



research in norway

High-quality research provides us with genuinely new knowledge and tools to meet global challenges. We need inspired researchers, good research conditions and solid commitment from government, industry and society at large. Last but not least, international cooperation is of vital importance for all scientific and technological progress.

The Norwegian government aims to increase total investments in research. Higher general R&D intensity is important for several reasons, such as

- tackling global challenges, i.e. related to climate change and the environment
- maintaining stable and well functioning public services
- strengthening the innovation capacity of Norwegian society and the international competitiveness of Norwegian companies

Norway aims to occupy a strong position internationally in terms of new technology, skills and knowledge. In several areas Norway can offer unique competence and research opportunities. Our strengths are largely related to the country's geography, economic specialisation patterns and institutional characteristics:

A challenging topography has impelled leading research within fields such as oceanography, satellite communication and polar research.

The exploitation of natural resources has had a profound impact on our innovation and research profile. Hence Norway has strong research traditions within marine and maritime research, petroleum research and energy research in general. More recently, special priority is given to research related to renewable energy, carbon capture and storage.

Together with the other Nordic Countries, Norway is a relatively egalitarian society, with small wage disparities, low unemployment and generous social benefits. These cultural and institutional features may explain the relatively strong position of social sciences in research and higher education.

In addition Norway is engaging in new and emerging technology areas. ICT, biotechnology and nanotechnology are therefore areas of high priority in Norwegian research policy.

I hope that this brochure will inspire you to find out more about Norwegian research communities as potential partners, and of Norway as an interesting country for researchers.

A handwritten signature in black ink that reads "Tora Aasland".

Tora Aasland
Minister of Research and Higher Education

investing in talents

Sufficient and qualified researchers are a prerequisite for attaining a leading position on the international research arena. In 2005, 33 percent of the Norwegian population had higher education qualifications, a very high number by international standards. The number of researchers per thousand total employment was 13 in 2006, which is considerably above the EU-average.

Mobility of researchers across borders is of paramount importance for developing and maintaining world-class research. There is a need to increase mobility not only across Europe, but also between Europe and other regions of the world. Norway can offer strong research communities and favourable conditions in a number of areas, and would like to attract ambitious and qualified researchers from all parts of the world.

The Government promotes internationalisation of Norwegian research institutions and enterprises. Vacancies for scientific positions are advertised internationally and the inward and outward mobility of researchers is encouraged. The Government has steadily increased the number of PhD-positions and there is a marked increase in PhD-positions filled by foreign candidates. In Norway, most PhD-candidates are employed by their institutions. They enjoy job security and social security benefits, as well as internationally competitive wages.

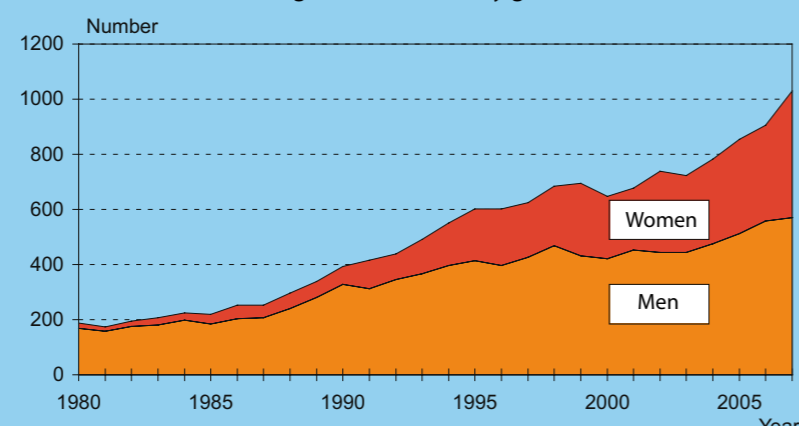
The Government gives high priority to international research cooperation. Since 1994 Norway participates with full rights and obligations in the EU Framework programmes. Bilateral agreements are also

important to facilitate international research cooperation. As of 2008, the Norwegian government has entered into general agreements on science and technology with Japan, the United States, France, Russia, India and South Africa. The Government also promotes cooperation with China and countries in Latin-America, such as Argentina, Chile and Brazil.

Attracting foreign researchers and increasing recruitment to research demands access to high-quality research centres and advanced infrastructure. A Centres of Excellence (CoE) scheme was launched in 2003. Today 21 centres from a variety of disciplines and institutions have achieved the status of CoE. Through the CoE scheme, outstanding research groups receive long-term funding to engage in world-class basic research.

The CoEs receive annual grants from the Research Council of Norway averaging MNOK 10 to 20 for a maximum of ten years. In addition host institutions cover a considerable proportion of the CoEs' expenditures, and the CoEs are free to raise funding from other sources. The main criterion for selecting the Centres of Excellence is scientific quality, as judged by international standards. The scheme has so far proved successful in pooling resources, linking national institutions, and not least developing extensive international links. The centres have attracted a great number of top qualified researchers from abroad, and some of the centres have placed themselves as central nodes in larger international networks.

Doctoral degrees 1980-2007 by gender.



The Norwegian Centres of Excellence

Bjerknes Centre for Climate Research
 Centre for Quantifiable Quality of Service in Communication Systems
 International Centre for Geohazards
 Aquaculture Protein Centre
 Centre for the Study of Civil War
 Centre for the Biology of Memory
 Centre for Advanced Study in Theoretical Linguistics
 Centre for Ships and Ocean Structures
 Centre for Molecular Biology and Neuroscience
 Physics of Geological Processes
 Centre for Integrated Petroleum Research
 Centre of Mathematics for Applications
 Centre for Medieval Studies
 Economics, Institutions, and Social Forces. Confronting theory with Nordic Lessons
 Centre for Geo-Biosphere Research: Deep Seafloor, Deep Biosphere & Roots of Life
 Centre for the Study of Mind in Nature
 Centre of Theoretical and Computational Chemistry.
 Centre of Excellence: Centre for Ecological and Evolutionary Synthesis
 Centre for Cancer Biomedicine
 Centre for Immune Regulation
 Centre for Software Components for Biomedical flows

The Outstanding Young Investigators scheme, established in 2003, is designed to give talented younger researchers from all disciplines particularly good framework conditions to help them realise their potential and achieve international excellence in research. The scheme is part of the effort to enhance the quality of Norwegian research and to develop highly competent research leaders. In the selection process, importance is attached to the originality and innovation of the planned project, and to the element of international co-operation it entails.

A number of international scientific prizes are awarded in Norway. The Abel Prize for mathematics was awarded for the first time in 2003, followed by the Holberg Prize for arts and humanities, social sciences, law and theology in 2004. In 2008 three Kavli Prizes for astrophysics, nanoscience and neuroscience were awarded. The Kavli Prizes will be awarded every second year.

The Kavli Institute for Systems Neuroscience and the Centre for the biology of memory

The Kavli Institute coexists with the Centre for the Biology of Memory (CBM) and is part of the Norwegian Centre of Excellence scheme. The scientific goal of the Kavli Institute for Systems Neuroscience is to advance our understanding of neural circuits and systems

According to a recent international evaluation of the CBM "the articles of the centre have a very high impact and the quality is exceptionally high and the quantity clearly satisfactory." Furthermore, "The training aspects of both PhD and post docs are clearly of very good quality and the centre is now an attractor for foreign PhD and postdoctoral students."

"The centre has had a major impact and developed into a major international centre for studies of the biology of memory. The ranking is exceptionally good."

The Institute is chaired by professor Edvard Moser and his co-director professor May-Britt Moser and the remaining principal investigators are international leaders in their fields.



NTNU Info

energy /environment

As a major energy nation, Norway has a particular responsibility to ensure an adequate energy supply and to develop knowledge and technology for efficient and sustainable energy systems. Norway is among the world's leading nations in petroleum and hydropower competence. In addition, Norway has vigorous research communities in the field of environment and climate research.

The High North is one of Norway's most important strategic priority areas in the years to come. The Government will intensify efforts to ensure the sustainable management of the rich natural resources in the High North. The Government's High North Policy aims to protect the environment while maintaining settlement patterns and promoting business development. A central task in the years ahead will be to predict and handle the impacts of climate change in our part of the Arctic region.

Despite extensive recovery of petroleum resources during the past 30 years, the petroleum industry still represents a large potential for future value creation. Large parts of the remaining resources on the Norwegian shelf are located in the High North; an area with particularly demanding environmental challenges. The Government will promote research aimed at further development of expertise and technology for sustainable petroleum exploration and production in the High North.

Although petroleum is important to the Norwegian economy, the Government has a very strong focus on research on renewable energy and carbon capture and storage. Norway will invest considerable resources in these fields the coming years as a result of a national agreement on climate policy.



Norsk Polarinstitutt, Inger Lise Næss

Svalbard – a unique research environment

The natural environment on Svalbard, coupled with the advanced research infrastructure established on the island, makes this a leading location for Arctic and environmental research. The Norwegian government sees Svalbard as a central location for international research infrastructure. India, Germany, Great Britain, France, Italy, Japan, China, Russia, Poland and South Korea have all set up permanent research stations on the island, most of them in Ny-Ålesund. Longyearbyen accommodates both the European Incoherent Scatter Scientific Association (EISCAT) and the University Centre in Svalbard (UNIS). The objectives of UNIS are to provide university level education in Arctic studies, to carry out high quality research, and to contribute to the development of Svalbard as an international research platform. UNIS will form the core of the Svalbard Science Centre (SSC), an international Arctic centre of expertise in research and education, which will also incorporate other professional and scientific institutions on the islands. Svalbard has been linked with the rest of the digital world through a fiber optic cable since January 2004. Two important additions to the research facilities on Svalbard were made in 2005: the 9000 m² main building of Svalbard Science Centre, and a new marine laboratory in Ny-Ålesund.

Norway has taken a clear initiative in order to develop the research infrastructure on Svalbard further. In this an important aspect will be to co-ordinate and improve access to all scientific data originating from geophysical, chemical and biological research. A planned Knowledge Centre will be responsible for data assessment, storage and delivery. This work, which will strengthen Svalbard's position as the leading natural laboratory for polar research for European and non-European countries alike, will hopefully take place within the framework of the European Strategy Forum on Research Infrastructure.



the norwegian economy

Norway's economic performance in terms of per capita GDP growth has been consistently very good for a long time. Average real incomes and productivity rates are among the highest in the world.

The labour market has tightened significantly over the last couple of years and the unemployment rate is now 2.8 per cent, the lowest in nearly 20 years. A major challenge for the Norwegian economy in the coming years is to maintain high, sustainable growth in traditional industries while promoting other knowledge-based activities. Conscious and systematic promotion of innovation is therefore an important focus in Norwegian research policy.

Rapid technological advances in emerging technology areas such as ICT, biotechnology and genomics and material and nanotechnology are drivers behind new waves of transformative research and technological developments in various sectors, including the environment, natural resources, the life sciences, transportation and advanced

manufacturing. Norway has established strategic large scale research programmes in these fields. ICT has already strong position in Norwegian business R&D. In 2005, 41 per cent of Norwegian industry's R&D expenses were spent on ICT.

Norway has internationally leading competence in a number of areas, both in universities, in the research institutes and in industry. Norway has a solid institutional framework and generous public measures for supporting private R&D. The interaction between research and industry is promoted through various schemes and agencies, inter alia through a number of measures managed by the Research Council of Norway. Norway also looks abroad to foster knowledge and to promote the exchange of ideas. The Government seeks to promote cooperation between national research and innovation and foreign companies, research institutions and scientists. Norway has a highly skilled labour force that generates new ideas and is adaptive to new working methods and change.

Some new initiatives are:

- A new industry PhD training scheme launched in 2008 to enhance cooperation and mobility between research and industry.
- A Centres for Research-based Innovation scheme was introduced in 2006. 14 centres have now been established. The main objective is to enhance the innovative capability of the business sector by forging alliances between research-intensive enterprises and prominent research groups in long-term research projects. The scheme is co-funded by corporate partners, host institutions and the Research Council of Norway (RCN). Corporate partners participate actively in centre governance, funding and research. The primary criteria for selection are scientific quality of a high international standard and the potential for innovation and value creation.
- Norwegian Centres of Expertise (NCE) is a programme aimed at specialised business clusters in order to promote internationally competitive businesses and industrial centres. The programme was launched in 2006. Regional partnerships and the industrial centres shall ensure that the programme will strengthen both the regional and national innovation systems.
- The Norwegian tax credit scheme, called Skattefunn, was introduced in 2002. All enterprises operating in Norway are eligible for a deduction in tax payable for expenses in approved R&D projects. The scheme is built around a generous rate of tax subsidy combined with a defined ceiling for eligible R&D expenditure. The ceiling for qualified R&D expenditure per formed in the firm is NOK 4 million. With the purchase of

R&D services from an approved institute, the firm will qualify for a maximum of NOK 8 million. Skattefunn was subject to an external evaluation from 2002 - 2007. The evaluation finds that Skattefunn contributes to increased private investment in R&D and that the additionality of the scheme is high.

- The Research Council of Norway operates a programme for user driven innovation projects (BIA). Grants from this programme are allotted on the basis of potential for value creation and R&D content in the projects, regardless of industrial sector.

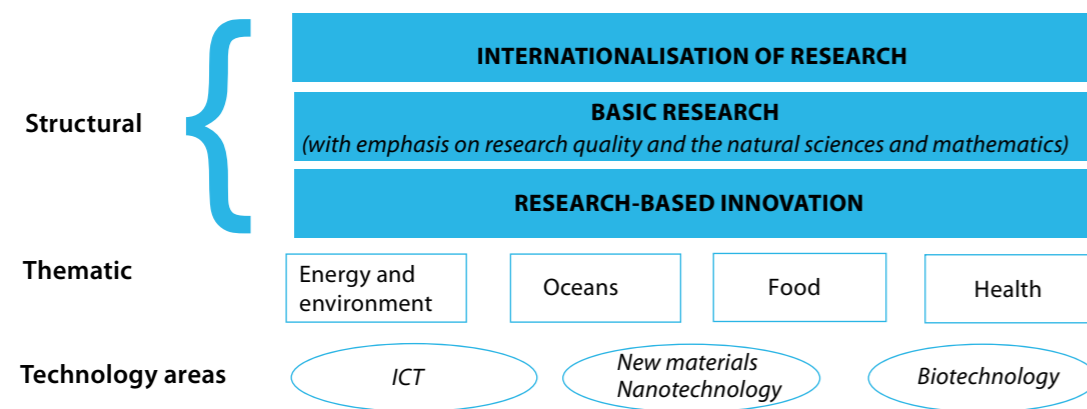
MabCent - The Arctic Bioprospecting Centre

MabCent is one of the Norwegian Centres for Research-based Innovation. The centre covers the pipeline from biology of marine resources and species through screening and research on bioactivities to commercialisation of drugs and biotechnological and nutraceutical products.

The seabed around the Svalbard archipelago (Spitsbergen) hosts about 2000 benthic species. Of these, only about 50 have yet been analysed. At MabCent the research-based treasure hunt is on. And the probability of discovering treasures is high. The Arctic offers a combination of low temperatures and a host of other special circumstances in a rare marine environment. These organisms often have far better chemical defence systems than humans, and which may help in combating viruses, bacteria and parasites and discover cures yet unknown to man. MabCent also aims for commercialisation of its research, and has several corporate partners in the international pharmaceutical industry.



norwegian research policy/ the research system



Three structural areas are given priority in Norwegian research policy.

Firstly, internationalisation constitutes an overall perspective. International participation is systematically emphasised in the allocation of R&D resources. Secondly, basic research is a priority. Special attention is given to research in the field of mathematics, science and technology. Thirdly, priority is given to investments in research-based innovation and business development, to provide support for the reorganisation and renewal of Norwegian business and industry and the public sector.

In addition priority is given to four thematic and three technological areas. The four thematic priority areas - energy and the environment (including petroleum research), food, oceans and health have been defined on the basis of national strengths and needs.

Three technological areas have wide areas of application and are undergoing substantial development. They are information and communication technology (ICT), biotechnology, and materials and nanotechnology.

About 30 percent of all public R&D funding in Norway is channelled through the Research Council of Norway. The Research Council identifies strategic research areas, allocates research funds and evaluates research within all fields and disciplines. The Council is the principal research policy adviser to the ministries, and acts as a meeting-place and network builder for Norwegian research. The Ministry of Education and Research has the administrative responsibility for the Research Council, but practically all ministries contribute to R&D programs and institutions funded by the Council.

Higher education institutions

About 30 per cent of all R&D in Norway is carried out in higher education institutions. R&D is mainly funded over the ordinary budgets of the institutions, but supplementary financing is obtained for programmes and equipment, mainly from the Research Council of Norway. There has been a substantial increase in research expenditure in the higher education sector from 2001 to 2009.

Norway has been an active participant in the Bologna process. Substantial changes have taken place within tertiary education in Norway during the last ten years, mainly aimed at encouraging institutions to be more responsive to the needs of society. As a result of the Quality Reform introduced in 2001, all higher education institutions have been given significantly greater autonomy in managing and organising their activities. The largest higher education institutions are the University of Oslo, the University of Bergen, the University of Tromsø, the Norwegian University of Science and Technology in Trondheim and the Norwegian University of Life Sciences at Ås and Oslo University College.

The Norwegian higher education system consists mainly of public institutions. Government funds are the main source of income also for the few private institutions of higher education. Government funds are distributed to all institutions based on a funding system, which is partly performance based. In addition to government grants, the institutions are encouraged to get external funding.

Research institutes

More than 20 per cent of total Norwegian R&D is carried out in the institute sector. The sector is diverse in terms of R&D activity, research topics and size of institutes. Norwegian research institutes serve a wide range of clients, including the civil service and the industrial sector.

The variety of customers also reflects the range of subject areas in the sector. Technology is the dominant area with more than one third of the sector's total R&D in 2005. A large number of institutes specializing in social sciences provide research relevant for social development and for government policies. In 2005 public funding for the institute sector amounted to NOK 4.4 billion, while funding from industry amounted to NOK 1.5 billion and funding from abroad amounted to NOK 0.8 billion. Funding from abroad has increased substantially during the last decade. A considerable part of this funding comes from the EU, and some institutions get a significant source of income from abroad by performing research for foreign companies. Norway is also home to the SINTEF Group, the largest research organisation in Scandinavia (see box).

SINTEF Group

The SINTEF Group is the largest independent research organisation in Scandinavia, with approximately 2000 employees. The SINTEF foundation was founded in 1950. In the 1970s SINTEF grew rapidly due to the demands for technology in the emerging Norwegian petroleum industry. Important laboratories such as the Ocean Basin Laboratory and the Multiphase Laboratory saw the light of day during this period. In the 1980s the SINTEF Group was founded. Today the SINTEF Group consists of seven research divisions: SINTEF Health Research, SINTEF ICT, SINTEF Building and Infrastructure, SINTEF Marine, SINTEF Materials and Chemistry, SINTEF Petroleum and Energy and SINTEF Technology and Society. The SINTEF Group has offices in Norway and abroad, with headquarters in Trondheim, Norway. SINTEF Group is active on an international level and in 2006, 12 per cent of the turnover came from international projects.

The Norwegian foreign missions and Innovation Norway

Norway has more than 100 foreign missions, which together with Innovation Norway promote cooperation between foreign and Norwegian enterprises and institutions involved in research and innovation. Research envoys are stationed at the Norwegian embassy in Washington D.C. and the Mission of Norway to the EU in Brussels.

Relevant links:

- The Norwegian ministries www.government.no/english
- The Research Council of Norway www.rcn.no/
- Innovation Norway www.invanor.no
- The Norwegian Association of Higher Education Institutions www.uhr.no
- The Norwegian Centre for International Cooperation in Higher Education (SIU) www.siu.no/en
- University of Oslo www.uio.no/english/
- University of Bergen www.uib.no/english/
- Norwegian University of Science and Technology www.ntnu.no/english
- University of Tromsø www.uit.no
- University of Stavanger www.uis.no/english
- University of Agder www.uia.no/english
- Research Institutes
http://english.nifustep.no/english/content/statistics/institute_catalogue
- Research prizes:
www.abelprize.no
www.kavliprize.no
www.holbergprize.no



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Published by: Norwegian Ministry of Education and Research
<http://www.regjeringen.no/en/dep/kd>

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Fax: + 47 22 24 27 86

Publication number: F-4236 E
Design: Grafia Kommunikasjon AS
Photo: Svein Erik Dahl/Samfoto and Kunnskapsdepartementet
Print: Grafia Kommunikasjon AS 10/2008
Impression: 1000



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