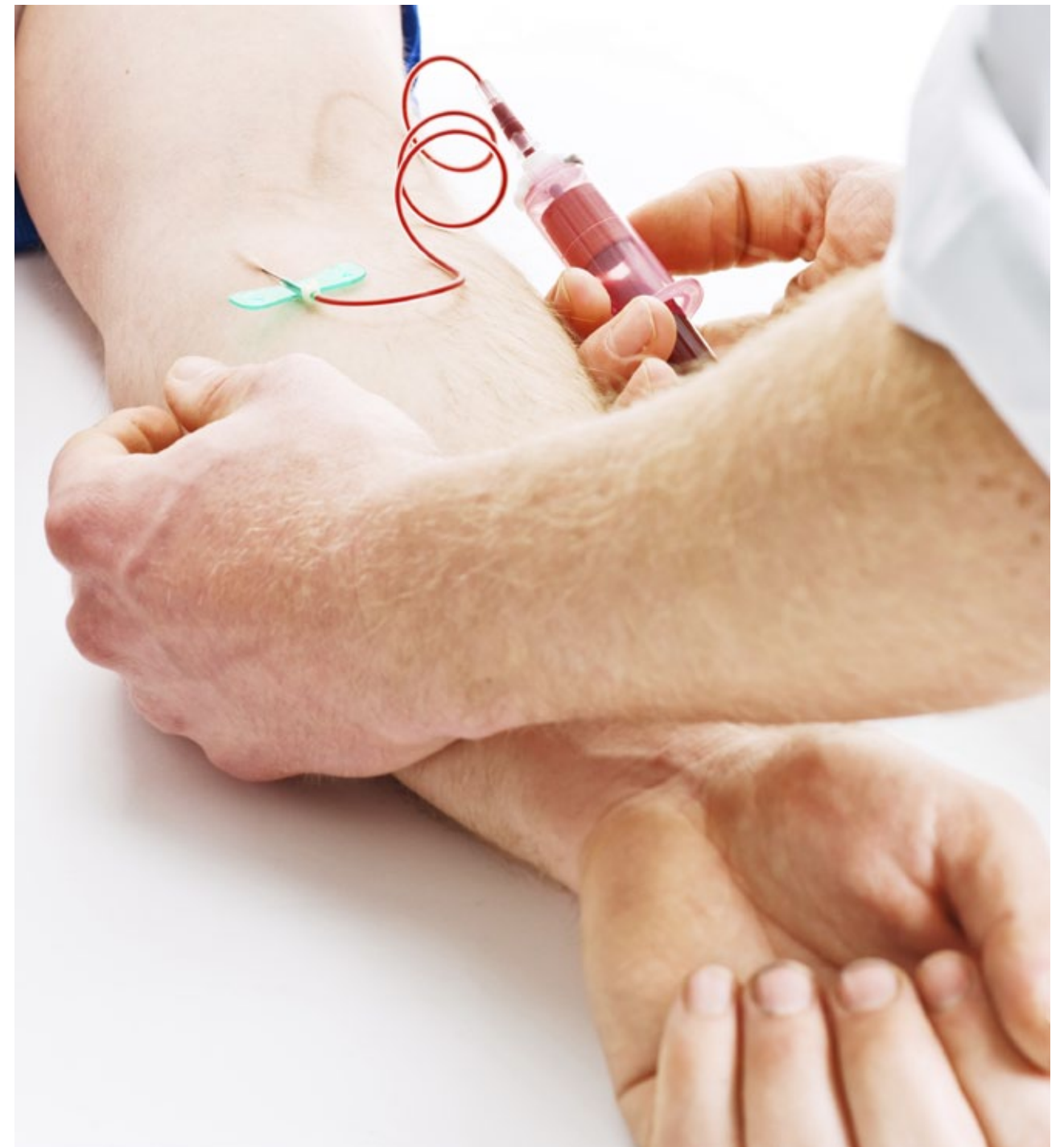


Jan-Eric Litton and Joakim Dillner are professors at the Karolinska Institutet's Department of Medical Epidemiology and Biostatistics. In the middle, President of Karolinska Institutet Harriet Wallberg-Henriksson. The photo is from the opening of the Swedish National Large-Scale Biobanking Facility (SSB) in 2010. Photo: Karolinska Institutet.

certain variations in RNA levels in colon cells which are very early markers of abnormal cell behaviour and progression of cancer.

A priority both for the Nordic region and Europe

The European organisation for research infrastructures ESFRI (The European Strategy Forum for Research Infrastructures) has given priority to BBMRI (Biobanking and Biomolecular Resources Research Infrastructure), which is one of the largest research infrastructure projects in Europe. Professors Litton and Dillner are the Director and Deputy Director, respectively of the Swedish national hub, BBMRI.se. Professor Litton is also the leader of BBMRI Nordic, an initiative launched as a collaborative effort between the national networks of biobanks in Sweden, Finland, Norway, Denmark and Iceland. Estonia and the Faroe Islands have later joined the network. In the pilot study Joint Nordic Biobank Research Infrastructure, initiated autumn 2011, Nordic researchers will share information and infrastructure in order to increase knowledge about the causes of colon cancer. NordForsk has provided funding for this cooperative



Residents of the Nordic countries have been donating blood over many years. The samples can be used for lifesaving research. iStockphoto

project as part of a strategic initiative for Nordic cooperation on research infrastructure.

– Other countries do have health registries and biobanks, but what is unique about our registries is that they are structured so similarly that they allow combination at the Nordic level which significantly increases the amount of information. Another unique feature of the Nordic registries is that they contain personal identity numbers, so that an individual can be followed over many years. This enables researchers to carry out large-scale studies of rare diseases for which a single country may have too little data, the professors explain. – The Nordic

countries together possess data with such high quality that we have the potential to become the international leading force for this type of research.

Setting a new standard

– If good results are achieved in this way, then the same principles could be systematically applied to a number of other large-scale disease studies at the Nordic level, comments NordForsk Director Gunnel Gustafsson. – This project could help to set an international standard on how to best collaborate on large-scale biobank-based research.

Jørn Olsen

Stress during pregnancy may affect the child's health

Research indicates that when a pregnant woman experiences severe stress, the risk of premature birth increases. Her child may be more vulnerable to developing heart defects, diabetes and obesity. Researchers are able to identify correlations such as these in the Nordic region thanks to the countries' uniquely comprehensive health registries.

When a Norwegian is diagnosed with cancer, the treating physician reports the patient's name, personal identity number, address, diagnosis and treatment plan to the nationwide Cancer Registry of Norway. Each Nordic country has a corresponding registry for cancer and for a number of other diseases. Professor Jørn Olsen at Aarhus University and the University of California, Los Angeles (UCLA) heads a NordForsk-funded project that demonstrates the value of the Nordic health registries for revealing new and significant correlations.

– Previous research has shown that if rats and mice undergo stress during gestation, offspring morbidity (disease rate) increases, explains Professor Olsen. – We were interested to learn if this also holds true for humans. But examining the effects of stress is no simple matter, since some people can become highly stressed in situations that may not affect others. So the researchers needed to find a sufficiently large group of women who had unambiguously been exposed to acute stress. Looking into the Nordic health registries, they found anonymised information on women who had lost a child or other close family member immediately prior to or during pregnancy. It was also possible to follow the newborns' health development for up to 30 years. – It is well known from psychology that such deaths in connection with pregnancy are extremely stressful, says Professor Olsen.

Stress and health problems

Fortunately, women rarely lose a previous child during pregnancy; the number of such cases within a single Nordic country is statistically too small to show correlations. However, by using health registries in multiple Nordic countries, the researchers were able to collect enough data to draw conclu-

sions. After three years of study, the project yielded its first finding: If a mother experiences severe stress during pregnancy, the frequency of premature birth increases. The researchers in the project were also able to document a higher incidence of heart defects and diabetes types 1 and 2 in the children, as well as a higher post-puberty obesity incidence. Stress in the early pregnancy was shown to be particularly harmful.

Opportunities for further research

Professor Olsen sees great potential for using the Nordic registries in future research. – It is possible, for example, to conduct large-scale studies to identify factors that affect the development of cancer, diabetes, cardiovascular disease, mental health disorders, and so on. The Nordic registries also present the opportunity to search for, say, undesirable side effects of medications taken over a long period of time, such as medicines to lower blood pressure or cholesterol. We also want to identify the effects of different cancer treatments in the Nordic countries and examine whether some are more successful than others. There are so many possibilities!

– Receiving funding from NordForsk was critical, as it enabled us to start the project and gain access to registries in all of the Nordic countries. In addition, adds Professor Olsen, it paved the way for subsequent funding from the EU.

Jørn Olsen. Photo: Aarhus University



Jørn Olsen is Professor at the Aarhus University School of Public Health and at the University of California, Los Angeles (UCLA) School of Public Health.

Severe stress in pregnant women can lead to higher incidence of health problems in their children, even many years later.
Jess Wiberg/iStockphoto

The research project **Construction of the Nordic Prenatal Stress Cohort** (2008–2010) received funding under NordForsk's call for proposals for Joint Nordic Use of Research Infrastructure. The project has compiled a database of registry data for nearly 1.3 million children born in Denmark from 1970 to 2004, in Sweden from 1973 to 2006, and in Finland from 1987 to 2007. The European Research Council (ERC) has allocated funding for continuation of the project until 2015.

The most promising

What is the point of Nordic research cooperation in a world of transboundary research? And how can Nordic cooperation be improved? NordForsk Magazine has spoken with three promising young Nordic researchers.

All three have received the prestigious European Research Council Starting Independent Researcher Grants (ERC Starting Grants) in 2011. This grant scheme targets up-and-coming researchers seeking to establish their own research group in Europe. Recipients are awarded up to EUR 2 million for a project period of up to five years.

Norwegian Kenneth Ruud is one of the 40 Nordic scientists to receive the grant in tough competition with over 4 000 European researchers. Ruud is a professor at the University of Tromsø, the world's northernmost university, and from his northerly perch he knows that research extends beyond national borders. Nevertheless, he believes that there are certain advantages to cooperating with Nordic colleagues rather than colleagues elsewhere, even though it is just as easy for him to hop on a flight to London as it is to Stockholm.

– Nordic chemists have a longstanding tradition of cooperation, primarily for the sake of the science, but there are other reasons to collaborate at the Nordic level as well. We're more informal here in the Nordic countries, which helps things run more smoothly.

Ruud works in theoretical chemistry, a field that is no stranger to cooperation at the Nordic level.

A tradition for sharing



Kenneth Ruud

– We have a well-established tradition of 'divvying up' research questions to avoid overlapping activities. We have also been collaborating on a data program system for the past 30 years. This cooperation has given us a competitive edge in the international market. One needs a certain scientific gravitas to succeed at the European level. This is hard to build within our separate nations, so Nordic cooperation is very helpful in this respect.

Ruud heads a Norwegian Centre of Excellence and has participated in the Nordic Network of National Centres of Excellence under the auspices of NordForsk.

– It has been very beneficial, but I wish these networks could be used even more effectively as a tool for boosting our competitiveness at the European level. A strong support network is vital when trying to get a foot in the door of EU research. NordForsk could ideally take on a more visible role in this context, he says.

Ruud would also like to see more substantial investment in infrastructure as a component of Nordic research cooperation.

– Part of the EU Seventh Framework Programme's Capacities programme is dedicated to further developing and optimising the use of existing research infrastructure. Significant coordination efforts are already underway, he says, but perhaps the Nordic countries could work together more unified to carve out a larger role in this initiative, he suggests.

Need more than meeting-places



Anja Groth

Danish researcher Anja Groth, an associate professor at the Biotech Research and Innovation Centre (BRIC) at the University of Copenhagen, does not consider a common culture to be the most important aspect of Nordic researcher cooperation. She is primarily interested in understanding the functions of chromatin, which controls gene expression and DNA replication and prevents DNA damage.

– My main concern is finding people with the expertise I need. As an independent researcher, I don't think too much about where these researchers come from. Nevertheless, she says, I do think Nordic research cooperation has a significant role to play.

– First and foremost it is important for Nordic society, as research is crucial to knowledge-building and economic growth. That is why it is vital to enhance Nordic cooperation in my field. When I organise major conferences I try to hold them here in the Nordic countries in order to draw more attention to and promote development in my field.

According to Groth, organisations such as NordForsk serve an excellent purpose. She became acquainted with NordForsk through the researcher network Chromatin, Transcription, and Cancer, in which her laboratory participates.

– But we need more than meeting places. We also need financial incentives to engage in Nordic cooperation. Funding will make it more attractive to establish research groups that can exchange technologies and take advantage of each other's expertise, she says.

Little cooperation on large questions



Anders Johansen

In contrast to the field of chemistry, there has been very little Nordic cooperation on astronomy research. And this is sorely missed, according to Danish researcher Anders Johansen. A senior lecturer at Lund University in Sweden, Dr Johansen was awarded the ERC Starting Grant to study extrasolar planets, or exoplanets, an area of astronomy undergoing extremely rapid growth. Over 550 exoplanets have been

discovered since 1995.

– This type of research is fascinating because it may help us answer one of the most enduring questions in astronomy – and in science in general: Is there life on other planets? I'm surprised there isn't greater interest in this exciting field here in the Nordic countries. Once my grant has been transferred I'm going to invest in building a stronger Nordic research community in precisely this field by encouraging Nordic candidates to apply for the doctoral and post-doctoral fellowships within the framework of the project.

The ERC Starting Grant is a very attractive and sought-after award, but not many Nordic researchers have the potential to qualify for it. According to Johansen, the Nordic countries need a similar grant scheme of their own.

– I've previously worked in the Netherlands and Germany. Both of these countries have grant schemes for younger researchers seeking to establish their own research teams, but we lack such a scheme in the Nordic countries, which is a real weakness, he points out.

Dr Johansen works in Sweden and had to learn Swedish for the administrative part of his job – but this was not a problem.

– Not only do Nordic researchers speak similar languages, we share a common culture as well, which makes it easier to collaborate. I think it is completely natural to view the Nordic countries as a single unit, he concludes.

Gard Titlestad

NordForsk a safe haven in an uncertain Europe

– NordForsk is one of the most successful initiatives on Nordic cooperation ever established. The organisation can take on even greater importance in a Europe marked by uncertainty, says Gard Titlestad, who recently stepped down as the head of the Department of Knowledge and Welfare under the Nordic Council of Ministers.

Mr Titlestad is well versed in Nordic and Europe research cooperation. As the Counsellor for Research for the Norwegian EU delegation in Brussels, he took part in the first meetings that led to the establishment of NordForsk in 2005. He has since left the field of Nordic research cooperation to assume the position as Secretary-General for the International Council for Open and Distance Education (ICDE).

– NordForsk is entitled to be proud of what it has achieved so far. In the last couple of years the organisation has really taken off. Now it's delivering on its promise.

The power of good examples

Mr Titlestad points to the Top-level Research Initiative as one of the clearest examples of Nordic cooperation at its best. The initiative is modelled on the knowledge triangle – that is, the interaction between education, research and innovation. Titlestad believes this is unique and should serve as a model for NordForsk's activities in the future. Other good examples are the eScience Globalisation Initiative and the Joint Nordic Education, Research and Dissemination Initiative.

– If I were to give advice to NordForsk, I would say they should be clearer about what they do well and bring people's attention to the good examples of successful Nordic cooperation on research and innovation. The potential to further develop the organisation is enormous. There is every reason to have high aspirations for the future.

Not a research fund

NordForsk was never intended to serve as a new research fund. Titlestad says we must not forget that.

– Even if the politicians had allocated 100 million NOK extra to the organisation, which I of course would hardly have opposed, it's not certain that NordForsk could have been more

successful. NordForsk's strong suit is its role as facilitator and integrator. I believe this is what the organisation should profile more clearly. This is what NordForsk does best and should build on. Today all countries focus on the importance of knowledge, but NordForsk is able to get key interested parties to collaborate on major knowledge initiatives. In the long run this will trigger funding as well, says Titlestad.

– Many people are impatient on NordForsk's behalf, but don't forget that the organisation is still quite young.

Don't forget innovation!

Mr Titlestad believes that NordForsk could give innovation a bigger boost than it does today.

– The development of new products and concepts is linked to the development of new knowledge. So we mustn't forget that NordForsk also has a job to do in the area of innovation. It's not only the responsibility of NordForsk's partner organisation in Oslo, Nordic Innovation. Research-driven innovation is a strength as well as a key activity of NordForsk.

– I would like to see incentives to promote integration between NordForsk and Nordic Innovation in areas where these will clearly be beneficial. It is crucial for both organisations – and Nordic Energy Research – to have arenas where key parties can interact. And not least, the operative players 'on the ground' will benefit greatly from integrated initiatives that can generate new knowledge and promote value creation.

An envious EU

Those who have closely followed European research cooperation will know that NordForsk has managed to realise «in miniature» several of the visions for research cooperation to which the EU has aspired but has not achieved. This is true especially for the EU's aim to allow funding from the multi-national organisation to melt with national allocations. Titlestad thinks the EU is looking a bit enviously towards the Nordic countries right now.

– The EU would like to have achieved this itself. The model is very good and it would have triggered major research funding from European countries, if the EU had succeeded. In this context the Nordic region can provide inspiration to Europe as a whole.

– The financial crisis is making the situation in Europe very insecure. This gives new momentum to Nordic research cooperation since NordForsk represents solidarity and inspires



Gard Titlestad in his new office in Oslo. Photo: Terje Heiestad

confidence, explains Titlestad. – As a consequence, the conditions for Nordic research cooperation are better than when the organisation was founded, in an era of optimism. A Europe in crisis may lead to new solutions that we hadn't thought of before.

Dramatic rise and fall

Gard Titlestad has worked with Nordic cooperation for many years and has seen enthusiasm for it both rise and fall – dramatically.

– Remember that Nordic cooperation is broad, diverse and has popular support. Cooperation among the authorities is often more of a symbol of this solidarity.

– Some people are disappointed that not everyone participates, that not all of the Nordic countries are equally committed at all times. But NordForsk has shown that not everyone needs to take part all the time. It is often enough that three countries take the lead in order for cooperation to function well.

Bengt Sundelius

Nordic cooperation on societal security

Threats to societal security can have natural or human causes. Such threats include climate change and its impacts on nature and our way of life, collapse of critical infrastructure such as energy and water supply systems, organised crime, and terrorism. All of these have one thing in common: they extend across boundaries.

– There is unique transparency in the Nordic countries surrounding societal security and preparedness planning, says Professor Bengt Sundelius, who participated in the Nordic working group for increased cooperation on research, mapping and development in societal security and preparedness – one of six working groups established in the wake of the Nordic Haga Declaration of April 2009. In the declaration the Nordic ministers responsible for societal security and preparedness in their respective countries agreed that the countries should work together more closely on these issues.

Solving Grand Challenges requires broader cooperation

The working group focused on research relating to major events that trigger challenges across sectors and national borders. These «Grand Challenges», as they are called, are too extensive for a single country to tackle on its own, making it evident that research cooperation is sorely needed. – Issues of societal security and preparedness have topped the parliamentary agenda in the Nordic countries for many years, but not much research cooperation has taken place until now, says Professor Sundelius. – Research at the national level is very limiting, because each country is working on a relatively small scale. It is time to begin cooperating at the Nordic level, he declares. Nordic-based research activities many not be the first choice for younger, talented researchers who have the opportunity to collaborate with colleagues all over the world. Incentives must therefore be created to encourage them to cooperate at the Nordic level. – We are not talking about large sums here. Support for visiting researcher stays, travel expenses or network-building across national borders may be sufficient for creating a framework for future cooperation, Professor Sundelius points out, and cites the Research Programme on Societal Security

and Risk (SAMRISK) at the Research Council of Norway as an example of an initiative that achieved excellent results with limited funding. He hopes that these results will be utilised to improve practice within the field of societal security.

From declaration to practice

According to the solidarity clause of the Treaty of Lisbon of 2009 and the separate Nordic solidarity clause of 2011, European and Nordic countries shall come to each other's aid in the event of a crisis such as a terrorist attack, humanitarian crisis or natural disaster. It is therefore vital to build the capacity to provide such support when a crisis occurs. So how is this to be done?

– There are clear, common societal needs that can form the basis for a Nordic research agenda, and we must assess our strengths in the context of such cooperation. In which areas do Nordic researchers excel? And which fields are suitable for research? We can build on these answers to create a more clearly-defined framework for further development. We must forge close links between the actors who know about societal needs and the researchers who can ask the right questions. The Nordic Council is already on board – there is political will at the Nordic level and we must capitalise on it!

22 July

The manner in which Prime Minister Jens Stoltenberg handled the terrorist attacks in Norway on 22 July has been lauded around the world. The same cannot be said about the operative preparedness, says Professor Sundelius. – Norway is now in a similar state of shock as Sweden was after the assassination of Olaf Palme in 1986. Neither country was prepared because it was generally believed that nothing like that could ever happen there. The Nordic countries have gone through different types of crises and have much to learn from each other. Sweden, for example, handled the assassination of Anna Lindh in 2003 –

The Nordic working group for increased cooperation on research, mapping and development in societal security and preparedness submitted its report in November 2010. The report proposes a number of measures for enhancing cooperation. The Haga ministers will review the report in November 2011.



Photo: Terje Heiestad

17 years after Palme – in a totally different manner, as the country had learned from previous events and put this knowledge into practice. The other Nordic countries can also benefit from each other's experience by sharing knowledge.

How to capture a Black Swan

These tragedies have been a wake-up call in many ways – we now know that disasters such as these can strike in the Nordic countries as well. But Professor Sundelius warns: – We must be very careful and not let single events form the basis for a new, specialised research agenda. The agenda must remain generic because the next crisis will be something completely different. It is therefore impossible to thoroughly prepare ourselves for such a Black Swan event. What we need to do is acquire skills and tools that we can apply in a way that best suits a new

situation when it arises – much like children put together Lego blocks to create a unique structure. This is the only way we can prepare ourselves to tackle the unknown. Everybody knows that black swans don't exist, yet they seem to materialise anyway.

Bengt Sundelius of the Swedish Civil Contingencies Agency (MSB) is Professor of political sciences at Uppsala University specialising in crisis management and international cooperation and the author of 18 books and numerous scientific articles on the topic of European and Nordic security. He is a member of the European Commission's FP7 Security Advisory Group, which shapes the direction of European research under the Security theme of the EU Seventh Framework Programme (FP7).

Cornelis Vis

Meeting Grand Challenges

Since the Swedish EU Presidency and the Lund Declaration of July 2009, a number of Grand Challenges were given a role on the agenda in the media, at work group meetings and at conferences.

The Nordic approach to meeting and solving challenges ahead has been put forward by academics and policy-makers alike. The economic crisis in Europe opens for new approaches and new mindsets to meet challenges facing society and the way we live.

Cornelis Vis works at the Bureau of European Policy Advisers (BEPA), a small unit attached to the President of the European Commission José Manuel Barroso, providing the president and the College of Commissioners with strategic analysis and policy advice.

His main concern is how Europe can generate new economic growth and jobs to overcome the economic crisis and to help reduce the levels of public deficit and debt across Europe. It is important to shift the focus from crisis management and back to delivering on Europe 2020 as agreed upon in 2010 by the EU Heads of State and Government. Research and innovation play a prominent role in the European reform and growth strategy which is being implemented in partnership with the EU Member States and national and regional stakeholders.

– We cannot return to ‘business as usual’ in Europe, to how things were before the crisis struck. The Innovation Union as one of the Europe 2020 flagship initiatives puts research and innovation at the heart of Europe’s reform to smart, sustainable and inclusive growth.

Apart from strengthening Europe’s knowledge base and measures to get more good ideas to the market faster, the Innovation Union advocates European Innovation Partnerships as a new way of tackling the major societal challenges facing Europe. We are, for instance, currently piloting an EIP on ‘Active and healthy ageing’. This is obviously linked to Europe’s demographic developments. But there are other candidates for Grand Challenges linked to resources such as food, water, raw materials for industry or energy, and to climate change.

Bringing stakeholders and resources across Europe together around such challenges makes sense in times where both public and private budgets for research and innovation are under pressure. And solving societal challenges will not only benefit our societies and all of Europe’s citizens. It will also provide new business opportunities and revenue and with that new growth and employment, states Vis.

Why did the European Commission propose a much higher European research and innovation budget for the next planning period, 2014-2020?

– The issue always seems to revolve around money. At the national level in particular, public research and innovation funding can easily be victim in times of austerity, as politicians tend to favour protecting other categories of expenditure, for instance for health and social protection, which have a more direct effect on the population than longer term investments in research and innovation.

Few politicians look further than the next elections. Last summer the Commission was courageous in presenting a European budget that carries an almost 50% rise for research and innovation in the 2014-2020 period. This is part of a deliberate strategy to gear the next European budget to the objectives of the Europe 2020 Strategy. It is important to see this proposal as an investment budget, a budget for growth. That doesn’t mean that in practice the sky will be the limit in these times of fiscal discipline.

We need to focus on both the national and the European level and ask not what is important, but what is *urgent*? We don’t only need to define Grand Challenges, we have to determine how to go about them, at national, regional and European levels. Who does what, what do we tackle first? Those types of questions.

A challenge in itself is to ensure that we do not end up at European level with a sum of all the ‘shopping lists’ of the items that each EU Member State feels is important at national level. Because then we risk losing our focus and with that we lose impact. And we need to look at the instruments we want to use at European level. In my view there is considerable scope to rationalise and simplify both the objectives and the instruments we use. That would make the EU research and innovation





Policy Adviser European Commission Cornelis Vis. Photo: Terje Heiestad

funding easier for research institutes and companies to use. But there is a trade-off – it may in turn entail that there is no longer something for everyone. And then there is of course the aim to simplify the funding process in an administrative sense, to render EU funding less bureaucratic. But for that we need to find a new balance between trust and accountability with the EU Member States and the European Parliament that scrutinises the EU expenditure.

In what way do the Nordic countries succeed as a region, and can they serve as a model in Europe?

The Nordic collaboration and NordForsk have a down-to-earth logic, where concrete work is done and practical problems are addressed. And of course we are aware that the Nordic region traditionally invests quite a lot in research, establishing links with innovation whenever possible.

The Nordic region has shared traditions and culture, even though there may be some differences in how research is integrated in society. The Nordic region is already inspiring new European member countries.

For instance we see how the Baltic countries are looking at Nordic collaboration and the ways in which the Nordic countries cooperate, and the Baltics are in dialogue with the Nordics in several fields. So there seems indeed to be scope for the Nordic collaboration to share its experience and practical successes with other European countries. This is of course part of the advantage of European collaboration in these areas. That we can learn from each other and move forward more effectively together, also in terms of achieving results that would not be possible to the same extent without pooled resources.

What future perspectives are essential in the European research collaboration?

Delivery is essential in these economically difficult times. Europe produces on the whole excellent research results, but is

less good in turning these results into new products, revenue and new growth. We urgently need to complete the European Research Area, to remove the remaining obstacles to free circulation of knowledge and researchers.

We need to facilitate entrepreneurial activity to bring more ideas to the market. This is not just a matter of culture, it is about access to finance, affordable IPR, faster setting of interoperable standards, etc. And we need to focus at the European level on a limited number of grand societal challenges and address them in a cross-disciplinary way.

To focus on and do more together with the resources that we have at the individual Member State level. That is why we have decided to integrate the current EU research and innovation funding programmes, FP7, CIP and the EIT, into a common strategic framework which will be presented before the end of 2011 under the name Horizon 2020. And if we want to stand a chance of in the end getting a substantial budget for Horizon 2020, we will need to show its added value upfront.

How its focus and its instrumentation is expected to deliver. Not only in terms of excellent research results, but in terms of actual innovations both for society and most urgently now for the market, through new products, new growth and new jobs. As I said before, there is no returning to ‘business as usual’ in Europe.

– We must focus on challenges, and the focus to meet them must be on both research and innovation.

– In times of economic crisis, and in order to be able to pay our debts, innovation and financial instruments are essential. The logic behind Horizon 2020 is based on a different mindset than current and previous research initiatives have been. More than ever before do we need to look at the interaction between research and innovation!

Top-level Research Initiative

– a major Nordic venture for climate, energy and the environment

In the autumn of 2008, as part of the Globalisation Agenda of the Nordic Prime Ministers, the Nordic countries joined forces in the largest regional joint research and innovation initiative to date.

With a budget of ca 400 MNOK, the Top-level Research Initiative (TRI) within climate, energy and the environment promotes research and innovation within the northern region, focusing on fields of common interest to the Nordic countries and where the region can contribute to international solutions.

The Top-level Research Initiative consists of six sub-programmes:

1. Effect studies and adaptation to climate change
2. Interaction between climate change and the cryosphere
3. Energy efficiency with nanotechnology
4. Integration of large-scale wind power
5. Sustainable biofuels
6. CO₂ – capture and storage (CCS)

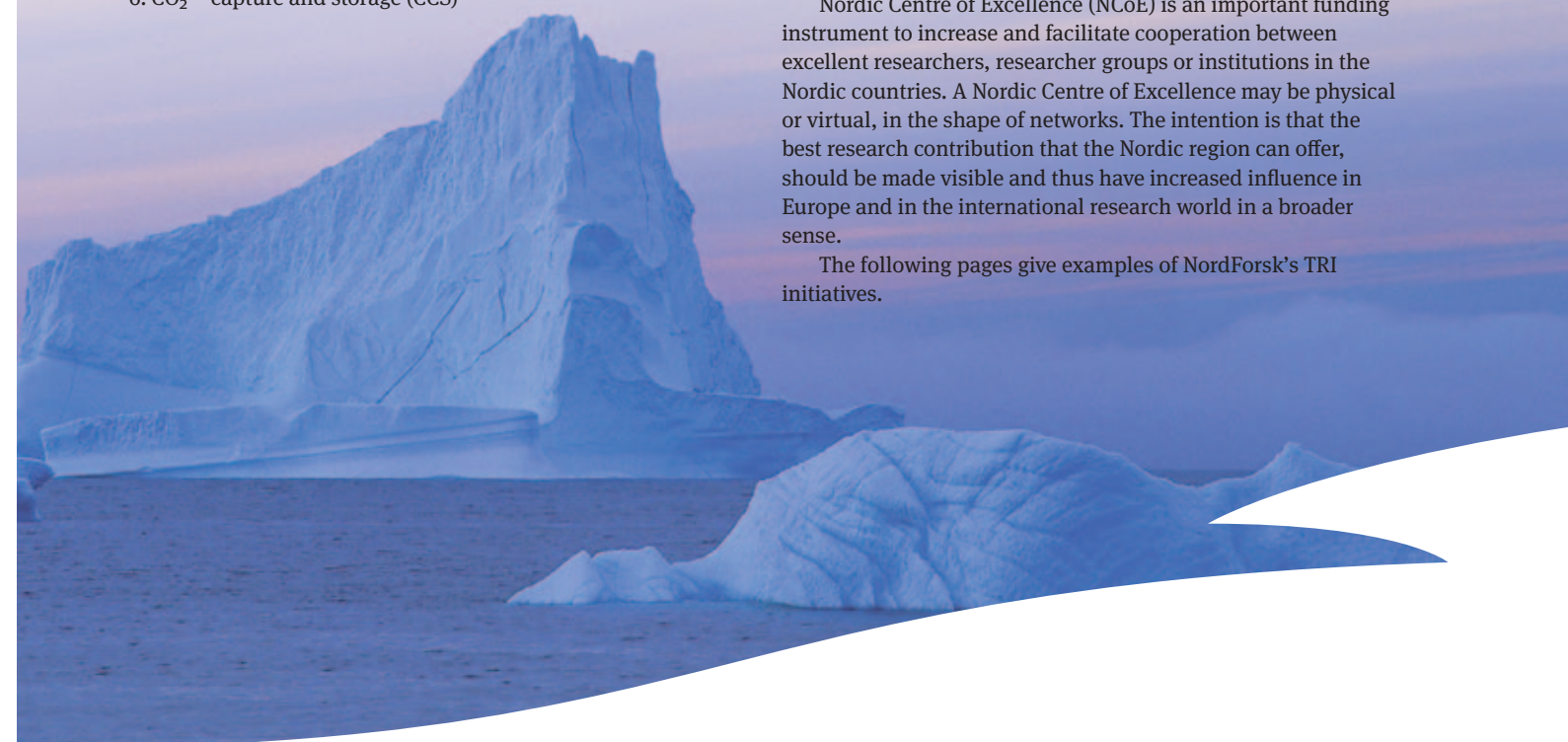
Across these sub-programmes, the TRI includes advanced climate modelling, social sciences and humanities, and a focus on the Arctic region.

The TRI has established six Nordic Centres of Excellence within climate change research; a competence centre within carbon capture and storage; 11 integrated research and innovation projects within nanotechnology, sustainable biofuels and integration of large-scale wind power, as well as 13 networks for researchers, industry participants and policy makers dealing with climate and energy issues. The TRI has also conducted a range of studies on topics of CCS, social sciences/humanities and Arctic cooperation.

The TRI is led by a Management Board representing the Nordic research, innovation and energy financiers and administered by a secretariat formed by the three organisations NordForsk, Nordic Innovation and Nordic Energy Research. The funded projects within the TRI involve hundreds of research institutions, enterprises and public bodies within the Nordic and Arctic region. The projects are funded by TRI within the period 2009-2014.

Nordic Centre of Excellence (NCoE) is an important funding instrument to increase and facilitate cooperation between excellent researchers, researcher groups or institutions in the Nordic countries. A Nordic Centre of Excellence may be physical or virtual, in the shape of networks. The intention is that the best research contribution that the Nordic region can offer, should be made visible and thus have increased influence in Europe and in the international research world in a broader sense.

The following pages give examples of NordForsk’s TRI initiatives.



Disco Bay, Greenland. Photo: Pål Hermansen, Samfoto

Michael Evan Goodsite

Communicating for a better climate

– We scientists have not been good enough in communicating climate change issues, neither to decision makers nor to citizens' hearts. We must become much better at both visualising and communicating, in order to design and implement successful adaptation strategy and policy, says Michael Evan Goodsite.

Professor Goodsite is the Centre Director of the new NCoE NORD-STAR, which is based on two key ideas: – We are going to use state-of-the-art climate visualisation techniques and policy-analysis tools to help bridge the gap between adaptation science, practice and policy. We are also going to link climate adaptation with mitigation, in order to help both public and private stakeholders to improve strategy development and decision-making, Goodsite explains. He adds that visualisation does not have to be pictures or videos. It can also be about finding better words to create images in people's minds, or better ways to present the results of advanced modelling.

Mitigation and adaptation

NORD-STAR aspires to a Nordic region that can adapt sustainably to the inevitable impacts of climate change and unintended consequences of climate policy. The scientists' input may be used to develop a Nordic adaptation strategy. – We are doing this research for the benefit of citizens in the Nordic countries. NORD-STAR is going to stay away from the debate about the causes for climate change, or how much it is changing. We just accept that the climate is changing. The time has come to figure out what we need to do about it, Goodsite says.

What we need to do, is to mitigate the things we can change and adapt to the things we can't. – It is important to understand the difference between mitigation and adaptation. Most research and focus is on the reduction of greenhouse gas emissions or enhancing the systems that remove greenhouse gases from the atmosphere, which is called mitigation. Adaptation is how we will adjust in response to actual or expected climatic changes or their effects, Goodsite explains.



Dean Svend Hylleberg and Michael Goodsite signed the NORD-STAR-contract, 9 June 2011. Photo: Aarhus University.

Adaptation can be autonomous or planned, according to Goodsite. We can do it reactively or proactively, and we can also do it in a way that inadvertently increases our vulnerability to climate change – which we refer to as mal-adaptation. Flood walls should be built and settlements moved out of flood plains – but we could also choose to allow water to flood an area or control this, and embrace new waterfront property. By linking climate adaptation with mitigation, NORD-STAR results will help public and private stakeholders improve strategy development and decision making.

International and local attention

NORD-STAR's name is inspired by the North Star or Polaris, historically used for celestial navigation. Goodsite has already been asked to develop a similar concept for an America Latina (ALL-STAR). – It would be excellent if NORD-STAR could grow into a whole constellation of stars, says Goodsite.

NORD-STAR has already seen a lot of attention and additional funding at the highest international level. The centre was launched at a meeting in Norrköping with a videolinked greeting from Dr. Rajendra Pachauri, chair of The Intergovernmental



Professor Michael Evan Goodsite heads Aarhus University's Centre for Research and Higher Education in Herning and the new NCoE NORD-STAR. Photo: Aarhus University.

Panel on Climate Change. Professor Goodsite has also had the chance to meet U.S. and Danish Ambassadors and Attachés; the European Commissioner for Climate Action Connie Hedegaard, the UN Assistant Secretary-General for Disaster Risk Reduction Margareta Wahlström; and Dr. Gerald Geernaert, Director, Climate and Environmental Sciences Division, DOE Office of Science at the U.S. Department of Energy, just to name a few. The industrial partner Project Zero has briefed former U.S.A. Vice President Al Gore.

All about adding value

Professor Goodsite has also met with several local mayors who are looking for advice on future land use and energy transitions, which are the two focus areas of the centre. – But we haven't been seeing much attention at the national level, and that makes me slightly worried. I sincerely hope that the national entities don't see us as competition, because that would be a misunderstanding. The Nordic collaboration is all

about adding value to ongoing research, and it is not meant to replace the national efforts. We need to be certain that the national efforts are aware of NORD-STAR, so that they won't create parallel research programs, Goodsite insists.

NCoE NORD-STAR – Nordic Stratedic Adaptation Research – is headquartered in Herning in Denmark, with a visualisation centre at Linköping University in Sweden and hubs at other partners. It is funded by the Nordic Top-level Research Initiative's sub-programme Effect Studies and Adaptation to Climate Change. NORD-STAR is co-directed by Prof. Richard Klein, Stockholm Environment Institute.



In August 2011, people were evacuated from this house with the aid of an excavator bucket in Stange, Norway. Roads and railway were closed. Photo: Jan Erik Heggelund / SCANPIX

Björn-Ola Linnér/Tom Anders Stenbro

Insurance and research join forces against climate damage

Climate change is already causing a rise in the amount of compensation paid out by insurance companies for flooding and other damage. Homeowners need more information about how they can avoid damage due to climate change, and new visualisation technology can contribute to this.

The summer of 2011 has been the wettest on record throughout much of Norway, and over one billion NOK in claims for compensation have been filed for flooded basements and other water-related damage. The situation is even worse in Denmark, where there were periods of extremely heavy rainfall in the summers of both 2010 and 2011.

– The number of compensation payments has increased considerably, and the prognosis is that they will rise even more throughout the Nordic region in the upcoming years. From now on the insurance companies need to work even more actively to prevent damage, both individually and together, as well as in cooperation with researchers and homeowners, says Tom Anders Stenbro, adviser with Tryg Insurance.



Tom Anders Stenbro (left) and Björn-Ola Linnér (right)

A common problem

Traditionally the insurance industry has been very competitive, but the climate summit in Copenhagen in 2009 inspired the top management of the Nordic insurance companies If, Gjensidige, Trygg-Hansa/Codan and Tryg Insurance to meet to discuss the possibility of cooperating on the climate problem. During their meeting the insurance companies agreed to provide funding for Nordic climate research, and they all expressed a desire for a web-based tool that their customers could use to learn how to adapt to climate change.

– The road from there went to NordForsk and the Top-level Research Initiative, and through them we got in touch with the NORD-STAR centre, one of the Nordic Centres of Excellence, explains Stenbro. It quickly became clear that NORD-STAR (Nordic Strategic Adaptation Research) and the insurance com-

panies have a lot to gain from each other, and the result was a collaborative project that will give homeowners a tool inspired by computer games.

Adaptation using gaming technology

– Imagine a family that is considering building a house near a riverbank, and they want to live there for the next 50 years. We will create a web-based visualisation program that can tell them

whether the area is at risk of flooding today and whether it will be in the future. The program will also show whether there are measures that can reduce the risk of building damage due to flooding or erosion, which in turn can have ramifications for the insurance premium, explains Björn-Ola Linnér, a climate researcher at Linköping University in Sweden.

Stenbro and Linnér add that the computer tool is being developed mainly for private homeowners, but other groups such as land-use planners and property managers can also make use of it. – This is a dual problem in the sense that private homeowners can do a lot to protect their own property, but many types of damage can only be prevented with measures at the municipal level, such as ensuring that drain pipes have adequate capacity. The municipalities, companies and individual homeowners can all build in smarter ways that take the climate into account, and we want to help them do this, Stenbro concludes.

Björn-Ola Linnér is Professor in the Department of Thematic Studies in the area of Water in Nature and Society and a researcher at the Centre for Climate Science and Policy Research (CSPR) at Linköping University in Sweden. He also heads the NORD-STAR centre's project Increasing Nordic Homeowners' Adaptive Capacity to Climate Change.

Tom Anders Stenbro is an advisor on social responsibility at Tryg Insurance, a Norwegian insurance company. He is also the contact person for the four insurance companies that are cooperating with the NORD-STAR centre.

Professor Oksanen has been fascinated by the tundra ever since the 1960s when his parents took him on trips to the mountains all over southern Norway. Professor Oksanen first visited the Finnmarksvidda plateau as a post-graduate at the beginning of the 1970s, and since then has spent several weeks and months of every year in the tundra. Tundra is the term used to refer to the treeless areas north and south of the polar forest boundary and above the tree line in mountainous areas.

– The tundra is being overcome with trees and shrubs due to the rise in global temperatures. This is causing a vicious circle that could further intensify climate change. The bare tundra reflects a lot of sunlight in the winter, whereas shrub-covered tundra will absorb more instead, leading to higher ground temperatures which could cause the snow to melt earlier in the spring, Professor Oksanen explains.

Well-known experiments

Professor Oksanen has become well known internationally for his theory that predators suppress the number of herbivores in the fertile scrubland areas below the tree line and in the southern part of the tundra and thereby reduce the grazing pressure in these areas. In the more barren areas above the tree line the impact of the predators is less pronounced, allowing

the herbivores to graze with such intensity that their grazing changes the plant cover.

The theory has gained support through a series of experiments conducted on isolated islets far out in Iešjávri, the largest lake in the Nordic tundra. Virtually no predators or birds of prey are found on the islets, nor are they subject to grazing by reindeer. Professor Oksanen was therefore able to study what happens to the vegetation on the tundra both when it is able to grow unhindered, and when small herbivorous mammals are given free rein. In 1991 he began to release grey red-backed voles onto the islets, and later he transferred vegetation from the mainland out to the islets in order to find out whether the isolated vegetation had any special properties.

The isolated islets were originally dominated by unpalatable plants such as crowberry, bog-rosemary and lingonberry, but these disappeared gradually once the grazing began. Grey red-backed voles like to gnaw on tree bark in the winter and in this way help to keep the scrub down. The edible green plants, such as cloudberry, exploited the free space and were able to spread more widely.

The tundra's best bet

– The tundra is a complicated ecological system, but we are certain that mountain grazing is good both for biodiversity in

the tundra and the fight against climate change. Grazing reindeer are actually the best thing for the tundra and the climate, Professor Oksanen sums up.

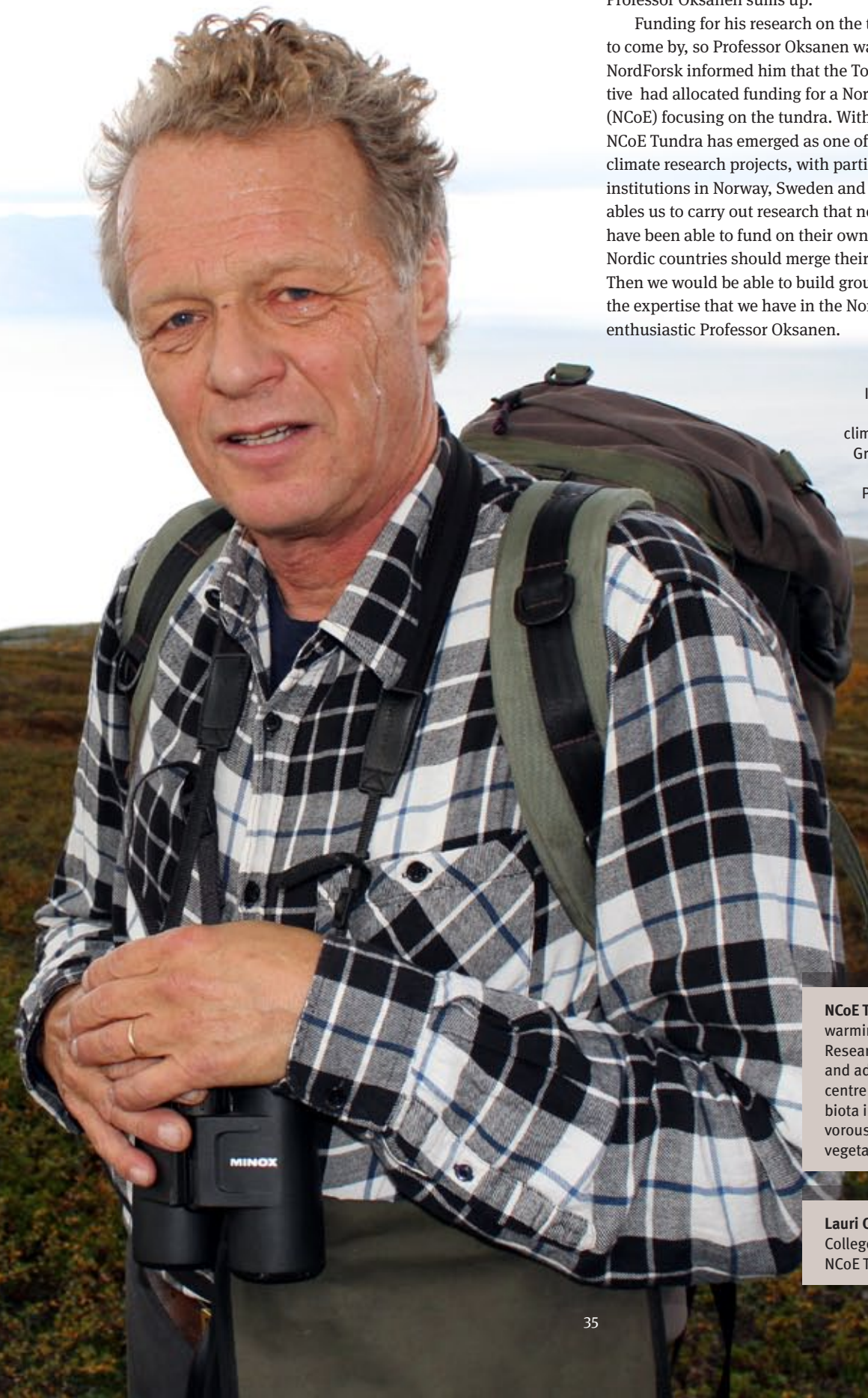
Funding for his research on the tundra has not been easy to come by, so Professor Oksanen was very pleased when NordForsk informed him that the Top-level Research Initiative had allocated funding for a Nordic Centre of Excellence (NCoE) focusing on the tundra. With the help of this funding, NCoE Tundra has emerged as one of the Nordic region's largest climate research projects, with participants from eight research institutions in Norway, Sweden and Finland. – The funding enables us to carry out research that none of the countries would have been able to fund on their own. Sometimes I think the Nordic countries should merge their national research councils. Then we would be able to build groups that could truly utilise the expertise that we have in the Nordic region, says a clearly enthusiastic Professor Oksanen.

If the tundra succumbs to overgrowth from trees and shrubs, climate change will be intensified. Grazing is beneficial for both the tundra and the climate.
Photo: Inger Elin Utsi/Finmark University College.

Lauri Oksanen

Mountain grazing the best thing for the tundra

– As a result of global warming shrubs and trees are taking over the tundra. This could further accelerate and intensify climate change. Mountain grazing could break the vicious circle and preserve the tundra as a species-rich ecosystem, says Professor Lauri Oksanen.



NCoE Tundra – How to preserve the tundra in a warming climate? – is funded by the Top-level Research Initiative's sub-programme Effect studies and adaptation to climate change. The aim of this centre is to find methods to preserve arctic-alpine biota in a warmer climate. The idea is to use herbivorous mammals to control the expansion of woody vegetation.

Lauri Oksanen is Professor at Finnmark University College and the University of Turku and heads the NCoE Tundra.

Safeguarding the future of the Nordic cod

Nordic cod stocks have already undergone major changes, caused in large part by intensive harvesting and a warming climate. The Nordic Centre for Research on Marine Ecosystems and Resources under Climate Change (NorMER), a new Nordic Centre of Excellence (NCoE), will study the impacts of climate change on cod and the ecosystem in which it lives, generating knowledge about how to better safeguard the future of this important Nordic fish species.

Professor Nils Chr. Stenseth, chair of the new centre, has headed research showing that intensive harvesting of cod in the Barents Sea and along the Norwegian coast has selected for individuals to be smaller in size and to reach sexual maturity at a younger age – and these changes will have economic repercussions. The scope of NorMER's activities will geographically broaden this research, to include studies of cod stocks in the Barents Sea, North Sea and Baltic Sea, off Lofoten, in the Skagerrak strait, and coastal regions of Greenland and Iceland.

Ecology, evolution and economics

– NorMER will use cod as a model organism for studying the direct and indirect impacts of climate change on cod stocks, and the ability of cod to adapt to these changes. The centre will study cod with an ecological perspective, with an examination of different cod life stages and the plankton and other marine resources and conditions affecting their survival and growth. These studies will be combined with economic models to evaluate current stock management practices and to explore the economic impacts of climate change on cod harvests. The chair of NorMER, professor Nils Chr. Stenseth, is an ecologist and chair of CEES, and the co-chair, Professor Carl Folke, is an economist and Scientific Director at the Stockholm Resilience Centre.

Professor Stenseth's speciality is using available data to gain an understanding of the underlying ecological and evolutionary processes of nature. Cod is an ideal model for these studies since lots of data and knowledge are already available throughout the Nordic region. Moreover, cod provides us with a unique opportunity to apply an interdisciplinary approach. Many teams that are described as interdisciplinary continue to work on projects in isolation, and the various disciplines primarily communicate only within their own circles. In NorMER, the full research programme is designed around cod, which thus provides a common ground and a mutual dependency between the different disciplines.



Ole Petter Ottersen, Rector of the University of Oslo, Minister of Research and Higher Education, Tora Aasland, State Secretary Kristine Gramstad from the Ministry of Fisheries and Coastal Affairs, and Professor Nils Christian Stenseth, University of Oslo at the NorMER annual meeting in October 2011.

Photo: Terje Heiestad

Widespread interest

When Professor Stenseth began assembling an advisory panel of scientific experts for the new NCoE, every researcher he approached expressed immediate interest in being involved. Such a positive response is a testament to both the concept of NorMER and the reputations Professors Stenseth and Folke have earned for their many years of outstanding research. Both State Secretary Kristine Gramstad from the Ministry of Fisheries and Coastal Affairs, and Tora Aasland, Minister of Research and Higher Education, attended the inaugural NorMER annual meeting in October 2011. They stressed the point that modern management of marine resources must be based on the best possible research.

NorMER is a collaborative effort between 10 research institutions in eight countries, comprising 45 established researchers with experience in studying physical, biological, social and economic aspects of ecosystems. The centre will educate 15 doctoral candidates – each of whom will have a home institution and several months hosted by at least one other institution – and five post-doctoral candidates, who will visit between all 10 institutions.

– If we make this happen as planned, we will generate a great deal of new knowledge, while educating the next generation of marine biologists with interdisciplinary expertise, says Professor Stenseth. – I have never claimed that my research can have immediate practical application, but I certainly hope it can be useful in the long run.

NCoE NorMER – The Nordic Centre for Research on Marine Ecosystems and Resources under Climate Change – is funded by the Top-level Research Initiative's sub-programme Effect studies and adaptation to climate change. The centre will develop tools to predict the biological consequences associated with climate change, developing new tools, as well as quantifying impacts on profit, employment, and harvesting of cod in the Nordic region.

Olav Orheim

Colder Nordic winters due to ice-free Arctic Ocean?



Olav Orheim is former Director of the Norwegian Polar Institute from 1993 to 2005, now a senior adviser at the Research Council of Norway.

There has been less sea ice in the Arctic Ocean the autumn of 2011 than ever recorded before. Climate researchers are now examining a possible link between ice-free waters in the Arctic and colder winters in the Nordic region.

– Is it possible, from the changes we are seeing, to make reliable seasonal forecasts for the coming year? This is currently being assessed, says glaciologist and climate researcher Olav Orheim, a member of the NordForsk-appointed steering committee for a project called 'Vidareførsel av International Polar Year som arktisk tema i TFI regi', (VIP), which will make recommendations on how the Nordic region should follow up the International Polar Year (IPY).

The last two winters in the Nordic countries and large parts of Europe were unusually cold. Is this a direct result of diminishing ice cover in the Arctic Ocean? Is this a lasting climate change we are facing? Is it possible to reliably forecast seasons based on what we know about climate change?

Scientists are now developing models that could help to answer these questions. A main objective is to find out whether there is a scientific basis for working out seasonal forecasts for climate change.

A general theme for the VIP project steering committee is assessing the dangers and opportunities that climate change will bring. Declining ice in the Arctic Ocean affects several of the other thematic areas within the Top-level Research Initiative. In February and October of 2011, Nordic scientists met to discuss the best course for Nordic research in this field.

Russia and Canada

In 2010 Russian researchers and politicians took the initiative to promote an international polar decade. Other countries bordering the Arctic have also sent positive signals, and the World Meteorological Organization (WMO) expressed support for the idea last summer. An international polar conference is being organised for April 2012 in Montreal, and many forces are urging that a decision be taken there to launch a new large-scale climate initiative focused on the Arctic and northern areas and starting in 2015.

– We in the Nordic region are now engaged in workshops and programme development to set down a scientific basis for how we can enter into some kind of global programme, says Dr Orheim.

Because Russia and Canada are promoting intensified research activities on climate change, it is likely that the Nordic region will also support the cause. Another key factor in favour of this initiative is that the highly-populated countries of Europe are now interested in the links between ice conditions and climate change.

Reliable seasonal forecasts?

Since 2007 researchers have been observing dramatic changes in the extent of Arctic Ocean sea ice. A marine area 10 times the size of Norway's landmass is now ice-free.

– There is now so much open sea into autumn, where once there was ice, that it completely alters the heat exchange with the atmosphere, explains Dr Orheim.

– A great deal of water is evaporating into the atmosphere, which has an effect on the development of high and low pressure systems over Siberia. This will result in drastic changes in temperature and climate. In the Nordic region and down into Europe, we have seen more precipitation and much colder winters, the last couple of years in any case, while by contrast North America has experienced warmer winters.

– We have hypotheses that indicate it is realistic to continue developing models for the relationships between the extent of Arctic ice and climate change in the Nordic region. The objective is to be able to make reliable seasonal forecasts.

What would it mean for societal planning to have such climate projections?

– Good climate forecasts could play a role in a great many areas, answers Dr Orheim. – One obvious example is that good forecasts of precipitation could help to dimension streamflow and to protect ourselves from floods and slides. It is also conceivable that agriculture crops may need to be converted. If it turns out that these climate changes are permanent or semi-permanent, then being able to predict them would have enormous significance for the infrastructure and trade and industry of every country in the northern and middle latitudes. This is why we are so concerned with coordinating resources and research in the Nordic region and globally.

Climate adaptation is nothing new

– There has been a strong focus on the issue of whether climate change is being caused by humans. What everyone can agree upon is that the concentration of atmospheric CO₂ has increased and that this is leading to global warming. Climate researchers say that anthropogenic contributions to warming now surpass the natural fluctuations, but that both remain factors. An objective discussion about the significance of nature's own variations is in progress.

When will we begin to adapt society's infrastructure in response to new climate prognoses?

– It will be many years before we can forecast seasons reliably enough for municipal engineers to use. However, adjustments are already being made continually, independent of prognostications and theories. Many places are introducing moratoriums on new construction near flood-prone rivers, for instance, and the Tromsø area bought more snow-clearing equipment to deal with its heavy snowfalls. So adapting to climate change is nothing new – people have always been doing it.

We are in the midst of the greatest revolution in ideas since Copernicus!

According to Gudmund Hernes, we are in the middle of a revolution. Humanity is revising the way it thinks about itself and its relationship with the planet Earth. Not since Copernicus and his once heretical theory that the Earth revolves around the Sun has there been a comparable shift in thinking.

– In the past we thought that the world was near infinite and that the Earth was invincible. We could do what we liked with it. Now I am seeing an ever greater awareness of the fact that the world is fragile and that we are in danger of causing irreparable damage.

Under the Nordic Top-level Research Initiative (TRI), Gudmund Hernes, researcher, professor of sociology and former Norwegian minister, has explored this topic through the eyes of the social scientist. He has written an essay entitled «Hot Topic – Cold Comfort, Climate Change and Attitude Change» and will present his views at the TRI Annual Conference 2011 in November.

Professor Hernes has focused on setting out assertions and theses as a basis for debate – and in time political action:

– It is important for me to describe how humans respond to the impact of their own interactions with nature. By this I mean that we do things to nature, and when we are faced with the repercussions of our actions, how do we react? In order to understand this we need to get the social scientists involved. Today we have a wealth of knowledge provided by meteorologists, climate scientists and oceanographers. But this is not enough. As experience has shown, knowledge in itself is never a sufficient basis for action. The aim of this report is therefore to mobilise the social science disciplines. Only when we understand how and why we have reacted so far can we take effective action.

Gudmund Hernes. Photo: Terje Heiestad



In preparing the report, he has observed the world as it has appeared since the Second World War, drawing on findings from his earlier research as well as from his own perceptions and experiences. The conclusion he has reached is that there are seven pivotal events that

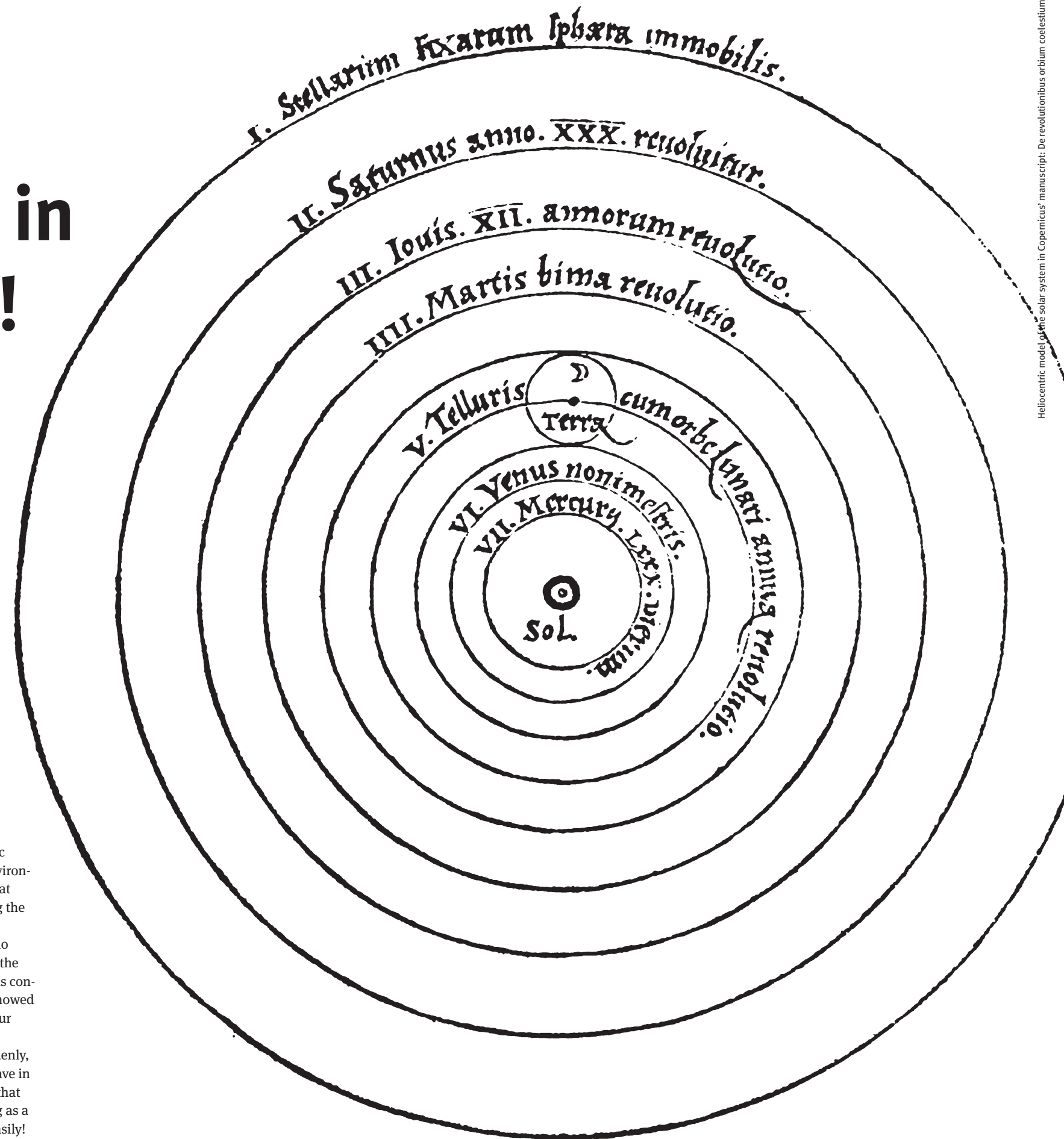
together have prompted the majority of us to see the world as small and vulnerable.

The bombing of Hiroshima on Monday 6 August 1945 marks the beginning of the ecological revolution:

– That event ushered in a long period that was dominated by the arms race, nuclear proliferation, and the threat of radioactive fallout – setting in motion a change in people's attitudes. The next event I mention is the publication of Rachel Carson's book *Silent Spring*, which documented the devastating effects of the synthetic pesticide DDT and led to the establishment of the first environmental protection agencies. Later came Agent Orange. That was when we began to realise that we could be destroying the world's ecosystems.

On Christmas Eve 1968, astronauts on board the Apollo 8 were the first to succeed in photographing the whole of the planet Earth. The photograph, called *The Blue Planet*, was considered one of the most important of the last century. It showed with dazzling clarity both how beautiful and how small our planet is.

– Some of the events I have described happened suddenly, while others took place gradually over time. What they have in common is that they have been perceived as so dramatic that we have been willing to abandon our old ways of thinking as a result of them. And that is not something that happens easily!



The ecological revolution

According to Hernes, the ecological revolution is made up of the following shifts in the way we perceive the Earth:

1. In the past, the Earth was seen as boundless. Now, the Earth is regarded as finite, with some of its resources in danger of exhaustion.
2. The Earth is increasingly being perceived as alarmingly fragile and can suffer from breakdowns.
3. Different natural processes (such as draughts, hurricanes) and social processes (such as energy use, poverty, emergencies) are increasingly being construed as tightly linked and causally integrated.
4. Man is recognized as determining the condition of Mother Nature, not vice versa.
5. The world was regarded as compartmentalised in separate entities and systems; while, today, the world is viewed as one vast, single, complex system.
6. Citizens assumed that most of their welfare was determined within the borders of their country; whereas they now recognise that more and more of their welfare is the outcome of decisions taken abroad and often far away.
7. The processes on planet Earth were previously regarded as stable and predictable. Today, it is realised that processes are increasingly interconnected and constitute a dynamic complexity, which can produce extreme events, such as freak weather.
8. Joint human response to the aggregate effects of multitudinous human decisions was viewed as uncalled-for or ineffective. Increasingly, massive collective countermeasures are seen as inescapable.
9. What happens to the Earth was essentially perceived as cyclical. Today, the view is that complexities and contradictions can make for tipping points and perhaps irreversible changes.
10. It is no longer generally assumed that humanity can carry on business as usual. There is a foreboding that joint action, indeed global action, is urgently needed.

It is not until we are confronted with something that comes as a shock that we are prepared to change our opinions – and even then not until our friends and those around us have also done so.

We are in the midst of a revolution

According to Gudmund Hernes the current ecological revolution represents an overwhelming shift in mindset, and is the most important shift in human thought since Copernicus. The reason that we do not experience it as dramatic today is that we are ourselves a part of it – and are right in the middle of it. It is all happening gradually. Similarly it took people several centuries to realise the true nature of the solar system.

– There are many reasons why this type of realisation is so deeply buried within us, and why it takes so long for people to change their long-held beliefs. Moreover, fully addressing the fact that humans are changing the Earth and the climate will require action and incur costs – for us as individuals, for trade and industry, for politicians, for society as a whole. Where should we store CO₂, for example? Who should pay to save the rainforest? We need decisions that involve investments. This creates political conflicts and the decisions are delayed. But the

longer we postpone implementing the necessary measures, the greater the changes we will need to make – and the greater the costs will be, states Professor Hernes.

He believes that politicians must be willing to think along new lines, focus on new types of measures and redesign international institutions.

– Are you an optimist?

– I have to admit that I am worried that irrevocable harm will be done to our planet before we realise that we have to take action. But I am an optimist up to a point. I think you could call me a cautious optimist!

Gudmund Hernes Born 1941 in Trondheim
Ph.D., John Hopkins University in sociology, 1971.
Minister of Education and Research, later
Health and Social Affairs, 1990-1997.
Researcher at Fafo, an independent, multidisciplinary research foundation and Professor at the Norwegian School of Business BI.





Facts about the initiative

The Nordic Council of Ministers and NordForsk have each allocated DKK 15 million to the Joint Nordic Initiative for Educational Research and Dissemination, and the national research councils have followed up with a total of DKK 60 million.

Eivind Heder/Armi Mikkola

More knowledge equals better educational systems

– Everyone has gone to school, many parents have children in school, and most people have views about the schools and the educational system. It's crucial that people's opinions and political decisions are based as much as possible on knowledge, say Eivind Heder and Armi Mikkola.

In the upcoming four years, Nordic educational researchers will cooperate on research which seeks answers to questions that intrigue a lot of people: Why do the results of the OECD's PISA surveys vary so much between the Nordic countries? How can we reduce the rate of drop-out from upper secondary school? What forms of management produce the best results in the various segments of the educational system, from early childhood education and care to higher education? What is the best way to use new technology? On the initiative of the Nordic Council of Ministers, educational researchers in the Nordic countries will collaborate across national borders and learn from each other.



Armi Mikkola (right) and Eivind Heder (left).

Similar yet different

– The Nordic countries have similar qualities as well as common challenges when it comes to the educational system, and we share a desire for policy in this area to be based as much as possible on knowledge. We are different enough, though, that we have something to learn from each other. All of this means that we can achieve a great deal by cooperating on educational research, says Eivind Heder, Director General of the Department of Policy Analysis, Lifelong Learning and International Affairs at the Norwegian Ministry of Education and Research.

– It is really rather strange that we haven't had a programme like this before now. Cooperation in educational research is a natural, necessary solution that generates Nordic added value for all stakeholders, adds Armi Mikkola, Counsellor of Education at the Finnish Ministry of Education and Culture.

Mikkola and Heder hope that the joint Nordic initiative will be instrumental in shaping the educational system of the

future. The Nordic research communities in this area tend to be small and fragmented, and their activities are not well coordinated. Greater cooperation can therefore strengthen Nordic educational research as a whole and produce results that are relevant for political decision-makers, researchers, funders of research, the central government administration, schools, teachers, early childhood education and care centres, and universities.

More knowledge about teachers and the classroom

– In Norway we would like to see more practice-based research. For example, what factors promote good learning in the classroom? This is a crucial question, but the new research initiative addresses many other important issues as well, Heder emphasises.

– In Finland we see well-educated teachers as the cornerstone of the entire school system. That is why we consider it



essential for the programme to include research to support the development of teacher education. A key objective would be to apply an interdisciplinary approach to focus on questions relating to equality in education-related issues, prevention of marginalisation, and how educational traditions are passed on. Studies of the economy of education also belong in this research area, says Armi Mikkola.

Both Mikkola and Heder are looking forward to the results of the initiative. – In Norway we have already invested a lot in educational research, and it is my impression that the insights underlying discussions in this area are expanding in scope. It would be fantastic if Nordic cooperation would advance the field even further! says Eivind Heder.

Eivind Heder, Director General of the Department of Policy Analysis, Lifelong Learning and International Affairs at the Norwegian Ministry of Education and Research.

Armi Mikkola, Counsellor of Education at the Finnish Ministry of Education and Culture.

Nordic research gains an international voice

Nordic research will be given a higher profile on the international stage thanks to ScienceNordic, a new English-language news service.

Up until now, Anglo-American news has dominated international research dissemination while news has only trickled out of the Nordic region. – The reason Anglo-American news is most prevalent is not that Nordic research is of poorer quality but because we have lacked a mechanism for spreading our news, says Nina Kristiansen, editor of forskning.no in Norway, and Vibeke Hjortlund, editor of Videnskab.dk in Denmark. As from autumn 2011, this mechanism is now in place with the establishment of ScienceNordic, a joint English-language news service for all five Nordic countries.

Meets many needs

Kristiansen and Hjortlund have a long list of good arguments for establishing ScienceNordic. – The Nordic research institutions have a clear need to disseminate news via an international

research magazine. There are also many who need to stay up to date with what is happening, including international researchers and research groups, students, the business sector, investors, international partners or research journalists. Another important target group is the general public that is interested in research, says Hjortlund.

Up to now, the Nordic countries have been publishing national web-based research magazines with slightly different profiles. ScienceNordic draws primarily on the forskning.no and Videnskab.dk solutions, which have independent editorial boards. Forskning.no disseminates self-produced news briefs as well as edited news items from the institutions. ScienceNordic will begin with a Danish editorial board that also encompasses Finland and Iceland and a Norwegian editorial board that also covers Sweden.

Leading research and job advertisements

– In terms of content, we will focus on those fields where Nordic researchers are leading the research front, such as in alternative energy, the environment, nature conservation, oil and offshore activities, the welfare state and welfare economics, gender equality and fisheries, says Kristiansen, who will

serve as the editor of ScienceNordic for the first two years, while Denmark will have the main responsibility for technical solutions.

– Our aim is to develop ScienceNordic into a site that functions well and has a large number of users, that enables Nordic research institutions to contribute material directly, and that is financially self-sustaining with a varied income base. For instance, we hope to establish a section for job advertisements in the Nordic region, as this will generate good income for the magazine and provide a helpful service to the users at the same time, Hjortlund explains.

A more comprehensive service

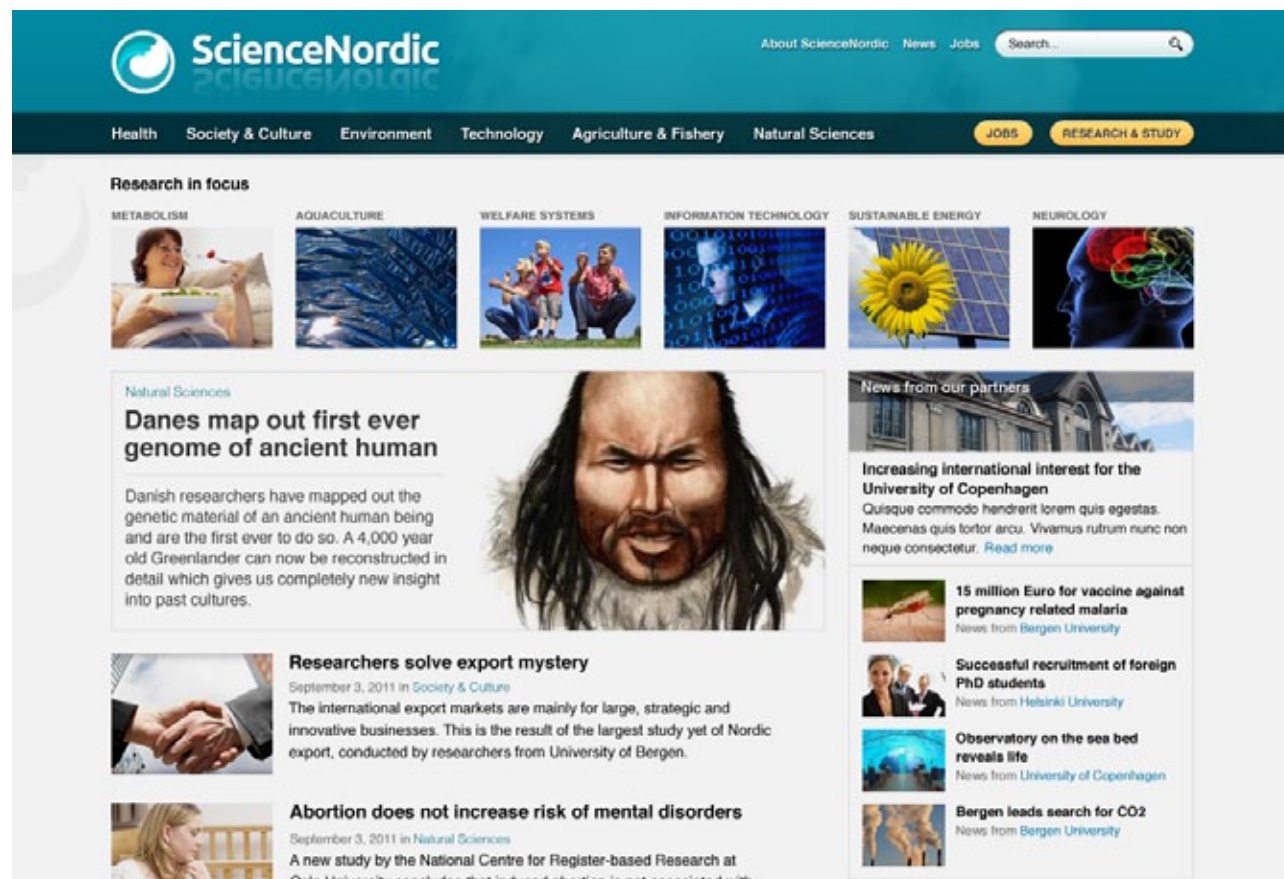
Forskning.no was founded in 2002 on the initiative of the Research Council of Norway, and Videnskab.dk was launched in 2008 on the initiative of the Danish Ministry of Science, Technology and Innovation. Subsequently the two editorial boards began to develop the idea of a joint Nordic, English-language news service, which led to the creation of ScienceNordic.

– This is a unique project that is feasible thanks to the longstanding tradition of cooperation in the Nordic region. The individual countries are small, but together we comprise a substantial

force. The English-language news service will be so much more comprehensive with five countries working together than if each country had created a service on its own, Kristiansen adds.

Nina Kristiansen and Vibeke Hjortlund express special appreciation to NordForsk, whose leadership quickly understood the value of the project and allocated the project's initial funding. This funding was especially crucial because it triggered other allocations from institutions such as the Ministry of Education and Research in Norway and the Ministry of Science, Technology and Innovation in Denmark. The funding also provides a solid basis for applications to Nordic research funds because it indicates that the project is both important and sound. – Funding has been secured for the next two years, but we still have room for more partners, says Kristiansen.

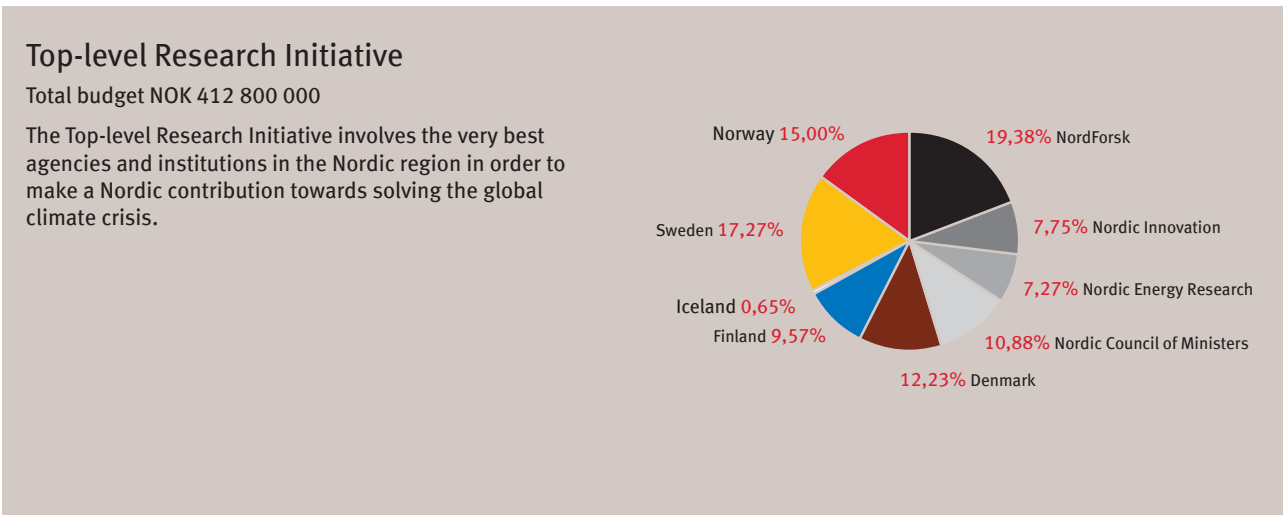
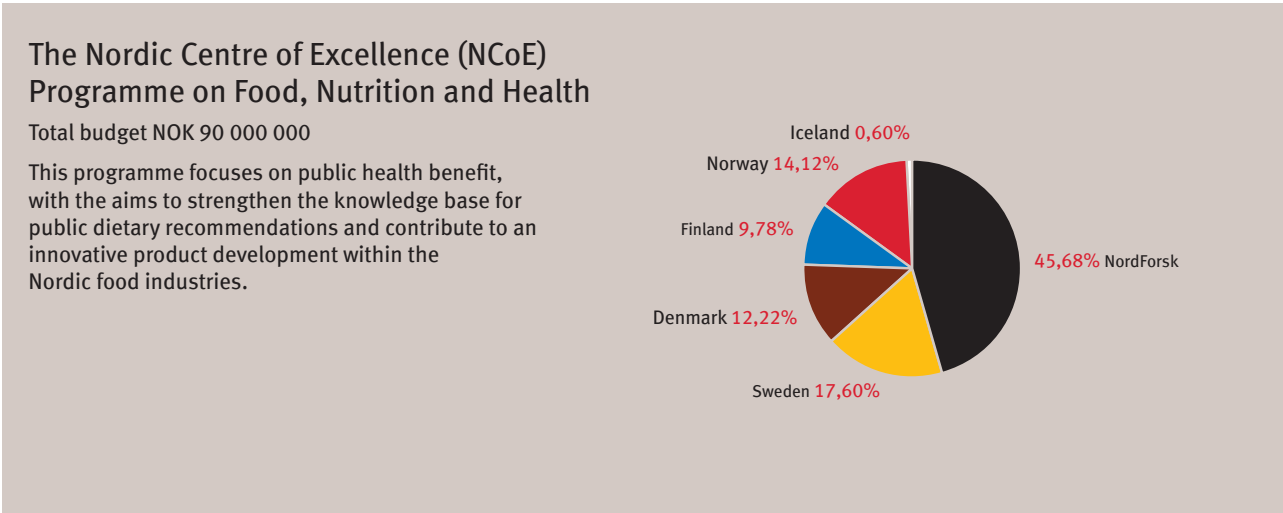
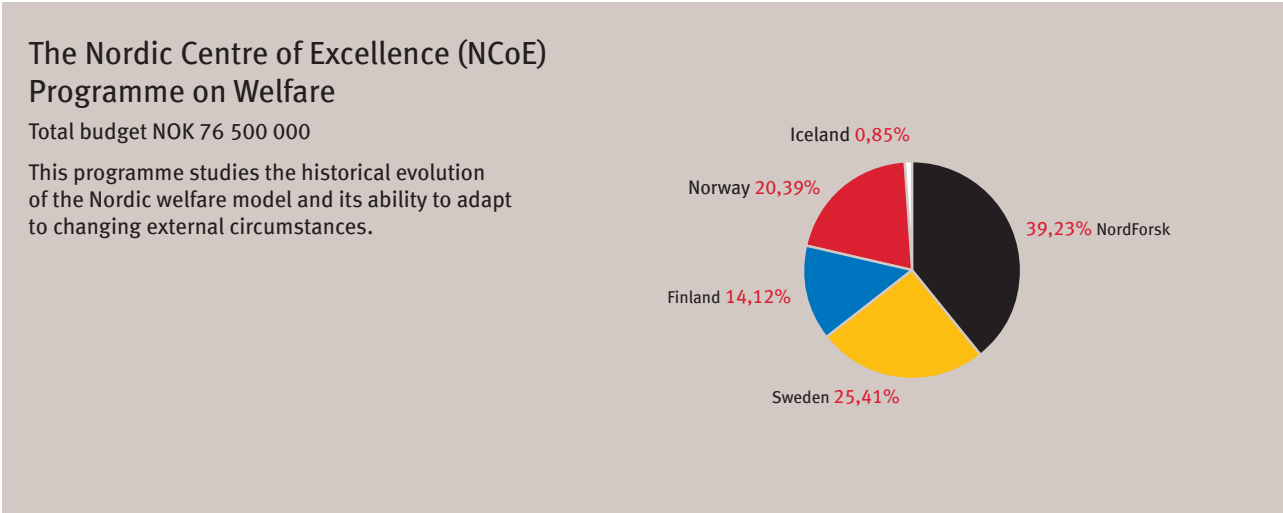
Start-up meeting in Oslo, from left Risto Alatarvas, Academy of Finland, Peter Hyldgård, Videnskab.dk, Eva Barkemann, forskning.se, Kai Egon Kverme, forskning.no and employed to work with ScienceNordic, Vibeke Hjortlund, Videnskab.dk and Nina Kristiansen, forskning.no. The representative from Rannis, Iceland was not able to attend. Photo: Terje Heiestad





NordForsk sekretariat 2011. From the left: Janina Lassila, Siv Hege Strand Larsen, Marianne Røgeberg, Lotta Strandberg, Mikael Heimonen, Susanna Sepponen, Harry Zilliacus, Harald Botha, Christian B. Lorentzen, Gunnel Gustafsson, Leif Eriksson, Sverker Holmgren, Michael Andersson, Erlendur Helgasson, Anne Riiser, Lisa H. Ekli, Anne Indahl, Ewa Preston, Pål Pettersen and Tina Lindström. Maria Nilsson and Hanne Silje Hauge were not present. Photo: Terje Heiestad.

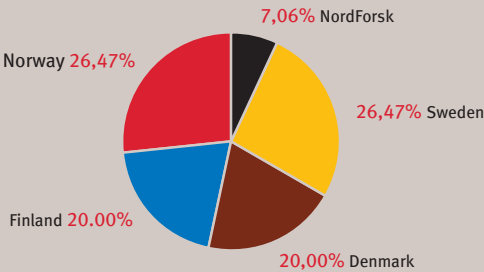
NordForsk works to enhance added value to existing research activities in the Nordic countries, and thereby strengthen the position and influence of Nordic research, both in Europe and globally. With the purpose to promote excellence in research, NordForsk launches strategic initiatives which bring together national research groups in large-scale Nordic programmes based on common pot. Here is an overview of the different contributions to the active programmes with national funding:



Sustainable Freight and Logistics in a Nordic Context

Total budget NOK 17 000 000

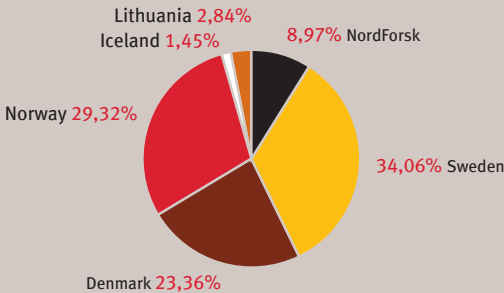
This programme aims to address major societal needs by strengthening the competitiveness of freight transport, creating know-how and building stronger cooperation between research communities, industry, and ministries in a Nordic context.



Nordic-Baltic research and innovation programme on Living Labs (LILAN)

Total budget NOK 17 940 000

This programme aims to strengthen the knowledge and research on Living Labs and user-driven innovation in the Nordic region, establish new networks, and make use of existing ones.



NordForsk Policy Briefs 2011

NordForsk conducts analyses and studies of Nordic research and research policy in its role as strategic research adviser. These analyses provide a sound basis for decision-making regarding joint Nordic initiatives. The publication series Policy Briefs is an important tool in this context. In 2011, NordForsk published these four Policy Briefs:



European cooperation in Dublin

Dublin has been chosen to host Europe's
largest science conference: ESOF 2012
The Convention Centre Dublin
From 11-15 July, 2012



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NordForsk

The EuroScience Open Forum (ESOF) 2012 is an arena for international cooperation in which NordForsk will be participating alongside numerous important stakeholders and scientists. NordForsk and Nordic research cooperation in general garnered significant attention at ESOF 2010 in Turin, Italy. NordForsk is seeking to bolster its presence at ESOF 2012, primarily by presenting its activities and initiating debate in four priority areas:

- Health and welfare
- Research in education
- eScience
- Top-level Research Initiative on climate, energy and the environment

Representatives of NordForsk will take part in panel debates and give presentations, and there will be a stand in the exhibition hall. The aim is to profile large-scale Nordic research initiatives together with national Nordic research funders as well as international networks and researchers involved in Nordic programmes. NordForsk serves as a platform for cooperation on research and research policy not only within a Nordic framework but also within a European and international context. ESOF provides an excellent arena for showcasing research initiatives and generating debate and useful input from sources outside the geographic and research-policy boundaries of the Nordic region.

