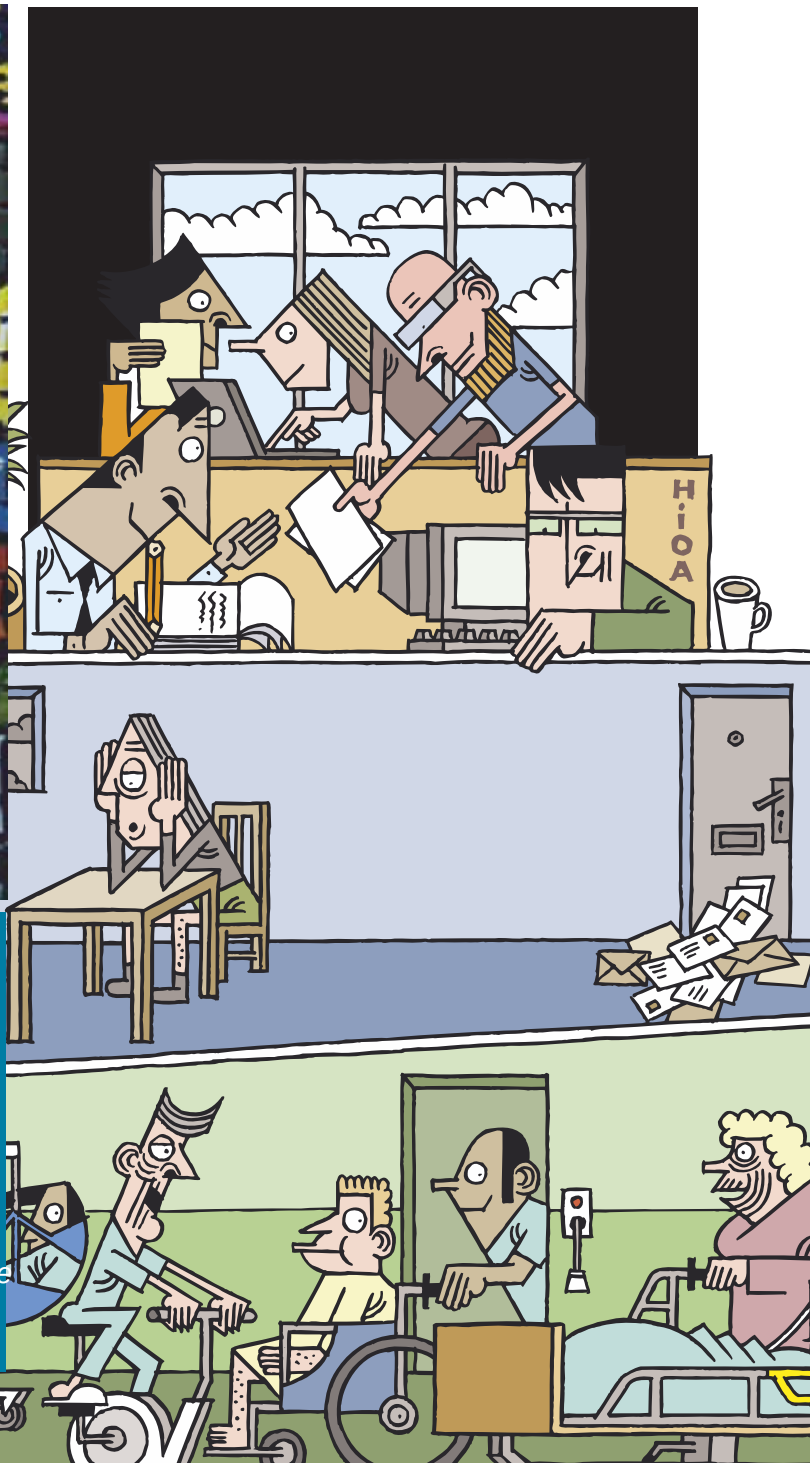
OSLO AND AKERSHUS
UNIVERSITY COLLEGE
OF APPLIED SCIENCES

Explore HiOA

Magazine froM oslo and akershus university college of applied sciences 2014

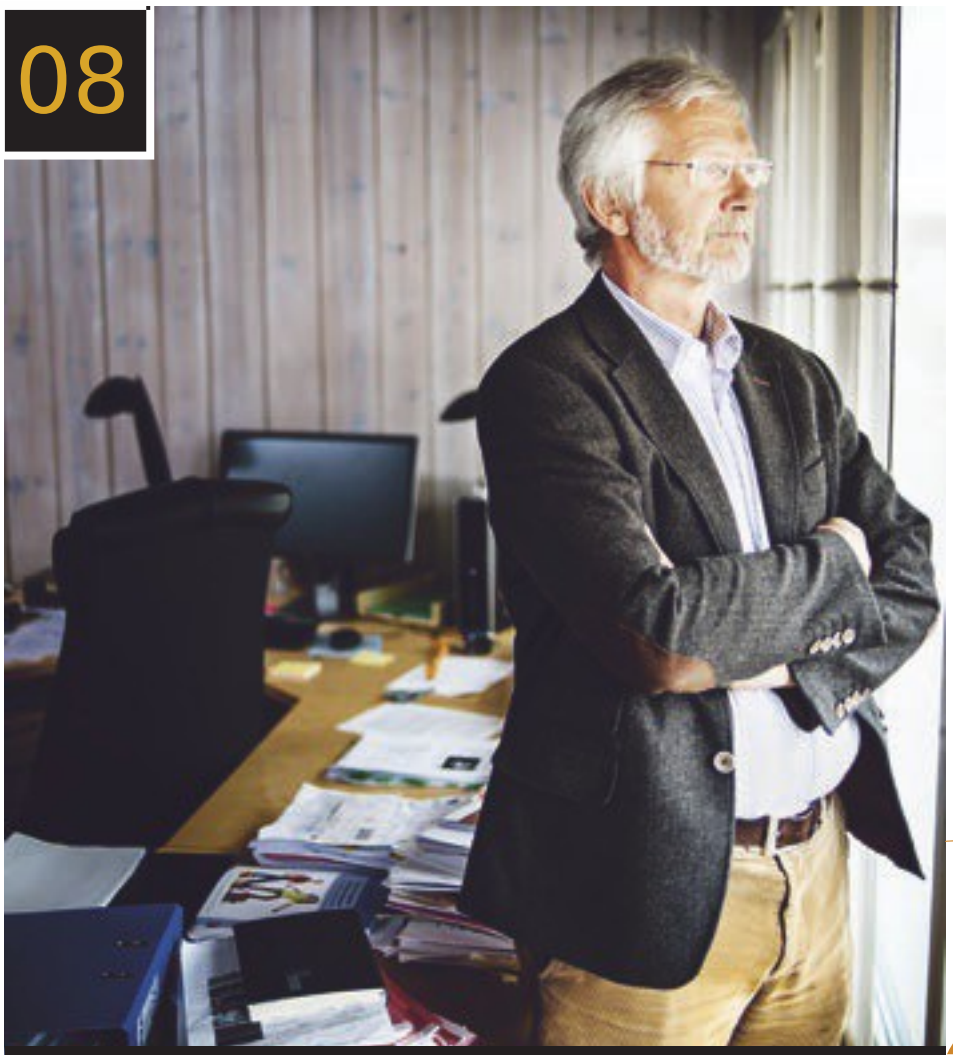


Ready to make a diffeReNce?

New knowledge and new practices for a changing world

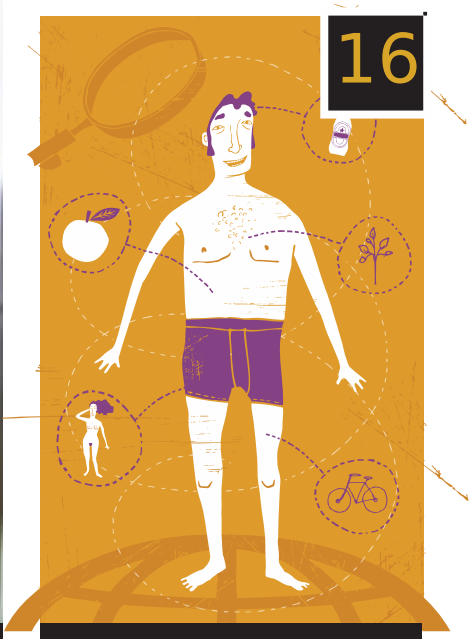
Rector Kari Toverud Jensen's vision for HiOA is ambitious, yet one that she is eager to achieve – possibly with your help. *(p. 4–7)*

08



AT THE FOREFRONT OF SOCIAL WELFARE RESEARCH

16



HEALTH RESEARCH

26

LIVING AND RESEARCHING IN OSLO

HiOA is looking to recruit teachers and researchers with an international background. Meet three academics who have made the move to Oslo.

SEE PAGE 26

Written by:
Valeria Criscione

Photos:
Benjamin A. Ward

Welcome to HiOA

READY TO MAKE A DIFFERENCE

New knowledge and new practices for a changing world. The vision for Oslo and Akershus University College of Applied Sciences (HiOA) is ambitious, yet still a vision that the rector, Kari Toverud Jensen, is more than eager to achieve – possibly with your help.

Kari Toverud Jensen, rector at Oslo and Akershus University College of Applied Sciences (HiOA).

The rector herself is testimony to the possibilities that lie within the combined educational institutions. She started her nursing studies in the 80's at Ullevål College, which later became part of HiOA. After working several years as a manager of a nursing home, Dr Jensen pursued an academic career at the University of Oslo. Under the current merged structure, she could have studied for her Master's and Doctorate degrees at HiOA.. A doctorate in Health Sciences was established in 2013, the sixth PhD programme at the college.

Close to everything. The main campus lies in the capital of Oslo, split between a historic brick brewery complex and the former National Hospital, and serves the most populous and diverse region in Norway. The institutes cooperate with a wide array of businesses and institutions in their research and teaching efforts, ranging from Oslo University Hospital to the Norwegian oil service company Aker Solutions.

"As a young college, we are committed to creating and maintaining close relationships with partners outside HiOA. You can do everything here and the college is close to everything," states the rector.

As part of its plans, the college is working towards achieving university status, a move that would give it more freedom to expand its educational offerings and attract even more research projects internationally.

THE STRATEGY FOR HIOA, 2020

New knowledge, new practice

HiOA is the third largest high-level educational institution in Norway, measured by number of students. The university college is unique in a national context due to its wide range of professional programmes, its close ties with the respective fields of practice, and the opportunities it offers to specialise at both master's degree and PhD levels. Its strategy for 2020 is based on the vision of "New knowledge, new practice".

1 **HiOA WILL CONTRIBUTE** to knowledge development in society as a whole, by educating practitioners with high levels of professional ability and high-impact skill sets. HiOA aims to serve as an important contributor to policy making.

2 **HiOA WORKS TO ACHIEVE UNIVERSITY STATUS.** Such a status would afford the academic freedom and necessary leverage to meet the important research and educational needs of the society.

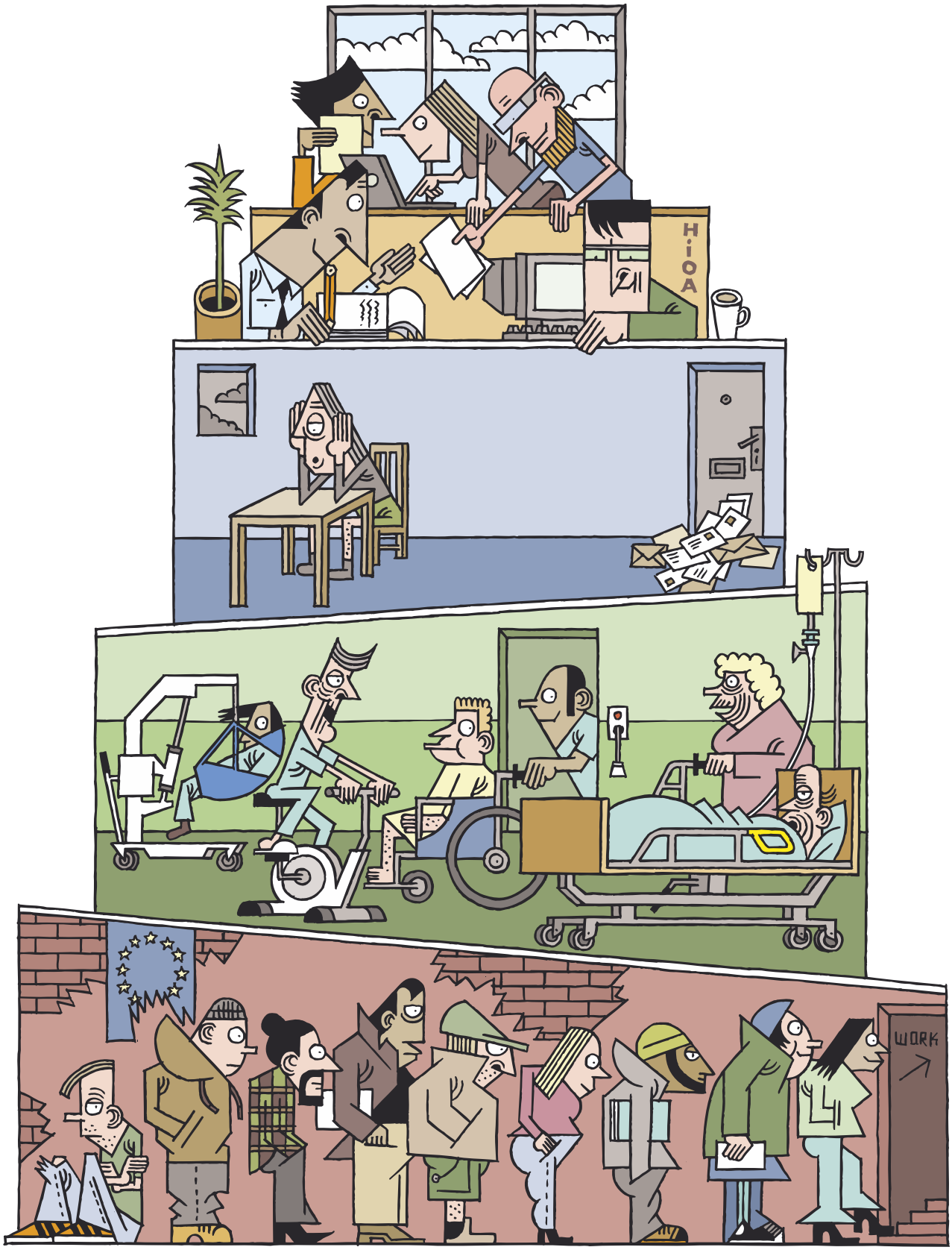
3 **HiOA's ADDITIONAL VALUES.** Knowledge, critical reflection, source criticism, scientific method, and the exchange of ideas are core values in higher education and research. In addition to these, HiOA also has its own three values reflecting the organisation's culture and priorities. These values are: diversity, learning and innovation.

4 **EDUCATIONAL GOAL:** HiOA will be internationally recognised for its professional programmes.

5 **RESEARCH AND DEVELOPMENT GOAL:** HiOA will be at the forefront of professionally relevant research and development.

6 **GOAL FOR EXTERNAL RELATIONS AND DISSEMINATION:** HiOA will challenge and develop the professions in cooperation with business and society and will be an active agent and participant in the public debate.

7 **GOAL FOR HUMAN AND FINANCIAL RESOURCES:** HiOA will be a learning and innovative workplace that organises and develops activities and resources in a goal-oriented and effective manner.


HiOA
WORK

ROOM FOR EVERYONE

How is it that the Nordic welfare system is so popular, despite the high taxes and different reforms that people have to tolerate? According to Dr Kåre Hagen, director for the newly established Centre for Welfare and Labour Research, the answer is simple: Because the system includes everyone.

The state and welfare of its citizen has been the research focus for Dr Hagen for nearly 30 years. He is now heading the Centre for Welfare and Labour Research (SVA) at HiOA, an umbrella body for the Work Research Institute (AFI) and Norwegian Socia Research (NOVA) that were merged into HiOA in the beginning of 2014.


Kåre Hagen is the director of the new Centre for Welfare and Labour Research at HiOA.

A strong social scientific environment. "Through this merger we have established what probably is the strongest social scientific environment in the Nordic countries, thanks to the research and knowledge existing within AFI and NOVA. We will now be able to combine analysis and research of labour market institutions with redistributive social policies," says Dr Hagen.

We managed to catch up with the director despite his busy schedule to hear more about the newly created SVA and why this field of study is particularly important and relevant to our lives today.

"The key component of the Nordic welfare state's success is the combination of good labour institutions combined with a centralised wage settlement and small differences within the population itself," he remarks.

Dr Hagen informs us that the research focus for the new centre will be mostly on social policy and living conditions with special attention given to social exclusion.

"We are especially interested in social inequalities, problems of inclusion as well as labour and housing issues," he states.

A sustainable society model. Many see the Nordic welfare model as a utopian idea and something that is virtually impossible to achieve for emerging nations. Unsurprisingly, Kåre Hagen doesn't agree.

"The Nordic welfare states have historical roots, but the ability to carry out reforms in a peaceful manner is one of the main reasons that this has been a sustainable society model for so many years," he points out. An example of one such reform is the recent pension reform in Norway.

"This was quite a radical pension reform carried out by the authorities affecting the pension levels of many, and yet there was little protest from the population," Dr Hagen says, adding: "Norway is in the unique position that it can afford to experiment with huge social policy reforms."

The high level of taxation is effectively what helps finance the welfare state. But Norwegians aren't complaining. Norway also emerged relatively unscathed from the

POVERTY, SHAME AND SOCIAL BENEFITS

Receiving social assistance from the state is shameful to many, as they feel stigmatised by society. Erika Gubrium, the director of the research centre Sosialforsk, wants to improve the situation for social benefit recipients.

How do various forms of welfare structures promote or prevent health, well-being and/or the social inclusion of individuals? This is one of the research questions that the Social Welfare Research Centre (Sosialforsk) at HiOA is concerned with. Given the well organised Norwegian welfare system, Norway is a good place to conduct this research. This is where Dr Erika Gubrium enters the stage – an American set out to find out more about the pros and cons with Norwegian welfare systems.

Dr Erika Gubrium is in charge of the research unit Sosialforsk.

The relationship between poverty and shame has been the focus of Dr Gubrium's research since 2010. Together with Professor Ivar Lødemel, she started by working on the project, "Tackling poverty, shame and social exclusion: a study in seven countries," financed in the UK and directed by Robert Walker, University of Oxford.

Dr Gubrium is now coordinating a new project; "Poverty and Shame: Perspectives and Practices Concerning Anti-Poverty Measures in a Global Context". This project focuses on the structural role of shame in the pursuit and practice of anti-poverty policy in various study sites: Norway,

Professor Espen Dahl at the Faculty of Social Sciences researches health and social inequalities, and he won the 2012 Research Award at HiOA.

GOOD NEWS for the welfare state

Does the welfare state make disadvantaged citizens more or less likely to be a part of the labour force? Professor Espen Dahl at the Faculty of Social Sciences has found surprising results on this matter.

Espen Dahl, a professor in health and social policies, has carried out extensive research in health-related social exclusion and its effects in Norway and other European welfare states. "You could say that a lot of my research is about looking at social policy through an equity lens," the professor remarks.

The results of his extensive research demonstrate that the likelihood of participating in the labour market among disadvantaged groups increased as welfare generosity increased. This is good news for the welfare state, and contrary to long-standing beliefs that the welfare state makes disadvantaged citizens less likely to be a part of the labour force.

"In Norway's case we have seen that disadvantaged groups have been better integrated in the labour force than is the case in many other countries. Part of the reason for this is that the generous Norwegian welfare state gives them enough incentives to work," Dahl explains. Most of the benefits of the welfare state are only available to those who work, and this is known as the entitlement effect.

In a recent report commissioned by the Norwegian Directorate of Health, Dahl found that an increasing number of high school drop-outs could threaten the economic basis of the welfare state in the future.

"This report documents that there is a clear link between poor health, poverty, and the tendency to drop out of school early," he explains. The report also shows that among those who smoke, educational levels tend to be lower, their health is poorer and they tend to have a decreased earning capacity.

"However, it's not as simple as getting all smokers to quit, because that factor only explains around a quarter of the health inequality in Norway. It is important to qualify everybody for the labour market by giving them an education. Education also ensures that people take better care of their health," Dahl says. His research also shows that children with parents who have little or no education are significantly more likely to become school drop-outs than their peers who have educated parents.

"In order to prevent a disadvantaged child from dropping out of school, appropriate measures need to be implemented while they are still at nursery school. We also have to be aware of reducing child poverty," Dahl explains.

His most recent research will be expanded to look at other countries in Europe, especially Spain and Greece, two countries that have been badly affected by the recent financial crisis and do not have well-functioning welfare states.

"We have formed an international research network so that we can cooperate in looking at health inequalities in other European countries. This project is expected to run until well into 2016."

UNIQUE

possibilities within health research

Looking to have an impact on clinical practice and policy, or contribute to a deeper understanding of people's behaviour? Then one of the two health-related PhD programmes at HiOA may be right up your alley.

Written by:
Caroline Svendsen

Illustration:
Berit Sømme

The Faculty of Health Sciences at HiOA offers two PhD programmes, each of them unique in its own way: HiOA is the only educational institution in Europe to offer all levels of degrees in Behaviour Analysis; i.e. Bachelor's, Master's and doctoral degrees. Whereas the new PhD programme in Health Sciences is special in its approach, emphasising health sciences as a research field in its own right.

The PhD in Health Sciences , introduced in 2013, has an overall perspective taking into account that health is a complex and comprehensive phenomenon that involves interaction between physical, psychological, and social dimensions. The PhD programme has an inter- and multidisciplinary profile whereby health researchers cooperate on developing integrated knowledge-based health care services at individual and systemic levels.

Key elements in the programme are: evaluation, interventions in health promotion, preventive health care, epidemiology, treatment, rehabilitation, and care. "The term 'health sciences' is more comprehensive than 'medicine', something our new PhD programme reflects," says Astrid Bergland, the academic head of the new PhD programme in Health Sciences.

"An important goal for us is to provide more research-based knowledge on assessment intervention, professional experience, and user involvement in health and social services. The result of the research should have an impact on clinical practice and policy," Dr. Bergland underlines.

"We are open to candidates doing research on a topic that they have a particular interest in within the health sciences"

Trine B. Haugen, Vice-Dean R&D and professor at the Faculty of Health Sciences.

knowledge of behaviour analysis touches all areas of human activity. Organisations and cultures consist of people and their behaviour.

"We cannot work efficiently with or within these systems without understanding how behaviour is affected, maintained or changed. This also applies to health and lifestyle issues; we know a lot about what is good for us, but this does not help unless we change our behaviour in ways that benefit our health," she remarks.

Behaviour analysis can be used in clinical treatment, ideally in conjunction with other health professions. However, insights from behaviour analysis can also be useful in addressing challenges facing society as a whole, such as overconsumption of natural resources or combating climate change.

"One strength of our scientific community is the emphasis on documenting effects of interventions. Society's demand for empirically supported interventions is increasing. We see a common interest between academia and society in developing robust communities that can operate at the frontier of research and development," she adds.

HiOA has an extensive international network. The researchers at the Faculty of Health Sciences often host conferences where their work can be discussed and presented to a wider audience.

"We welcome international academics and lecturers, and we think that students from other countries would benefit from doing a PhD here," Haugen says. "Furthermore, it will also be fruitful to us to have an international perspective."

Since both the research done at the faculty and the PhD programmes are internationally oriented, the teaching is given in English. The faculty has participated in several EU-funded projects and has extensive international collaboration with other researchers.

22 July 2011 Norway was struck by terrorist attacks. A new research project at HiOA will study the use of social media in this and two other emergency cases.

Twitter in an EMERGENCY

How useful are social media in a crisis? That is what Dr Harald Hornmoen and an international team of researchers are trying to find out.

Written by: Caroline Svendsen

Photo: Luca Kleve-Ruud/Samfoto/NTB scanpix

Innovation as teaching method:

CREATING VALUE THROUGH NEW IDEAS

By freeing students and researchers to indulge their creative powers, HiOA has become a global fount of new ideas, designs and systems.

Written by:
Ane Bamle Tjellaug and Walter Gibbs

Photos:
Benjamin A. Ward

"We want to help change society," says Frode Eika Sandnes, the prorector for research and development at HiOA. "That means educating people not only to perform a job, but to push their professions forward and create new types of careers."

Crossing disciplines in pursuit of a goal, he says, is the essence of entrepreneurship. It's also a key to recent student innovations in medicine, robotics, social policy and boat technology.

Engineering the heart. Among the green-clad surgeons hustling between operations at Oslo University Hospital are four bachelor-level mechanical engineering students. They have found a less invasive way to repair heart valves.

Their focus is the mitral valve, whose string-like tendons stretch or rupture in some people, causing a partial reverse flow of blood. Along with cardiac surgeon Jacob Bergsland, the young engineers have developed a safer, cheaper method of affixing a new tendon, with access obtained through an artery in the groin.

"Today this is a big operation," says Bergsland. "You have to open the chest and stop the heart, an enormous procedure compared to what could be possible with the new method."

Nikolai Hiorth and three fellow students devoted a semester to the project.

"We came up with a variety of ideas, then let people with surgical experience judge what might work," he says. "When you don't know something is 'impossible', you have an advantage."

He learned that cardiac medicine has something in common with oilfield technology, which preoccupies many engineering students in this country of vast energy resources.

"Blood vessels are like a network of pipes, where pushing, pulling and rotating are the simplest kinds of mechanical transfer," he says.

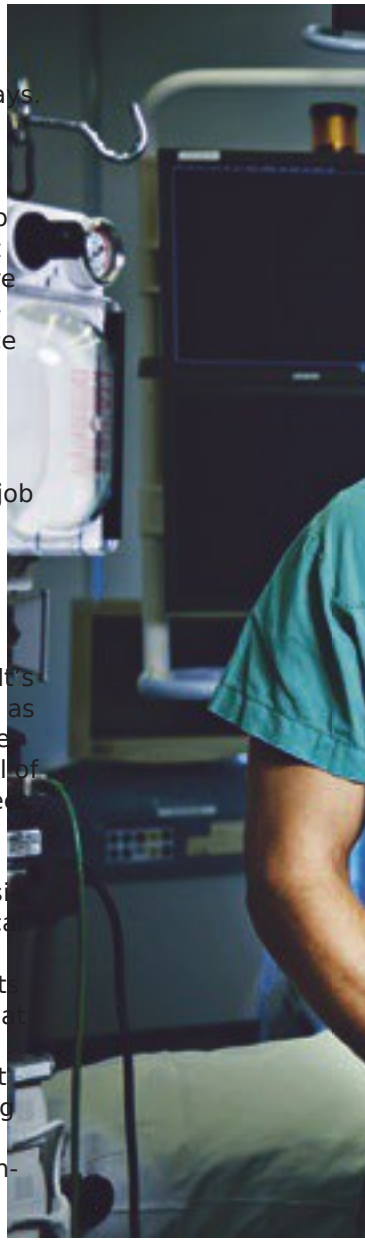
Serious play with Lego. Toy giant Lego gives real-world experience to the product design students at HiOA. Sigrid Hustad's task was to bring the beloved Lego man to life, then test prototypes on a kindergarten class. "We were supposed to generate as many ideas as possible," she recalls, adding that the experience boosted her career prospects.

Lego creative director Erik Legernes is indeed on the lookout for design brilliance. "If we're looking to hire new designers and we find very talented students, I can promise a job interview," he says.

Learning's a game. As a veteran teacher, Steinar Aas knew that Norwegian schools have unused computer capacity. So while earning a Master's degree, he created Enki. It's a computer game that lets teachers observe as pupils solve math and English puzzles and develop creative avatars. The Research Council of Norway invested NOK 1.5 million in the project.

Another example of student innovation is the 2013 winner of Young Enterprise Norway's national championship for student businesses. Sjøsikker SB was founded by electrical engineering student Fredrik Eriksen and two friends. To improve safety on motorised boats, they have developed a wireless kill switch that is now nearing production.

Not all innovators are technology wonks. At an "entrepreneur camp" for first-year nursing students, a city health agency posed a challenge: How can nursing-home residents maintain their old social networks? Brainstorming students proposed 40 ways.



INNOVATIVE COLLABORATION

In HiOA's high-tech Motion Analysis Lab the focus on interdisciplinary collaboration leads to important innovations.

Written by:
Valeria Criscione

Photos:
Benjamin A. Ward

Imagine monitoring critically ill patients through a wireless sensor network. Or mapping the cerebral activity of a stroke patient with the help of near infrared lights. Or even preventing pc-related shoulder aches. All this might be a reality in the near future, thanks to the new Motion Analysis Lab at HiOA.

Working towards a common goal. The lab opened in March 2014, as the result of a chance encounter in 2008 between Terje Gjøvaag, an associate professor at the Faculty of Health Sciences and Peyman Mirtaheri, associate professor in Biomedical Engineering. Their first meeting was coincidental, but the two doctors have worked closely together ever since.

"When we met, my first thought was: 'Can we work together?', says Gjøvaag, who holds a doctorate in exercise physiology. "At that time, I didn't know there was a biomedical engineering group at HiOA. In a way, we were looking for each other in parallel."

The two doctors' common goal is to improve modern patient care. They shared the view that the best way to achieve that goal, would be to work together across disciplines. They established a cross-disciplinary research group called "Clinical Interventions and Biomedical Engineering" (CIB). Then Mirtaheri and Gjøvaag collaborated to create the Motion Analysis Lab, together with colleagues from four different institutes at HiOA. Gjøvaag leads the lab.

"Collaboration between different professionals is needed to meet the challenges of current and future healthcare systems," says Dr Mirtaheri, who is in charge of the complementary Optical Lab at the Faculty of Technology, Art & Design.

High-tech lab. The new Motion Analysis Lab is stocked with NOK 4.1 million in high-tech equipment. Here the CIB group runs nearly a dozen research projects seeking to make lives better for patients with prostheses or neurological diseases. Their most recent purchase, a functional Near Infrared Spectroscopy (fNIRS), resembles a swimming cap with a lot of colourful buttons. However, the NOK 600 000 piece of equipment is a sophisticated optical device that can send near infrared lights through the skull into the brain to map the cerebral activities of, for example, stroke patients.

Although the lab is equipped with the most advanced technological equipment, the lab is about a lot more than just equipment.

"Motion analysis labs are found in most hospitals," says Dr Gjøvaag. "What makes this lab unique are the people connected to it." The lab facilitates collaboration between different

Motion Analysis Lab

Opened in March 2014

Situated in Katti Anker Møller's building on campus

A "playground" for testing new ideas

Four institutes at HiOA took part in establishing the lab:

- Institute of Ergotherapy and Orthopaedic Engineering Studies – Faculty of Health Sciences
- Institute of Physiotherapy – Faculty of Health Sciences
- Institute of Industrial Development – Faculty of Technology, Art and Design
- Institute of Product Design – Faculty of Technology, Art and Design

"Motion analysis labs are found in most hospitals. What makes this lab unique are the people connected to it."

Dr Terje Gjøvaag

The strength of the Motion Analysis Lab is its manpower, according to Dr Terje Gjøvaag. Here he explains some of the Lab's many high-tech features.

professionals such as medical doctors; physiologists; chemists; ergo therapists; biomedical, mechanical, and orthopaedic engineers; and industrial designers – thus facilitating a unique type of research across disciplines.

A recent case example is a PhD project on an optical probe that detects light in deeper layers of tissues. This probe could be used to monitor blood flow and oxygenation of critical care patients and neonates. In the future, it could even be used for blood pressure monitors without a cuff, a technology for which the two doctors recently won a research award at HiOA.

"These ideas could not have been developed without the interdisciplinary collaboration of the healthcare professionals and engineers. We can develop and test concepts that are real problems met by healthcare professionals," says Gjøvaag.

Wireless future. One of the three main research areas that the CIB group touches is the development of optical and mechanical sensors that communicate wirelessly as a sensor network. The other two areas involve application of rehabilitation and prevention such as the energy expenditure during prosthetic use or factors that lead to muscular and skeletal disease in patients with shoulder pain – a common problem in our modern PC-obsessed society.

"Most of the future in healthcare will be dependent on sensors and wearable sensor technologies," says Gjøvaag. "Wireless sensor networks could offload the burden of continuous monitoring of patients from the busy workday of health professionals."

The most recent project in the Motion Analysis Lab was carried out by a Brazilian PhD student, Ana Paula Cunha Loureiro, from the Pontifical Catholic University of Paraná. Her study focused on monitoring the activity level of well-functioning post-stroke patients with an accelerometer and testing their oxygen uptake and muscle strength through an isokinetic dynamometer.

International collaboration. The Brazilian collaboration is just one of many projects the laboratory has had with international academia. Mirtaheri and Gjøvaag recently received visitors from the University of Lodz in Poland, and met with the universities in Southampton, UK; Jönköping, Sweden; Potsdam, Germany; and the Lab for Engineering Education & Development at Boston University, the US.

The next step is to make the lab open to all academics and involve students at the four respective institutes. The laboratory has started with courses for select HiOA employees to establish a broader range of research professionals, who can later take their students into the lab as research assistants. The concept is to make the lab a "playground" for testing ideas, open for all disciplines involved. Currently, the lab is offering a course on optical gait analysis.

"This is a strategic investment that gives enormous potential for research," says Gjøvaag. "If you get qualified for this type of equipment, you can do anything you want."

The fjord city project in Oslo has opened up the waterfront to the public.

Written by:
Valeria Criscione

Photos:
Benjamin A. Ward, John Hughes, Thinkstock and Svein Nordrum/NTB scanpix

Foreign academics living and researching in Oslo:

GLOBAL THINKING, LOCAL LIVING

They come from different countries and for different reasons: some for the family-friendly Nordic welfare model and Oslo's beautiful nature, others for Norway's attractive sound economy. But all who come to work at HiOA help fill the growing need for international academics within the applied sciences.

“It is good to be able to steer your day and find time to do things.”

Alejandro Figueres, Spain

Alejandro Figueres (centre) works as lead engineer in the Department of Civil Engineering and Energy Technology. Here he helps Annum Iftikhar Akhtar and Babæk Abnar with their projects.

FASCINATED BY THE WELFARE MODEL

Alejandro Figueres set his sights on working in Norwegian academia because of his admiration for the Nordic welfare model and the country’s well-functioning economy. It added positively to the equation that his partner Teresa, a fellow civil engineer, had just landed a full-time position in the Norwegian Public Roads Administration.

The 27-year-old Spanish civil engineer moved from Valencia to HiOA as lead engineer in the Department of Civil Engineering and Energy Technology last year. He learned Norwegian in just one month at the Nordic Centre in Alicante, a Spanish resort town popular amongst Norwegians. Many of their friends had emigrated from the high unemployment situation in Spain to Chile or Brazil. But Figueres wanted a place that was closer to home and could offer an attractive work-life balance.

“If I had stayed in Spain and worked at an internship at a private building contractor, I would have worked from 8 a.m. to 8 p.m.,” says Figueres. “This is something we really appreciate in Spain – to be able to steer your day and find time to do things.”

At the college, Figueres spends an average 10-12 hours per week teaching lab courses. The rest of his workweek is spent helping students with their projects. In their free time, the couple likes to explore the nature around their home in Drammen, a popular town located a half-hour train ride from Oslo. Drammen has attracted many international residents.

“We met many Spanish friends through a Facebook page in Drammen,” Figueres says. “The page had 40 members. Now it’s up to 100.”

Research IN BRIEF

To find out more about research and development at HiOA, visit www.hioa.no/eng

From left: Tobias Andersen, Jan Lysen Andersen, Kristen Ribu and Nina Bauge. Code by Velimir Jankóvic.

Facebook for people without speech

Informatics students at HiOA are helping people without speech to use Facebook. The students used open source code to make Blissymbolics, an ideographic writing system, accessible via a normal keyboard. This is part of a larger project at the Department of Computer Science that aims to reinvigorate the use of Blissymbolics, which was originally developed for international communication. In the Nordic countries it has been used to help persons without speech to communicate. Until now, however, it has not been possible to use the symbol language on speech machines, PCs or tablets.

PEOPLE FEEL YOUNGER THAN THEY ARE

PEOPLE OVER 40 identify with age groups that are younger than themselves. And people with lower levels of education feel younger than peo with higher education. These are some of the findings of the research unit "Aging, health and welfare", led by prof. Astrid Bergland at HiOA. " explanation may be that highly educated peopl simply are more at ease with their actual age. It may also be that people with lower education a more likely to work in more physically demandi professions where being young and having a good physique, is more important as the work demands it", says prof. Berglan. These findings are based on data from The Norwegian Study o Life Course, Ageing and Generation (NorLAG), a multidisciplinary and longitudinal study followin 2 500 individuals aged 40–80 years.

Identifying as a pupil is better for learning

CHILDREN WHO IDENTIFY themselves with the role as pupils will accept boring tasks, and learn more from them than less motivated pupils. By actively engaging in school chores, over time the "good pupils" will develop better literacy and understanding of meaning. This in turn is a prerequisite for better learning.

Pupils who have parents with higher levels of education will often have better pre-knowledge, and are therefore better able to take advantage of school activities. This research project shows, however, that the pupils' attitude towards their own role as pupils and the tasks they are given at school, can be more important for the learning outcome than the family background.

The findings are based on analysis of classroom observation and interviews with pupils, and are part of the ongoing research project "The Didactic Challenge of New Literacies in School and Teacher Education", funded by the Research Council of Norway. For more information, see blogg.hioa.no/literacy.

Energy-efficient cloud computing

CLOUD COMPUTING REQUIRES a lot of energy, as each server normally handles between 10 and 100 virtual computers. Now researchers at the Department of Computer Science at HiOA have shown through experiments that it is possible to minimise the size of the virtual computers. The researchers, Alfred Bratterud and Hårek Haugerud, found that it's possible to have 10 000 virtual computers running on less than 2 per cent of the computer processor (CPU). They also found that 110 000 virtual computers could run on just one server, hence dramatically reducing the energy usage.

Emotional attachment as design methodology

BY ANALYSING USERS' EMOTIONAL attachment to products, designers can increase the lifetime of products. Professor Tore Gulden at the Department of Product Design has developed a design methodology that examines how a product activates the user. The more the user is activated, the stronger the attachment to the product will be. This in turn will make the user take better care of the product, thus reducing waste. The development of the methodology was a transdisciplinary project involving design master students and a psychologist.