

NordForsk

magazine | 2015



NordForsk | 10 years



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NordForsk

NordForsk magazine 2015

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NordForsk

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The Swan ecolabel was
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Nordic research collaboration in a global reality

NordForsk celebrates its 10th anniversary this year. Ten years is not a very long time, but a lot has been achieved at different levels in this period. Many initiatives, programmes and projects have been accomplished where Nordic added value has been gained. Several evaluations in addition to experiences from participating researchers in NordForsk's programmes have confirmed the success. Through regional collaboration, NordForsk has proven to possess the ability to facilitate common cross-border initiatives and programmes, based on national priorities, providing results of international significance.

At the turn of its first 10 years, it is not only the time to look back, but perhaps more importantly to look ahead at coming opportunities and challenges nationally, regionally and globally.

The world stands before enormous demands for knowledge and action, and the need to take a new direction is evident, as pointed out by the United Nations in the document, *Transforming our world: The 2030 Agenda for Sustainable Development*. How can the Nordic region and the Nordic research collaboration contribute to the ambitious global goals? The UN declaration points to the governments' responsibilities at the global, regional and national levels, and in this, Nordic research collaboration has great potential to contribute to the realisation of the goals within a number of areas.

NordForsk's programmes have focused on grand challenges such as;

Responsible development of the Arctic, adaptation to climate change and sustainable solutions through the Top-level Research Initiative, the Green Growth and the Bioeconomy Initiatives as well as the Health and Welfare Programme. The Societal Security Programme addresses topics along two main thematic lines; security technology and societal values, and resilience to crisis caused by natural hazards. Equality, justice and freedom of the individual are key topics in the programmes on Gender in the Nordic Research and Innovation area, as well as in Education for Tomorrow.

The European Commission has through Responsible Research and Innovation (RRI) pointed to key focus areas; the importance of public engagement in research and innovation; open access to scientific results, gender equality and integration, ethics, and science education. The RRI is a "cross-cutting issue" in Horizon 2020, including transdisciplinary and integrated perspectives. In line with its strategy, NordForsk's programmes and projects have a cross-sectorial dimension whenever possible. Furthermore, the common Nordic investments in research infrastructures will have impact beyond the Nordic region, and facilitate research mechanisms and access to and sharing of research results. The Nordic eScience Action Plan 2.0 gives an overview of development needs in the areas of eScience and eInfrastructure and sets out ten recommended actions in this field.

When looking forward towards the coming 10 years NordForsk's ambition is

to contribute to turning today's challenges into opportunities and progress. This is approached in many different ways. Openness to science, open innovation and openness to the world are key issues on the European agenda. This works well with NordForsk's strategic principle of promoting Nordic research cooperation in a European and international context. NordForsk has adopted the Science Europe principles for Open Access to research publications and will further develop NordForsk's policy in this area in line with relevant national, Nordic and European initiatives. At the same time, NordForsk joined the Nordic Council of Ministers' Open Access project, which has resulted in a common Nordic repository for publications.

NordForsk is approaching another topic high on the European and international agendas; ethics and research integrity. Even though the Nordic countries individually already are working with research ethics and research integrity, NordForsk is developing its own framework for preventing misconduct in research. NordForsk is on track through its various programmes, and the Nordic research collaboration is well prepared to contribute to the European and global challenges within the frame of existing and future initiatives and activities.

Marja Makarow, Chair

Eva Björck, Vice Chair



Chair of the NordForsk Board Marja Makarow (right) and Vice Chair Eva Björck (left). Photo: NordForsk/Terje Heiestad

Nordic Research Collaboration seen from Europe

NordForsk Magazine has asked Director-General Robert-Jan Smits about his opinion on the Nordic research collaboration and NordForsk seen from Europe and a European Commission point of view.

What are the main impressions of the Nordic region as a research area seen from a European perspective?

“The outstanding performance by Nordic research stakeholders in the context of the Framework Programme, especially Horizon 2020, demonstrates both the scientific excellence of Nordic Universities, the quality of the organisations specialised in technological development and the dynamism of the players operating in the innovation sector, especially the industrial sector.

Let me in this context recall the excellent work done by the Danish Presidency in the first half of 2012 on the launch of Horizon 2020 negotiations. Seen from the European perspective, the Nordic Research and Innovation Area (NORIA) is a highly successful mini European Research Area (ERA), a strong driver of the knowledge society and Nordic competitiveness. I must say I am particularly impressed by NordForsk’s joint programming activities and, more generally, by Nordic cooperation in the scientific field. Welfare Research and Food, Nutrition and Health joint Nordic research programmes (2007-2013) are two striking examples of the successful implementation of the Nordic Centre of Excellence (NCoE) funding instrument, making use of the ‘Common Pot’ concept.

The key to success seems to be mutual trust which is very strong between Nordic countries. Therefore, in the context of ERA, we must work to establish the same degree of mutual trust between the 28 EU Member States, as well as with the Associated Countries to the Framework Programme (which includes Norway, Iceland and the Faroe Islands). This objective is of great importance for DG RTD and is currently being formalised through the strategies for *Open Science* and *Open Innovation*.”

Are there topics of particular interest where the Nordic region could play a role in collaboration with the European Union in the future?

“In the field of research and innovation, Nordic players are already very strong and active in the vast majority of sectors, from life sciences to advanced manufacturing. Of course, the Nordic region also has a particular interest in research into the Arctic, with a strong link to climate issues. This is also the case for forestry, a favourite research topic for several Nordic countries. We hope that these different research areas will provide solutions for the future, so that together, at European or even at Global level, we will be better able to respond to major societal challenges.

Building on the Nordic experience, in 2009 the Swedish Presidency played a central role in the launching of the process of joint programming in research at European level; the Lund conference to be held on 4 December 2015 aims to take stock six years later and will therefore be a very important event. Also taking

place in Lund, I would like to underline the ongoing construction of the European Spallation Source, a multi-disciplinary research facility based on what will be the world’s most powerful neutron source, which will put Europe at the head of basic material research using neutron scattering technologies. To date, 15 European countries, including Sweden, Denmark and Norway, belong to the Council of the European Spallation Source ERIC (ESS), a European Research Infrastructure Consortium, under EU law*. Other ERICs are under preparation under Nordic countries’ leadership, namely ICOS (International Carbon Observation System), to be hosted in Helsinki, CESSDA (Consortium of European Social Science Data Archives), that will have its statutory seat in Bergen, and ECCSEL (European Carbon dioxide Capture and Storage Laboratory), with its seat in Trondheim.”

Are there areas where the Nordic cross-border collaboration has been successful, seen from a European point of view?

“The success of the Programme ‘BONUS’ (Baltic Sea Research), set up under Article 185 of the Treaty and hosted by Finland, is also noteworthy. This endeavour has successfully integrated the national research programmes and activities of the eight Baltic Sea States (including Denmark, Finland and Sweden) into a single joint research programme, mainly focused on environmental research. Despite limited financial resources, it effectively structures a research topic that would otherwise lack critical mass. It forms a bridge between the two shores of this fragile sea. Ongoing evaluations lead us to suggest that the Member States



*Director-General Robert-Jan Smits,
the European Commission.
Photo: European Commission*

NordForsk has been in existence for 10 years and celebrates its 10th anniversary this year. Are there future perspectives that seem particularly important for the next 10?

“Over the past 10 years, the contribution that NordForsk has brought to the ERA construction has been undeniable. Until recently, NordForsk has been an active member of the ERA Stakeholders’ Platform. I am sure that the ERA national roadmaps, which are expected in mid-2016, will be coordinated at the Nordic level for the relevant Member States, and that the subsequent implementation will when relevant be operated under NordForsk’s wise auspices.

I also think that NordForsk can contribute a great deal to the development and implementation of the objectives that the Commissioner for Research, Science and Innovation, Carlos Moedas, has set for all of us for the coming years in terms of ‘Open Science’, ‘Open Innovation’ and ‘Openness to the World’. We are confident that the dialogue with NordForsk will continue to be successful, ensuring scientific excellence, supporting innovation and ultimately strengthening the competitiveness of the European economy.”

* The Founding Members of the European Spallation Source ERIC are the Czech Republic, Denmark, Estonia, France, Germany, Hungary, Italy, Norway, Poland, Sweden and Switzerland. Founding Observers of the European Spallation Source ERIC, who intend to become Members in the near future, are Belgium, the Netherlands, Spain and the United Kingdom.

concerned put forward a proposal for a ‘BONUS 2’ Programme, which could not only be better equipped, financially, but also expanded on different aspects.

From the European point of view, the Nordic cross-border collaboration is also an example in gender equality and gender mainstreaming in research. The Helsinki Group, in charge of this policy, was set up in Finland in 1999. As a follow up of the Gender Policy approved by its Board in June 2013, NordForsk has upgraded its call text templates for funding and, in the grant application, all proposals must

provide a description of gender balance in the project consortium, as well as gender perspectives in the proposed research. This is good practice that we will closely monitor in order to better design the Framework Programme.

NordForsk’s active policy on Open Access (publications, data, software and educational resources) is also much appreciated at European level. More generally, NordForsk’s endeavour to enhance the quality of research by any means is very inspiring.”

Nordic research cooperation needs a new boost



"I think that at the Nordic Council's annual meeting in the autumn, the Nordic prime ministers should ask their research ministers to discuss how to increase the added value of Nordic research cooperation by renewing the Top-level Research Initiative."

– Bertel Haarder

"My experience of Nordic cooperation is that research has been given a more important position in the wake of the Top-level Research Initiative and that the research sector plays a more pivotal role than previously. In my view, this is a very positive shift."

– Katrín Jakobsdóttir



Katrín Jakobsdóttir

born 1976, Icelandic Minister of Education, Science and Culture, and Minister of Nordic Cooperation, 2009–2013. Head of the Left-Green Movement of Iceland.

Bertel Haarder

born 1944, Danish Minister for Culture and Minister for Ecclesiastical Affairs since 2015. Previously served as Minister for Education, Minister for the Interior and Health, and Minister for Nordic Cooperation, among other posts, and as President of the Nordic Council. Member of Venstre, the Liberal Party.

Nordic research cooperation needs a new boost

Status: Developing Nordic research cooperation lies at the heart of NordForsk’s activities. NordForsk Magazine has asked two former ministers of education and Nordic cooperation – the Danish politician Bertel Haarder and the Icelandic politician Katrín Jakobsdóttir – to look back over the last decade as well as 10 years into the future. Here are their views of the past and their hopes for the future.

What have been the defining features of Nordic research cooperation in the past 10 years?

Jakobsdóttir: The Top-level Research Initiative is the clearest manifestation of Nordic research cooperation in the last decade. Nordic research cooperation was given greater focus because the prime ministers took the initiative and set aside very ample funding for a few designated areas. I think that the political focus created a Nordic advantage in research cooperation. It was an extremely important initiative.

Haarder: The Danish prime minister at the time, Anders Fogh Rasmussen, was highly committed to the Top-level Research Initiative. I remember that in 2008 we met in the town of Riksgränsen in northern Sweden along the border with Norway in minus 25-degree weather, and dinner was served outside on a frozen lake. Inside in the warmth sat all of the Nordic prime ministers, discussing research policy. Actually they didn’t talk; they *listened*. Then Anders Fogh Rasmussen concluded that we should inject new life into the Nordic budgets and free up funding for joint Nordic research. There was talk of large sums, up to DKK 100 million per year. Halldór Ásgrímsson was the secretary general for the Nordic Council of Ministers and in charge of implementing the initiative. The director of Microsoft Denmark was with us up there, and I think Novo Nordisk as well. The idea was to give a boost to Nordic research cooperation. And I think

there is a great need for a new push, if I may be perfectly honest.

Jakobsdóttir: It’s important because we found that we got a lot out of working together, that we gained more than each country could achieve on its own. I agree with Bertel that a new push is needed, because it’s obvious that the world is changing dramatically from a geopolitical perspective, and we must take care not to lose our advantage in research and innovation. In Iceland, which has only 320 000 inhabitants, we feel strongly that it has been extremely beneficial for us to participate in Nordic cooperation. In the big picture, all of the Nordic countries are small in size. I think everyone benefits from being part of a larger community.

Haarder: But we politicians are often not expressly involved in promoting a Nordic focus. I think the reason is that everyone feels an affinity towards the Nordic community. Everyone supports it – which is why it doesn’t make the news. It’s frustrating.

Jakobsdóttir: My experience of Nordic cooperation is that research has been given a more important position in the wake of the Top-level Research Initiative and that the research sector plays a more pivotal role than previously. In my view, this is a very positive shift. We have greater influence when we work together – I totally agree with you about that, Bertel – and this applies to all aspects of Nordic cooperation, not just research. But politicians know of course that sup-



porting Nordic cooperation isn’t what gets us elected. That isn’t what gets us a wide number of votes.

Haarder: No, we don’t win elections by campaigning for a Nordic focus, unfortunately!

If you look 10 years ahead, what will be the best possible political framework for Nordic research cooperation?

Jakobsdóttir: As Bertel said, I think it’s important to note that we need some new momentum. It would be good to see the prime ministers focus on taking the next steps in the research and innovation sphere. If we are going to get the most out of the potential, we will need political clout, so it will be important to get the prime ministers to set the stage for how to proceed in the upcoming 10 years.

Haarder: I think that at the Nordic Council’s annual meeting in the autumn, the Nordic prime ministers should ask their research ministers to discuss how to increase the added value of Nordic research cooperation by renewing the Top-level Research Initiative and by reviewing impor-



Photo: NordForsk/Kim Wendt

tant areas of research so we can see if there is overlap and if there are obvious gains to be made from cooperation. If we can get more for the same amount of money. The prime ministers could also encourage their respective research funds to pool some of their means in joint Nordic initiatives instead of only accepting grant applications from their national researchers.

Jakobsdóttir: The prime ministers should keep research well within their sights, because in the context of competitiveness, a favourable outcome will be dependent on the success of our research and innovation. So this should be a top priority for everyone, across party lines and national borders.

In general, I think that the key to Nordic cooperation is our common linguistic heritage. Because cooperation is based on the culture and history we share. I would like to see more Nordic interdisciplinary research cooperation on language and technology, because technology is advancing so rapidly today and will do so in the years and decades to come – and we must find ways to enable

everyone to keep using their Nordic languages in connection with new technological opportunities.

Haarder: Our ability to understand each other is such a gift! A thousand years ago we were one culture, which is why we remain so alike. Alicia Adams, the curator for the Nordic arts festival in Washington, D.C., *Nordic Cool*, said at the conclusion of the festival that she had searched for differences in the Nordic countries for two years, and she did not find a single one. This is how we appear to outsiders. We can easily see the differences ourselves, but viewed from the outside, we look very much the same.

How can NordForsk make a difference in future cooperation?

Haarder: I think that NordForsk needs to drop its natural reserve and be more extroverted, more visible. I am very well aware that this is something we can always say and that it's easier said than done. But I would still like to see it happen.

As we know, all of the Nordic countries participate in EU research cooperation.

We could work together more on submitting proposals for research programmes. And when the programmes are underway, we could encourage talented people from universities and companies to seek funding for projects that encompass enough countries to qualify them for EU grants. This could clearly comprise a component of Nordic research cooperation, and here NordForsk could help by identifying research areas. The other countries will be interested in hearing what the Nordic countries are doing because they have enormous respect for us. We don't do this enough at present because we suffer from a small-nation mentality, which is passé. Together we are not small.

Jakobsdóttir: For example, all of us want a healthcare system that works, and we want technological possibilities. This won't happen if we don't have skilled researchers who work closely together. When a volcano erupted on Iceland, for instance, everyone suddenly got very interested in advancing research because they saw that the eruption had ramifications far beyond Iceland.

I also think it's important to involve the universities more in Nordic cooperation. We have a collaboration between the rectors of the Nordic universities, and we could probably capitalise more on this.

Haarder: It's possible that NordForsk could serve as a think-tank which could inspire universities and research institutions to engage in joint initiatives. We must ensure that Nordic cooperation does not lead to overlap. That would be the worst thing that could happen. It is crucial to encourage the existing institutions to cooperate in the typically pragmatic Nordic fashion, i.e. not with a lot of bureaucracy, but by establishing networks so that there is greater awareness in Trondheim about what is taking place in Reykjavik, Malmö and Copenhagen in a given field. An excellent example of this is the European Spallation Source super-microscope which the Swedes and Danes are currently building as a joint effort in Lund. This is a fantastic collaboration. Just think, Denmark is investing hundreds of millions of kroner in a project located in Sweden! This is the kind of thing we need more of.

Exciting results from the Top-level Research Initiative

The largest ever Nordic research and innovation venture is in its final phase, and many of the results are presented in a book launched this autumn.

The book contains interviews with many researchers who have participated in the largest Nordic research and innovation venture to date, the Top-level Research Initiative (TRI). NordForsk funded six Nordic Centres of Excellence (NCoE) within the framework of the TRI. The TRI budget was DKK 400 million, and evaluations show that even more value was added through in-kind investments.

In the book, Professor Nils Chr. Stenseth explains that when humans threaten the cod stocks, we also threaten our own interests. Professor Markku Kulmala describes how our northern boreal forests slow climate change, giving us additional time to solve the climate crisis. Professor Jukka Käyhkö presents how reindeer, lemmings and caterpillars may help to curtail melting of the tundra. Professor Michael Goodsite points out how adaptation to climate change will be increasingly important to our societies, and Professors Jon Ove Hagen and Torben Christensen discuss an especially critical problem: The Arctic is the first victim of climate change, and we need more knowledge about what is taking place.

The results are still coming in

The results from the TRI will keep coming in for several years.



The book 'Saving the Climate - A Nordic Contribution' describes some of the most important results of the Top-level Research Initiative.

“Even though the Top-level Research Initiative has ended, I am sure that the best is yet to come!” says Jason D. Whittington, Scientific Director of the Nordic Centre for Research on Marine Ecosystems and Resources under Climate Change (NorMER), a Nordic Centre of Excellence. Dr Whittington led the coordination and writing of the original proposal that was later approved by the TRI.

“In fact, many of the projects from NorMER are not completely finished. We have had a total of 27 PhD students and post-docs, and most of them are currently working hard on a wide array of scientific papers. As these are produced, we are able to synthesise the results from the entire project. It looks like the best results from NorMER will be published after the official end of the TRI,” explains Dr Whittington. In other words, the TRI will have important ramifications far into the future.

An international brand

Jason D. Whittington and Professor Nils Chr. Stenseth, the chair of both NorMER and the Centre for Ecological and Evolutionary Synthesis (CEES) at the University of Oslo, discovered very early in the

process that the centres were attracting a lot of attention. The CEES already had a very high international standing and received many applications each time a new project was announced, but the number of applicants seeking a position at the TRI-supported NorMER surpassed this by a wide margin. And the positive response came from more than just students. In 2011, Professor Stenseth needed no more than 24 hours to find willing international experts to form a Centre Advisory Panel for the new Nordic Centre of Excellence. Everyone he contacted accepted the offer immediately. Nordic top-level research had evolved into an international brand. Rolf Annerberg, Chair of the TRI Management Board since the initiative was launched in 2009, agrees with Dr Whittington.

“The Top-level Research Initiative in itself has been a success. Nordic cooperation has functioned very smoothly, and the initiative has already resulted in a number of interesting findings. However, it is too early to say what the final research results will bring – we will have to wait several years to find out,” says Dr Annerberg.

A close-up portrait of a man with dark hair and a mustache, smiling warmly. He is wearing a dark jacket with a light-colored, fuzzy lining. The background is a soft-focus outdoor scene.

*“Even though the Top-level Research Initiative has ended,
I am sure that the best is yet to come!”*
– Jason D. Whittington, Scientific Director of NCoE NorMER

TRI: Successful in supporting young researchers

“The Nordic Top-level Research Initiative (TRI) has been highly successful in supporting young researchers and boosting their visibility,” states Anne Maria Eikeset, an interdisciplinary scientist.

Anne Maria Eikeset is one of several young researchers who became more profiled by participating in the TRI, even if she was developing a fine career already before the initiative. Her doctoral thesis in 2010 garnered attention for at least two reasons. The thesis described the development of a completely new method, which combined perspectives from evolution, ecology and economics; and the unexpected findings showed that the Norwegian fisheries industry played a role in causing an evolutionary change that has reduced the preponderance of large-sized cod.

In short, Eikeset’s thesis showed that the fishermen’s nets have targeted the largest cod, in fact the very same individuals that would fetch the highest price, while smaller cod were able to escape and reproduce. Being small thus became a survival advantage. Now the cod population is dominated by smaller individuals that become sexually mature earlier – and have less economic value. In the long run, fishermen would probably have earned more by fishing less.

Valuable experience from TRI

Dr Eikeset was a research fellow at the Centre for Ecological and Evolutionary Synthesis (CEES) in Oslo while working on

her doctoral thesis. She subsequently went to Princeton University in order to work with world-renowned biologist, Simon A. Levin, supported by a Personal Post-doctoral Research Fellowship from the Research Council of Norway.

During her post-doc period she also became a member of the TRI-supported Nordic Centre for Research on Marine Ecosystems and Resources under Climate Change (NCoE NorMER), as a collaborator and PhD advisor. These collaborations formed the foundation for GreenMAR, a joint project between Nordic and international researchers. Professor Levin’s group of researchers at Princeton is one of the partners, and Eikeset is Co-Principal Investigator and head of one of the four work packages.

The GreenMAR project sought to link together some of the best Nordic and international researchers within their respective fields, from climatology, ecology and evolutionary biology to economics and sociology. Dr Eikeset explains that the GreenMAR project could not have been realised without the experience gained from the TRI.

Focusing on younger researchers

“NordForsk is highly adept at future-oriented thinking and attracting top-notch grant applications, and is also bold enough to invest in ambitious interdisciplinary projects. There are plenty of calls for proposals which emphasise obtaining a large number of partners but not many new positions, which limits what can be achieved. NordForsk, on the other hand, has understood that it is often the younger researchers, the doctoral candidates and postdoctoral fellows, who do much of the work and drive the research forwards towards published articles”.

“And who will do the work if post-docs don’t get paid? The permanently employed researchers are to a large degree already tied up with their normal work. My experience is that NordForsk is well aware of, and focus on, training a new generation of scientists as well as research leaders of international and inter-disciplinary networks,” Dr Eikeset explains.

Outreach beyond the Nordic region

When young researchers do much of the work, it is also reasonable for them to receive their share of the credit, and this is something the TRI has taken steps to ensure. Dr Eikeset also says that the Nordic collaboration has been noticed in places far beyond the Nordic region.

“When we started the GreenMAR project, Princeton’s administration became so interested that they approached Santander Bank for funding to send students and personnel to three of our nodes. This resulted in the SEReNe project, where the objective was to provide Princeton scientists the best opportunity to investigate social and environmental processes using the expertise we have here in Norway,” she states.

“What is unique about the TRI is that we were afforded the opportunity to come together as a Nordic group and perform research that was superior to what we could have carried out individually. This also made us more attractive partners to international research groups, as we had ample opportunity to bring in non-Nordic partners who were leaders in their fields and who could help us to deliver even better research. I doubt it would have been possible to achieve anything like this in other ways, because no one else thinks of the Nordic countries as a unified whole,” Dr Eikeset adds.



*Anne Maria Eikeset has made a great career since her ground-breaking doctoral thesis in 2010.
Photo: Forskningsdagene/Bård Gudim*

GreenMAR and CEES

The Centre for Ecological and Evolutionary Synthesis (CEES) was established as a Norwegian Centre of Excellence in 2007. It is based at the Department of Biosciences at the University of Oslo and is chaired by Professor Nils Chr. Stenseth. The centre employs 150 persons who come from over 25 different countries.

The NordForsk-funded project, GreenMAR (Green Growth based on Marine Resources: Ecological and socio-economic constraints) is studying one of the fundamental challenges associated with green growth: How to use our renewable natural resources more efficiently while ensuring that the ecosystems retain their functionality. GreenMAR is organised with four Nordic nodes and partners in Europe and the USA.

Similar views, divergent practice

The topic of research ethics usually only attracts public attention in the wake of accusations of fraud and scientific misconduct. NordForsk, however, is taking a precautionary approach and is drawing up guidelines for handling allegations of misconduct in the organisation's Nordic projects, should they arise.

The Nordic countries by and large share the same clear views on research ethics and integrity. Nevertheless, an expert seminar on the topic organised by NordForsk in 2014 showed that the countries vary widely in terms of both their statutory framework and their practice.

“That is why NordForsk, which works across Nordic borders, is developing its own framework for preventing misconduct in research. We are also drawing up principles for how to handle breaches of ethical guidelines if an unfortunate situation arises,” says Advisor Hanne Silje Hauge at NordForsk.

“NordForsk has been spared serious research ethics-related problems thus far, and we would like to ensure that our research projects continue to avoid such problems in the years to come. With researchers from several countries involved in the projects, and the risk for conflicting procedures and legislation this implies,

NordForsk sees a need to establish principles before we are faced with a potential case,” adds Ms Hauge.

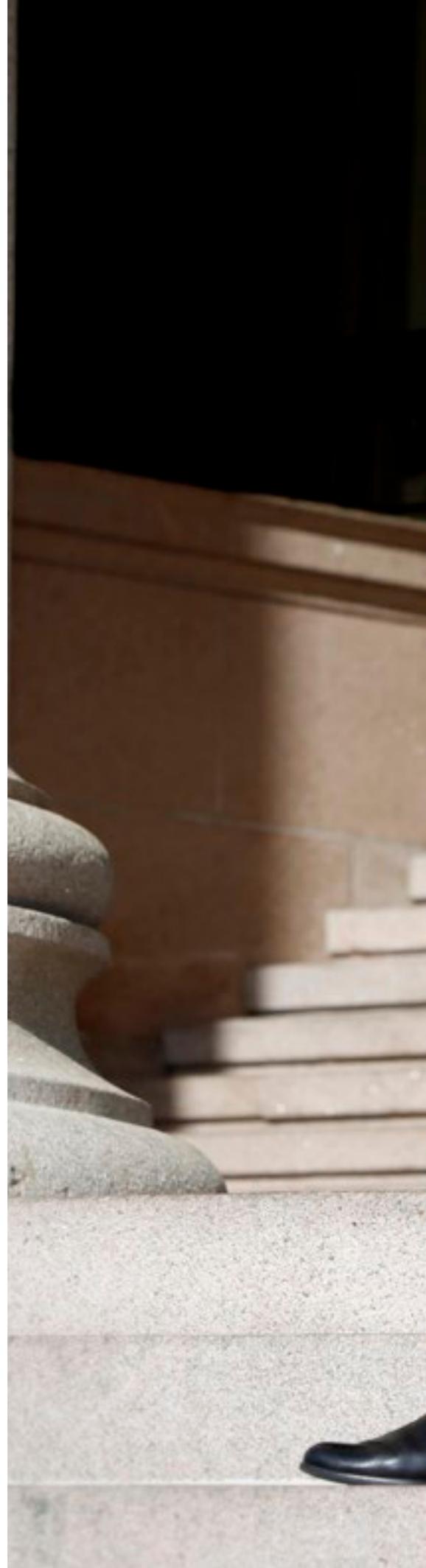
Although the Nordic countries are already at the forefront in terms of research ethics and integrity, NordForsk finds itself in a special position because it funds projects across national boundaries.

“Theoretically, we run the risk of, say, a researcher in one of the Nordic countries accusing a researcher in another Nordic country of stealing his or her ideas or falsifying data. Meanwhile the project leader is located in a third Nordic country and the NordForsk administration in a fourth. Whose rules apply then? It is clearly to our advantage to think these issues all the way through and to establish principles and guidelines for handling them, before such a situation arises,” she explains.

Similar, but different

Professor Varantola, who is the chair of the Finnish Advisory Board on Research Integrity (TENK), played a key role in NordForsk's expert seminar and authored a report summarising the presentations. The report concludes, among other things, that the shared Nordic values make it possible to develop a joint platform for Nordic efforts to promote research with a high level of integrity and a high ethical standard.

“In the Nordic countries we tend to think that we do things roughly the same way. The expert seminar, however, showed that what the Nordic countries actually share are the same values and attitudes regarding what constitutes acceptable research practice. Something





*Advisor Hanne Silje Hauge, NordForsk.
Photo: NordForsk/Terje Heiestad*

Promoting research ethics in the Nordic countries

Norway: Three National Research Ethics Committees were established in 1990 and together encompass all academic disciplines. Their primary task is to provide advice to research institutions on ethical questions and to prevent scientific dishonesty. The National Commission for the Investigation of Research Misconduct was established in 2007. The commission investigates cases of scientific misconduct and plays an advisory role vis-à-vis the research institutions.

Sweden: The research institutions themselves have the primary responsibility for investigating allegations of scientific misconduct at their own institutions. The Central Ethical Review Board has an expert group which – at the request of a university or other institution of higher education encompassed by the Higher Education Act – will issue a statement on cases concerning investigations of suspected misconduct in research, artistic research and development work.

Finland: The Finnish Advisory Board on Research Integrity was established in 1991 to address and coordinate ethical questions relating to research and the advancement of research ethics in Finland. Among other tasks, the board serves as an expert body working towards the resolution of ethical issues relating to research.

Denmark: Like Norway, Denmark has three National Committees on Research Ethics. In addition, there are three Danish Committees on Scientific Dishonesty that investigate allegations of research misconduct. These were established in 1992 and encompass all academic disciplines.

Iceland: The University of Iceland established its own ethics committee in 2003. There are plans to establish a national ethics commission for promoting good practice in science and research, whose members will represent all of the country's institutions and all academic disciplines.

Similar views, divergent practice

that is a breach of good research practice in one of the countries, will generally be a breach of good research practice in the others. We also share the same general ideas about what constitutes good research ethics and what characterises scholarly integrity. But beyond this, legislation and practice vary rather widely among the Nordic countries,” explains Professor Emerita Krista Varantola of the University of Tampere.

Harmonisation better than standardisation

“It would be in keeping with the very best of Nordic tradition to decide not to impose one country’s system on the others. Instead, we should pursue constructive dialogue and discussion forums for matters concerning integrity in research. The aim of NordForsk’s efforts should, in my opinion, be to harmonise the conceptual framework and identify best practices in the area, rather than to unify the various national systems,” adds Professor Varantola.

Research ethics is currently a hot topic of debate at the European and global levels as well as in the Nordic countries. Luxembourg assumed the Presidency of

the Council of the European Union on 1 July 2015, and indicated early on that it would highlight research integrity during its six-month presidency.

Four World Conferences on Research Integrity have been held thus far – in Lisbon (2007), Singapore (2010), Montreal (2013) and Rio de Janeiro (2015). The second conference culminated in the Singapore Statement on Research Integrity, a document that represents the first international effort towards the development of unified principles to foster greater integrity in research. The subsequent Montreal Statement on Research Integrity is a checklist for all types of international collaborative projects. The conference in Rio de Janeiro placed greater focus on improving systems to promote responsible research, by emphasising the importance of publishing negative research results and ensuring reproducibility of studies.

Will communicate applicable rules to researchers

“The report from our seminar has been very well received, and is providing the basis for our continued efforts. Among other things, we are seeking to develop some principles we can incorporate into

the text of our calls for proposals so that researchers applying for funding from NordForsk know what they have to comply with. As it stands now, we will be making a distinction between serious violations of the rules and issues that lie in more of an ethical grey area,” says Hanne Silje Hauge.

This entails that scientific misconduct as defined in the statutory framework, such as fabrication of data or plagiarism of results, should be followed up by the institution where the project leader is located. In most such cases, the legislation will require further follow-up of this type of ethical breach via the national-level systems.

“On the other hand, we need more time to assess how we are going to handle issues in the grey area, for example disagreement on intellectual property rights to ideas or distribution of funding among participants in a consortium. The national legislation of the various countries doesn’t say much about this, so NordForsk needs to develop its own principles and potential sanctions. We are of course doing this in consultation with the national ethics committees,” concludes Ms Hauge.

Definition of research ethics

Research ethics involves the application of principles for planning and conducting research and reporting results. The principles of research ethics are most widely developed in the field of medical research, with the Declaration of Helsinki of 1964 as the cornerstone document. The ethical principles encompass the planning and conducting of experiments on

human and animal subjects, statutory regulation of genetic research and biotechnology, and prevention of fraud, plagiarism and impropriety in research. In medical research, the primary objective is to avoid causing harm to or minimise the burden on research subjects, to protect the confidentiality of personal information and to ensure the credibility of research results.

Responsible Development of the Arctic: Opportunities and Challenges

Responsible Development of the Arctic: Opportunities and Challenges, one of NordForsk's more recently launched programmes, issued a call for proposals in 2015 for Nordic Centres of Excellence.

All five Nordic countries as well as Greenland are participating in the programme, and like NordForsk's other programmes, the Arctic programme has a broad international interface. Applicants seeking NCoE status were encouraged to include leading researchers from countries outside the Nordic region as well, and most of the applicants have done so.

NordForsk also cooperates with research funders outside the Nordic region on joint activities and initiatives.

Marianne Røgeberg, NordForsk Head of Arctic Affairs, says:

“NordForsk has cooperated with the Belmont Forum and several national research councils on the joint programme *Arctic Observing and Research for Sustainability*. The programme received a large number of high-quality applications, and many exciting projects have started up in 2015, two of which are funded by NordForsk. The US National Science Foundation played a very central role, serving as the highly capable secretariat for the Belmont Forum. This kind of cooperation makes perfect sense, because we always seek to organise our programmes to provide the researchers who receive funding with the best possible framework for working with colleagues from all around the world.”

Facts

● **Objective:** The programme *Responsible Development of the Arctic* will generate new knowledge about the opportunities and challenges facing the Arctic region.

● **Background:** In 2012 NordForsk appointed a NORIA-net (representatives of the research funding agencies in the Nordic countries) to assess the potential for added value in a larger-scale joint Nordic research initiative. Based on recommendations from the NORIA-net, the NordForsk Board decided to establish this interdisciplinary programme.

● **Process:** In early 2016 a number of Nordic Centres of Excellence focusing on Arctic research will be launched.

● **Funding:** The programme runs from 2014 to 2018. The total programme budget is roughly NOK 85 million: Denmark (roughly NOK 5 million), Finland (roughly NOK 18 million), Greenland (in-kind contribution), Iceland (roughly NOK 1 million), NordForsk (NOK 30 million), Norway (NOK 12 million) and Sweden (roughly NOK 20 million).

International cooperation in the Arctic

Kelly K. Falkner, Division Director at the US National Science Foundation, on working together with Nordic researchers and NordForsk.

How would you describe the collaboration between the National Science Foundation and NordForsk through the Belmont Forum?

”NSF is always looking for innovative ways to facilitate international collaboration toward advancing the progress of science. The complex scientific and social issues related to Arctic sustainability are of course best addressed in an international framework, and the Belmont Forum provided one mechanism for multilateral funding of bottom-up collaborations among researchers.

It was useful to have NordForsk identify and represent collective Nordic interests in the area of sustainability. The strong community response to the



Kelly K. Falkner, Division Director at the US National Science Foundation.

Photo: The National Science Foundation

Belmont Forum call on *Arctic Observing and Research for Sustainability* confirmed the interest in and readiness for trans-disciplinary research on this issue. NSF will continue to explore a variety of bilateral and multilateral mechanisms in its efforts to fund and support world leading Arctic research.”

How does Nordic research collaboration look from the perspective of the National Science Foundation?

”We see Nordic countries as world-class research partners who bring a wealth of scientific talent, data, and research infrastructure to the table. There is a history of successful collaborations



between individual U.S. and Nordic investigators as well as government-to-government agreements to promote science and infrastructure sharing.”

Do you see any room for further international cooperation on Arctic issues?

”From the NSF perspective, we see an increasing need for collaboration with Nordic countries on Arctic issues because of the growing interest in research and environmental change across the Arctic and because of the advantages from sharing Arctic research infrastructure. Joint research cooperation has been facilitated by various bilateral science and technology agreements between the US and

Nordic countries and ensuing specific agreements or arrangements between NSF and Nordic funding agencies.

The rapid pace of Arctic change and the prospects of future socioeconomic development are driving the need for a better understanding of the Arctic environment and its people.

The Nordic countries are important research partners for NSF because of the history of high quality joint scientific research, the opportunities for access to high latitude environments both on land and in marine territorial waters, and the opportunities to leverage research infrastructure (land stations and research vessels) and logistics in the most cost-

effective way. Joint US-Nordic collaboration also provides a means to interconnect traditional knowledge across the arctic indigenous peoples and to better frame the societal and research issues associated with future Arctic change and development.”

Along with various experts from different countries, NordForsk contributed to 'The New Arctic', a book highlighting and exploring the important issues that are shaping tomorrow's Arctic region.



Nordic Programme on Health and Welfare

Facts

● **Objective:** The overall objective of the Nordic Programme on Health and Welfare is to improve health in the Nordic countries by finding solutions to societal and public health challenges through high-quality research. The programme seeks to generate knowledge on the effects of demographic, social, environmental and biological factors on human health and the challenges this implies for human welfare, and to translate this new knowledge into practical solutions in healthcare and welfare systems.

● **Background:** It focuses on areas in which the Nordic countries already hold a strong position or in which there is potential benefit to be drawn from increased Nordic research cooperation. The programme was established on the basis of reports from various Nordic working groups and analyses of the current and future health and welfare situation in the Nordic countries, among other things.

● **Process:** The programme was launched in 2014 with the publication of three calls for proposals. The first call was for Nordic research projects on the distribution of health and welfare, under which five projects were awarded a total of NOK 140 million in funding. This was followed by a call targeting user-driven innovation in health and welfare, under which two projects were awarded a total of NOK 11 million in funding, and a call for the construction of joint Nordic registers and databases for research purposes, under which four projects were awarded a total of NOK 40 million to establish research infrastructures.

● **Funding:** The programme is funded by the Academy of Finland; The Danish Council for Independent Research | Medical Sciences; The Icelandic Centre for Research (RANNIS); The Research Council of Norway; The Swedish Research Council for Health, Working Life and Welfare (FORTE); The Estonian Research Council; The Latvian Council of Science; The Nordic Council of Ministers; and NordForsk. The programme will run from 2014 to 2018, and has an overall budget of NOK 200 million.





The programme funds 11 projects

- **Coming of Age in Exile (CAGE) – Health and Socio-Economic Inequities in Young Refugees in the Nordic Welfare Societies.** Project leader: Professor Allan Krasnik, University of Copenhagen.
- **Working hours, health, well-being and participation in working life.** Project leader: Professor Mikko Härmä, Finnish Institute of Occupational Health.
- **Understanding the link between Air pollution and Distribution of related Health Impacts and Welfare in the Nordic countries.** Project leader: Professor Jørgen Brandt, Aarhus University.
- **Social inequalities in Ageing (SIA); health, care and institutional reforms in the Nordic welfare model.** Project leader: Professor Johan Fritzell, Karolinska Institutet.
- **ActivABLES: Tangible Interaction to Support Effective and Usable Stroke Rehabilitation at Home.** Project leader: Associate Professor Charlotte Magnusson, Lund University.
- **Symptom monitoring after hospitalisation in patients with advanced heart failure – a Nordic-Baltic study.** Project leader: Professor Anna Strömberg, Linköping University.
- **A Nordic Rheumatology Register Pilot to facilitate collaborative studies based on linkages of clinical data with national health.** Project leader: Professor Johan Askling, Karolinska Institutet.
- **Adult Life after Childhood Cancer in Scandinavia (ALiCCS): Socioeconomic consequences of long-term survival.** Project leader: Senior Advisor Jeanette Falck Winter, the Danish Cancer Society.
- **Contingent Life Courses (C-LIFE).** Project leader: Professor Espen Dahl, Oslo and Akershus University College of Applied Sciences.
- **Nordic Occupational Register – a tool for estimation of the potential of workplace and population level interventions.** Project leader: Svetlana Solovieva, Finnish Institute of Occupational Health.
- **Psychosocial work environment and healthy ageing.** Project leader: Professor Mika Kivimäki, University of Helsinki.

Long-term research is the best medicine

NordForsk's Nordic Programme on Health and Welfare awarded close to NOK 200 million to 11 projects in the course of its first year – and given the increasing pressure on the Nordic welfare states, it is important to keep up the funding pace.

Professor Erland Hjelmquist, chair of the programme committee, is absolutely certain that targeted, long-term research is the best medicine for dealing with the challenges to come.

Health and welfare-related challenges in the Nordic countries are complex. The population in the five countries is ageing, there is uneven distribution of health and welfare, and social inequalities are on the rise. NordForsk launched its health initiative to improve public health in the Nordic countries by generating new knowledge to help to find answers to these multifaceted problems.

Despite widespread interest in the programme, it took time before it got off the ground. Professor Erland Hjelmquist, former Secretary General of the Swedish Research Council for Working Life and Social Research (FAS) (now the Swedish Research Council for Health, Working Life and Welfare (FORTE)), knows this better than anyone. He has been involved from the very start.

"It's been a fantastic journey! In 2012 I led the *NORIA-net on Health and Welfare*

working group, and our report recommended that NordForsk establish a large-scale Nordic health research programme. It took several years before the wheels started turning, but support has remained steady the entire time, and we are extremely pleased with the results so far," says Professor Hjelmquist, who now chairs the programme committee for the Nordic Programme on Health and Welfare.

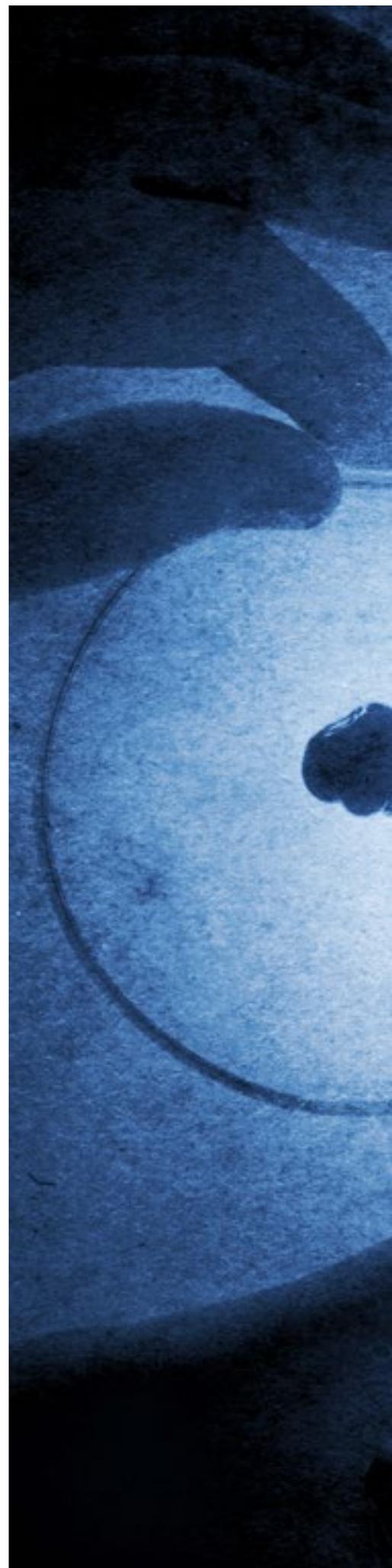
"Our intention has always been to cultivate research that will improve living conditions in the Nordic countries and to generate new knowledge to provide politicians with a sound basis for developing effective health policy. We are convinced that the 11 projects awarded funding will do precisely this, and we are looking forward to following their progress," he adds.

Broad-based perspective

The programme operates with a broad definition of health and welfare. In this context, the term "welfare" encompasses not only welfare and unemployment benefits, but education and the labour market as well.

"We wanted a research programme that would help to find solutions to the grand societal challenges, so we had to employ a broad definition of welfare. A high influx of refugees and work migrants, an uneven distribution of welfare, increasing social inequalities and an ageing population are issues that all the Nordic countries are grappling with," says Professor Hjelmquist.

"Children born today have a 50 per cent chance of reaching the age of 100, which gives us some idea of what we are facing, particularly because it's not only elderly care we are talking about, but the





“Some research questions pertain only to the Nordic countries and some can only be answered through Nordic research cooperation. I hope NordForsk will continue to set the research agenda in the years to come.”
– Professor Erland Hjelmquist

entire life course, from cradle to grave. How are we going to organise working life to ensure that people can be productive for as long as they like? Many factors must be taken into consideration to ensure that the welfare systems can be maintained and further developed. Therefore the scope of the first call for proposals was also very broad,” he explains.

Diverse research areas

A full NOK 140 million was available under the first call for proposals, which focused on the mechanisms and inequalities behind the considerable variation in the distribution of health and welfare among individuals and groups in the Nordic countries.

“We received a very large number of applications in response to the call, which led to a comprehensive application review process. Many of the proposals were of an extraordinarily high scientific standard, which greatly impressed the international panel of experts. Competition was tough, as funding could only be awarded to five projects, but the programme committee and NordForsk were pleased to see the widespread interest in the call. The five projects awarded funding are all very different, which again underlines the broad scope of this vital field of research.”

He continues in more detail, “One project looks at the complex challenges linked to the growing number of young refugees coming to the Nordic countries, while another explores the potential impacts of air pollution on public health. From our vantage point now we see that the projects address particularly pressing societal issues, and the current refugee situation in the Nordic countries and Europe in particular makes these projects even more relevant than we could have anticipated.”

Two subsequent calls for proposals were issued targeting user-driven innovation in health and welfare, and construction of joint Nordic registers and databases for research purposes, respectively.

“Under the third call we gave funding to four pilot projects that will shed light on existing obstacles to Nordic cooperation on registers. There are currently technical, legal and ethical obstacles that must be overcome before we can share data across national borders,” he says.



*Professor Erland Hjelmquist, Chair of the Programme Committee of the Nordic Programme on Health and Welfare.
Photo: Per Westergård*

“One could say that the pilot projects hold the greatest potential, as all of the countries have access to high-quality register data extending back for decades and we have not yet managed to institute better cooperation. It’s an accepted truth that these registers are a potential goldmine for the Nordic countries, but only if these obstacles can be surmounted. A joint Nordic register will provide access to data on 26 million individuals, which can be tremendously valuable to research both in terms of disease prevention and development of new methods,” the professor adds.

The road ahead

Professor Hjelmquist emphasises that research takes time. It is not possible to take shortcuts; it is important to be patient and work in a long-term perspective to find good answers to the questions being addressed. Thus, he believes that there is still untapped potential in the programme, even though three calls have been issued. He points to several reasons: “Our aim the entire time has been for the programme to deliver long-term research results that would not be possible to generate anywhere else in the world and which can help to ensure good health, working life and education, as well as individual freedom in the Nordic welfare systems,” says an enthusiastic programme committee chair.

“To achieve this we hope that the programme will be expanded and continued

beyond 2018, maintaining continuity in a research programme with a broad-based Nordic perspective.

The number of applications received under the various calls shows that Nordic researchers are very interested in working across national borders, and the many high-quality proposals clearly prove that there are a myriad of research projects out there that have the potential to generate Nordic added value and that need funding,” he continues.

Must not lose Nordic momentum

If the programme committee were to be given more funds on the table, Professor Hjelmquist knows exactly which research area he would prioritise.

“All the projects awarded funding touch on the major health and welfare challenges to be tackled, and we firmly believe that they will inspire new research. At the same time, there is one research area in which there is no time to waste. The Nordic registers are unique in a global context, and greater priority must be given to exploiting this advantage before it’s too late. The four pilot projects are a step in the right direction, but several countries are now investing substantial resources in constructing their own registers, which makes it imperative to achieve greater coordination among the Nordic countries to further develop this advantage,” he says.

“We can always be better. If we stop trying to improve ourselves, the Nordic countries will quickly realise that we’re not particularly good at all. Research must continually seek to improve itself, its methods and its tools. I’m concerned that the Nordic countries have not yet managed to surmount the obstacles to data sharing, so I would like to see the programme expanded with another large-scale call for proposals targeting register research,” concludes the professor.

NordForsk invests millions in Nordic cooperation on statistics

NordForsk is investing NOK 14 million in a collaborative project between the Nordic statistics bureaus.

The statistics bureaus are seeking to establish a Nordic model that will provide better access to metadata for research purposes, thereby expanding and facilitating Nordic register-based research. The Nordic countries have long traditions of collecting data for statistical purposes, and the registers are viewed by many to represent a Nordic goldmine because their data goes back many decades. Despite the enormous potential of Nordic register research, various obstacles continue to pose limitations.

Potential for Nordic added value

The collaborative effort was launched in autumn 2015, and will enable the individual Nordic statistics bureaus to coordinate the release of register data to researchers in the other Nordic countries while at the same time developing a joint framework for metadata (data that describes or defines other data).

“Strengthening Nordic register research is a very important topic within Nordic cooperation in the health and welfare sphere, and I’m certain that there is great potential for major Nordic added value in the project. NordForsk is therefore very pleased that the directors general of the national statistics bureaus have decided to establish a new Nordic cooperation model to be tested in selected research projects that will receive joint Nordic data,” says Director of NordForsk, Gunnel Gustafsson.

Closer ties between statistics bureaus

The test period also includes an evaluation phase in which the experiences with the Nordic cooperation model will be reviewed in order to identify advantages, and potential problems, at an early stage.

“In brief, the model consists of a joint application form, a data protection and security agreement between the researchers and the statistics bureaus, and an agreement between the statistics bureaus themselves to set the framework for secure data transfer,” explains project leader Claus-Göran Hjelm of Statistics Sweden.

“Our registers are unique – and an unexploited research infrastructure. We can enhance both the quality and the relevance of the research conducted by sharing the work and creating much larger data sets. Therefore I hope this collaboration will forge closer ties and enable the Nordic countries to share register data on a much greater scale than previously,” concludes Ms Gustafsson.

The initiative is funded by NordForsk and the Nordic statistics bureaus, and is part of NordForsk’s Nordic Programme on Health and Welfare.



Illustration: Berit Sømme

Facts

● **Objective:** The Nordic Societal Security Programme is a multi-disciplinary research programme designed to generate new knowledge about what is required to ensure the safety and security of the Nordic countries' inhabitants. Given that today's societal security challenges are trans-boundary by nature, there is much to be gained from Nordic and international collaboration.

● **Background:** The Nordic countries have cooperated closely on societal security for decades. In recent years, this tradition has been strengthened through several political initiatives across national borders. In 2012, a Nordic expert group explored the prospects for Nordic cooperation in the field of societal security. Based on the group's recommendations, the Nordic Societal Security Programme was launched in 2013.

Nordic Societal Security Programme



● **Process:** Cyber security will be the focus of the programme's next call for proposals to be issued in autumn 2015 – this time with the aim of broader international cooperation.

● **Funding:** The programme is currently funded by the Academy of Finland, the Icelandic Centre for Research – RANNIS, the Swedish Civil Contingencies Agency, the Norwegian

Directorate for Civil Protection, the Research Council of Norway, and NordForsk. The budget to be provided by the Nordic countries is expected to be more than NOK 90 million by the end of 2015.

Two Nordic Centres of Excellence are funded within the programme:

- Nordic Centre of Excellence for Security Technologies and Societal Values (**NordSTEVA**)
- Nordic Centre of Excellence on Resilience and Societal Security (**NORDRESS**)

European cooperation for a safer, more secure society

The Nordic countries have been cooperating closely in recent years in the field of societal security. Now cooperation under NordForsk's Nordic Societal Security Programme is being expanded to include the UK and The Netherlands.

The participants are joining forces to support the best researchers – across national borders – with a special emphasis on research on ICT security.

A new call for proposals for research on ICT security, funded by a common pot, will be issued in autumn 2015 under the administration of NordForsk.

“It is important for researchers to work together to create dynamic groups that can compete internationally,” says Eivind Hovden, Department Director at the Research Council of Norway. He also chairs the programme committee for NordForsk's Nordic Societal Security Programme.

“A strategic initiative like this is precisely what this field needs in order to develop,” believes Dr Hovden. “By promoting cooperation with two major European research nations, we also strengthen the Nordic community of researchers.”

Common objectives

The idea for expanded cooperation sprang from discussions at New Opportunities for Research Funding Agency Co-operation in Europe (NORFACE), a collaborative partnership of national



*Eivind Hovden, Department Director, the Research Council of Norway and Chair of the Programme Committee for NordForsk's Nordic Societal Security Programme.
Photo: NordForsk/Terje Heiestad*

research funding agencies in the social and behavioural sciences. This is where dialogue began between NordForsk, The Netherlands Organisation for Scientific Research (NWO) and the Economic and Social Research Council (ESRC, one of the UK's seven research councils) regarding their common interests. Would it be advantageous for the countries to cooperate on a joint call for societal security, a topic that so clearly transcends national borders? Close dialogue and collaboration over recent months has answered this question with a clear yes.

Joint initiative to fund the best projects

“This is the first time NordForsk is co-operating internationally on a call in this way,” explains Senior Adviser Sólveig Mortens, Coordinator of NordForsk's Nordic Societal Security Programme.

“It's very exciting for us to take part in this joint initiative,” she continues. “In

many ways it reflects researchers' daily activities in that it is very international. Jointly issuing a call with a common pot gives the very best Nordic, British and Dutch researchers the opportunity to work together across national borders, which is the essence of international research cooperation.”

Different approaches

Thus far the cooperation reveals the parties have much in common and are quite like-minded.

“Overall, most of the processes are the same,” says Dr Hovden, “but each country has its own statutory framework and procedures, which entails different forms of research administration. So even though the parties share a common platform, it has taken some time to find a common approach.”

Rapid development

“Many aspects of the field of societal security are challenging,” he continues. “It is a young discipline in rapid development, so as research funders we need to make sure we don't restrict its possibilities too early.” The UK has a strong tradition of involving stakeholders, and Dr Hovden believes that the Nordic countries may have something to learn in this regard:

“When we involve the researchers in the process, they can help us to direct the focus to new issues of relevance. This is just one of the many areas where we can learn from one another.”

Recommendations for the future of eScience and eInfrastructure

The Nordic eScience Action Plan 2.0 gives an overview of development needs in the areas of eScience and eInfrastructure and sets out ten recommended actions.

The need for eScience and eInfrastructure in research has risen dramatically since the turn of the millennium, with Nordic researchers at the forefront of developments. The Nordic Committee of Senior Officials for Education & Research (EK-U) appointed an expert group to identify relevant opportunities and needs in order to strengthen these areas. The result was the *Nordic eScience Action Plan 2.0* that recommends the following ten actions:

- 1. Training Researchers in eScience Tools and Methods;**
- 2. Fostering Nordic eScience Collaboration through mobility;**
- 3. Strengthening eScience Aspects of Nordic Research;**
- 4. Nordic Research on eScience Methods and Software;**
- 5. Nordic Pilot Projects within Open Science;**
- 6. Nordic Sharing and Exchange of eInfrastructure Resources;**
- 7. A Nordic Federated Cloud;**
- 8. Nordic High Performance Computing Collaboration;**
- 9. Nordic eInfrastructure for Sensitive Data;**
- 10. Nordic eInfrastructure for Scientific Software.**



Professor Gunnel Gustafsson,
Director of NordForsk.
Photo: NordForsk/Per Westergård

NordForsk, together with others, can help to bring the recommendations of the eScience Action Plan 2.0 to fruition.

Version 2.0 is an updated version of the first Nordic eScience Action Plan presented in 2008.

“The implementation of the first eScience Action Plan has been a real success story. eScience has gained momentum across the entire research community over this period, so clearly the first actions were taken at exactly the right time. It is also evident that Nordic cooperation in this area has been significant and has garnered attention from outside the Nordic region,” states Gunnel Gustafsson, Director of NordForsk.

She adds, “It’s essential to continue providing support for development. eScience tools are needed in an increasingly wider range of areas, and it is both important and necessary to provide training for researchers of all ages. When it comes to research infrastructure

initiatives, eInfrastructure has a critical role to play, a point which has also been noted internationally, for instance in the European Strategy Forum on Research Infrastructures (ESFRI). Implementation of more recommendations will depend on discussions in the individual countries. If an initiative is not prioritised at the national level, it will not be possible to generate Nordic-based synergies.”

The expert group responsible for designing these recommendations to promote Nordic research hopes that the plan will be used by decision-makers at universities, research councils and other research organisations.

The group was headed by Sverker Holmgren, professor at Uppsala University and Programme Director for the Nordic eScience Globalisation Initiative (NeGI). He explains:

“The expert group has undertaken a huge task in creating an overview of how we can further enhance the connections between initiatives in eScience and eInfrastructure. Via NeGI and NeIC, NordForsk has adopted a couple of the recommendations from the *eScience Action Plan 2.0* and is in the process of implementing them in the Nordic research community through a call for proposals under NeGI, among others. We sincerely hope that other national stakeholders will discuss the remaining recommendations so that these can soon be implemented.”



NordForsk's initiatives for research infrastructure and eInfrastructure

Research infrastructures and eInfrastructures have become a prerequisite for carrying out high-quality research. Such infrastructures typically comprise large-scale investments, and cooperation on research infrastructure and eInfrastructure will therefore be highly beneficial at the Nordic level.

Strategic initiatives and activities

Nordic e-Infrastructure Collaboration

NordForsk hosts the *Nordic e-Infrastructure Collaboration* (NeIC), which facilitates the development and operation of high-quality eInfrastructure solutions in areas of joint Nordic interest. NeIC is comprised of technical experts from national academic eInfrastructure centres in the Nordic countries.

High-level advisory group for research infrastructure

Since 2013 a high-level advisory group has been providing NordForsk with strategic input on Nordic research infrastructure cooperation. The group members are: Lars Börjesson, Chair, (Sweden), Peter Sloth (Denmark), Paula Eerola (Finland), Ingileif Jónsdóttir (Iceland), Hans Chang (The Netherlands), Steven Krauwer (The Netherlands), Solveig Flock (Norway), Vigdis Kvalheim (Norway), Juni Palmgren (Sweden), Cherri Pancake (USA).

Nordic eScience Action Plan 2.0

An ad hoc expert group published the *Nordic eScience Action Plan 2.0* in 2015. The plan, commissioned by the Nordic Committee of Senior Officials for Education & Research (EK-U), proposes 10 actions in the areas of eScience and eInfrastructure which, if given priority and implemented, could substantially strengthen Nordic research.

The NOS organisations

NordForsk serves as the secretariat for the Joint

Committee of the Nordic Research Councils for Natural Sciences (NOS-N) and the Joint Committee of the Nordic Medical Research Councils (NOS-M). The NOS organisations are collaborative bodies for the national research councils in the Nordic countries and research infrastructure issues often appear on their agendas.

Research infrastructure networks

NordForsk has provi-

ded support to Nordic research infrastructure networks that strengthen Nordic cooperation on specific, large-scale international research infrastructure projects, including joint efforts to increase joint Nordic use of international research facilities. The aim is for the networks to provide a Nordic platform, thereby facilitating more coordinated Nordic participation in international research infrastructure projects. Several of the networks have focused on Nordic coordination in connection with ESFRI Roadmap projects.

Biobanks

NordForsk has provided support to the Nordic

In principle, all research infrastructures generate data, normally in digital form. Many produce extreme amounts of data, and there is a rapidly rising need to manage these data via eInfrastructures (computers, storage resources, software and analytical tools).

NordForsk gives high priority to both research infrastructure and eInfrastructures through strategic discussions as well as targeted, specific activities. Research infrastructure and eInfrastructures will be playing an increasingly larger role in more and more NordForsk programmes.

The purpose of this strategic focus is to enhance the quality and impact of Nordic research. The idea is to promote initiatives that increase joint Nordic use of and access to research infrastructure at the national, Nordic and international levels.

Programmes

Biobank Network (2010-2016) (formerly the BBMRI Nordic). The network developed the pilot project *Nordic biobank-based study of causes and biomarkers of cancer* (2011-2015).

NORIA-net

In preparing the publication *Joint Nordic Registers and Biobanks - A goldmine for health and welfare research*, the working group *NORIA-net on Registers and Biobanks* (2011-2014) focused its efforts on how to overcome existing obstacles that impede Nordic data sharing and proposed ways of enhancing coordination to strengthen Nordic register-based research. A new Nordic

group of experts has been given the mandate to continue this work in 2015.

The NORIA-net *Nordic Research Infrastructure Network* (NRIN) (2009-2011) provided recommendations on how to expand and add value to Nordic research infrastructure cooperation in its concluding report in 2012, *Enhancing Nordic Research Infrastructure Cooperation*.

Research infrastructure and eInfrastructures are widely applied by researchers within all of NordForsk's programmes. However, there are three programmes in which both play a particularly pivotal role:

Joint Nordic programme for neutron research

A new Nordic programme for neutron research was launched in 2015. Its main objective is to raise the competency level and increase the number of Nordic-region researchers in order to take full advantage of the European Spallation Source (ESS).

Nordic eScience Globalisation Initiative

The Nordic eScience Globalisation Initiative (NeGI) promotes Nordic collaboration on eScience through efforts targeting research and graduate education. The NeGI also takes part in the development of Open Science. The use of eInfrastructures is an integral component of both these areas.

Nordic Programme on Health and Welfare

The programme's overall objective is to improve public health in the Nordic countries, and research infrastructure comprises an important element of this. In 2014 the programme provided funding to pilot projects targeting joint Nordic use of registries, as well as a collaborative project between the Nordic central statistics bureaus regarding how to harmonise metadata at the Nordic level.

The Nordic eScience Globalisation Initiative (NeGI)

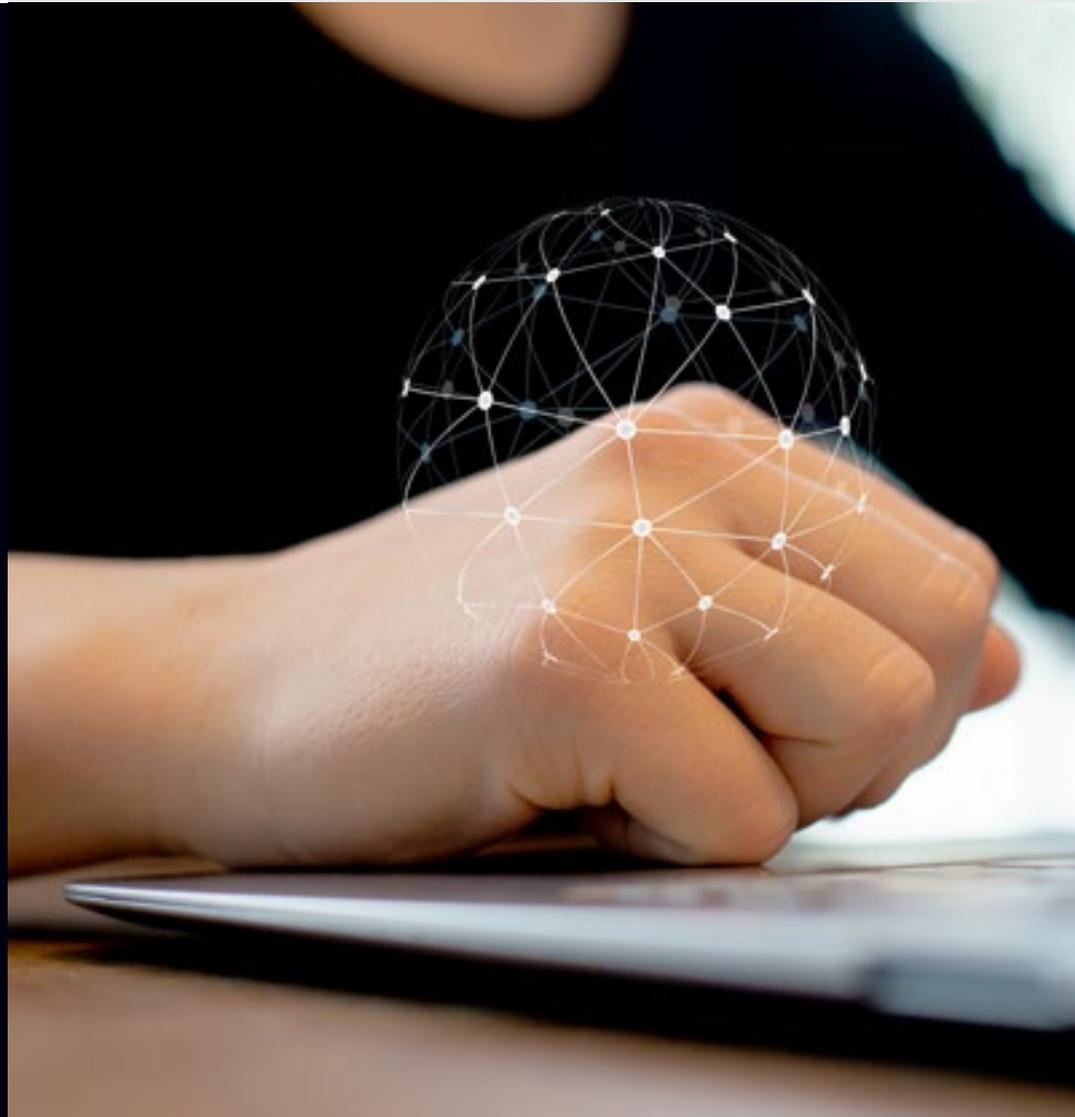
Facts

● **Objective:** Promote Nordic collaboration on eScience by focussed efforts on eScience research and graduate education. NeGI also takes part in the development of research collaboration and Open Science.

● **Background:** The NeGI was launched in response to a proposal from the Nordic Committee of Senior Officials for Education & Research (EK-U) and is the result of the first Nordic eScience Action Plan, published in 2008.

● **Process:** The NeGI is operating in the period 2010–2015. During this time, three Nordic Centres of Excellence have been established, as have three research projects on eScience tools and techniques and eScience researcher schools. These initiatives and projects will continue for a number of years after 2015.

● **Funding:** The Academy of Finland (NOK 16 mio), NordForsk (NOK 30 mio), the Nordic Council of Ministers (NOK 27 mio), the Research Council of Norway, (NOK 17 mio) the Swedish Research Council (NOK 20 mio). The total budget for the five-year period of the programme is approximately NOK 110 million.



eScience is fundamentally about the digitisation of research.

It is a research field focussed on developing and applying advanced methods and tools within information and communication technologies (ICT), e.g. calculations, storage, data processing and



Photo: Shutterstock (m)

communications. It also involves establishing access to digital resources and services such as networks, computing, data and instruments within all areas of research.

eScience must not be confused with eInfrastructure; eScience designates the research itself, which requires expertise in mathematics and physics, whereas eInfrastructure comprises the technical solutions which are a result of research activity.

Open Access

The NeGI is developing Open Access to publications and data at the Nordic level, using Science Europe's principles on open access to publications. The three Nordic Centres of Excellence and the three research projects under the NeGI are Open Access pilot projects which provide open access to research data and publications produced under the projects.

The NeGI has initiated the following:

Three Nordic Centres of Excellence, two of which focus on eScience in Climate and Environmental Research, and one on eScience in Health and Social Pre-conditions to Health. The centres were launched on 1 January 2014 and will be in operation until 31 December 2018.

- eScience Tools for Investigating Climate Change at High Northern Latitudes (eSTICC), headed by Senior Research Scientist Andreas Stohl, Norwegian Institute for Air Research (NILU). The centre is working on developing new tools for more precise predictions of climate change. NOK 25 million.
- Ensemble-based Methods for Environmental Monitoring and Prediction (EmblA), headed by Professor Geir Evensen, Nansen Environmental and Remote Sensing Center, Bergen. The centre is developing and improving mathematical

models to use with climate research data. NOK 17 million.

- The Nordic Information for Action eScience Center (NIASC), headed by Professor Joakim Dillner, Karolinska Institutet. The objective is to develop new methods for cancer screening. NOK 40 million.

Three research projects on eScience tools and techniques working to develop tools and methods to support research activities taking place in the NeGI's three Nordic Centres of Excellence and other research initiatives in similar areas. The projects will carry out research on new theories, models, methods, algorithms and software to address problems in the application of computer and data-intensive resources relating to research on climate, the environment and health in particular:

- Automated uncertainty quantification for numerical solutions of partial differential equations. Project leader: Head of Department Marie Rognes, Simula Research Laboratory, Norway. NOK 4 million.
- Statistical analysis of climate projections. Project leader: Senior Research Scientist Thordis Thorarinsdottir, Norwegian Computing Center. NOK 4 million.
- An open-access generic e-platform for environmental model-building at the river basin scale. Project leader: Research Director Thorjörn Larssen, Norwegian Institute for Water Research. NOK 4 million.

A call for proposals for graduate education in eScience will be issued in 2015.

Establishing cooperation in a new research area

The Nordic eScience Globalisation Initiative (NeGI) will soon be formally concluded after five years of activity. We have spoken with the chair of the programme committee, Professor Juni Palmgren, about the programme's activities and ambitions.

In the course of these five years, the NeGI has launched three initiatives in eScience, encompassing everything from researcher training to major Nordic Centres of Excellence. What are the ambitions underlying this endeavour?

"From the outset the idea was to promote a Nordic exchange of new electronic methods and apply them in the specific context of research. This fuelled the start of two Nordic Centres of Excellence (NCoE) in the area of climate and environment and one in health and welfare. The centres bring together many of the leading researchers in their respective fields. In addition, three research projects were launched with a focus on developing tools and methods to use in the three NCoEs. And lastly we announced funding for universities to design and hold courses," Juni Palmgren explains.

Why did you choose to focus on researcher training?

"Quite simply because Nordic researcher training makes it possible to

specialise in areas where the scientific framework and the number of students in each individual country is relatively modest. The courses are to be targeted enough to be interesting and generic enough to generate new knowledge and benefits. The Nordic region has great potential here, and the NeGI has taken on the challenge," states Dr Palmgren. She adds, "Experienced researchers don't always see the intrinsic opportunities of e-tools, so we need to focus on the younger researchers to continue to develop research areas."

Now that NeGI is drawing to a close, do you see any need for the programme to continue?

"I see a great need for the eScience initiative to continue on a broad scale. It was a ground-breaking effort five years ago when the research councils in Sweden, Norway and Finland contributed to a "common pot" for eScience and to the NeGI. Activity should continue under NordForsk," states Professor Palmgren, adding:

"We should find ways to implement the Nordic Council of Ministers' *eScience Action Plan 2.0*, which, among other things, states that 'educational efforts are urgently needed'. We need to develop funding forms and define the distribution of responsibility. I hope that the high-level advisory group on research infrastructures, among others, submits a clear recommendation to the NordForsk Board for NordForsk and Nordic funders to move this forward. A smooth transition post-NeGI is essential.

eScience in Sweden benefited from

being prioritised as a strategic research area in 2008. This led to two eScience research centres: SeRC and eSENCE. Norway's eVITA programme has existed for many years. Many countries treat eScience and eInfrastructure as one and the same thing, but in Nordic countries the distinction is very clear. "





Juni Palmgren

is a professor at the Karolinska Institutet in Stockholm, has served for the past five years as Secretary General of the Council for Research Infrastructures at the Swedish Research Council, is a member of NordForsk's high-level advisory group on research infrastructures and is one of Sweden's two delegates to the European Strategy Forum on Research Infrastructures (ESFRI).

Photo: NordForsk/Terje Heiestad

What will we see a few years down the road when we look back on the overall programme of the NeGI?

“A clearer Nordic context – first and foremost through the three NCoEs. A large number of countries, universities and institutions are involved. The Nordic Information for Action eScience Centre

(NIASC), the NCoE in health-related eSciences, has 16 partner institutions. Cooperation is expanding, individuals learn from one another and say yes to Nordic mobility. These factors are very important to competence building. I have seen many young researchers grow as a product the Nordic perspective. I truly

hope that eScience and application of eInfrastructure become visible, especially in areas where it has been less common to take advantage of the potential of e-tools, such as environmental research, medicine and social sciences,” Professor Palmgren concludes.

The Nordic e-Infrastructure Collaboration



Facts

● **Objective:** NeIC works to facilitate the development and operation of high quality eInfrastructure solutions in areas of joint Nordic interest.

● **Background:** NeIC became an organisational unit under NordForsk in 2012. NeIC has close to 40 employees located throughout the Nordic region. Most of the personnel are technical experts affiliated with universities or eInfrastructure centres.

● **Process:** Projects under NeIC are divided into four strategic areas:

The Nordic Tier 1 data centre: Computing and storage for CERN.

Generic: Projects to develop software and services such as data management and computing, including cloud solutions, for application across a wide range of research areas.

Biomedicine: Projects to develop services for the secure storage and sharing of sensitive data.

The environment: Projects to develop infrastructure and data services for use in environmental research.

● **Funding:** NOK 12 million from NordForsk and NOK 13 million from the five Nordic countries.

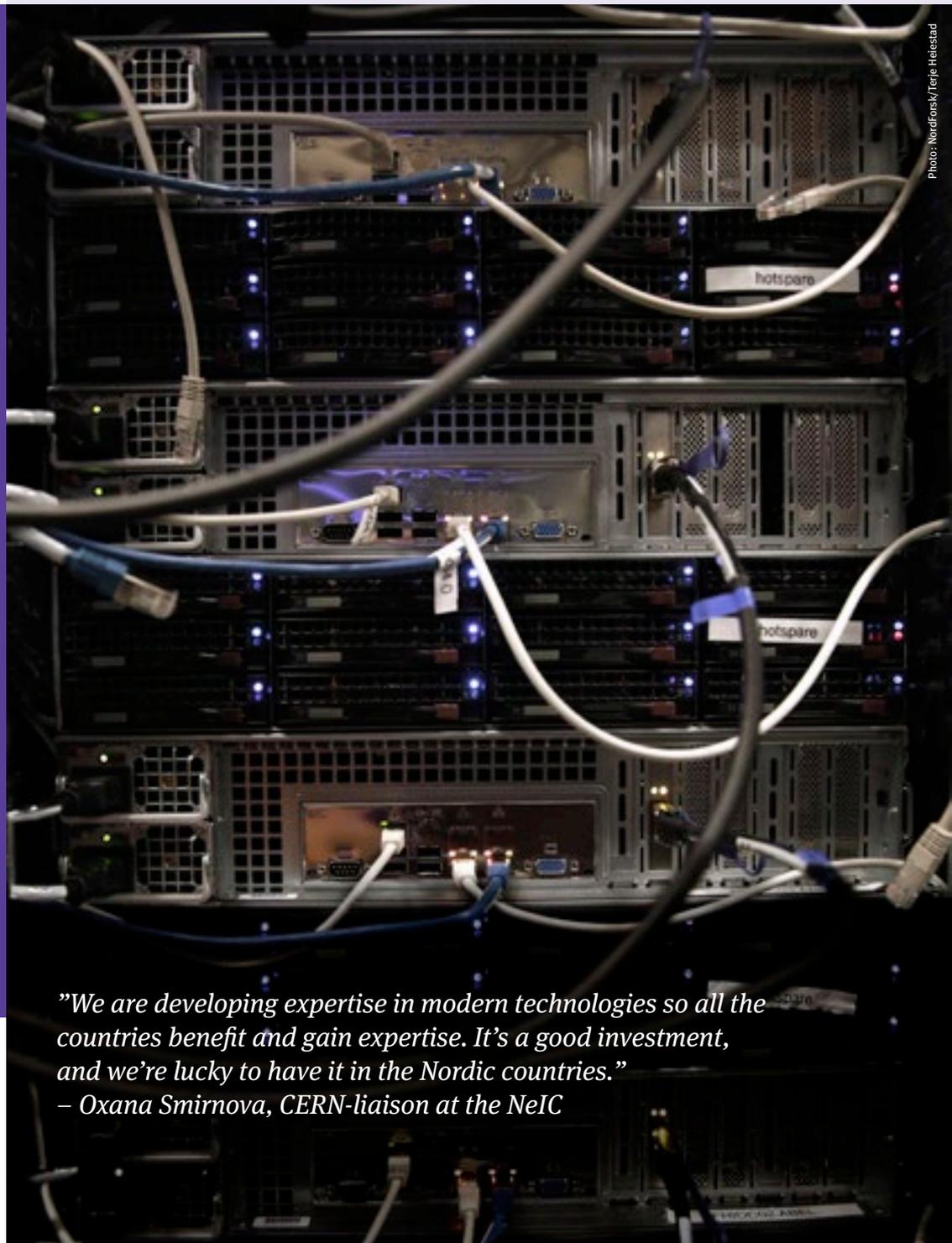
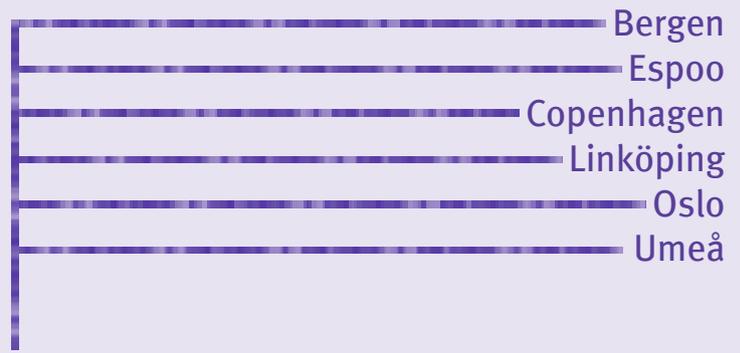


Photo: Nordforsk/Terje Heiestad

“We are developing expertise in modern technologies so all the countries benefit and gain expertise. It’s a good investment, and we’re lucky to have it in the Nordic countries.”

– Oxana Smirnova, CERN-liaison at the NeIC



The Nordic Tier 1 Data Centre

When data from CERN are to be made available to researchers, they are first received by one of the 13 Tier 1-centres, located around the world. One of these is situated in the Nordic region.

This Nordic solution is unique in being distributed across four countries, whereas the other centres are located on a single site. But what is a Tier 1 centre and why have we organised ours so differently from the rest of the world? Oxana Smirnova, CERN Liaison at the NeIC, provides a clear explanation.

“The Nordic Tier 1 is the only Tier 1 centre that is distributed across countries. This is a special situation and a result of a Nordic cooperative effort,” Oxana Smirnova explains in her office at the Department of Physics at Lund University. As CERN liaison, Dr Smirnova’s job is to ensure that communication between the Nordic Tier 1 centre and CERN is maintained as seamlessly as possible, both technically and in terms of policy. “The goal for my job is not to be noticed by the researchers. For instance, my colleagues don’t know where their data are being processed. It just works.”

Tier 1 centres provide access to CERN data

The Tier 1 system basically comprises a cluster of computers distributed over a large area. Researchers call it the ‘Grid’



*NeIC’s CERN-liaison Oxana Smirnova.
Photo: NordForsk/Terje Heiestad*

– a form of distributed supercomputer which combined provides supercomputer capacity. Dr Smirnova has been involved from the very beginning (ca. 2000) when the Tier 1 centres were first being established. She says:

“Seventeen years ago when CERN was preparing to start constructing accelerators, computing expenses weren’t in the budget because at the end of the 90s nobody knew what computing technology would be like. However, it became clear that a single computer was not the solution. That would be a very expensive beast. So people looked for cheaper solutions – researchers made farms of small computers themselves. You could buy them in the downtown supermarket and connect them into a single system. It became evident that the cluster model was the way forward. At the same time, researchers wanted to access the data from anywhere without travelling to

CERN. So remote access was needed, and people started to develop a model for infrastructure. Consequently the Tier 1 centres emerged.”

Nordic joint forces

Why have we placed the Nordic Tier 1 centre in more than one location?

“When the Tier 1 centres were planned, only countries of a certain size could afford to host a centre. Naturally, the largest countries with the largest economies were able to be hosts, while the Nordic countries were too small. So the Nordic countries decided to join forces and create a Nordic Tier 1 centre. It’s a distributed Tier 1 system that actually has resources in four of the five Nordic countries. From the point of view of human capital, we are developing expertise in modern technologies so all the countries benefit and gain expertise. I think it is an outstanding example of cooperation between different countries. It’s a good investment, and we’re lucky to have it in the Nordic countries,” the CERN liaison concludes.

Taking decisions while on the move

Advanced Resource Connector (ARC) is software developed through a small, Nordic collaboration, which, with little funding, has outcompeted far better-financed projects and is currently enjoying international success.

Farid Ould-Saada, a professor of particle physics at the University of Oslo and head of the NorduGrid collaboration behind ARC, attributes his group's achievements to being a tight-knit, efficient project group that is capable of taking decisions while moving ahead at full speed.

Solving CERN's data challenge

ARC gives researchers the ability to work with Tier 1 CERN data centres.

"ARC is a computer program, but a special one," explains Professor Ould-Saada. "It means 'Advanced Resource Connector'. Advanced, because we think it is advanced. And Resource Connector because you have distributed computing and storage resources you need to orchestrate. Around the year 2000 we faced what we call the 'data challenge'. We really had too much data. Advanced instruments like the Large Hadron Collider (LHC) were producing much more data than we could even imagine. We ran into kind of a crisis, which at the same time was very interesting for computer science. We had to figure out how to take

all this data, put it somewhere, access it, and be able to handle and analyse it – which is the goal of experiments. ARC was developed to help solve this problem."

Developed on working weekends

This is a solution that many scientists can use.

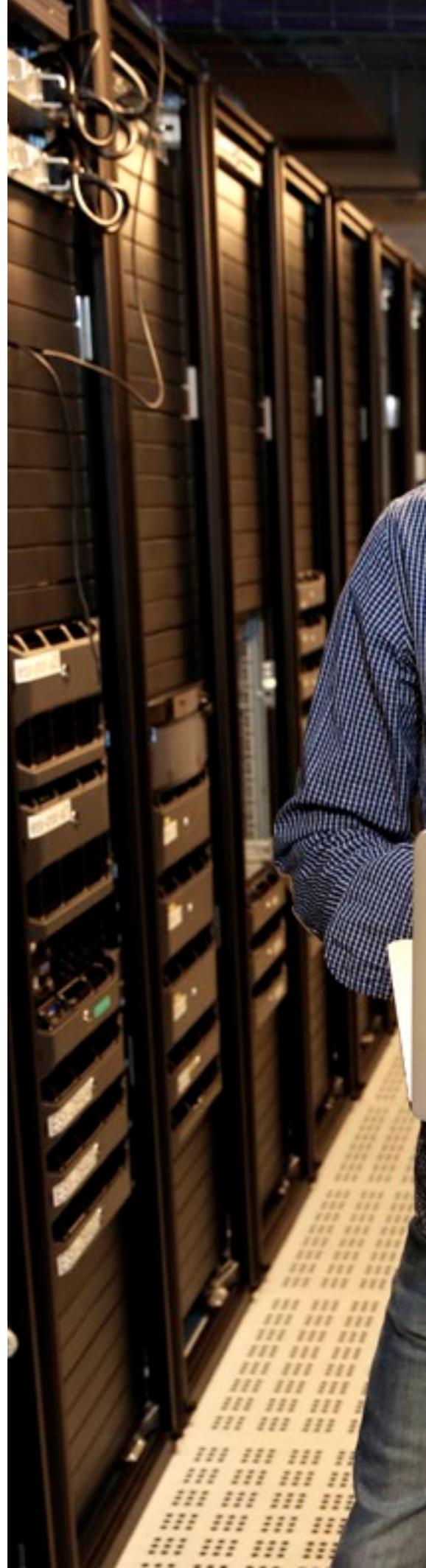
"In the beginning, only the Nordic Data Grid Facility, now NeIC, was using ARC, but now several Tier 1 centres have adopted it because it is efficient. Switzerland, the UK and Germany rely on ARC now, and France is starting. ARC has become renowned because it is a way to access High Performance Computing centres. China is joining too," adds Professor Ould-Saada.

One special thing about ARC is that it was developed using little funding, which was possible thanks to the many who donated their spare time. Currently there are only a few full-time developers. As the professor explains it, "The idea has been developed in coffee breaks and in what Norwegians call a 'dugnad' (a group work effort). This is really teamwork. In six months we produced a grid that was demonstrated at CERN before anybody else, before several European projects could come up with a solution."

A small, efficient team is the key to success

How were you able to do this?

"I think it is due to our bottom up-approach. Ideas are good, but to deploy them in a realistic way is even better. We were probably the only ones working directly with system developers and administrators at the High Performance





*Professor Farid Ould-Saada
Photo: NordForsk/Terje Heiestad*

Computing (HPC) centres, which are closed environments for security reasons. So when we developed the code we took all the complexity into account. ARC works and it is much simpler than anything else.

Moreover, we are a loose collaboration. We talk to each other and discuss which way to go every day. That's what you can do when you have a small team. Very efficient. I think what you could call latency time is very important. When you have a research-important idea you sometimes have to ignore the stop sign, which is possible when you don't have a big administrative framework. You have to be able to follow ideas and take decisions while moving ahead at full speed.

To sustain the speed and quality of Nordic, cost-effective and competitive initiatives, it is essential that our funding agencies follow the trend, and take decisions while on the move", Farid Ould-Saada concludes.

Education for Tomorrow

Facts

● **Objective:** The aim of NordForsk's thematic programme *Education for Tomorrow* is to generate new knowledge about the Nordic educational systems that will

better equip them to meet the needs of society – today and in the future. A critical aspect of this objective involves bringing the research conducted out into the wider community, and dissemination of findings to politicians, the school system and teachers will be a key activity as more and more research results are generated.

● **Background:** In 2010, the Nordic Council of Ministers for Education and Research (MR-U) and the national research councils in the Nordic countries agreed to co-fund a Nordic initiative on education. NordForsk was assigned the responsibility of administering the programme.

● **Process:** As research activities progress, importance will be attached to expanding cooperation across the programme's various projects to strengthen the programme as a whole. Researchers from the various teams will then have the opportunity to work together on common thematic questions within the framework of the programme.

● **Funding:** Funding organisations are the Nordic Council of Ministers, the Academy of Finland, the Swedish Research Council, the Research Council of Norway, the Icelandic Ministry of Education, Science and Culture, and the Innovation Fund Denmark. Overall programme budget is NOK 75 million for the period 2012–2018. The programme also encompasses a smaller-scale thematic initiative (NOK 4 million) on Nutrition, Learning and Health, which is fully funded by the Nordic Council of Ministers via the Globalisation Initiative on Health and Welfare.

The programme funds six large-scale, interdisciplinary research projects and one Nordic Centre of Excellence:

- **Nordic Centre of Excellence: Justice through education in the Nordic countries (JustEd)**
- **Skill acquisition, skill loss and age. A comparative study of Cognitive Foundation Skills (CFS)**
- **The future of vocational education – learning from the Nordic countries**
- **Nordic fields of higher education. Structures and transformations of organisation and recruitment**
- **Learning spaces for inclusion and social justice: Success stories from immigrant students and school communities in four Nordic countries**
- **Values education in Nordic preschools: Basis of education for tomorrow**
- **ProMeal – Prospects for promoting health and performance by school meals in Nordic countries**





Better understanding of diversity in education

“We have to increase the focus on diversity in schools. Many teachers are not aware of suitable approaches and educational practices for students with immigrant backgrounds, and this is quite serious,” says Professor Hanna Ragnarsdóttir.

Hanna Ragnarsdóttir is a professor of multicultural studies at the School of Education, University of Iceland and the leader of the project *Learning spaces for inclusion and social justice: Success stories from immigrant students and school communities in four Nordic countries* under the NordForsk programme *Education for Tomorrow*. She is heading a group of Nordic researchers that has taken a closer look at the learning situation for children with immigrant backgrounds in Norway, Sweden, Finland and Iceland.

Hanna Ragnarsdóttir, Professor of multicultural studies, University of Iceland and Leader of the project 'Learning spaces for inclusion and social justice'.

Foto: NordForsk/Terje Heiestad

who work with newly arrived students in reception classes.

Divergence among the Nordic countries

“Here in the Nordic region we often talk about the Nordic countries as if they were a unified whole, but the countries diverge far more widely than we first assumed,” explains the project leader.

“The educational systems are quite different. Immigration to Sweden and Norway began earlier than to Finland and Iceland, and the immigrant populations come from different countries of origin. We also see social inequalities. So the four countries are not necessarily facing the same challenges, which has been extremely interesting to explore,” she says.

Learning from success stories

The researchers selected 26 schools with good results from the four countries, based on average marks, test results and dropout rates, among other factors. The project has encompassed preschools, primary schools, and lower and upper secondary schools. The idea was to learn from the success stories of students with immigrant backgrounds. Which experiences can be extrapolated to improve education for this group of students in the Nordic countries?

Higher aspirations

Although there are many examples of excellent work in the schools in the study, some examples from the four countries show that the level of ambition in terms of educating students with immigrant backgrounds is too low.

“We see that some teachers view this as a lost cause. They put little effort into helping these students to progress and perform better,” says Professor Ragnarsdóttir. She believes such a lack of effort is related to a lack of knowledge.

“The examples in this project are obtained from schools with good results in teaching this group of students. If this is the case in the schools we’ve studied,

what’s the situation at the other end of the spectrum?” she asks.

A few teachers leading the way

The visionary teacher is a pivotal actor in the students’ learning environment in all four countries.

“Individual teachers who care about their students invest extra effort in including them in the school environment in every way. It’s fantastic that such teachers exist, and I was actually somewhat surprised to see how much responsibility some teachers take on.”

She continues, “But a good education shouldn’t be dependent on chance or on a single individual. There’s a lot of excellent knowledge out there in the schools, and that is precisely why it’s so important for teachers and schools to cooperate and share their knowledge and success stories.” According to the professor there is too little of this.

“It’s all about transforming individual knowledge into shared knowledge and ensuring the sustainability of this knowledge. But this will take time and it should be a long-term objective.”

Wide interest in the results

The researchers are certain that their results will help to develop knowledge-based policy in the field of education in the Nordic countries. They have presented their research at the ministerial and municipal levels, as well as in national and international conferences, and have been met with great interest. This autumn they will be finalising a report that provides guidelines for the school sector which they believe can increase understanding and help to direct more focus towards inclusive education in schools. To reach the teachers, the research group received additional support from the *Education for Tomorrow* programme to develop a course that will be implemented in all four countries. But this is a job for next year.

“We will use every means we can to make our research accessible,” concludes Professor Ragnarsdóttir.

Teacher training must keep up with the times

All of the Nordic countries have evolved into multicultural societies over the past few decades. This is also reflected in the schools, and diversity is expanding in many parts of these countries. Despite this, teacher training in the Nordic countries in general devotes too little attention to diversity in schools, according to the researchers. This needs to change. All teachers need to get involved, believes the professor, not just those

Eating environment more important than food

Many 10-year-olds eat very little at school, and the reason for this is not that the food is unappealing, but because of loud noise and stress during lunch hour. These are some of the preliminary conclusions of the comprehensive Nordic school food study ProMeal.

The school food study was conducted in Norway, Sweden, Finland and Iceland in the 2013–2014 academic year. More than 800 10-year-olds took part in the study which sought to identify possible connections between what pupils eat during the school day and their ability to learn and concentrate.

The research project was funded by NordForsk under the *Education for Tomorrow* programme. This is the first time that a specific study has been conducted on the role of school lunches and school food in the Nordic region.

“It has been taken for granted that pupils perform better if they eat a good portion of healthy food. But very little is really known about this,” says project leader Agneta Hörnell, who is a professor at the Department of Food and Nutrition at Umeå University.

In part, Dr Hörnell and her colleagues in Bergen, Reykjavik and Åbo wanted to compare the Nordic countries because they have different systems and traditions. They also sought to find connections between food and learning independent of country.



*Agneta Hörnell, Professor at the Department of Food and Nutrition, Umeå University, and Project Leader of 'ProMeal'.
Photo: NordForsk/Terje Heiestad*

High noise level and stress

One of the most surprising findings is how little the children eat. A large percentage eat less than planned. This is the case whether they are served a portion of food, as in Iceland; whether they help themselves, as in Finland and Sweden; or whether they bring food from home, as in Norway.

Sweden is the only country where the pupils have a salad buffet. Although the selection of food was usually large, a high number of pupils never helped themselves to fruit or vegetables.

The results are still being analysed. One of the researchers' tasks is to collate data about the nutrient intake of individual pupils.

Why do so many pupils eat so little?

“We have observed that there is a generally high noise level, and there was a lot of commotion and disruption. The pupils found the lunch hour to be stressful, so

this may be part of the reason,” says Dr Hörnell.

“There is nothing to suggest that anything is wrong with the food. It is tasty and varied. The homemade lunches also look good for the most part. When asked, the children responded that they thought the food was good, although they did not like everything.”

When the pupils describe a good meal in their own words, they use expressions such as “peace and quiet,” “eat quietly,” “sit, chat and have a nice time” and “eat with friends”.

How can this be changed?

“This concerns the environment, planning and implementation. And especially the noise level.”

Main axis of comparison

When the researchers began the study, they hypothesised that different school food schemes could have different impacts on the ability of pupils to concentrate. Now that the researchers are analysing the data, they are shifting their axis of comparison towards the difference between those who eat a little and those who eat a lot.

“We are concerned with finding out how the pupils who eat little are faring; whether they have problems paying attention in class or whether they manage just as well as the pupils who eat a lot,” explains Dr Hörnell, who visited several of the schools herself and spoke with pupils – while eating a nutritious school lunch.

The emerging 'e' component of research infrastructure

"The Nordic countries have led the way here in understanding that eInfrastructure is an important component of a national research system"

– John Womersley, Chair of ESFRI



Since 2006 the European Strategy Forum on Research Infrastructures (ESFRI) has been drawing up roadmaps to assist in setting political priorities for large-scale research infrastructures in Europe. The next roadmap will be published in early 2016.

But the landscape is changing: Many research infrastructures are now producing vast amounts of data whose processing requires extensive resources. These data represent major new scientific opportunities, provided this wealth of information can be properly structured and coordinated via e-infrastructure. This means that ESFRI will be attaching increasing importance to eInfrastructures in its list of priority research infrastructures. With this in mind, ESFRI is establishing closer cooperation with the eInfrastructure Reflection Group (e-IRG), which specialises in the vital field of electronic infrastructure.

“New technology is changing everything that we do: changing our lives, changing the way governments work, changing the way science is done,” says Professor John Womersley, who chairs ESFRI and is CEO of the Science and Technology Facilities Council (STFC). From

his office at the STFC Rutherford Appleton Laboratory, near Oxford, he describes how the development of eInfrastructures has opened up new ways to conduct research. Astronomers, for instance, no longer need to physically travel to the world’s best mountaintop telescopes. Instead, they can access data from many different sources and carry out new kinds of calculations and experiments from their home institutions.

As Professor Womersley explains, “A lot of the research infrastructures are really data infrastructures or networks that bring together datasets from existing facilities or large single-sited infrastructures that generate very, very large amounts of data. It is no longer possible or sensible to simply look at the facility without also considering the data handling.”

Greater integration of research infrastructure and eInfrastructure

For this reason, ESFRI is seeking closer collaboration with the e-IRG, which is chaired by Sverker Holmgren, Professor in Scientific Computing at Uppsala University.

“We have involved the e-IRG experts in the construction of ESFRI’s next roadmap (in 2016),” continues Professor Womersley, “since this is a direction which is growing in importance, and the need for a common approach to eInfrastructure across Europe is becoming clear. It means that the e-IRG and ESFRI need to work very closely together. You can no longer say that a facility generates the data, and then, the e-IRG

will give advice about what happens to the data. It has to be integrated.”

Dealing with big data from research infrastructures is challenging not only in terms of the science and technology involved, but also in financial terms.

“Now the challenge is that eInfrastructures place new demands on national funding systems,” says Professor Womersley. “So part of ESFRI’s role here is to raise the awareness of the governments and of funding agencies, that you cannot build a research infrastructure without thinking about the eInfrastructure aspects of it. So the two key questions are: How is this infrastructure to be managed, and how is it to be funded? And I do not have answers to those questions yet. But I think the Nordic countries have led the way here in understanding that eInfrastructure is an important component of a national research system, perhaps a little bit sooner than other countries have done. You may not have all the answers either, but the questions have been asked.”

Towards an ‘eInfrastructure commons’

Finding the right solutions may take time, but John Womersley’s ambition is clear: “We want a common approach to scientific data from many sorts of large facilities. We cannot support five or six different eInfrastructures for five or six science areas. It’s challenging, but we need to be much more general-purpose. We have to have a European approach to eInfrastructure



John Womersley

CEO of the Science and Technology Facilities Council (STFC) and Chair of ESFRI
Photo: NordForsk/Kim Wendt

commons', as you could call it, which will serve the entire research community, including all of the research infrastructures." Creating a comprehensive solution for data processing for all research areas under the new research infrastructures carries political challenges as well. Creation of common capacity in Europe will mean that eInfrastructure centres would have to be located far away from some of the funding sources.

"Many countries are willing to support activities in their own national infrastructure," explains Professor Womersley, "but they are less willing to support a computing hub if it is not located within their country. But without the central data hub you could not do the science. And so we need to raise the awareness and to integrate these activities between different science areas.

Within ESFRI we see the Nordic countries have already adopted a coherent and strategy-led approach in discussing research infrastructure needs and capabilities in a sensible way. I know that NordForsk does not have a large budget. It's much about coordination and bringing people together, and that's exactly what we need to replicate across the whole of Europe, which is challenging because of the diverse economies and research portfolios, but it shows how this can be done," says the ESFRI chair.

eInfrastructures on coming roadmaps

Will eInfrastructure projects be a part of the coming roadmaps?

"Yes, already in the 2016 roadmap," confirms Professor Womersley. "When we are assessing new projects, we are looking at their state of readiness as well as their scientific priority. Part of the state of readiness is if they have planned for the eInfrastructure. But those are the needs of the particular projects, they are not the common, underpinning capability."

"In the 2018 roadmap," he adds, "we want to include a serious consideration of the common, underpinning capability based on this vision of a science eInfrastructure that has a common approach to serving the needs of all European scientists across all research areas. Transversal eInfrastructures like networking, authentication and science cloud are currently not included in ESFRI's roadmap. But in 2018, we will need to find a way to include underpinning eInfrastructures projects in the roadmap, and working closely with the e-IRG is the obvious way to do it."

A number of challenges remain and the bar is set high, but John Womersley is clear about the ultimate goal for ESFRI:

"Integrating eInfrastructures and infrastructures is a challenge for us in science, it is a challenge for us to get the funding, it is a challenge for us to figure out how to do this, but if we can do it right, it can really be a way that big research infrastructures will impact the life of every European citizen."

The European Strategy Forum on Research Infrastructures (**ESFRI**) and the e-Infrastructure Reflection Group (**e-IRG**) are both comprised of national delegations from the EU member states and associated states.

● **ESFRI** is set up to support a strategy-led approach to policy-making for research infrastructures in Europe and regularly produces a European Roadmap listing initiatives of pan-European interest.

● **e-IRG** acts as a strategic instrument encouraging integration of European eInfrastructures and produces recommendations aimed at facilitating and harmonising eInfrastructure development in Europe and globally.

Joint Nordic programme for neutron research

Facts

- **Objective:** Strengthening Nordic neutron research, which includes supporting young researchers and extending the use of neutron techniques into new research areas.
- **Background:** The programme was launched to prepare Nordic researchers to use the European Spallation Source (ESS) in Lund, Sweden.
- **Process:** The programme operates 2015-2020. The programme committee comprises representatives from Denmark, Norway and Sweden, with Iceland and Finland participating as observers. The programme committee is drawing up the programme's first call for proposals, to be issued in 2015. The call will focus on researcher training and mobility. Other activities will follow.
- **Funding:** There is no final agreement as to the distribution of funding between Denmark, Norway, Sweden and NordForsk at the time of going to press, but the preliminary budget is approximately NOK 50 million. NordForsk will provide one-third of the funding from the outset, with the three participating countries jointly providing two-thirds.



*Fredrik Melander, Senior Adviser, The Danish Agency for Science, Technology and Innovation, and Chair of the Programme Committee.
Photo: NordForsk/Terje Heiestad*

“Our long-term vision is to see the Nordic region become a hub for, and world-leader in, materials research.”

– Fredrik Melander, Chair of the Programme Committee

The European Spallation Source (ESS) is currently under construction in Lund and will be completed in 2019. To ensure that the Nordic region has well-trained researchers ready to begin using the highly advanced microscope, a joint Nordic programme for neutron research was initiated in 2015 by Denmark, Norway and Sweden together with NordForsk.

Fredrik Melander, chair of the programme committee, believes that Nordic cooperation in neutron research is a natural next step:

“Sweden and Denmark are host countries for the European Spallation Source (ESS), so it stands to reason that we – while the ESS is being built – establish a dynamic Nordic neutron research community in order to make the most of the facility once it is completed. We will have a strong, wide-ranging neutron research base, i.e., we will have many experts skilled in the use of neutron research techniques in the core areas of neutron research (physics) as well as in other fields of relevance within the research community. Dynamic networks have already been established between Nordic research groups. They are small and highly specialised. It is clear that we have a sound platform on which to build. I hope it will not be limited

to Nordic cooperation, but that is where we are beginning. The Nordic countries have so very much in common that there is consensus that we can turn this into a broader collaboration.”

Focus on competence-building

“The programme’s focus on increasing our research capacity, especially at the doctoral and post-doctoral levels, is absolutely fundamental. We would like to create a new generation of Nordic instrument scientists who can become key ESS personnel in the future. Another important focus area is on how to encourage other researchers in other subject areas, such as life sciences, to apply neutron techniques,” explains Fredrik Melander. He adds:

“The combination of strong political backing, widespread approval among Nordic universities, significant overall support within the research community and scientific prioritisation among the research councils is a major strength of the programme, and generates unique opportunities for new research cooperation. All the involved actors are working together very constructively and we intend to expand upon this. One of the short-term challenges we face is how to promote participation of all the Nordic countries. Neutron research has been strongest in Sweden, Denmark and, to a certain extent, in Norway, but regrettably, Finland and Iceland are not yet involved in the programme. Fortunately, they are participating as observers and can keep themselves apprised of developments in this way. Of course, we hope to be able to support the small-scale neutron research circles found in both these countries so we can in the long term support developments throughout the entire Nordic region.”

Upcoming Nordic neutron projects in 2016

“I hope we will see two types of results from the programme: for one, structural results in the form of organised cooperation between research and educational groups. Towards this end, we will issue calls for NordForsk projects aimed at developing and coordinating a wide array of Nordic researcher training school activities and supporting networks in order to take advantage of the particular strengths at different universities. The second type of result we are seeking is specific project cooperation – pure and simple collaboration between researchers. The ESS will entail major research and industrial potential. We will see everything from new medications to wind turbine blades composed of new materials. Our long-term vision is to see the Nordic region become a hub for, and world-leader in, materials research.”

In conclusion, Fredrik Melander says, “The programme committee also focuses on innovation. One aspect of development involves links with industry. The entire field of materials research is closely linked to industrial development, and there are major industrial opportunities. Expanding research capacity within neutron research will yield very interesting results for industry because we can help to ensure a greater number of materials researchers in the industrial sector. I believe there is tremendous potential in a Nordic-level approach where we can create closer ties both between researchers and between researchers and industry throughout the Nordic region. We will be studying this more closely as the programme progresses.”

Prepare for the best

CEO of the European Spallation Source (ESS)
James H. Yeck calls for involvement and coordination from the Nordic countries as we prepare for the launch of the facility in 2019.

How will the ESS affect the Nordic countries?

"It is safe to say that the ESS will have a tremendous impact on society, economically and scientifically. We know that from the experience of other facilities. What is less easy to predict is what will be the results of the science programmes. The ESS is a discovery tool. We know there will be discoveries; we just do not know what they are. Some of the best and brightest people in the world will come to ESS, and contribute to the body of knowledge," states James H. Yeck, and continues:

"The Nordic countries have an absolutely fantastic opportunity here. To have MAX IV and ESS coming online within the same decade is spectacular."

What did we do to make that happen?

"In the Nordic countries there is a very deep appreciation for the benefits of science. The investment in science in GDP is relatively large which is a reflexion of that priority. So the Nordic countries have a cultural value as a backdrop which makes it easier to have the political discussion," James Yeck says.



Photo: NordForsk/Kim Wendt

How can the Nordic countries gain the most from the ESS?

"At the ESS, we want the community to be involved so what we are doing will be shaped by the input we get. This makes it stronger, makes it better. If you combine top-down recognition of the broader value to society with bottom-up initiatives, then you have a frame where good things can happen.

We have recently signed a memorandum of understanding with Chalmers University, and that is fantastic. I would love to see that with lots of universities. And if the involvement were organised in bigger groups than one university, it would be even better," asserts James H. Yeck.

What would you like to see from the Nordic countries?

"Better coordination is very useful. We walk down a path together, but there can be many deviations. We need coordination, so we are able to see ahead.

It is amazing what Sweden and Denmark have accomplished as host countries. I think it is due to a profound commitment. When difficult issues come up, there is an understanding and willingness to find solutions because of the level of engagement. The most important thing is that the facility has a strong foundation of support in the scientific community.

I hope all the Nordic countries join in, because we are building a tool that will be the best in the world. Not all countries may have the researchers it takes within this area today, and it makes sense to begin preparing. It does not happen overnight," James H. Yeck concludes.

“The Nordic countries have an absolutely fantastic opportunity here. To have MAX IV and ESS coming online within the same decade is spectacular.”

– James H. Yeck, CEO ESS

Facts about the European Spallation Source

The European Spallation Source (ESS) is under construction in Lund, Sweden. The building and actual neutron source are slated to be finished in 2019, after which 22 various additional instruments will be added. A data centre for handling research data is being set up in Copenhagen. The plan is for ESS to be up and running for research experiments in 2023.

ESS can be compared to an advanced microscope, enabling scientists to visualise and analyse at the atomic level. It is particularly well-suited to developing new materials. Protons will be propelled at nearly the speed of light through a 602-meter-long underground accelerator, hitting a target of tungsten and releasing neutrons to be used in a variety of the

instruments. Basic research as well as product development will be carried out at the facility.

Sweden and Denmark are the host countries and are financing 35 and 12.5 per cent, respectively, of the ESS construction costs. Norway is a member country and is contributing 2.5 per cent. Currently, 15 countries are contributing to the construction costs, which are estimated at EUR 1.84 billion, with an additional annual operating budget of roughly EUR 140 million. Investments in similar research infrastructures in Europe have been shown to attract research-intensive activities and highly skilled personnel.



Gender in the Nordic Research and Innovation Area

The Nordic region is the European leader in gender equality, but when it comes to leadership positions in research and innovation, men dominate just as widely here as in the rest of Europe.

Facts

● **Objective:** Through new and innovative, yet focused and result-oriented activities, this joint Nordic initiative will make a significant contribution to gender issues on the research and innovation agenda. The aim of the initiative is to pinpoint the reason for why the research and innovation area has not followed the trend towards a gender equal society and to identify the measures needed to remedy this.

● **Background:** For the last forty years, gender balance and gender equality have been an important Nordic political priority and the societal changes have been significant, pushing the Nordic countries to the forefront of gender equality. However, the positive results from gender equality indexes are not reflected in the Nordic research and innovation area. Instead, all Nordic countries perform around the European average.

● **Financing:** Consultation process is ongoing



Jesper W. Simonsen, Executive Director of the Division for Society and Health at the Research Council of Norway, and Chair of the Programme Committee for 'Gender in the Nordic Research and Innovation Area'. Photo: Sverre Chr. Jarild/Lysbordet

“If we are going to continue to set an example for the rest of Europe, we have a moral obligation to do a better job in this area,” says Marja Makarow, Chair of the NordForsk Board. She is pleased that NordForsk has put the lack of gender equality on the agenda.

“When I returned from Strasbourg to Finland in 2012 and discovered that NordForsk had begun to work in this field, I was surprised at first. After all, don’t the Nordic countries have a high degree of gender equality? But after looking more closely at the statistics, I have really learned that something needs to be done. It’s true, we had been making progress on gender equality in academia – but now this progress has stalled. We are not seeing the improvement we would like,” says professor Makarow.

Progress at a standstill

Marja Makarow, a professor of biochemistry and molecular biology, served as Chief Executive of the European Science Foundation in Strasbourg from 2008 to 2012, and she is now Vice President for Research of the Academy of Finland. She was appointed the new Chair of the NordForsk Board in 2014, and now speaks enthusiastically about NordForsk’s new programme called *Gender in the Nordic Research and Innovation Area*.

“Overall, the Nordic countries are way out in front with regard to gender equality, including in academia. You can find documentation of this in the European Gender Equality Index, which is prepared each year. But the problem now is that progress in academia has slowed almost to a stop. We no longer are seeing the

development we want and need,” states professor Makarow.

“It is also the case that women are almost completely absent from the innovation arena. There is an overwhelming dominance of men who work with commercialising research results in order to develop them further, for instance into new start-ups. We know of course that innovation is based on cutting-edge research, so it is a serious matter that such an imbalance has developed in the sector. I have conducted some simple studies myself on the innovation area, and the results are shocking. We must really look more closely at this issue,” adds professor Makarow.

She is also concerned that women remain in a weak position in the Nordic research excellence programmes.

“Of course I know Finland best, for obvious reasons. There we have 29 centres of excellence, and only 17 per cent of the directors are women. Finland is not a special case. When a report was published on research excellence initiatives in Sweden, it was titled “Hans Excellens”. This translates to ‘His Excellence’ in English. You get the picture!” says Dr Makarow.

Action must be taken

Something needs to be done, and NordForsk has responded – by launching a research programme that will explore why gender balance in senior-level positions in the Nordic countries lags behind the progress made in other areas of society.

“If we know more about the reasons for the lack of gender equality, we can



A step closer to gender balance

In 2013, the Nordic Council of Ministers presented a report in Norwegian on gender balance in Nordic research. The report presented statistics showing that almost 80 per cent of all professors in the Nordic region are men.

The report gives examples of successful measures and discusses research policy challenges that are important to analyse in a gender and gender equality perspective. The report presents a number of recommendations for consolidating the field of gender balance in academia into a single policy and research field in the Nordic region. Establishing a Nordic research programme in this area was one of the recommended measures.

Report Title *The Nordic region - a step closer to gender balance in research?: Joint Nordic strategies and measures to promote gender balance among researchers in academia*.

Gender in the Nordic Research and Innovation Area

also identify measures to remedy the situation,” says Jesper W. Simonsen, Executive Director of the Division for Society and Health at the Research Council of Norway. Now he has taken on the additional task of chairing the programme committee for NordForsk’s gender programme.

”In the Nordic region we like to believe that we are better than others when it comes to gender equality, but as Dr Makarow points out: At the highest levels of research and innovation, we don’t score any better on gender balance than the European average. This programme will help us to find out why this is so, because there is really no one anymore who believes that men are generally more talented than women. That being said, we have probably made more progress on gender equality in many areas outside of academia. As a result, women may find it more appealing to work in other areas of society. This programme will allow us to study connections like this,” says Mr Simonsen.

”It has been suggested that women are less interested in leadership positions, but the fact that women are taking on a growing number of leadership positions in other sectors belies that theory. It is also possible that there is a time lag, meaning that it takes a long time for older male professors to retire and free up space for younger, talented women. But if we look more closely at the numbers, we see instead that it takes longer for young women to advance to the professor level than for young men, and there are many women who drop out along the way. This is why we need this programme, to find out more about why these things happen,” adds Mr Simonsen.

Talent is not being distributed equally

The main reason that both NordForsk and the national research councils are



*Professor Marja Makarow, Vice President for Research, Academy of Finland, and Chair of the NordForsk Board.
Photo: NordForsk/Terje Heiestad*

funding the new programme is that talent is being distributed equally between women and men. If we recruit more men than women to leadership positions, this means in practice that we are not benefitting from the many different types of talent out there. A research institution or a research-based company that is not able to bring women on board is quite simply not as excellent as it would have otherwise been.

Mr Simonsen is optimistic, and believes it is possible to improve the faltering trend in gender equality. There are already examples of measures that have worked.

”When the Research Council of Norway announced the first funding round for the Centres of Excellence (CoE) in 2003, we did not set any requirements regarding gender balance, and then only men ended up as centre directors. When we announced a second, ‘middle’ funding round in 2008, we added a requirement involving moderate gender quotas and asked the applicants to describe measures they would implement to promote gender

balance. We did this again in the new main funding round in 2013. The result of this rather modest incentive scheme, which we call a ‘soft push’, was that the proportion of women in leadership increased to 23 per cent. This is major progress, but we still have a long way to go to achieve true gender equality,” concludes Mr Simonsen.

Nordic She Figures

Every third year the European Commission publishes the report She Figures, which contains statistics on the status of women in research in all of the countries involved in EU research cooperation. The statistics encompass both the Nordic EU members and Norway, an associated member of the EU Framework Programme for Research and Innovation, Horizon 2020. However, Statistics Sweden discovered a number of errors in the She Figures reports, which prompted the idea of compiling a Nordic version. This will be one of the specific tasks of NordForsk’s gender programme.

”We need reliable data on gender balance for at least two reasons. First of all, because we can use the data to learn more about what can be done. Secondly, because we can use the data to monitor the progress. If we don’t monitor the progress, and we if don’t take action to prevent a lack of progress, nothing will happen,” concludes Dr Makarow.

Gender equality makes our societies better

“Results are better when both women and men are involved in the work process. And this applies to any task, whether it is peace talks, research projects or running a welfare state,” says Ewa Stålldal, Director General of Forte.

Ms Stålldal, who took the helm at the Swedish Research Council for Health, Working Life and Welfare (Forte) in January 2014, believes that gender equality is one of the key reasons the Nordic countries are all among the world’s best places to live.

“Nordic gender equality is part of our international trademark, and gender equality goes hand in hand with welfare. I believe we should take advantage of this

for the benefit of our own as well as other countries, at a time when an increasing number of large countries – such as India, China and South Korea – are investing enormous amounts in research. International research competition is getting tougher and tougher, so it’s logical for us in the Nordic countries to concentrate on further developing ourselves in areas where we are already ahead of the game,” Ms Stålldal states.

Gender equality and welfare research is precisely one such area, and Ms Stålldal has noted that the emerging research countries often look to the Nordic countries to learn from their highly developed welfare states. She envisions the Nordic countries investing even more resources in gender equality research.

“This is research that can make the Nordic societies even better than they currently are,” she asserts, “and at the same time promote major progress beyond the Nordic region! I can see a future where Nordic advances in this area could become a platform for a global gender research initiative.”

Speeding things up

Ms Stålldal has taken active part in shaping the new NordForsk programme *Gender in the Nordic Research and Innovation Area*. Gender equality in academia has stagnated in recent years, and more knowledge is needed to accelerate progress towards full gender equality.

In many ways, Forte is itself a Nordic and international role model for gender equality – as men and women are quite

evenly represented in the research projects that Forte is funding. In some research areas, in fact, there are more women than men participating, but Ms Stålldal is not completely satisfied. Upon closer inspection, significant gender differences remain even in Forte’s project portfolio.

“The fact is that men are receiving the largest allocations and men are heading the largest-scale initiatives,” she points out. “What appears at first glance to be gender-balanced actually conceals gender differences that most likely stem from power structures in academia.”

Fully supported by feminist government

Ms Stålldal has already experienced the benefits of Nordic research cooperation, as Forte was involved in establishing NordForsk’s *Nordic Programme on Health and Welfare*. The programme runs from 2014 to 2018 and includes the Academy of Finland, the Danish Council for Independent Research | Medical Sciences, the Icelandic Centre for Research (Rannís) and the Research Council of Norway as its other participants.

“That cooperation has been so successful that we at Forte began to seek out other areas for the same type of participation. In discussions with NordForsk Director Gunnel Gustafsson we agreed we too should incorporate the gender perspective, and now we are underway. I can count on the full support of the Swedish Government, which has declared itself a feminist government – and for my part I want to be a feminist funder of research.”



*Ewa Stålldal, Director General of Forte.
Photo: Forte*

NordForsk seeks to strengthen collaboration between Nordic universities

Nordic universities cooperate extensively on education and research, and NordForsk is currently focussing on further developing suitable support mechanisms for Nordic research cooperation.

The impetus for this arose from the decision of the Nordic Council of Ministers to re-channel some of the existing Nordic research funding and assign NordForsk the task of distributing it through open competitions. This change will take effect in 2017.

In response to this, NordForsk appointed a high-level special advisory group to conduct a strategic analysis of research cooperation between Nordic universities. The aim of the analysis is to provide the NordForsk Board with recommendations on suitable funding mechanisms that can help to strengthen research cooperation between Nordic universities.

The special advisory group is chaired by Chancellor Emerita Krista Varantola of the University of Tampere in Finland. The other members are Rector Emerita Agneta Bladh, Pro-rector Kenneth Ruud of UiT

The Arctic University of Norway, Rector Emeritus Professor Jens Oddershede of the University of Southern Denmark, and Director General Hallgrímur Jónasson of Rannís – The Icelandic Centre for Research.

The special advisory group has taken the responsibility for a profound process. This includes expert assessments of a number of the existing Nordic cooperation bodies, meetings with all of the Nordic university rectors' councils, and a joint workshop with the Organisation for Nordic University Cooperation (NUS). In addition, Gaia Consulting has contributed with an overview of existing research cooperation between Nordic universities.

The special advisory group is still working, but soon there will be concrete recommendations to NordForsk. These will include funding mechanisms based on shared priorities and involve financial commitment from NordForsk and participating universities.

NordForsk has asked Krista Varantola some questions about the work of the expert group:

Why is this effort so important?

“In the near future, NordForsk will be responsible for re-channelling, through open competitions, funds that were previously earmarked for specific cooperation bodies. This makes it is even more

critical for universities to become active partners in helping to define the criteria used in Nordic research funding.

Furthermore, it is vital to understand that Nordic research cooperation can help the universities to implement their strategic priorities, as well as make them more attractive and competitive in international research cooperation.”

How has the special advisory group approached its task?

“In addition to internal meetings and meetings with NUS and the national rectors' councils, we have also discussed the upcoming changes in funding principles with the existing cooperation bodies and reported directly to the NordForsk Board on our progress. Furthermore, the overview of existing cooperation compiled by Gaia Consulting shows that the Nordic universities enjoy a highly varied and well-established collaboration.”

What is your most important message to the Nordic universities and NordForsk?

“Nordic cooperation results in a ‘win-win’ situation when it generates added value for the participating researchers and universities. We have outstanding research environments and a solid reputation as reliable partners. Working together makes us even stronger in a global context.”



*Special Advisory Group from left: Pro-rector Kenneth Ruud of UiT The Arctic University of Norway, Chancellor Emerita Krista Varantola of the University of Tampere, Director General Hallgrímur Jónasson of Rannís, Rector Emerita Agneta Bladh, and Rector Emeritus Professor Jens Oddershede of the University of Southern Denmark.
Photo: NordForsk/Terje Heiestad*

Nordic cooperation opens international doors

“Nordic and international cooperation between researchers and universities are not mutually exclusive; rather, they are two sides of the same coin. Productive Nordic cooperation gives us a higher profile on the international stage,” says Chancellor Thomas Wilhelmsson of the University of Helsinki.

The chancellor of the University of Helsinki is a professor of civil and commercial law, and served as the university’s rector from 2008 to 2013. He was chair of the Organisation for Nordic University Cooperation (NUS) in 2012–2013, and has been an enthusiastic supporter of Nordic university cooperation ever since he attended a Nordic researcher training school for legal studies when he was pursuing his doctoral degree. There he made contacts that have been valuable to him ever since.

“When we conducted a study of Nordic cooperation at our university a few years ago, many of our most internationally recognised, top-level researchers said that Nordic cooperation has been a critical stepping stone for them in their development. This is why we gave the report the descriptive title *With the Nordic region to the top*,” explains Dr Wilhelmsson.



Professor Thomas Wilhelmsson,
Chancellor of the University of Helsinki.
Photo: University of Helsinki

A step on the path to international cooperation

Dr Wilhelmsson believes that Nordic cooperation should be viewed as an expanded version of national cooperation, and as a platform for taking the next step towards international cooperation. Nordic researchers want to work together, but there are still some structural obstacles, for instance in the funding area. Nor is it always easy to deal with the tax and social welfare authorities who do not understand why researchers may live half a year in one country and half a year in another.

“But the other Nordic countries are not really ‘abroad’ for those of us who live here,” he says.

The University of Helsinki participates in all of the Nordic cooperation forums and collaborates closely with the other top Nordic universities in Uppsala, Lund, Oslo, Copenhagen and Aarhus. The institution has also established a strategic partnership with Stockholm University.

“The future trend in cooperation will probably move more in the direction of

strategic partnerships like these, rather than large portfolios of collaboration agreements with hundreds of universities around the world. Then the universities can identify areas that are especially important and focus on those,” states Dr Wilhelmsson.

“In addition, I would really like to see the scheme for Nordic researcher courses reintroduced. These courses can give a tremendous boost to young researchers and help them to establish many valuable relationships. It’s unfortunate that such courses are now only being organised by the Nordic Centres of Excellence or in special areas,” says Dr Wilhelmsson.

Dreams of the Kalmar Union

Thomas Wilhelmsson often speaks in favour of reinstating the Kalmar Union – the union between the Nordic kingdoms from 1397 to 1523.

“This is a rhetorical tactic I often use when I want to emphasise that the Nordic region, when viewed as a whole, is one of the world’s leading university and university college regions. Today we have seven of the 100 best universities in the world, according to the Shanghai ranking. The Nordic countries have more leading universities than both Germany and France. If we had a Kalmar Union today, the Nordic countries would rank third among the world’s leading university regions. In relation to our population, we are already the world’s strongest region!” states Dr Wilhelmsson.

A bird's-eye view of the Nordic countries

“There is much to be gained from profiling ourselves jointly as a research region. Particularly in this competitive world, we need to stand together united,” says Professor Ole Petter Ottersen.

Ottersen is Rector of the University of Oslo, and chairs the Organisation for Nordic University Cooperation (NUS). He is also a member of the NordForsk board.

Professor Ottersen is very pleased with the NordForsk strategy 2015-18, which gives cooperation between the universities a greater focus than previously. The comprehensive analysis of Nordic university cooperation being carried out under the auspices of NordForsk forms a basis for further developing joint Nordic initiatives. The professor has first-hand knowledge of the practical benefits of Nordic cooperation from his time heading a Nordic Centre of Excellence (NCoE).

Springboard to the world stage

“The trick is to make the Nordic region function as a springboard to the EU and the world. It’s that simple, and that difficult,” wrote Professor Ottersen in his blog in June 2015.

He sees it as an important task to strengthen the Nordic universities and encourage the Nordic region to position and market itself as a knowledge region with first-class universities. To compensate for a low population density that is widely dispersed geographically, the region needs to build networks of cooperation – as well as concentrate on those areas where it can deliver high-quality research.



Rector Ole Petter Ottersen,
University of Oslo.
Photo: Terje Heiestad

“The Nordic countries should not be funding research that can be carried out with higher quality elsewhere in the world,” he continues.

Clear areas for added value

“There are certain common Nordic characteristics that put all-important added value right in front of us for the taking.” Professor Ottersen lists several key areas with major potential for Nordic cooperation:

Health: Health care is a critical field with individually customised health care services and access to clinical trials, often across Nordic national boundaries. The professor refers to the Könberg report on the significance of Nordic biobanks and health registries. Many population groups, for instance in Iceland and parts of Norway, can be tracked multiple generations in the past, providing valuable medical history. Resistance to antibiotics is one of the greatest challenges facing the world today, and the Nordic countries can help. The same is true of research on diseases such as Parkinson’s and Alzheimer’s.

The Arctic and the oceans: There is already a high level of activity underway in this field and the time is ripe for increased cooperation. The Skagerrak strait, the Baltic Sea and the North Sea are marine areas to be examined more closely from a Nordic perspective, not least climate change in the Arctic and its effects on fish and other marine life.

Welfare: Social welfare is another significant field for joint Nordic research activity. “Research on our social model is needed to better understand why it is successful and how it differs from other parts of the world,” says Professor Ottersen.

Infrastructure: Professor Ottersen points to this as an area where large-scale investments are necessary and where cooperation between the Nordic countries can lead to significant benefits. “Our individual countries cannot afford investments on this scale, so it is important to facilitate research infrastructure as a joint Nordic effort.”

The humanities and social sciences: In many countries around the world there have been cutbacks in the humanities and social sciences, largely due to the economic crisis. Professor Ottersen, however, believes we need to think more long-term in this regard.

According to Professor Ottersen, we need to think from a Nordic perspective and encourage Europe to continue investing in the humanities and social sciences despite difficult economic times. Without these disciplines, he urges, we cannot understand the changes occurring in the world and we are left with no safety net to rely on.

Secretary General of the Nordic Council of Ministers

A flagship of Nordic cooperation

As NordForsk celebrates its first decade, we can look back on ten very successful years. One key factor behind its success is that the areas of focus chosen by the institution are of importance to society both in the Nordic region and beyond. This helps to make NordForsk an attractive partner.

Perhaps the best example of how NordForsk has addressed societal and global challenges is through the Top-level Research Initiative (TRI), the largest joint Nordic research and innovation initiative ever undertaken. The TRI has concentrated on climate, energy and environmental issues, and it is no exaggeration to say that the initiative has created a unique, new platform for Nordic research cooperation.

Over these past years, NordForsk has taken on greater responsibility for Nordic cooperation beyond the TRI as well, funding a number of strategic and interdisciplinary research programmes. Most recently, research infrastructure has emerged as a growing area of focus – another challenge NordForsk has addressed head-on, through several major initiatives.

NordForsk has developed a number of research cooperation programmes in vital knowledge and policy areas, such as *Education for Tomorrow*, *the Nordic eScience Globalisation Initiative*, *the Nordic Programme on Health and Welfare*, *the Nordic Societal Security Programme*, and *Responsible Development of the Arctic: Opportunities and Challenges*. These programmes have resulted in a number of large-scale projects as well as the Nordic Centres of Excellence that have proven so valuable for universities and researchers in the Nordic countries, and for the Nordic Council of Ministers as well.

In connection with the reform of Nordic research cooperation, NordForsk has been given a wider range of tasks and is now responsible for the Nordic Committee on Bioethics and for key processes involved in the future financing of the five Nordic cooperative bodies. Nordic research collaboration is targeted towards excellence and Nordic added value and NordForsk serves as a catalyst in its ongoing design.

While NordForsk's expanded mandate is a confirmation of quality, it also places high demands on the institution in the years ahead. One of the challenges will be to convince the relevant Nordic research councils to contribute at least twice as

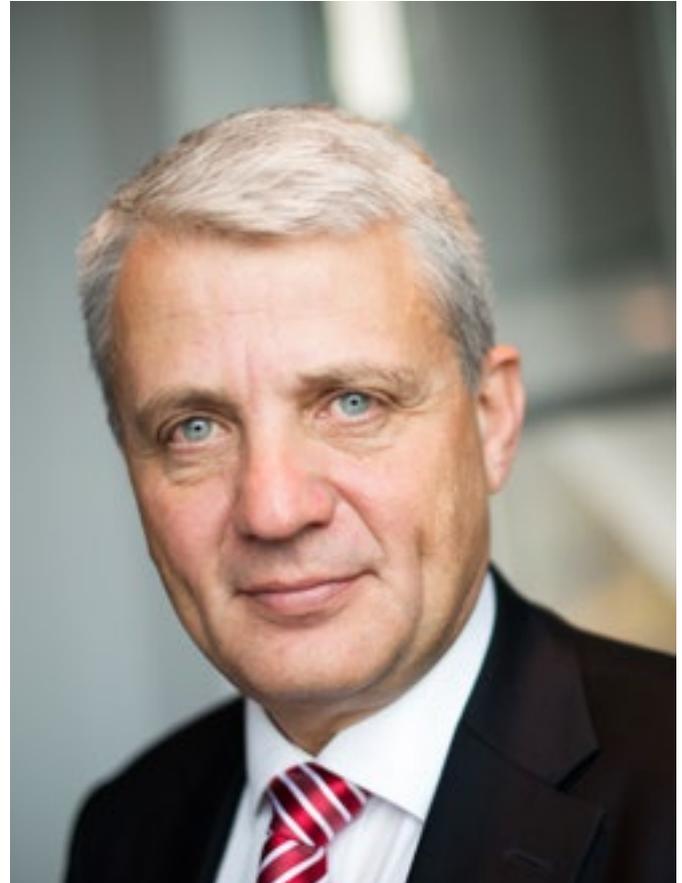


Foto: Johannes Jansson/norden.org

much funding as the Nordic Council of Ministers for the various research initiatives launched. NordForsk's positive track record during its first ten years, however, gives us good reason to be optimistic about the future.

Ingenuity and a willingness to invest in creativity and innovation are among the core values that characterise the Nordic region. By embracing these same values, NordForsk has already managed to become a flagship of Nordic cooperation.

The Nordic Council of Ministers congratulates NordForsk on its first ten years – and we look forward to many many more!

Dagfinn Høybråten
Secretary General of the Nordic Council of Ministers

Two directors reflect on NordForsk's first 10 years

NordForsk is marking its 10th anniversary with a supplement to NordForsk Magazine 2015 describing important events and milestones and presenting some individuals who have played an important role in NordForsk's establishment and during its first ten years. Two directors have led the way in shaping NordForsk and Nordic research cooperation into what they are today.



Liisa Hakamies-Blomqvist, the first director of NordForsk, is currently Head of Publishing at the Society of Swedish Literature in Finland (SLS). Photo: Terje Heiestad.

Professor Liisa Hakamies-Blomqvist was the first director of NordForsk.

She is proud to have had the privilege of taking part in a fantastic organisation-building endeavour. The one thing that Hakamies-Blomqvist found most surprising during the first years was that the interest in Nordic cooperation in general and Nordic research cooperation in particular was so widespread.

“Naturally I hoped this would be the case. But I must admit that it came as a revelation when I experienced it first-

hand. The interest in cooperation was tangible all the way up to the highest governmental level in the Nordic countries,” Hakamies-Blomqvist explains. She fondly recalls one event in particular:

“I was presenting NordForsk's very first strategy to the Nordic ministers for research and education. When I had finished, the ministers broke out in spontaneous applause. That is the sort of thing one remembers,” she says.

Professor Gunnel Gustafsson has followed NordForsk from its start, first as a member of the board and subsequently as director from 2010 to the present.

“These have been some very intensive and interesting years,” she says and continues: “NordForsk has developed its portfolio and many important initiatives and programmes have been started. I have had the opportunity to lead NordForsk's strategical, as well as its practical, work during an exciting time.

The volume of research and research infrastructure cooperation has grown, and we at NordForsk have noticed that there is great interest in our calls. The basis for this development is the cooperation between NordForsk and the national funding agencies. Another success factor is the dialogue with Nordic universities and political decision-makers at different levels. The interest in Nordic research cooperation is also increasing both in Europe and beyond.



Begge foto: Terje Heiestad

Gunnel Gustafsson, the second and current director of NordForsk. Photo: Terje Heiestad

I would like to extend my thanks to all of our stakeholders and partners, within programme committees and other advisory groups, and last but not least to the researchers who deliver results of major societal importance. I am convinced that there are huge opportunities for the development of Nordic research cooperation in the future. This conviction spurs me and my staff in our daily work.”

