University of Stavanger

Annual Research Report 2010

UNIVERSITY OF STAVANGER www.uis.no

EDITORIAL

Strengthening our research

The University of Stavanger has during the last years established several research centres and 25 Research Programmes. The Research Programmes are by the end of 2010 regrouping 240 internal and 80 external researchers. This is an increase from last year's participation. The Research Programmes are regrouping more than a third of all research positions at UiS. The strategy of establishing these research areas has contributed positively to strengthening and achieving synergies between researchers who were otherwise scattered internally. This development is further encouraged by financial means allocated centrally. All faculties are now running Research Programmes. There has also been a higher focus on applying for external funds.

After the substantial increase in publication at UiS of 35 per cent from 2008 to 2009, we can notice that the publication rate increased by 4 per cent between 2009 and 2010. A continuous positive development can also be noticed in the number of doctoral candidates examined, which in 2010 was 31.

For a young research university in an ever increasing international competition for funds and resources, it is a pleasure to observe that we have achieved a very positive success rate in EU's 7th Framework Programme in 2010, as described in this report.

It is also worth noting that the International Research Institute of Stavanger (IRIS) at the end of 2010 was acknowledged a Centre for Research-based Innovation, named Drilling and Well technology for improved Recovery. UiS is one of the four research partners within this 8-year research programme.

Troels Jacobsen
Acting Research Director, UiS

Patient safety in European hospitals

Five years ago, a research team at UiS started to study patient safety at a hospital in Norway. Professor Karina Aase and her colleagues have since then extended their scope to other hospitals in Norway and in Europe.

Over the past few years, Karina Aase and the patient safety research team at the University of Stavanger have observed how this new field of research has been put firmly on Norwegian and European agendas. Starting at the Stavanger University Hospital in 2004, the team has quickly expanded and tied up with a number of national and international collaborating partners. In 2010, they were pleased to see their application for EU funding of their Quality and Safety in European Union Hospitals (QUASER) project granted. The same year, the research group was established as one of the University of Stavanger's 25 priority areas of research within the area of Quality and Safety within Healthcare Systems.

Karina Aase, professor of societal safety, UiS.

Safety focus

"Up until the last five years, the Norwegian public health services have paid little attention to safety and risk management, compared to other high-risk sectors of the society. We have previously concluded that there is an underreporting of adverse events within Norwegian hospitals, and that there is room for improvement of their safety culture," Aase says.

In 2010, the research team published *Pasientsikkerhet* – a book which sums up research activities carried out over the last five years. It highlights the many challenges faced by the public health services in Norway. Among them is the absence of reporting of, and learning from adverse events, and the lack of collaboration between clinics and departments, as well as management focus.

The University of Stavanger is one of six partners in the QUASER project, which also include representatives from Portugal, the United Kingdom, Sweden and the Netherlands. Together they will study how European hospitals could improve their quality and safety work, and how public authorities may evaluate and safeguard these efforts.

Common guidelines

"We will produce a set of general guidelines, which hospitals can employ to improve their quality and safety work," says Aase.

The Research Council of Norway and the regional Health Authority, Helse Vest, have recently awarded 7 million Norwegian kroner to the research group for a new project entitled "Quality and safety within elderly health and care services – a focus on transitions and interactions."

On top of the research-efficiency list

The University of Stavanger has the most efficient researchers of all Norwegian universities, according to a new governmental survey. The ranking is derived by comparing the amount of research published by each university and college of higher education, with the public funding allocated to them. The survey includes researched published in Norwegian as well as international data bases. The Norwegian publishing point indicator puts the University of Stavanger firmly on top. When both Norwegian and international publishing are added up, the University of Stavanger is the highest-ranking of all universities and number three in total. The new productivity ranking is produced by the Fagerberg Committee, appointed last year by the Minister of Research and Higher Education, Tora Aasland.

Major EU breakthrough

In 2010, UiS had a major breakthrough with regard to EU's research programmes, obtaining a success rate of 55 per cent of sent applications. EU's 7th Framework programme (FP7) is the world's largest research programme, and is financed with nearly one billion Norwegian kroner per week over a period of seven years. FP7 provides a platform for collaboration with top research institutions in Europe. This is a unique opportunity for researchers at UiS to meet other top researchers within their fields. The competition is high, so we are proud to say that the achieved results are very satisfactory.

Researchers from IRIS are also involved in our EU projects. An example is the participation in FP7's largest demonstration project within security (SECUR-ED), which has a total budget of 40 million euros. Researchers from IRIS and UiS will provide key knowledge to the risk and privacy aspects in the surveillance of urban public transportation in medium and large cities.

By the end of 2010, UiS was involved in or negotiating contracts with 10 EU projects of a total value of 2.7 million euros for UiS. The projects are dispersed within fields like security, energy, health, biotechnology and social science, and are typically anchored to either a centre or a Research Programme at UiS.

Petroleum economist in demand

Based on the Norwegian model, professor of petroleum economics Petter Osmundsen at the University of Stavanger has made his mark on taxation guidelines for oil producing countries worldwide to follow. He is nevertheless critical of his native country's petroleum policy.

Being one of a very few researchers in petroleum taxation, professor Osmundsen's expertise on the taxation of large oil revenues has become an export article in itself. In 2010, the International Monetary Fund (IMF) published *The Taxation of Petroleum and Minerals*, in which professor Osmundsen has written a chapter on petroleum taxation. Among other themes, it discusses how tax systems should respond to changing oil prices.

"A linear system like the Norwegian has proved itself to hold good incentive properties and to be stable over time. The impact of increasing and decreasing oil prices are shared between companies and the authorities. Most petroleum taxation systems are regressive, which means that the effective rate of taxation falls when oil prices rise. This is being compensated by frequent changes in taxes, resulting in an unstable tax system which discourages investments."

More research needed

The Norwegian system – with its predictable taxation of oil revenues – is highly sought after. Still, there is a crack in the system, according to professor Osmundsen. Even though Norway is enjoying huge oil earnings, government grants for petroleum research have diminished over the last few years.

Sleipner. Photo: Kjetil Alsvik/Statoil

"Technological developments generate higher productivity and more cost efficient development and operation. Research which could increase the recovery of oil from mature fields about to run dry is therefore vital. If this is not done, Norway is irrevocably set to lose billions in income," professor Osmundsen warns. He would like to see the government commit itself to supporting research within the petroleum industry for many years to come.

Sharing technology

Each company takes into account its own research gains, and sometimes less due to decentralised management systems. The manager may only take into account the benefits for a single project or field, which he is responsible for, instead of the company as a whole. The stakes involved in developing e.g. new and more effective drilling technologies are thus too small, compared to the profits gained by the society in general. In 2010, Osmundsen studied increased oil recovery and so-called knowledge externalities.

Petter Osmundsen, professor of petroleum economics, UiS.

"If the state contributes to the development of new technology, all parties operating on the Norwegian continental shelf will benefit. Many companies are likely to be able to share the same technology," the petroleum economist explains.

"Finding and producing more oil by using newer and better technology will increase everyone's profits, as well as yielding bigger tax revenues. This is why it is important for Norwegian authorities to finance this kind of research. By repeatedly slashing its funding of research and development carried out by the oil industry, the government exercises exactly the kind of short-sightedness it accuses the companies of."

Professional recognition

Professor Osmundsen is an acknowledged author, and is often invited to give lectures for the oil industry, government ministries, the Norwegian Petroleum Directorate, the Oil Tax Office and the Norwegian Petroleum Society. He is a member of the industrial economics research team at the University of Stavanger, which is busy studying the interaction between technology and economics. Among other tasks, the team is seeking to explain the decrease in drilling speed. In 2010 Osmundsen got Lyse's Research Prize for his achievements.

Centres for Research-based Innovation (SFI)

At the end of 2010 International Research Institute of Stavanger (IRIS), which is equally owned by the University of Stavanger and the regional foundation Rogalandsforskning, was acknowledged a Centre for Research-based Innovation (SFI) named Centre for Drilling and Well technology for improved Recovery (SSBU).

Four partners stand behind: IRIS, UiS, NTNU and Sintef. The aim of the new centre is to improve drilling methods, enhance safety and increase the recovery of oil and gas from existing fields on the Norwegian continental shelf. This may potentially yield billions in extra oil revenue to Norway.

RESEARCH CENTRES

THE UNIVERSITY OWNS OR IS ASSOCIATED TO:

- Centre for Sustainable Energy – CenSE
- Centre for Industrial Asset Management – CIAM
- Centre for Organelle Research – CORE
- Centre for Increased Oil Recovery – COREC
- Centre for Risk Management and Societal Safety – SEROS
- Stavanger Centre for Innovation Research
- Centre for Drilling and Well technology for improved Recovery – SBBU
- Norwegian Centre for Offshore Wind Energy – NORCOWE – led by CM Research
- Centre for Sick Leave and Occupational Rehabilitation – PreSenter
- Stavanger Acute Medicine Foundation for Education and Research – SAFER
- Centre for behavioural research (CBR) and National Centre for Reading Education and Research (Reading Centre) are research centres within the University of Stavanger as well as national resource centres

PhD, doctoral programmes at UiS

Biological Chemistry, Information Technology, Literacy Studies, Management, Offshore Technology, Petroleum Technology, Risk Management and Societal Safety, Educational Sciences

Number of PhD graduates during the last three years

Results	*2008*	*2009*	*2010*
Number of PhD graduates	12	29	31
Number of PhD graduates per scientific position*	0.02	0.06	0.06

Allocation of research funding from the Research Council of Norway and EU over the last three years

Results	*2008*	*2009*	*2010*
RCN-allocation per scientific position*, 1000 NOK	53.8	43.3	46.6
EU-allocation per scientific position*, 1000 NOK	4.4	3.2	7.1

** includes teaching, research and dissemination (as defined by the Ministry of Research and Higher Education)*

The University of Stavanger recorded a substantial increase in the number of PhD candidates for 2008 through 2009, from 12 in 2008 to 29 in 2009. The increase was less pronounced for 2009 through 2010, but the faculties are making a goal-oriented effort to improve their student throughput rates.

During 2010, the confirmation frequency of applications for EU grants doubled from 2009, and the University of Stavanger came first of all Norwegian universities in this category. Efforts are being made in 2011 to increase the number of applications to the Research Council of Norway.

Research published by the UiS during 2010	*Number of publications*	*Number of points*
THE UNIVERSITY OF STAVANGER	556	480,6
Management and staff	1	1,5
THE FACULTY OF SOCIAL SCIENCES	152	131,4
Department of Health Studies	50	43,2
Department of Social Studies	11	14,8
UiS Business School	20	15,0
Department of Media, Culture and Social Sciences	58	50,7
The Norwegian School of Hotel Management	13	7,8
THE FACULTY OF ARTS AND EDUCATION	128	120,8
Department of Music and Dance	5	9,9
Department of Cultural Studies and Languages	44	44,0
Department of Education	32	24,3
Department of Early Childhood Education	11	8,3
Centre for Behavioural Research	19	19,6
National Centre for Reading Education and Research	16	13,6
THE FACULTY OF SCIENCE AND TECHNOLOGY	266	210,4
Department of Mathematics and Natural Science	51	41,8
Department of Industrial Economics, Risk Management and Planning	91	86,2
Department of Electrical and Computer Engineering	30	17,1
Department of Mechanical and Structural Engineering and Materials Science	40	24,3
Department of Petroleum Engineering	54	41,0
THE ARCHAEOLOGICAL MUSEUM	9	16,5

Research Programmes

At the beginning of 2011, the University had a total of 25 Research Programmes. This organisation is well established. Annual reports submitted in 2010 record a high level of activity within the programmes. A total of 320 researchers – 81 of them external – have taken part in these activities.

The reports demonstrate a high productivity level in terms of scientific publishing and dissemination of information to a number of communication channels, as well as systematic efforts to obtain funding from external sources.

- Scientific Archaeological Laboratory Studies
- The ability of the kindergarten and the school to compensate for vulnerability in relation to psychological development in children and adolescents
- Reading, Writing and Arithmetic in a Lifelong Perspective
- Teachers' Knowledge for Teaching
- Learning Cultures in Early Childhood Education
- Memory Studies
- North Sea Language History
- Studies of Performance Skills
- Democracy, Globalization and Welfare
- Economics of the Family and Childhood
- Scandinavian Hospitality Research Group
- Law and Economics
- Coping With Chronic Illness
- Social-Scientific Research on Substance Abuse
- Risk Management
- Tourism Management
- Applied Finance
- Quality and Safety in Health Care Systems
- Interdisciplinary Gender-Research
- Societal Safety
- Biomedical Dataanalysis
- Centre for Organelle Research
- Distributed Sensor and Control Systems
- Food Market Research
- Green Production Chemistry

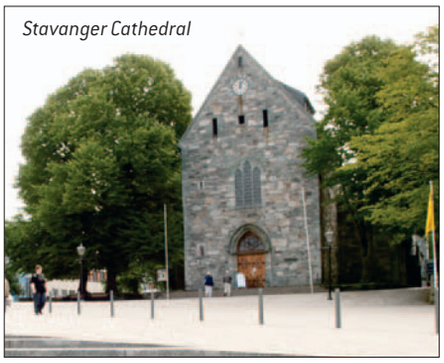
Research published by the UiS during the last three years

Number of points			*Number of publications*		
2008	*2009*	*2010*	*2008*	*2009*	*2010*
343,8	464,4	480,6	374	493	556

The Christians under the Cathedral

In 1968 archaeologists found many skeletons in the ground under the chancel in the Cathedral in Stavanger, built in the year 1125. The skeletal discoveries suggest that several generations of Christians lived in Stavanger in the western part of Norway before the cathedral was built.

"The skeletons were placed with their heads towards the west so that their eyes faced the east symbolising resurrection and eternal life. There were also no grave goods, jewellery or tools in the graves according to pagan practices. Discovery of many iron rivets showed that the bodies had been placed in coffins. This indicated clearly that they were Christian graves from a cemetery that was used before the church was built," Paula Utigard Sandvik says. She is an associate professor at the Museum of Archaeology, UiS.



Stavanger Cathedral

In 2010 researchers began skeletal studies and started to identify the individuals. The skeletal remains stem from both young children and old people.

"Some of them lived to over fifty, which certainly is not bad in the harsh medieval times. They were surprisingly tall. The men could be 175–180 centimetres. But we have also found a woman of 150 cm", osteoarchaeologist Sean Denham says.

People in the Middle Ages are reconstructed and modern people gain more knowledge. But when did the town become a town? No exact answer emerges.

"We cannot write a final history of Stavanger. We find no traces of urban development before the cathedral. But even when there are no physical traces in the city, we can get new answers, like the ones obtained from our skeletal analyses," Paula Utigard Sandvik says.

The ongoing skeletal studies is part of the Scientific Archaeological Laboratory Studies, which is established in 2010 as one of 25 research programmes at UiS.

The museum's research director, Mads Ravn, says the merger with the University of Stavanger has more than doubled the museum's research productivity from 2009 to 2010. Furthermore, the research funding is approximately quintupled.

The critical voice among technology optimists

Reading researcher Anne Mangen studies how various media and technologies impact our writing and reading skills. She is a prominent dissident among those who hail the entry of personal computers in kindergartens and schools.

We don't know enough about the effects of using ICT in schools, and what the costs may be, Anne Mangen says, associate professor of reading research at UiS.

Mangen's paper, which indicates that on-screen reading in many cases are more stressful for the brain than reading on paper, has attracted worldwide attention. It is cited by Nicholas Carr in his well-known book *The Shallows – What the Internet is Doing to Our Brains*.

"Activities such as clicking and scrolling on a screen occupy our attention and cognitive capacity. This may interfere with our mental attention, and leave us more vulnerable to distractions when reading a text," Mangen says. She is an associate professor at the University of Stavanger's Reading Centre.

In illustrating the difference between reading novels and stories on screen and on paper, she applied theory from the fields of psychology and phenomenology – particularly in relation to the interplay between haptics (the ways in which we use our fingers and hands) and attention. Mangen was awarded a highly commended in the UKLA/Wiley-Blackwell research and Education Award 2009 for this particular paper. Following the success, Mangen has introduced methodology derived from the natural sciences into her work.

Pencils better than PCs?

Through COST's European Research Network on Learning to Write Effectively (ERN-LWE), Mangen became aware of the French neurophysiologist Jean-Luc Velay's research on writing. Mangen believes his studies on the links between the sensorimotor and perceptual aspects when learning to write, are relevant to the study of reading. The two researchers have co-written a paper on the interplay between motorics, perception and cognition when writing by hand, compared to writing on a keyboard.

"Through a series of experiments, Velay and his colleagues have demonstrated that the motor components of handwriting play an important role in learning the letters of the alphabet. This disappears with the keyboard, where there is nothing in the movement of typing a "B" that informs the writer about the visual shape of the letter. When replacing handwriting with a keyboard, and thereby altering the role of the motor component, we could – and should – ask ourselves how this will affect our teaching and acquisition of writing skills," Mangen explains.

Velay and Mangen are about to compare e-books and printed books, in assessing how well we memorise and understand what we read. Mangen's theoretical approaches and pedagogical methods are supported by Velay's empirical findings.

"Currently, in the pedagogical field, there is a lack of awareness, or at least a lack of focus, on the workings of the human body and brain. This is in my view both incomprehensible and unfortunate. Scant attention is paid to biology and neuroscience in the pedagogic disciplines," she says.

A critical voice

Personal computers are omnipresent in Norwegian schools, and are increasingly being introduced in kindergartens as well. Anne Mangen often find herself to be of a minority of critical voices among technology optimists.

"There is little empirical evidence to support such an uncritical and wholehearted implementation of PC's, the way it seems to be done in Norway. It is too easy to sit back and refer to school curricula, impelling the pupils to acquire digital skills. We don't know enough about the effects of using ICT in schools, and what the costs may be," says Mangen, who would like to see more interdisciplinary, empirical research on this subject.