

## SPOTLIGHT ON NORWAY

# Healthy outlook for Norwegian life science

Higher state spending on health and medical research and great working conditions make Norway an attractive place to tackle some of the world's biggest health problems.

*"It is easier to establish a career here than in many other countries. PhD students get a good salary and we have a short gap between the research-leaders and the younger researchers."*

*Vincent Eijsink, Norwegian University of Life Sciences*

A **BREATHTAKING** coastline, forest-covered mountains, valuable oil resources, and the highest standard of living in the world are well known as some of Norway's biggest attractions. A better kept secret, however, is the Scandinavian country's vibrant healthcare research sector. During the past ten years, life sciences and medical research has blossomed in Norway, attracting investment from the government, charities and pharmaceutical companies, with scientists tackling some of the most common and life-threatening diseases, such as diabetes, cancer and cardiovascular disease.

"Norway has not traditionally been a research orientated country," says Joel Glover, director of the Norwegian Centre for Stem Cell Research, but

there appears to be an growing recognition that research in life sciences "represents an important investment for the future," he says.

Much of the action is in the capital. In June 2008, the journal Genome Technology named Oslo as one of the 20 best places for biotech in the world. According to Professor Hilde Nebb, vice dean of research at the University of Oslo, the country's research institutes are increasingly giving the more established hubs in Europe, Asia and the US a run for their money. "Norway has excellent health-related research institutes, very good medical technology, and attractive working conditions," she says. "Plus, we have good funding opportunities and permanent positions available."

## Brimming biobanks

Helping to propel Norwegian medical research on to the global stage are the country's biobanks, which give researchers access to millions of blood and cell samples, tissues, organs and extracted DNA, says Nebb. After approval by regional ethics committees, the banked biomaterials can be accessed by any research teams. Lars Akslen, professor of pathology at the University of Bergen, has been using materials from Norway's biobanks to identify new cancer types and sub-groups, in order to develop better personalised medicines. His group has recently been awarded a ten-year grant to establish the Norwegian Centre of Excellence, Centre for Cancer Biomarkers (CCBIO), opening this year, and Akslen believes the biobank system and registers are key to Norway's global success in biotech research

and innovation: "Our extremely well-organized biobanks give us a unique advantage," he says.

## Life-logging

Another boon for Norwegian researchers working on public health is access to databanks and registries of health collected from hundreds of thousands of citizens over their lifespan. "It is essential for our success that we are able to follow the population's health over time," says Kristian Hveem referring to the Nord-Trøndelag health study (HUNT) which he heads up at the Norwegian University of Science and Technology (NTNU) in Trondheim. "Every tenth year, we invite all citizens of Nord Trøndelag county to be screened," says Hveem. As a result, the HUNT study is one of the world's largest and most comprehensive longitudinal population-based health surveys, and has so far generated data from 120,000 people.

## Starting young

Though health related and medical research in general has progressed in Norway in the past decades, oncology is leading the charge. Increased public focus on cancer and greater governmental funding has led to a number of spinoff biotech companies and innovative networks for oncology researchers. One non-profit organisation, the Oslo Cancer Cluster, aims to reduce the time it takes to develop new cancer medication and diagnostics. It has evolved into an extensive network of researchers and private investors from Norway and abroad since it was established in 2006 as one of Norway's Centres of





Statoil Troll A natural gas platform off the coast of Norway is a feat of engineering.



High school students get a taste for working in the lab during an internship at Oslo University Hospital.

Expertise. Today, the cluster brings together almost 70 members including pharmaceutical companies such as Pfizer, Novartis and Merck Serono, and academic research institutions such as the University of Bergen and NTNU. Not only does the cluster promote biotech research and generate funding, it also fosters future medical innovation in unconventional and proactive ways, for instance by arranging internships for high school students in biotech-research laboratories.

“To many young Norwegians it is more attractive to work in the oil industry or with computer sciences than to perform medical research, but we need more researchers in the biotech field. By allowing a group of high school students to come and work with us for one week per year, we give them a feeling of how research actually is done,” says Kristian Berg, who investigates

radiation biology at Oslo University Hospital, which participates in the Cancer Cluster’s project. During the internships with Berg and his team, the students learn the basics of how light can be used to treat cancer. “Hopefully, it will help to strengthen Norwegian basic research and the medical industry in the long run,” Berg says.

The Cluster hopes to assemble the cancer research network in one place in 2015 with the opening of a new innovation park in Oslo. The buildings will total 32,000 square meters and house the Cancer Registry of Norway, several of the members of the Oslo Cancer Cluster and both the Oncology Pathology Lab and Institute for Medical Informatics at Oslo University Hospital. To help fledgling oncology start-ups, the park will also include a biotech incubator. And, unusually, a high

## Harnessing riches

Alongside the rapid growth of medical research and innovation in Norway over the past decade, the country’s research endeavours in petroleum and gas continue apace.

As the world’s sixth largest oil producer, the third largest oil exporting country and one of the most significant suppliers of natural gas to the European market, Norway strives to lead the way technologically when it comes to extraction methods. It is a top destination for those with industry expertise looking for solutions to problems such as dwindling reserves.

The Centre for Integrated Petroleum Research (CIPR), at the University of Bergen, for instance, receives funding from the National Research Council and several oil and gas companies to find new ways to maximise extraction from oil and gas fields before they are shut down, as well as methods of storing CO<sub>2</sub> beneath the North Sea. The centre’s approach combines maths, geology, chemistry and physics to come up with new techniques. The interdisciplinary nature of CIPR’s research provides a range of opportunities for both PhD and masters students who benefit from free higher education in Norway, even for international students.

Elsewhere the non-profit organisation SINTEF, the largest independent research institute in Scandinavia, is using its Petroleum Research arm to investigate new ways to extract oil from inaccessible small pockets which are currently unexploited.

The private petroleum industry is also developing innovative technologies to get the most out of Norway’s energy resources. International oil and gas company Statoil, which is based in Norway, has more than 3,000 staff working on 300 projects associated with increased recovery, says Siri Espedal Kindem, Statoil’s senior vice president for technology excellence.

The company is also investing 240 million Krone (\$42m) to build a new centre for improved recovery in Trondheim, which is expected to open at the end of the year. It also funds basic research which could improve the recovery of oil extraction through VISTA, a funding initiative which aims to strengthen links between Statoil and Norwegian academia by supporting 20 PhD and postdoc projects and professorships each year.

school. “The Innovation Park will ensure and strengthen the recruitment to life science and research and at the same time will improve the quality of education within math, and physical, social and health-science subjects,” says Kaare Norum, chairman of the board of the Oslo Cancer Cluster.

### Healthy priorities

International researchers are also drawn to life science roles in Norway in large part by the favourable working conditions. “For young researchers Norway is attractive because it is easier to establish a career here than in many other countries. PhD students get a good salary and we have a quite equal structure with a short gap between the research-leaders and the younger researchers,” says Vincent Eijsink, a protein engineer at the Norwegian University of Life

Sciences, adding that in Norway you are not dependent on meeting the right people in order to get ahead.

The growing potential of the life sciences sector and a shift away from oil and gas research (see box) is reflected in the budget priorities of the Research Council of Norway, which has identified eight key areas for funding for 2014, with health and healthy ageing research topping petroleum research in the council’s budgetary recommendations. The government is also backing a new interdisciplinary life science building at the University of Oslo. The 65,000 square meter-development will be located near Oslo University Hospital, which will make it easy to collaborate and test scientific findings clinically, says Ole Petter Ottersen, rector of the University of Oslo. “Interdisciplinary research is definitely one of the university’s

priorities. As in many Western countries, Norway has an ageing population, but by working across disciplines we can develop better medicines and technologies that can improve the population's health and quality of life," he says.

### Stem cell success

Oslo University Hospital is also home to the Norwegian Centre for Stem Cell Research, which was set up in 2002 with government funding in the aim of bringing together stem cell researchers in the Baltic to push advances in the field. "Stem cell research has become a major international activity, and it is hard for any country to not join in," says Glover, the centre's director. "Policy makers in Norway clearly feel that it is important to develop Norwegian expertise in the area so that the promise of stem cell treatments can be realized for patients at Norwegian hospitals. And our health system, with its well-developed patient databases, is particularly well situated for implementing such treatments," he says.

The proximity of researchers



A sketch of the planned life science centre at the University of Oslo, which would house approximately 1,000 life sciences researchers.

at the centre to patients means advances can readily be translated to the clinic, says Glover, and several clinical trials of stem cell therapies — for instance to treat cartilage damage and for corneal replacement — are

already underway. The advances being made in stem-cell research also "mesh nicely with other areas of internationally competitive life sciences in Norway, such as cancer research, immunology, and neuroscience," he adds. "We

hope that Norway will seize the opportunity to use its considerable financial resources to develop all of these areas much more strongly in the future."

*Nature editorial staff have no responsibility for content*

UiO : **Institute of Basic Medical Sciences**  
University of Oslo

## PROFESSOR / ASSOCIATE PROFESSOR OF MEDICINE (Neuroscience)

Available position as Professor / Associate Professor of Medicine (Neuroscience) at the Institute of Basic Medical Sciences.

The new Professor / Associate Professor will be expected to address some or several of the following areas: molecular biology, anatomy, physiology and biochemistry of the healthy brain, brain adaptation and development, and brain disease.

The successful applicant will have a strong and rising research profile among these fields.

**Further details and online application:**

<http://www.med.uio.no/imb/english/about/vacancies/>

UiO : **Institute of Basic Medical Sciences**  
University of Oslo

## DIRECTOR AT OSLO CENTRE FOR BIostatISTICS AND EPIDEMIOLOGY

Available position as Director at Oslo Centre for Biostatistics and Epidemiology, University of Oslo and Oslo University Hospital, combined with Professorship/ Associate Professorship of Medicine at the Institute of Basic Medical Sciences, UiO.

The Oslo Centre for Biostatistics and Epidemiology is seeking a new Director. The center constitutes a large and strong unit, covering all aspects of biostatistics, from methodological research to advanced consulting and supervision towards all areas of medicine and health related research, from clinical and epidemiological research, to molecular biology and other basic medical sciences.

The Director will play a key role in the establishment and successful operation of the new center.

**Further details and online application:**

<http://www.med.uio.no/imb/english/about/vacancies/>

NTNU is Norway's leading science and engineering university, located in Trondheim at 63° north. We work at Europe's outer edge – but our research is cutting edge. Here's one example:



# Cooling a warming world

Capturing carbon dioxide (CO<sub>2</sub>) is a little like catching fish: there are many different ways of doing it. The tough part is figuring out the best technology for catching the stuff, and what to do with it once you've captured it.

For more than a decade, NTNU scientists have been at work developing different technologies for CO<sub>2</sub> capture. Since 1996, more than 10 million tonnes of carbon dioxide have been pumped into a geological reservoir deep under the chilly North Sea, in the only full-scale test of undersea carbon storage in the world.

Norway's pioneering efforts have helped transform the city of Trondheim into a European hotbed for CO<sub>2</sub>-related science, with an annual research budget topping 20 million euros. In fact, NTNU is involved in ten EU CO<sub>2</sub> capture and storage projects that could help cool a warming world.

Some said CO<sub>2</sub> capture and storage was impossible. But all that CO<sub>2</sub> locked away under the ocean says otherwise.

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The Norwegian University of Science and Technology (NTNU) is Norway's premier academic institution for technology and the natural sciences, with equally strong programmes in the social sciences, the arts and humanities, medicine, architecture and fine art. The university's cross-disciplinary research results in innovative breakthroughs and creative solutions with far-reaching social and economic impact. Visit [www.ntnu.edu](http://www.ntnu.edu)

UNIVERSITY OF BERGEN (UiB) is an internationally recognised research university with more than 14,000 students and close to 3,500 employees at six faculties. The university is located in the heart of Bergen. Our main contribution to society is excellent basic research and education across a wide range of disciplines.



UNIVERSITY OF BERGEN

## Postdoc position in Neuroimaging and Schizophrenia

At the Department of Biological and Medical Psychology, Faculty of Psychology, University of Bergen there is a vacant postdoctoral position in Neuroimaging and Schizophrenia. The position is tied to the project «The neurophysiology of auditory hallucinations in schizophrenia», financed by the Research Council of Norway.

The position is affiliated primarily with the Bergen fMRI Group, which is a crossdisciplinary cognitive neuroscience research group with members from psychology, psychiatry, neurology, basic neuroscience, bioinformatics and physics. Expected starting time is September, 2013. The term of employment is 3 years.

For further information including details of the project and areas of responsibility, special duties and other circumstances given special emphasis in connection with the position, please contact: Prof. Kenneth Hugdahl, phone +47 55 58 62 77, e-mail: hugdahl@psybp.uib.no

For full details and to apply please visit [www.jobbnorge.no](http://www.jobbnorge.no) (ID no. 92705) - Application deadline: 31st of May, 2013

[www.uib.no/positions](http://www.uib.no/positions)

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THE UNIVERSITY OF BERGEN (UiB) Norway is an internationally recognised research university with more than 14,000 students and close to 3,500 employees at six faculties. The university is located in the heart of Bergen. Our main contribution to society is excellent basic research and education across a wide range of disciplines.



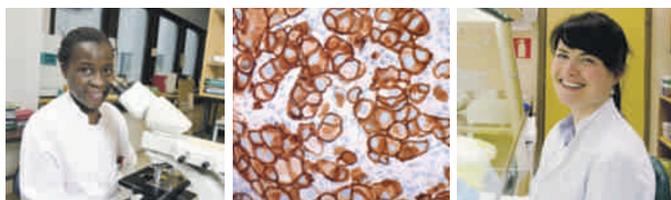
UNIVERSITY OF BERGEN

Centre for Cancer Biomarkers CCBIO, Norwegian Centre of Excellence

## PhD and Postdoc positions

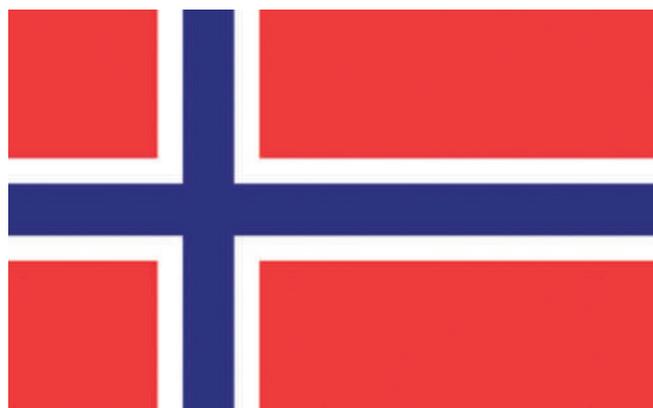
CCBIO (established 2013) is working on biomarkers and tailored cancer treatment. The researchers focus on tumor-microenvironment interactions by using preclinical models, large biobanks of human cancer samples with clinical and follow-up annotations, as well as implementation studies and clinical trials. CCBIO is located on the Haukeland University Hospital campus and currently includes nine integrated and collaborating research teams. The centre has a strong international profile and interacting collaborators worldwide.

**Deadline: 18 May 2013**



Further details: <https://www.uib.no/mofa/artikler/2013/04/work-at-centre-for-cancer-biomarkers-ccbio>

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I would like to take this opportunity to thank everyone who participated in the

***“Spotlight on Norway”***

for your support and collaboration.

The Spotlight on Norway will also be available online in the News and Resources section of [naturejobs.com](http://naturejobs.com), including the Employer Profile published by the Institute of Basic Medical Sciences at the University of Oslo.

For future recruitment advertising enquiries, please contact me using the details below and I wish you all the best of luck with your future research endeavours.

**Thank you!**

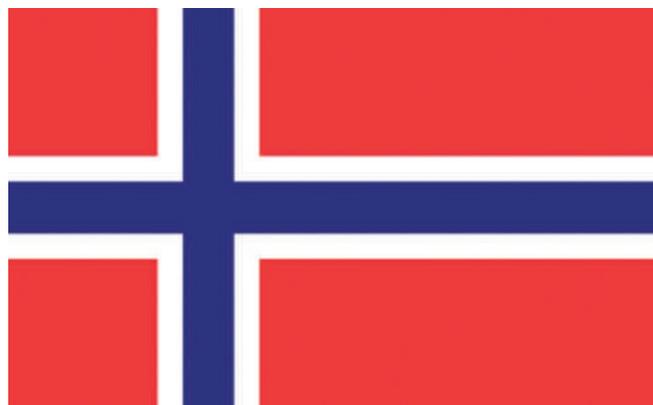
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## BIOFORSK, THE NORWEGIAN INSTITUTE FOR AGRICULTURAL AND ENVIRONMENTAL RESEARCH

Bioforsk, the Norwegian Institute for Agricultural and Environmental Research, conducts research linked to multifunctional agriculture and rural development, plant sciences and plant health, environmental protection and natural resource management. We have a strong international profile with employees from more than 25 different countries.

### Multifunctional Agriculture

The development of a multifunctional and sustainable agriculture, including rural development based on local resources, represents the framework of our agricultural research. Our activities extend from high altitude farming to production and harvesting of marine macro algae. Food security and safety through sound agricultural practices and technology innovation are the overall objectives in many of our agricultural research projects. Our R&D activities are directed towards end-users, such as the agro-industry and extension services, as well as policy support at regional and national levels.

### Plant Sciences

Plant biology including plant health and plant protection is an important framework for many of our research activities. Understanding the basic biological processes are key inputs to our development of strategies on integrated pest and disease management. Our activities cover the span from basic research in plant physiology and biotech, to monitoring and policy support and the development of decision support systems. The potential of terrestrial as well as aquatic plants to further developing the bio-economy is a priority area.

### Environmental Sciences

Soil, water, wastes and terrestrial ecosystem processes represent the overall framework of our environmental R&D activities. Climate change, integrated land and water resource management, soil and water conservation are important areas. Bioforsk develops new technologies for remedial measures and adaptation, and monitoring and decision support systems for policy support are at the core of many research projects. Integration of different research areas gives a multidisciplinary platform ensuring relevance and involvement for end-users and stakeholders.



### Working with Bioforsk?

If you have a suggestion for cooperation, or want to know more about our working areas, visit us on the web at [www.bioforsk.no/english](http://www.bioforsk.no/english)

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