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The Future of Hearing

Editorial

Dear Readers,

Are you “lazy”? This is the term scientists use to describe people who move their heads very little during conversation. Naturally it is not meant judgementally, but merely denotes scientific interest – at least from the point of view of the researchers in the Cluster of Excellence Hearing4all. They are working, among other things, on the question of how the space-aware, intelligent hearing device of the future can adjust to the wearer‘s behaviour. And different behaviours during conversation – whether this involves head nodding or not – play a key role here.

In our Focus article on the Cluster of Excellence we report on the challenges that the researchers in Volker Hohmann‘s team face on the path to developing a dynamic hearing aid. In our interview with Christiane Thiel and Birger Kollmeier you can find out how much progress has been made three years after the Cluster of Excellence began its work and what its further goals are. And in the accompanying photo series we show how Oldenburg researchers in Stefan Debener‘s team are miniaturising EEG technology and making it mobile.

Hearing also features, albeit indirectly, in the “Research Update” section. Musicologist Melanie Unseld talks about the legacy of singer and drawer Celeste Coltellini, for whom Mozart also composed a number of arias. Her legacy provides a new, “non-Mozart-centred” perspective on the music culture around 1800. In another article in the “Research Update” section sociologist Thomas Alkemeyer and sport scientist Mirko Brandes examine the phenomenon of self-tracking, looking at the benefits and risks of people obsessively collecting data about themselves and their bodies.

In our portrait of psychologist Ute Koglin you will also meet her closest co-workers, Ferdi, Finn and Lobo – three hand puppets that Koglin takes into kindergartens to research social-emotional skills in children. We also portray musicologist Gunter Kreutz who, together with the Pius-Hospital Oldenburg, has set up a choir for people suffering from chronic lung diseases. In this article you can find out more about what motivates the musicologist.

In a guest contribution historian Malte Thießen outlines the history of vaccination and “immunity” as emblematic of the contradictory modern era. What fears and hopes fuelled vaccinations, he asks. And how have they changed perceptions of risk and safety?

Legal theorist Volker Boehme-Neßler, on the other hand, is interested in why the legal world hardly ever uses images; why, in fact, it seems to actively dislike images. And yet the increasing power of images is undoubtedly having an impact on legal thought. Does this mean that the law and society are drifting too far apart?

And as if that wasn‘t enough variety, a number of scientists from our University tell us about their various missions abroad, each in their very own style.

We wish you a most pleasurable read!

Yours,
the EINBLICKE editors.

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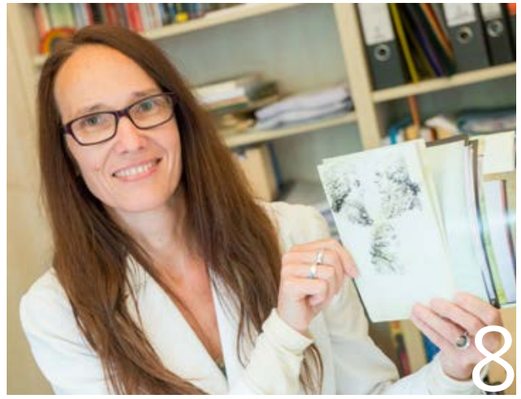


Musical Culture: The Legacy of Celeste Coltellini

Cluster of Excellence Hearing4all: Where does it stand?

How do children learn to feel emotions?

Malte Thießen: The History of Vaccination

[Anzeige]

12 **is the number of artificial islands Oldenburg scientists have constructed on the tidal flats off the East Frisian Island of Spiekeroog.**

„We expose the salt-marsh plants on our artificial islands to the stress of flooding to study how they cope with changes in environmental conditions.“

Prof. Dr. Michael Kleyer
Institute of Biology and Environmental Sciences

On six of the artificial islands the experts planted common saltmarsh-grass, sea purslane and sea-lavender, plants that are native to the Spiekerooger salt marshes.

The artificial islands are set at different heights to simulate the different flood zones of the salt marshes and ensure variations in the frequency with which the plants are exposed to the North Sea salt water. In this way the scientists analyse changes in the sea level and how they affect the vegetation.

"So the question of whether it is a picture of Mozart is the wrong question": Prof. Dr. Melanie Unseld with a reproduction of several heads in profile featured in Coltellini´s Vienna sketchbook.

"The focus is not on Mozart"

Musicologist Melanie Unseld talks about the legacy of singer and drawer Celeste Coltellini – and what it says about the classical music scene in the period around 1800

Celeste Coltellini was a famous singer in her time. She lived from 1760 to 1828 and was part of Vienna's classical music scene in the period around 1800 that we now associate so heavily with Mozart. But Coltellini was not just a singer, she also made a lot of drawings. Researchers have now been given access to her artistic legacy for the first time. What exactly does that legacy comprise?
At the core is a particularly interesting collection of six sketchbooks. The family, which so generously gave me access to the legacy, always made a point of documenting the fact that its female members had been artistically active across several generations. Celeste Coltellini was one of them. We have now been able to evaluate her sketchbooks. Carola Bebermeier, a doctoral candidate in my department, wrote her dissertation on the subject.

Can pictures also serve as musicological sources?
Yes, absolutely. But this requires an exchange between disciplines. Here at the University the work on the theory and history of art is highly advanced and raises new questions about approaches to visual culture. It is based on the premise that the visual is not immediately evident, but rather that images "allow something to be seen". However, they can also conceal things. It is an approach that doesn't aim to fully interpret pictures but to see them as part of the cognitive process. This is also productive for historical musicology because here too, it is important not to use pictures in a purely illustrational way but to see them as valuable in their own right.

And you are using this approach with the sketchbooks too. What significance does this discovery have for your research into music history?
The sketchbooks provide insights into the very specific music culture of the period around 1800. Coltellini was very well connected – and we are given glimpses into her everyday life as a singer and cultural mediator because for a long time she was a prima donna in Naples, and she also performed in Vienna. Inspired by musicological gender research we ask: what really means "music" and what means "musical culture"? Because the sketchbooks reveal a very different assessment of the importance of the people who were active in this environment. The focus is not on the composer but rather on the opera as an event in which many different people participate. So here we see that the opera phenomenon is not confined to the actions of famous composers, but that those composers are active within a whole group of people. Music is therefore more than just what the composer puts down on paper.

Can you name an example?
There is one drawing by Coltellini which shows the composer Giovanni Paisiello listening to Coltellini singing as she sits at the harpsichord. Another unidentified person is also listening. But in this picture the composer is part of a sphere of activity in which the singer plays an equally active role. And that is the point here: not to focus on the work but on the event, whether it's a rehearsal or a stage performance in which everyone plays their part – the singers, the conductor, the composer, the librettist, the impresario who makes sure everyone does what they are supposed to, the stage hands and so on.

Did Mozart and Coltellini ever meet?
Yes, and there is proof of it. Celeste Coltellini was an opera buffa singer. For ten years she was the undisputed prima donna in Naples. Joseph II, however, was always on the lookout for talented singers for his Viennese stages and he brought her in straight from Italy's best stages. So Coltellini came to Vienna and her first season there was very successful. She was also in Vienna for a second season, but it was less successful. The precise circumstances are a little unclear. She arrived late in the city and missed some rehearsals. The sources don't provide sufficient details. But we do know that the two were in contact with each other during that season because Mozart composed for Coltellini.

> **"Music is more than what the composer puts down on paper"**

What do you mean by that?
The event of opera staging in 18th century never entirely goes out from the score. It was the singers, and above all the primo uomo and prima donna, who had a great influence on what was sung. This was because on the one hand the parts were specifically written for particular singers by the composer, and secondly because the singers were allowed to add their own arias to an opera, which meant that composers constantly received requests to compose them. Coltellini also came to Mozart with such a request, and he composed several ensembles for operas that she performed in Vienna. But in order to write those parts for her he would have to have been very familiar with her voice. So they did meet. And perhaps Mozart – like Paisiello – even sat next to her at the harpsichord.

Do the sketchbooks make any reference to this meeting?
One of the sketchbooks was used by Coltellini while she was working in Vienna for the second time. And that book contains the address of the house where Mozart was living at the time. Mozart had rented a house out in the country for a few months. Today, of course, that area is within the city. But back then it was a little outside the city. Such accommodation was therefore more affordable and spacious.

Did Coltellini make any drawings of her meeting with Mozart?
Her Viennese sketchbook contains many pages featuring several heads in profile. Sketched encounters. One of those pages shows a profiled head which, according to the family tradition, is a portrait of Mozart. We examined the issue more closely and found indications that support that assumption. Leonhard Posch was a famous medallist at the time who made the so-called "Gürtelschnallenrelief" of Mozart. The similarities between Coltellini's drawing and that relief are remarkable. This and other indicators suggest that it is indeed Mozart in the drawing. But ultimately we can't prove it.

Which is presumably not such an important aspect for your music historical research?
Precisely, this is just one small picture in a very large assortment of drawings. If we were to focus solely on the question of whether it really is Mozart, Coltellini's role as a representative of her times would retreat into the background again. Perhaps it is a portrait of Mozart. We have good reason to believe so. But even if we could be sure, naturally it is not Mozart but a picture Coltellini drew of a musician she met in Vienna. So the question of whether it is a picture of Mozart is the wrong one to direct at this source.

Interview: Matthias Echterhagen

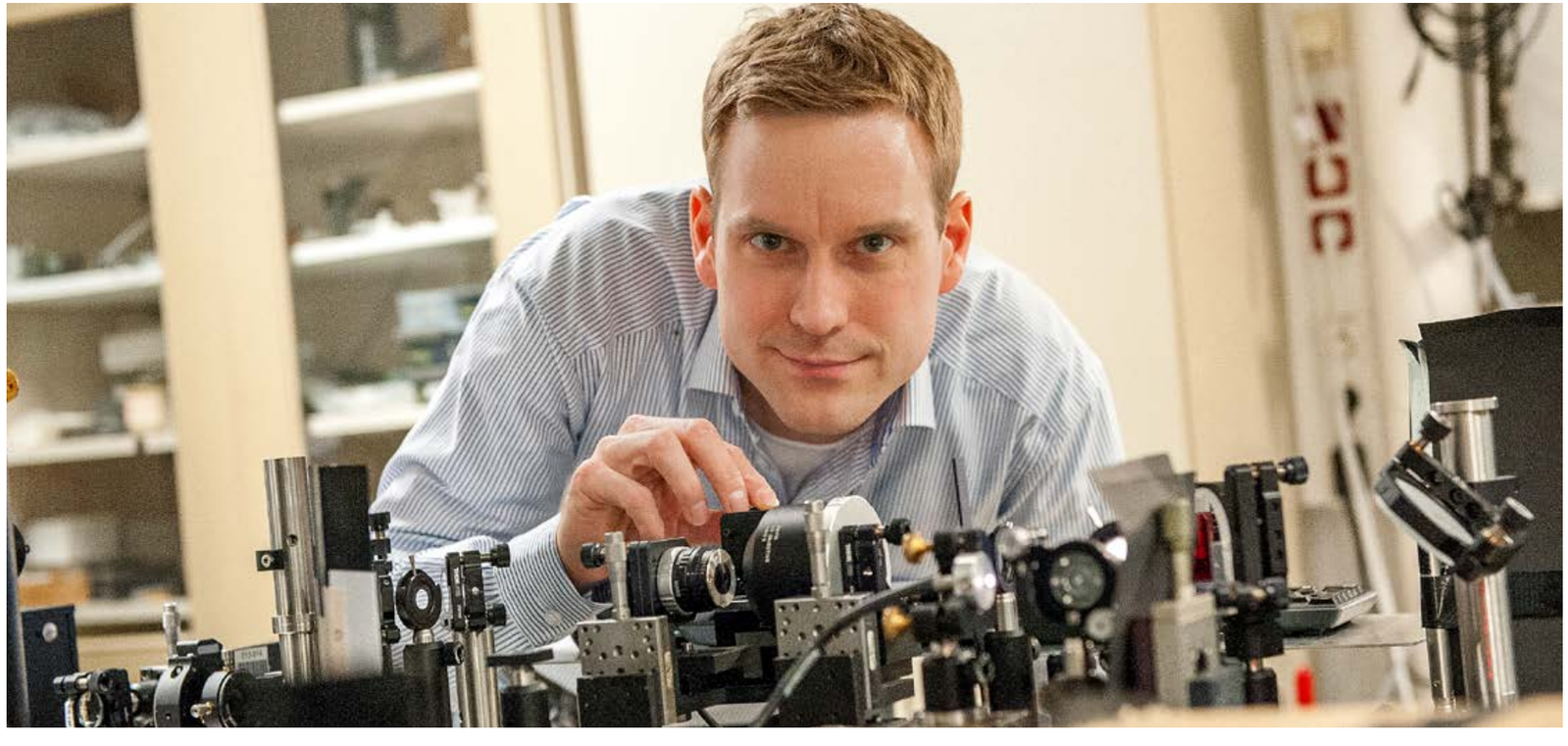
Literature on the subject:

Making transistors a thousand times faster

A new group for young researchers is being set up at the Oldenburg University's Institute of Physics. The Federal Ministry of Education and Research will provide Dr. Martin Silies with around 1.2 million euros in funding over a four-year period so that together with two colleagues he can develop an all-optical, nanotransistor capable of ultra-fast switching. Everyday electronic devices all feature transistors. Nowadays these electronic switches measure just a ten-thousandth of a millimetre, and millions of them can be incorporated into a single processor. It is, however, almost impossible to make them any smaller, and the size of the components limits the speed at which a switch can open and close.

Silies' research may be able to increase current clock speeds of a few gigahertz (several billion cycles per second) by more than a thousand times, which could considerably boost the speed of mainframe computers and other technology in the future. The 35-year-old scientist's objective is to control specific light particles, called photons, with such precision that they can be used to operate all-optical transistors. In this process the distance between the tips of two extremely fine, converging gold wires is just a few nanometres (one millionth of a millimetre). Silies' research group hopes to be able to control the process of photons crossing this almost inconceivably small distance – thus closing the switch – at almost unimaginable rates using dye molecules. Depending on these molecules' degree of light saturation they either allow a photon to pass or block the shutting of the switch.

With his team of doctoral candidates Silies plans to work initially on the delicategold antennas into which extremely fine lines are carved using helium ions. The lines guide the photons. The team will also be testing interactions between different dye molecules and potentially also other molecules on this tiniest of all scales.



Martin Silies is developing tomorrow's technology for use in ultra-fast "optical computers".

Successful sustainability research

The University was successful with not just one but two applications for project funding from the "Science for Sustainable Development" funding programme of the State of Lower Saxony and the VolkswagenFoundation. Oldenburg scientists are also involved in two other research projects on sustainability that were approved for funding. The new programme will provide around 12 million euros for eight projects in total.

"Reflexive Responsibilisation. Responsibility for Sustainable Development" is the title of a research project led by Oldenburg sociologist Prof. Dr. Anna Henkel. The sociologists, economists and philosophers involved in the project aim to uncover obstacles on the path to a sustainable society and anticipate consequences. "Resilience of Socio-Technical Systems exemplified using the Electricity Transport and Actor System" is the title of the second project, which is based in Oldenburg and led by Prof. Dr. Ulrike Feudel, a physicist. Resilience here refers to the ability of a system to maintain key functions even when malfunctions occur. The energy systems of the future must for instance be resilient against climate change, but also against fluctuations in wind energy input. In this project economists, physicists and sociologists will research interactions between complex networks.

Computer scientists and environmental economists from Oldenburg University and its affiliated OFFIS Institute are also conducting research on energy supplies for the future in the project "NEDS – Sustainable Energy Supply Lower Saxony", which is based at the University of Hannover. And in the project "Sustainable Consumption of Information and Communication Technologies (ICT) in the Digital Society – Dialogue and Transformation through Open Innovation", based at Osnabrück University of Applied Sciences, computer scientists specialising in the environment and sustainability are joined by economists from Oldenburg in conducting research aimed at improving sustainability in technology consumption.

Increasing wind turbine efficiency

Although high-quality wind turbines are already being produced today, the goal is continual improvement. The "ventus efficiens" research project based at the Universities of Oldenburg and Hannover in the ForWind Center for Wind Energy Research, is aimed at boosting efficiency in wind turbines. The VolkswagenFoundation is providing an initial 3.6 million euros in funding for the project.

Unlike at the turn of the millennium, when scientists were concentrating on optimising individual wind turbine systems, the focus today is on wind energy production as a whole. The researchers want to improve efficiency along the entire production chain: from energy conversion to the bearing structures and drive trains all the way to the power grid connections. By reducing electricity costs, extending the service life of turbines and improving the quality of their output the project is aimed at helping upgrade the European energy system.

"Smart Cams" and public life

"Smart cams", small intelligent cameras built into everyday objects and permanently connected to the internet, may soon completely digitise life in public spaces. Legal scholars and social scientists at Oldenburg University working together with computer scientists from the university's affiliated OFFIS Institute analysed the technological opportunities, potential for social conflict and need for legal regulations that come with this technology in a two-year project called "ChaRiSma". The Federal Ministry of Research and Education is providing just over 400,000 euros in funding for the project, which is led by professor of legal informatics Prof. Dr. Jürgen Taeger.

A team of five researchers and several students participated in the laboratory experiment. The samples were prepared and analysed using ultra-high resolution chemical methods.

Bacteria in the ocean: vital for the global carbon cycle

How can organic matter dissolved in the ocean store carbon over thousands of years and maintain our climate in the process? To shed light on this question, marine scientists at the University of Oldenburg performed a laboratory experiment over several years.
The team of five researchers led by Dr. Helena Osterholz and Prof. Dr. Thorsten Dittmar of the Institute for Chemistry and Biology of the Marine Enviroment (ICBM) published its findings in the prestigious journal "Nature Communications".
The ocean stores similar amounts of carbon in dissolved organic matter (abbreviated to DOM) as are present in the carbon dioxide (CO_2) in the Earth's atmosphere. The mixture of various carbon-containing substances consists of the products of metabolism and decomposition of marine organisms such as algae. DOM forms the basis for the survival of marine bacteria, which during the degradation of these compounds release part of the carbon they contain into the atmosphere in the form of CO_2. However, a large proportion of the DOM remains in the seawater for several thousands of years, some fractions have even been found to reside in the water for up to 40,000 years. Consequently this so-called refractory DOM - also known as RDOM - functions as a huge, long-term carbon depot.
The question of whether RDOM is created through biological processes alone, and if so, of how it can resist bacterial decomposition for so long forms the basis of the publication. To answer these questions the researchers mixed pure, initially DOM-free seawater water from the North Sea, including its natural algae and bacterial assemblages. Taking water samples over a period of 1011 days, they were able to observe algal growth, DOM release and decomposition processes and perform detailed analysis applying ultra-high resolution chemical methods.
The researchers examined whether the compounds produced in the laboratory were of the same molecular composition and present at similar concentrations as those in the deep sea across the globe. The result: the molecules were for the most part the same as those found in marine RDOM, but were present in very different concentrations. The ratios of the different DOM components in the laboratory were not identical to that of oceanic RDOM.
In complex calculations the scientists determined the percentage of RDOM present in all the organic material produced in the experiment; it constituted 0.2-0.4 percent of the entire fixed carbon. "In this experiment we were able to experimentally show what has long been suspected: biological processes suffice to keep the amount of carbon stored in the ocean at stable levels," Osterholz explains.
A fragile balance that Osterholz says is highly relevant for our climate: "In the history of our planet even small variations in the concentration of oceanic dissolved organic matter have probably led to global ice ages or interglacial periods."

Interdisciplinary dialogue: the grand opening of the NeSSy research building

The new NeSSy research building provides space for 80 researchers working in the "Hearing4all" Cluster of Excellence and those areas where the research centres for Neurosensorics and Safety-Critical Systems intersect. Around half of the building's 2000 square metres of floor space is taken up by laboratories containing high-tech instruments for advancing interdisciplinary basic and applied research. These include acoustics and hearing labs as well as neurophysiology laboratories.
The scientists' research focuses on innovations in medical technology and human-machine communication. The building houses extremely valuable research instruments such as a magnetoencelograph scanner, a functional MRI scanner and a "3D Virtual Reality" laboratory, as well as a conference centre. The federal government and the government of Lower Saxony shared the building's total cost of 15 million euros. At the opening ceremony of the NeSSy building guests were given an insight into the ongoing research in an interactive tour of the laboratories featuring live interviews with scientists.

Science study: homogenising biological communities

Humans are introducing increasing numbers of plant and animal species into new areas. An international team of researchers led by Prof. Dr. Henrique Miguel Pereira of the German Centre for Integrative Biodiversity Research in Leipzig has now demonstrated that the global anthropogenic transfer of species is causing the collapse of independent dissemination patterns that evolved over millions of years – with the result that different ecosystems are becoming more and more similar. Ecologist Dr. Hanno Seebens of Oldenburg University's Institute for Chemistry and Biology of the Marine Environment (ICBM) was one of the members of the research team who authored the study. Together with scientists from Portugal, Austria and Germany he examined 175 species of snails in 56 countries. The results of this large-scale study were published in the renowned "Science" journal. The study provides one of the first analyses of the global homogenisation of ecosystems.
"We were able to prove that regions that are separated by great distances but have similar climates, like for example Austria and New Zealand, have very similar communities of non-native snails. This means that the biological communities are becoming increasingly homogenised," Seebens said. He went on to explain that whereas in the past similarity patterns were determined by distance, nowadays climate in combination with global trade are the decisive factors. The more intensive the trading between countries with similar climates, the more similar their biological communities become. "This biological homogenisation could have far-reaching consequences," Seebens warned. The fact that humans are introducing new species all over the world puts many native species which are unable to defend themselves against the intruders under massive pressure, eventually killing them off completely, he explained. "The study shows that the introduction of ever more non-native species into new regions must be stopped if we are to ensure the survival of our ecosystems."

DFG research units to continue their work

The Research Unit "Horizontal Europeanisation", which analyses how European societies are growing together, has secured funding from the German Research Foundation (DFG) for another three years. The DFG approved an additional 2.8 million euros in funding for seven sub-projects. Renowned scientists from nine universities are participating in the Research Unit, which is coordinated by Oldenburg sociologist Prof. Dr. Martin Heidenreich.
This Research Unit focuses on so-called "horizontal Europeanisation", which refers to the social integration and socio-cultural assimilation processes that are transcending national borders within the EU. The sub-projects are researching areas such as higher education systems, asylum administration structures, collective wage agreements and the different dimensions of social inequality.
Since 2012 the Research Unit "Individualised Audiology", coordinated by Oldenburg University, has pursued the goal of improving "hearing for all" with technological and psychoacoustic solutions. The German Research Foundation (DFG) will provide the Research Unit, led by Prof. Dr. Dr. Birger Kollmeier and Prof. Dr. Volker Hohmann, with a total of 1.95 million euros in funding for another three years. "The work and results of this Research Unit are among the world's best in the field of audiology," the letter of approval from the DFG stated. In addition to the Department of Medical Physics and Acoustics of Oldenburg University the HörTech Centre of Competence and the Jade University of Applied Sciences, in cooperation with the Fraunhofer Project Group Hearing, Speech and Audio Technology, are also involved in the project. The Unit's research activities represent the technological core, as it were, of the "Hearing4all" Cluster of Excellence.

The benefits and risks of self-tracking: Prof. Dr. Thomas Alkemeyer (left) and PD Dr. Mirko Brandes.

I track, therefore I am

Self-tracking is in vogue: more and more people are gathering data about their bodies. Sociologist Thomas Alkemeyer and sport scientist Mirko Brandes are studying this phenomenon – each from a different perspective

How many steps have I taken today? How high is my blood pressure? How many calories did I burn while jogging? More and more people are using apps, fitness wristbands and smart phones to collect personal data about themselves and their bodies. This self-measurement trend is known as "self-tracking". Oldenburg sports and social scientists are among those studying the phenomenon and its methods.

A visit to Dr. Mirko Brandes, Professor for Sport and Health at Haarentor Campus. The sports scientist uses self-tracking methods for his research. On his desk lies an inconspicuous-looking pedometer. It is actually a state-of-the-art device that contains an acceleration sensor and a microprocessor. The pedometer can be adjusted to precisely match the test subject's speed parameters.

Brandes and his team used the pedometer in a study on the rehabilitation of patients after knee and hip joint operations. Their research was aimed at determining whether intervention measures can help patients with new hip and knee joints to become more physically active and thus gain more confidence in their new joints.

In order to find answers Brandes and his team equipped their test subjects with high-performance pedometers and monitored them throughout the rehabilitation programme. Alongside the usual rehab therapy, participants received continual feedback from the sports scientists. In one-on-one conversations they evaluated the subjects' movement patterns and the number of steps taken daily. A follow-up examination of physical activity was carried out approximately three weeks after completion of rehab, in the subjects' home environment.

The first results of the study, carried out in cooperation with the rehab centre in Kreyenbrück, showed in the follow-up check in the home environment that subjects who had used the pedometer for the full duration of the study were more physically active than subjects in the control group. The latter had participated in an identical rehab programme but received no feedback and had only used the pedometer at the start of the study. Furthermore the researchers demonstrated that subjects who made continuous use of the pedometer had a higher quality of life and trusted their new knee or hip joints more than the other participants in the rehab programme.

Prior to their operation, the subjects had often experienced permanent pain in their knee or hip joints over the course of many years, Brandes explains. "Using the tracking methods they could see that their new joints could withstand continuous extra strain without causing any problems. Of course this motivates them to be more active. And it boosts confidence in the new joint."

Brandes sees another major advantage of self-tracking methods from a scientific perspective. In another experiment, "The Oldenburg Fitness Study", he is analysing whether particularly inactive people who are put on specially designed fitness programmes actually start becoming more active. A key element of the study requires the subjects to record how much they move everyday using a pedometer over a two-week period. "We used to have to use questionnaires to gain information about physical activity in everyday life," the sports scientist explains. But this data was subjectively coloured. Subjects tended to record how much they wanted to be moving instead of how much they had actually moved. "Through self-tracking the data is much more precise than it was in the past," Brandes summarises.

But what does self-tracking do to people? And why are more and more people using these methods? Why are they putting their data online and comparing it with other participants in online forums? Are people not concerned about privacy? "We are careless with our data. We have yet to develop a cultural awareness of the ways such sensitive information can be used," explains the sociologist Thomas Alkemeyer. Alkemeyer sits two offices down from Brandes on Haarentor Campus. He is the spokesman of the postgraduate programme "Self-Making. Practices of Subjectivation in Historical and Interdisciplinary Perspective."

"It's a never-ending competition"

Alkemeyer is interested in how an individual becomes a subject, and is thus made responsible not only for himself but also for the welfare of the "social community". "Self-tracking is the attempt to self-optimise by permanently monitoring one's life through quantification. Thus the social norm of an unlimited capacity for improving performance, health and fitness is reproduced on one's own body. The individual subjects himself to this norm," the sociologist explains.

One example is the Quantified Self movement initiated in 2007 by US journalists Gary Wolf and Kevin Kelly. On the website quantifiedself.com self-trackers can discuss the latest data and developments on self-measurement. By now there are countless internet forums where self-trackers upload their collected data and compare such things as fitness levels with other self-trackers. Most well-known sport products brands offer apps that allow their users to compare data on physical activity.

"Subjectivation is a double-edged sword," Alkemeyer explains. On the one hand self-tracking helps people gain a certain control over their lives and allows them to live a reflexive life. On the other hand they are subjecting themselves to social expectations and entering into a never-ending competition with themselves and others. Self-empowerment comes at the price of self-subjugation.

For the sociologist, one of the reasons behind this development is that in modern society although the individual regards himself as autonomous, he always feels powerless in the face of external forces. "School education, vocational training, university – these things are less and less a guarantee for the future," explains Alkemeyer. "There's no way of knowing whether what I'm learning today will have any relevance tomorrow." At least, Alkemeyer says, this is how people today perceive their situation. The shift from provision to prevention, to a social state that is increasingly obliging the individual to take responsibility for his or her welfare, is the other key factor. "Self-tracking promises that you can take charge of your own life. It authenticates in a bodily and sensible way the modern ideal of being 'master' of your own destiny." (tk)

Self-tracking: Apps allow users to compare data on physical activity.

Combining hearing devices with smartphones

Birger Kollmeier und Christiane Thiel: "The broad spectrum of interdisciplinary expertise makes the Cluster unique."

The starting signal for the Hearing4all Cluster of Excellence came three years ago. How much progress have the scientists made? What are their ultimate goals? Birger Kollmeier, coordinator of the Cluster of Excellence, and Christiane Thiel, lead researcher, on combining hearing devices and cochlea implants, the internationalisation of Oldenburg standards and solutions for those for whom a hearing aid is too much, but no hearing aid at all is too little

The starting signal came in November 2012 – five years of funding for the Cluster of Excellence Hearing 4all. Mr. Kollmeier, you are the Cluster's coordinator. Where does Hearing4all stand at the half-way mark?
Kollmeier: It's always hard to make an interim assessment. The sheer number of tasks involved was and still is overwhelming. But after two-and-a-half years we are able to say that the majority of the problems we wanted to tackle, we have indeed tackled – and in most cases we have already achieved substantial success.

Hearing research in the Cluster of Excellence can be roughly divided into three fields: improving hearing aids, basic research for assistive audio technology and improving diagnosis to provide better individual treatment. What have you achieved in diagnostics, for example, and in what direction is it headed?
Kollmeier: We are looking into how sound is actually processed – from the perspective of neurobiology, psychophysics and neuropsychology for example. Building on this we have developed new ways of tying up the basic research with clinical requirements, the treatment side of things, in other words. We have developed diagnostic methods which already establish international standards, the "Oldenburg Sentence Test", for example, which exists in 21 languages.

Can you give a specific example of how you have improved treatment through diagnostics?
Kollmeier: Something that has come on in leaps and bounds recently is combining cochlea implants and hearing aids. Either on one ear so that the person hears high frequencies with the implant and low ones with the hearing aid. Or they have a cochlea implant in one ear and a hearing aid on the other. These therapeutic possibilities have only been developed in the past three years – and we have provided the underlying diagnostic basis and criteria for this. However it is not yet possible to develop the right therapy for each and every patient at the flick of a switch or even for this to be implemented globally as a software solution.

Is this a long-term goal?
Kollmeier: Absolutely. We want the standards we have developed here to be used internationally. Our internationally compatible language tests are a particularly important vehicle in this respect. By using them other scientists and partners worldwide draw on our experience and we can distribute our standards internationally.

... and at the same time presumably gain access to a much larger amount of data.
Kollmeier: Thanks to internationally comparable tests, all of a sudden data gathered in Russia can be compared directly with test-subject groups in other countries. For example a junior researcher in Finland translated the Oldenburg Sentence Tests into Finnish and used them on a patient with cochlea implants. Now his findings can be used as a comparison in 21 other language areas. This sort of thing was not possible before.

Ms Thiel, you are not involved with the Sentence Test specifically, but as one of the Cluster's principal investigators you also work in diagnostics. What is your approach there?
Thiel: Our goal is to individualise diagnostics. So are there factors, beyond simple hearing loss, that can help ex-

Prof. Dr. Dr. Birger Kollmeier

Physicist and physician Birger Kollmeier is coordinator of the "Hearing4all" Cluster of Excellence and also head of the „Medical Physics" department, the Hörzentrum Oldenburg GmbH and the Fraunhofer Project Group for Hearing, Speech and Audio Technology. Kollmeier has received a number of prestigious awards, including the International Award of the American Academy of Audiology and the German President's Award for Technology and Innovation.

plain why the quality of hearing in patients varies so much? Not everyone benefits from a hearing aid or a cochlea implant. Not just auditory but also cognitive factors may well play a role, for example, in how well someone is able to direct their attention to a speaker or how long their memory span is. On the one hand I observe these things on a purely behavioural level like other scientists in the Department of Psychology, but of course we are also interested in the extent to which brain activity potentially contributes here.

How has your field developed since the Cluster of Excellence began? How have the possibilities for your research expanded?

Thiel: One thing that makes a huge impact at this location is our two brain imaging devices – few institutions have both in one place, and they open up exciting questions for us. The MRI scanner that I work with allows us to localise processes in the brain. And the magnetoencephalograph provides us with the temporal resolution. This means we can examine the same patient in both machines and gain an optimal comparison of the temporal and spatial dimensions. That is one aspect which substantially strengthens Oldenburg as a scientific location, even beyond the Cluster of Excellence.
Kollmeier: And as well as about the machines it is also above all about the people. We have a very good mix of cooperating scientists who share the same methodology but approach the matter with very different research interests. In recent years, for example, the cognitive neuropsychology aspect has very much come to the fore. We were blind to this aspect before. Ms Thiel and the other scientists have classified our test subjects also according to central functions so that internationally we now have the best characterised stock of test subjects. This means we can run studies in Oldenburg that simply don't exist in any other locations.

The second field of research is better hearing devices. What is the current status here?
Kollmeier: We set out to demonstrate the principle feasibility of better hearing devices and to improve the systems technology. Our vision is to have a bit of Oldenburg in all hearing systems in ten years' time. The prototype development is highly successful. Using demonstrators we can show the advantages of binaural – or two-ear – hearing and of scalable algorithms. The first patent has just been registered for a device that that may be turned from an assistive listening system for very slight hearing impairments right into a fully functional hearing aid by button press. There have also been technological advances in cochlea implants.

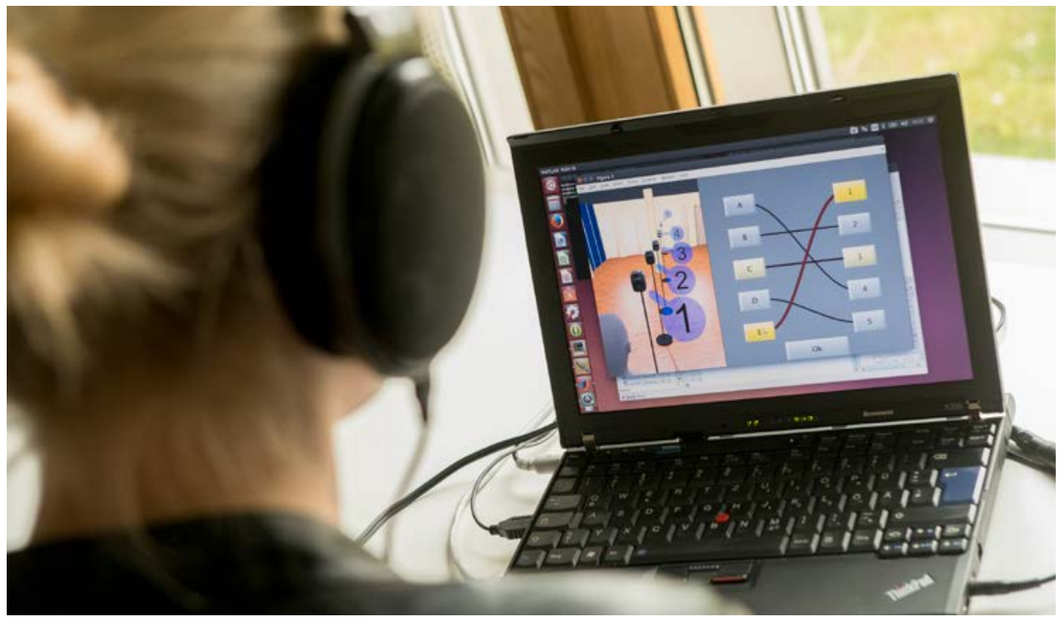
> **"Our advantages: entrepreneurial spirit and unpretentious collaboration"**
> Birger Kollmeier

What role does individualisation play?
Thiel: The goal is to adjust the function of the hearing device on the basis of individual diagnosis. For example researchers have found out that when hearing-impaired patients use a hearing aid for both ears simultaneously, loud volumes in particular are heard much louder than was previously assumed. Up to now this binaural accumulative effect was not taken into account when adjusting hearing aids. They were adjusted to each ear individually, which meant patients would find the volume too loud. So then the whole hearing aid was turned down – making it too quiet at lower volumes. Studies carried out here in Oldenburg have demonstrated that binaural hearing must be taken into account to a far greater extent than it has been in the past. It may be possible to lay the foundations for this in the next two years.

And how are things going in the third field of research, basic research into assistive audio technology?
Kollmeier: On the one hand we are trying to find solutions for people for whom a hearing aid is too much but no hearing aid at all is too little – and in general to integrate human-machine interfaces into audio systems. In the area of speech recognition, for instance, we have been very successful. But we are also moving in the direction of brain-computer interfaces, where we are trying to use EEG signals to help control hearing devices. Once again neuropsychology plays a key role here.
Thiel: That's Professor Stefan Debener's research group, which has developed very interesting measuring techniques. Basically we're talking about mobile measurement of electrical brain activity – but in practice no one would want to walk around campus wearing a conventional EEG cap. So the group is trying to make these devices smaller and smaller and has reduced the electrodes to the point where they can simply be stuck behind the ears. This makes them completely unobtrusive, but they can still measure brain activity.
Kollmeier: With that innovation Stefan Debener and his team have taken the global lead within just two and a half years. It's very impressive to think that in the future we may be able to operate hearing aids and similar devices on the basis of such mobile EEGs.
Thiel: Mobile recording techniques are one issue here. But brain-computer interfaces based on EEG technology are still very slow and unreliable. That means we will need a lot more processing power. This is why we now have our own expert on machine learning, Jörg Lücke, who uses algorithms and statistical classification to analyse the brain signals and deduce what the person wants to do.

What is your vision for this field of research? What do you want to achieve?
Kollmeier: Basically we want both technological and systems competence. Systems competence also means knowing how humans function and what they need, so in the future we can radically improve and support user-friendliness and practicability in hearing-related solutions. That means creating and controlling all the prerequisites for us being able to find solutions that are not possible today, but are already visible on the horizon.

Can you name an example?
Kollmeier: Hearing devices combined with smartphones for example. Our vision is that in a few years' time every smartphone will contain Oldenburg technology, in the form of an app, say, that helps the user to hear specific things more precisely.



"Not everyone benefits from a hearing aid or a cochlea implant." A test subject in the hearing lab.

Prof. Dr. Christiane Thiel

Prof. Dr. Christiane Thiel leads the "Biological Psychology" research group and is examining the role of neurotransmitters in cognitive processes. In the "Hearing4all" Cluster of Excellence she leads the "Functional Characterisation of the Individual" task group, which is researching why individuals process acoustic stimuli differently – and why not everyone benefits equally from a hearing aid.

Without a hearing device?
Kollmeier: Well for example I would have a small button in my ear, similar to a bluetooth headset for listening to music, and it would enable me to use hearing device technology without it really being distinguishable from a standard consumer audio device. So even people with normal hearing would benefit considerably from the technology as they go about their everyday lives, whether it's because it provides a kind of "enhanced reality" that makes certain sources more audible or because it gives them access to additional information channels via more or less conscious control, via gestures or brain-computer interfaces. So we would be the leading system address for all future applications related to auditory perception.

What do you personally enjoy most about your work with the Cluster of Excellence?
Thiel: The interdisciplinarity. This often gives you completely new ideas. For example I wouldn't normally go to engineering lectures – but there you get to see things from an entirely different perspective. So it make as lot of sense that so many different disciplines are involved in the cluster. This broad spectrum of expertise makes it unique.

> "We would like to involve our medical colleagues working in the hospitals here in Oldenburg"
> Christiane Thiel

And your hopes for the future?
Kollmeier: I want the cluster to continue to develop stably. Naturally it would be good if the funding period was extended, but that's still open. We would like to carry on with the structures that have already been put in place …
Thiel: … and also involve our medical colleagues working in the hospitals here in Oldenburg. When the project began we brought in colleagues from Hannover because we didn't have a medical faculty here. Now more and more professors are coming to Oldenburg and are expanding the local spectrum.
Kollmeier: We don't have the mass of traditional universities with their huge engineering and medical faculties. But our advantage is a certain entrepreneurial spirit and unpretentious collaboration which quite naturally crosses the boundaries between different disciplines. This is the only way to make progress. And preserving it is crucial – also for other areas at the University.

Interview: Dr. Corinna Dahm-Brey, Matthias Echterhagen, Deike Stolz

In front of the new NeSSy building: "Two large machines – an MRI scanner and a magnetoencephalography scanner – open up new research questions for us."

Smart and space-aware

Physicist Volker Hohmann and his team are working on the hearing devices of the future. And on virtual realities that help put these intelligent, space-aware hearing aids to the test

Several members of Volker Hohmann's research team recently once again spent a large part of their working week in the university cafeteria. Hohmann made no attempt to stop them – quite the opposite in fact. Hohmann, Professor for Psychoacoustics and one of the leaders of the Oldenburg Research Unit "Individualized Hearing Acoustics" funded by the German Research Foundation (DFG), actually seems delighted. Because the cafeteria on Wechloy Campus – in the form of a virtual three-dimensional model, please note – belongs to the team's research territory. "Every added detail brings reality a little bit closer," Hohmann says.

So what makes the cafeteria between the Maths and Physics wings so interesting for hearing research? It is a complex audio environment with diverse sound sources from different directions. To have a conversation there – potentially with a group of people – amidst the clatter of cutlery and mobile phone calls, requires excellent hearing. But as long as they function properly almost no one thinks about the complex processes in the ear and brain that transform sound sources into "heard information", filtering out what is important to us.

Yet almost one in six people has limited hearing – and plenty of people who have normal hearing now will be confronted with hearing impairment in the future. They all stand to benefit from Hohmann's work. Together with his team he divides his time between developing virtual realities (VR) that simulate environments like the aforementioned cafeteria or a busy train station with both images and sound in the laboratory, and following on from this, developing smart hearing devices that are able to analyse complex acoustics and also identify what their wearers wish to hear.

On a Monday morning in May we meet at NeSSY, the new research building on Wechloy Campus. In his office on the third floor Volker Hohmann, who is also the leading researcher in the Cluster of Excellence "Hearing4all", lays his cycling helmet on the windowsill. One of the walls is lined with boxes of books and folders. There has been little time to unpack them in recent months, as research and setting up the new laboratory rooms have taken priority. A visit to the new building provides a glimpse of the technical

The university cafeteria as research terrain: as virtual reality on a computer terminal in the NeSSy building's foyer and on the screen in the laboratory, as well as during a quick midday visit by hearing researcher Prof. Dr. Volker Hohmann to the real "terrain".

refinements on offer at NeSSy – including a state-of-the-art VR room which the physicist's team is currently setting up.

This new high-tech laboratory has arrived in perfect time for the second phase of his work in the DFG Research Unit, Hohmann explains. "After three years spent developing new research tools, it is time to start harvesting the fruits of our labour. We are now implementing our findings – like new methods for testing hearing devices – so that in another three years' time we can reach a preliminary conclusion for this phase of the project." Hohmann's aim is to create smart, "space-aware" hearing aids.

"Spatial perception and naturalness – smart devices should deliver both"

Three floors down on the ground floor is a corridor full of laboratories. The VR room is a particularly interesting example: an anechoic room lined with foam wedges to minimise sound reflections. On entering you find yourself standing on a metal grid below which more foam wedges cover the floor. Loudspeakers are arranged concentrically around the centre of the room. A scientist is hanging more from the ceiling. The room will eventually hold 94 loudspeakers to simulate complex audio situations in high quality, and these will be visualised simultaneously on a 180 degree screen.

Nineteen speakers placed towards the top and bottom of the room respectively will simulate the vertical reflection of sounds as well as potential sound sources from these directions, such as might arise while taking the escalator in a multi-storey shopping mall. The main ring of 48 speakers placed horizontally at head height surrounds the screen and targets directional hearing at the horizontal level, which is not only more sensitive but is also particularly important in complex conversational situations.

It is in such situations that conventional hearing aids come up against their limits, explains the 52-year-old Hohmann, back in his office again: "They suppress disruptive sounds and amplify whatever is happening right in front of your nose. This forces the user to fixate on the speaker's lips, and even to tilt their head in exactly the direction they want to hear from." This means that static forward-oriented hearing aids actually impair the natural conversational behaviour that people with slight hearing difficulties in particular want to maintain. What's more, the spatial impressions they deliver are poor. "Spatial perception and naturalness – smart devices should deliver both," Hohmann emphasises.

This is precisely what he and his team hope to achieve, and they are already working on a dynamic hearing device. It is gesture-controlled, and as such should be able to recognise what each individual wearer wants to hear by factoring in their eye and head movements. This is considerably more advanced than the binaural – two ear – acoustic analysis which Volker Hohmann co-developed and which won the 2012 German Future Prize. “Because these devices are often unable to identify which of all the possible sources in an environment the patient wants to hear at any given moment.”

Two new technical elements are to change that. One is an acceleration sensor, similar to the ones that allow smartphones to rotate photos on the display in line with the device. In hearing devices it will register head movements. The other is another sensor, which, just as electroencephalography (EEG) measures brain waves, uses so-called electrooculography (EOG) to measure the electric fields of the eyes. Oldenburg neuropsychologist and EEG sensor expert Prof. Dr. Stefan Debener is also involved in this. He is working in the lab to refine the technology that recognises the direction of a test subject's gaze.

"Eye and head movements are actually pretty easy to measure – even in a hearing aid worn behind the ear," Hohmann explains. "They also help to tell us what the hearing aid wearer is doing: Which direction is he looking in? How is he moving his head?" And this is critical when it comes to moving beyond the conventional "head-oriented" hearing aids to space-aware devices. Static hearing aids are completely unable to differentiate between a wearer turning his head and sound sources circling around the wearer's head.

"The aim is to educate young researchers, to open up spaces for them. That is what universities are for"

The dynamic hearing device of the future, however, will be able to adjust to the specific behaviour of the person wearing it. Its ability to factor in the direction of the gaze will be particularly useful to patients who use their eyes in conversation but who barely make unconscious movements with their heads. "We call these people 'lazy'," Hohmann says. He explains that between these 'lazy' people and those who literally hang on the lips of others and are therefore permanently moving their heads there are many different levels of unconscious, individual conversational strategies.

Hohmann's laboratory is increasingly conducting research into such strategies. "We use virtual reality to test hearing devices, but also to observe how test subjects behave. This is providing us with a comprehensive picture of the interaction between user and environment," Hohmann explains. The multidisciplinary approach enriches his research – besides computer scientists, acousticians, engineers, physicians and neuropsychologists, a doctoral student from sociology who is categorising and systematically analysing behavioural observations recently joined the research. "We are adapting methods from other disciplines for our hearing devices. It would make little sense to do everything ourselves," Hohmann stresses.

Instead he actively invites other experts to use his tools. "We come together on one level, each person bringing their own methods to the table, and we see what this achieves. Often it produces concepts that are new to us, but that's what makes it interesting." So his own role – besides programming acoustic tools and scientific publishing – mostly involves communication with the participating scientists. "How can we bring different disciplines together and integrate them to achieve the goal of building better hearing devices?" Hohmann sees himself to a certain extent following in the footsteps of the famous physicist Hermann von Helmholtz, an acoustics pioneer and 19th century polymath who had no fear of looking beyond disciplinary boundaries.

His research group "Auditory Signal Processing for Hearing Devices" consists primarily of engineers and physicists – and Hohmann is strongly committed to mentoring his PhD students and working with them on individual research plans. "It is a step-by-step process that varies according to the individual requirements and qualification interests. The aim is to educate young researchers, to open up spaces for them to fill with their creativity and motivation. That is what universities are for," Hohmann says. As project manager it is his job, he explains, to combine long-term research objectives with the naturally often short-term qualification objectives of his fellow researchers.

For Hohmann "HörTech", the centre of competence for hearing device systems engineering which was co-founded by the university and where he acts as area director for research and development, is invaluable for consolidating and utilising the various findings of his PhD students. His function there, he says, is to bring together the various findings, for example from dissertations, and integrate them into a larger whole. "Otherwise you might get the odd paper, but to integrate all the work, to be able to say that we have genuinely improved a hearing device – that cannot be achieved through PhD theses alone. That's why we need this transfer facility."

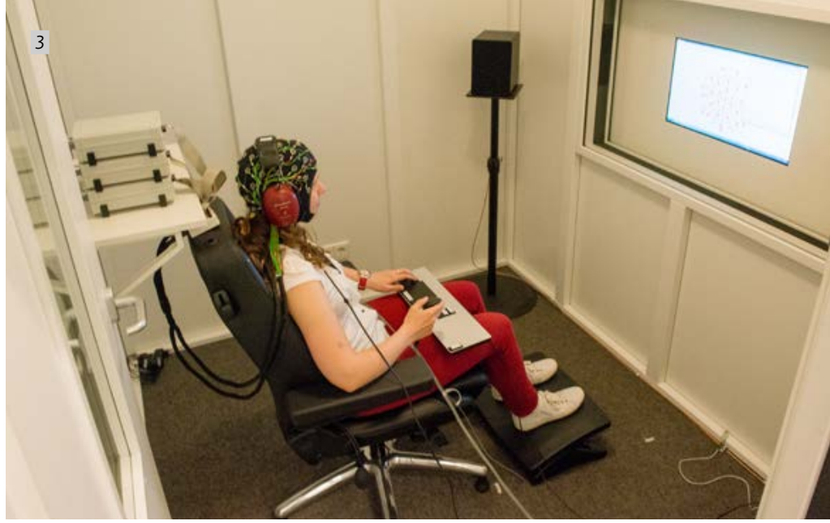
While HörTech is constantly working on implementing new findings and seeking commercial applications, Hohmann's research with his team at NeSSy is different, he explains: "We don't produce hearing devices – we create and open up possibilities." Even on trips to the campus cafeteria. (ds)

Measing brainwaves on the go

Stefan Debener is making EEG technology mobile

1 *The electroencephalogram (EEG) makes it possible to record brain activity in humans in a painless procedure. This enables us to gain a better understanding of how the brain controls cognition processes such as hearing and seeing. One disadvantage of the EEG is that uncomfortable caps are needed to attach the sensor electrodes to the head.*

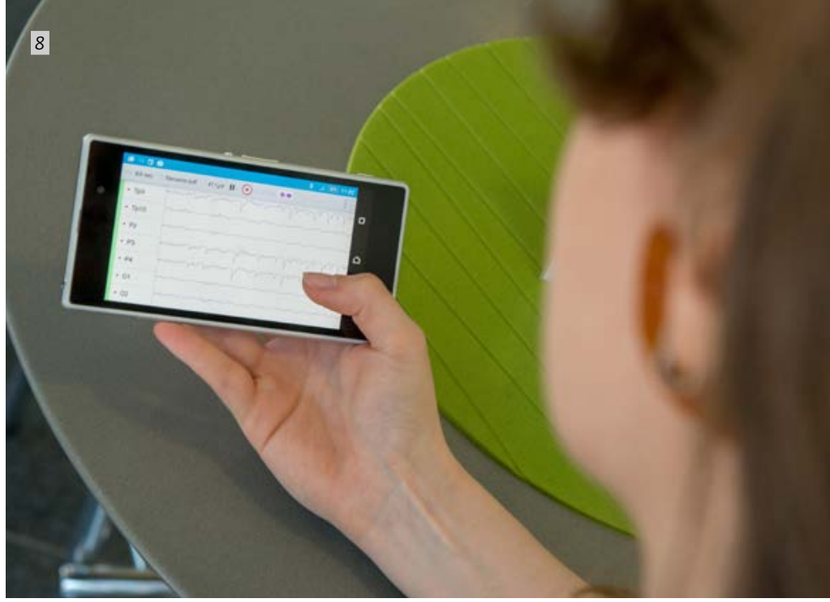
2 *In addition, a conductive gel must be applied, which means test subjects must wash their hair afterwards.*



3 *EEGs are traditionally carried out under controlled laboratory conditions. Test subjects should move as little as possible during the procedure.*

4 *Prof. Dr. Debener and his team are looking for new ways of conducting EEGs that are less disruptive for everyday life. He has invented so-called cEEGrids with sensors that can be placed around the ears so that hair washing after the procedure is no longer necessary.*

5 *Debener's team combines the new sensors with a miniature EEG amplifier. Signals are recorded wirelessly, meaning cables, computers and caps are no longer needed.*



6 *Attaching the cEEGrid sensors is a quick and easy procedure. Signals can be recorded for many hours at a time. The sensors are so comfortable to wear that, like a good pair of glasses, some test subjects simply forget they have them on.*

7 *The goal is to record EEG signals as unobtrusively as possible. Test subjects are barely aware of the cEEGrid in everyday situations.*

8 *Recording the signals is equally uncomplicated – requiring nothing more than a normal smartphone.*

9 *The mobile EEG technology is a prerequisite for thought-controlled, intelligent hearing devices – an ambitious goal of the Hearing4All Cluster of Excellence. The technology can also be applied in basic neurocognition research, neuro-rehabilitation, neurology and paediatrics.*

Her hand puppets, including Finn the dolphin, create a channel of communication with the children – but her own facial expressions also reflect the emotions under discussion: Prof. Dr. Ute Koglin at a kindergarten in Oldenburg.

Mission: To convey emotions

Ute Koglin uses a toy dolphin and snail shell when she applies her scientific concepts. A portrait of an expert in educational psychology

Ute Koglin's closest colleagues are Ferdi, Finn and Lobo. Finn is out and about at the moment. Ferdi is perched on the bookshelf and Lobo is sitting on an office chair, smiling rather idiotically and revealing four sharp teeth. "Oh, excuse me, just put him to one side," says Ute Koglin. Lobo is a bright green dragon, a cuddly toy like Ferdi and Finn. When Ute Koglin goes to give a training session at a kindergarten or primary school, she always has one of her animals with her. Finn the dolphin is currently with Ute Koglin's students at a kindergarten in Oldenburg. "What a shame, I would have liked to introduce you to him as well," says Ute Koglin.

Children love Finn, Lobo and Ferdi the chameleon. They stroke the animals and hug them goodbye. "The best way to reach children is using hand puppets. It's no different today than in the old days. At some point the children completely forget we are there and just talk directly to the puppets," says Koglin. With the soft toys the children are more open and less inhibited than when an adult talks directly to them.

Such openness is key to Ute Koglin's work. Ute Koglin is a psychologist. She holds the Oldenburg University Chair for the Psychology of Special Education and Rehabilitation Counselling. Koglin researches "the social-emotional skills in children from kindergarten to adolescence," as it says on her website. She deals with the question of what constitutes "normal" behaviour in children and what skills they have at particular ages. She tries to determine what is going wrong when children are unable to master certain tasks, when they become aggressive or anxious. And she works on methods to promote these skills. "The first step is to recognise the problems early on and to provide a correct diagnosis of the problematic behaviour – only then can you help," she says.

Most of her research in recent years has focussed on aggression. Her postdoctoral dissertation addressed "Aggressive Behaviour in Children: Current Research Trends and Methods of Prevention. Today we know a lot about how this sort of behaviour develops," she says. Genetic, psychological and social aspects all play a role. Boys tend to be more aggressive than girls; that is common knowledge now. The family is also key. Children who are beaten and tyrannised from an early age quickly learn that you can achieve your goals by using violence – and they adopt this behaviour themselves. "The earlier we can show children that there are alternatives, the better our chances are of preventing this behaviour from manifesting."

"The best way to reach children is using hand puppets"

Ute Koglin plays some video footage from a kindergarten, a role-playing game. A boy has deliberately sat down on a girl's chair. Finn steps in. He asks how the children are feeling. He tells them to say what they want loudly and clearly. "You're sitting on my chair. I want you to get up," says the girl, almost whispering. The boy does get up but Finn interrupts: "Say that a little bit louder! The girl repeats the words, this time in a loud voice." "Very good," says Finn and nods with his little grey head. "Well done!"

Ute Koglin's training sessions deal to a large extent with emotions. The children learn from one another what it feels like when someone is nasty to them. They understand when and why someone is sad. This sounds almost trivial, like basic "common sense". But there are children who have difficulties with such things. Children who have experienced a lot of violence at home, for example, or who are lonely. There are children who suffer from high levels of anxiety and perceive their surroundings as hostile. Markedly aggressive children, on the other hand, are almost unable to recognise fear in the faces of others. Normally an expression of fear will inhibit aggression. But this mechanism does not function in aggressive people. And aggressive people often perceive even neutral expressions in people around them as aggressive – and flare up accordingly. The social training sessions in kindergartens and schools help children learn what feelings "look" like and how to resolve conflicts peacefully. This is why Ute Koglin refers to her social training sessions as "psychological vaccinations".

She reaches for a cardboard box. It contains playing cards, emotion cards showing children with different facial expressions. The children have fish tails – they are mermaid children. Next to the box are two small plastic bags filled with snail shells. "This is the training kit that goes with Finn, everything relates to the sea," says Koglin. Finn tells stories from his world. This allows him to deliver important messages to the children in a fun and easy way. Ute Koglin developed the contents of the training sessions together with other researchers from Lower Saxony and Bremen who also work at the Nordwestdeutsches Präventionsforum. One of the forum's aims is to professionalise psychological support for children and provide it with a scientific basis. "There are plenty of social training and prevention programmes across Germany, but some of them are pretty amateurish," Koglin says. "They all mean well but some lack the scientific underpinnings. Little is gained by investing a lot of energy in the wrong thing." She uses her own training kits to show nursery and school teachers how to provide children with proper psychological support. She has developed many of the exercises herself. In the training sessions which she and her students carry out personally, she tests the effectiveness of these exercises – for example by comparing the children's behaviour; comparing children who have undergone social training with those who are unschooled. She also organises further education for kindergarten and school teachers.

"Little is gained by investing a lot of energy in the wrong thing"

But group social training sessions are not enough. Children also need individual support for their development. Kindergarten teachers are ideally suited to provide this because of the many hours they spend with the children every day. And in kindergarten children are not under pressure to learn, as they are in school. But here, too, before a child can be helped, it is critical to first pinpoint any developmental deficits. To this end Ute Koglin worked together with Franz Petermann, a pioneer of psychology in paediatrics at Bremen University, to develop teaching kits for kindergarten and school teachers that enable them to accurately assess a child's level of development. Their books for "Observing and Documenting Development" have become standard texts. They contain a series of tasks – logic problems and skill tests – which quickly reveal whether a child's level of development is normal for its age and which can easily be integrated into regular preschool activities. The teachers can opt for simpler exercises if a child has problems and thus quickly deter-

How does it feel when I'm sad or angry? And how do I recognise these emotions in others? The water nymphs in the training kits help to find answers here.

mine how far it is lagging behind other children of the same age. The books come with documentation sheets where the teachers can record the children's developmental steps in detail.

Koglin and Petermann developed these exercises on the basis of the so-called developmental milestones – skills which 95 percent of children attain at certain ages. These milestones have been recognised as the official measurement parameters in developmental psychology for many years. "They are also used by paediatricians," Koglin says. "So now kindergarten teachers and doctors use the same basis and can better share information about a child's development levels – and also better explain to parents where their child is having problems." Koglin and Petermann have also developed documentary material for crèches, because for some years now parents have been putting their children into childcare at ever younger ages – sometimes only months after birth. For many childcare workers this is a new experience. So they are happy to have material to hand which helps them assess the development of even very young infants.

"Now kindergarten teachers and doctors use the same basis"

As soon as they recognise a developmental deficit the childcare worker can provide the child with the "right learning opportunity" to practice. "Sometimes the problem is not very big at all," says Koglin, "but you just have to recognise it. In one of our studies we observed that children from the countryside are often unable to climb stairs properly. They can't climb steps one step at a time. This is simply because a lot of farmhouses only use the rooms on the ground floor. So when they come to kindergarten the children have never practised climbing stairs."

Ute Koglin is happy that she ended up in Oldenburg. Here she can perfectly combine basic psychological research with the practical work of special education. And she also likes working hands-on with children. She smiles as she speaks – as she talks about how the children write her letters weeks after the training sessions to ask how Finn is doing. She is full of ideas for improving the training. "Next on the agenda is the teaching material for Finn," she says. A few months ago she went diving in the Maldives. She has always loved snorkelling, but this time she was underwater in full diving gear. "It was incredible. A ray stopped right in front of us to warm itself in the sun." But what she loved most was the masked porcupinefish, a small round fish with a pouty mouth which raises its spikes when it feels threatened. Its eyelids are slightly droopy, which makes it look rather sleepy. "It's perfect for children. We need to make the drawings we use much more detailed, more beautiful, more true to life."

Before she came to Oldenburg she spent some time as the deputy Chair for Development and Pedagogical Psychology at the University of Bremen. After that she could have become a Professor for Child Health Psychology at Bremen University. But she opted for Oldenburg instead – because of the direct access to practical work through her students from Special Needs Education. But she still lives in Bremen, where she grew up: "It's hard to believe I did my Abitur in Bremen and still managed to make

"An emotional rollercoaster – I wanted to know what was behind it"

something of myself!" she laughs. At the age of 13 she had a poster of an F14 fighter jet in her bedroom. That's what she was into at the time. But ultimately it was people that interested her.

When her grandmother no longer wanted to live on her own, Ute Koglin's mother brought her to live with them. Ute Koglin witnessed her grandmother's deterioration. She did not know the word dementia at the time. But when one day her grandmother asked, "What's your name then?", it was very distressing. “Then came the emotional roller-coaster of adolescence. I spent a lot of time wondering why my friends and classmates were behaving the way they were – I wanted to know what was behind it.”

And then there was Klaus Berger, who taught psychology at her grammar school. Berger was actually an economist but his way of explaining psychology was so witty and fascinating that his pupils were totally captivated. "He was such a good teacher that even after our final exams we still all turned up for his lessons on time – even though they were on Fridays first thing in the morning." As time went by Ute Koglin found out that six of Berger's pupils went on to do PhDs in psychology.

Ute Koglin went to university in Bremen. After her BA in 1998 she went to the University of Erlangen-Nuremberg, just as the Erlangen-Nürnberger study was being launched – the first German longitudinal study of more than 600 children, in which psychologists analysed the effectiveness of social training.

Children are the main focus of her research. "I hope I can make a difference by providing support for children at an early age. More money should really be invested in this early support." She's an avid people-watcher. Parents with children, and children among themselves. She finds it amusing that adults sometimes behave just like children – in the train for example, when someone cheekily refuses to get up from a seat that is reserved for someone else. The response is not "I'm going to get my Mummy if you don't move," but "I'm going to get the inspector" instead. Ute Koglin has no children of her own. But she does have Gesi, a black-and-white striped cat with a thick white stripe across its nose. Gesi is 18 already and has been with Ute Koglin throughout her academic career. There are endless photos of Gesi lying among books. "If I'd been working too long, she would come over and lay her paws across the laptop."

Gesi in Bremen. Ferdi, Finn and Lobo in Oldenburg. And next up the masked porcupinefish. Ute Koglin's life is full of loveable creatures. Ute Koglin likes the friendly atmosphere at her department in Oldenburg. "No elbows, it's not always that way." But perhaps it's because of the way she is that no one feels the need to use their elbows around her. She takes people seriously, she cares about other people. On the table in her office is a small plate of sweets. Little chocolate bars and wine gums. They're vegan of course, so that during her consultation hours the students can help themselves. (ts)

Prof. Dr. Gunter Kreutz: "I felt that the question of what music does actually does with people wasn't getting enough attention."

"I am giving singing a lobby"

In cooperation with the Pius-Hospital Oldenburg he founded "Chordipus", a choir project for people with lung diseases. Gunter Kreutz is investigating why singing makes people happy

In the cafeteria of the Pius-Hospital Oldenburg, singers are sitting around the piano. The choir and chapel master Michael Wintering starts the warm-up exercises. Prolonged vowel holding and hissing sounds fill the room. The only unusual thing about this choir is that many of its members suffer from chronic or irreversible lung diseases.

Dr. Gunter Kreutz, a professor for Systematic Musicology at the University of Oldenburg, is sitting in on the choir practice. He started the choir together with Dr. Regina Prenzel, director of the Clinic for Internal Medicine, Pneumology and Gastroenterology. "Chorpidus – community singing for people with chronic obstructive pulmonary disease (COPD) and other lung problems" is the title of this unusual project.

"In Germany alone, over five million people suffer from COPD," Kreutz explains. "It is very widespread." Singing helps preserve health, according to new research. "Singing activates patients' breathing. The voice, breathing and relaxation exercises used in choir practice open the lungs and help maintain their capacity." At the same time singers improve their posture and strengthen the musculoskeletal system. "We want to use Chorpidus to research these factors and observe how singing contributes to wellbeing."

Kreutz is in his element. For more than fifteen years he has been researching the effects that listening to music, singing, dancing and playing music can have on body, mind and soul. A wide field of research – which became the focus of his interest only as his scientific career progressed. Kreutz studied musicology first in Marburg and later in Berlin. He followed the classic approach of starting with historical musicology. "People always think of musicology in relation to the work of art. You have a composer who produces music – and musicology is dedicated to this art form and the artefacts its produces. And there's nothing wrong with that," Kreutz says.

The scientist came to realise, however, that this approach was not for him. "What does music actually do with people? What do people do with music? And what effect does music have on people in return? I felt that these questions weren't getting enough attention." And so Kreutz decided to study Systematic Musicology with Prof. Dr. Helga de la Motte, who had just founded the field of Music Psychology Research in Berlin.

"Replenishing our reserves of positive energy"

In 1998, as a research associate at the University of Bremen Kreutz attained his PhD with research related to musical performance. "I wanted to know what happens when a pianist hammers on the keys," the scientist says, smiling. "Are the notes arbitrarily long or short, is playing loudly or quietly a reflected decision?" Following on from performance research, for his postdoctoral qualification Kreutz examined emotions and their expression. "Particularly in the field of music, right into the 2000s emotions were not given the attention they deserve – or the research."

He began asking choir members about their moods and analysing the different emotions that pieces of music trigger in the listener – also using magnetic resonance imaging and EEG. Eventually he discovered that what he really wanted to work on was wellbeing and health. "Society is gradually gearing up for serious changes in demographic structure. And cultural techniques like singing and dancing play an enormously important role here," the researcher says.

These days Kreutz can draw on a broad spectrum of empirical studies. He has researched the psycho-physiological effects of couple dancing and the relation between learning an instrument and cognitive development in children. Together with colleagues at the Bremen Institute for Prevention Research and Social Medicine (BIPS) he discovered that professional musicians are four times more likely to develop tinnitus than the rest of the population. And few years ago together with British musicologists Raymond MacDonald and Laura Mitchell he published a book titled "Music, Health and Wellbeing" that features insights by internationally recognised experts into the relationship between these three issues from interdisciplinary perspectives and presents the latest findings from musicology, psychology and medicine.

When asked what motivates his work, Kreutz points to the numerous questions that remain unanswered despite all the progress and the exponential increase in knowledge in recent years, even in niches such as music psychology. He talks about Scandinavian studies which have shown that music can help combat states of anxiety better than psychopharmaceuticals. He cites gerontology studies dealing with dance courses for people with dementia, which showed that the subjects' quality of life improved in the mid-term. "Music and dance are a unique resource that can help people to better manage their everyday lives or particular life situations. But these things take time. There's no such thing as a quick fix. Project cultures that do not provide long-term financing for interventions destroy potential instead of utilising it consistently. The cutbacks on music lessons in schools do nothing less than rob entire generations of potential quality of life," Kreutz asserts.

Choir singing in particular has huge potential in the musicologist's eyes – which is why he also published a book this year, "Why Singing Makes You Happy", an overview of scientific research for singers and above all potential singers. "What is the best way to stay healthy? Social contacts, positive emotions and movement." Singing in a choir is good for all three, he says. "It seems that singing makes us more resilient. It can replenish our reserves of positive energy. And to that end I will gladly use my research to lobby for singing." (tk)

"It seems that singing makes us more resilient."

Globetrotting scientists

Norway: Poisonous algae and water columns

The "cast off" call for the research vessel "Heincke" came in July, when we set off from Bremerhaven port for the Norwegian coast and the Trondheimsfjord and Sognefjord. In addition to the ship's crew the "we" here refers to scientists of the Institute for Chemistry and Biology of the Marine Environment (ICBM), the Alfred Wegener Institute (AWI), the Helmholtz-Zentrum Geesthacht Centre for Materials and Coastal Research (HZG) and the Norwegian Norsk Institutt for Vannforskning (NIVA). Our goal was to learn more about the formation and distribution of toxic algae blooms. The scientists on board had a full agenda to complete within the three weeks it would take to reach our port of destination, Trondheim.

Coastal areas and fjords are highly complex marine environments. Toxic or highly concentrated algal blooms form here, a process that has been observed with increasing frequency in recent decades. We studied the distribution patterns of the poisonous algae and the underlying mechanisms, in connection with light availability and nutrients as well as general topography and hydrodynamics. Building on the success of previous expeditions, we combined biological, chemical, physics and bio-optical methods to gain an interdisciplinary perspective of the system as a whole. We sampled and characterised the water column using a "rosette water sampling system" with a built-in CTD probe (conductivity, temperature, depth). On board, the composition of algae and dissolved substances in the water were analysed. In addition we measured the local underwater light fields in order to characterise the light regime available to the algae.

Thanks to good weather and calm seas we were able to perform all stations of the study according to plan. In addition to the dominant algae Ceratium we also found cells of the toxic Dinophysis norvegica. After three weeks at sea, additional laboratory tests and the combination of all the results were next on the agenda.

Daniela Voß

South Africa: Spare parts in Port Elizabeth

As a PhD candidate in the junior research group "Cascade Use" I'm fortunate because we maintain many international contacts in countries like China, Canada and Chile. And in July I travelled to South Africa, where I met old and new contacts.

The researchers of the "Cascade Use" group are studying decisions made at the end of a vehicle's life cycle in order to prolong the use of the materials it is made of as much as possible. The goal is to reduce the consumption of primary raw materials and the environmental damage this entails. Within the group I am examining the acquisition problems in "remanufacturing", or in other words how components can be repaired for reuse for example as spare parts. My trip confirmed the fact that this is an issue of interest across the globe.

In beautiful Port Elizabeth I took advantage of the opportunity to exchange views and information with carmakers at the Information Technologies in Environmental Engineering (ITEE) conference. In addition to visiting Volkswagen Group South Africa I met experts from Lumotech Ltd. Lumotech manufactures headlights for vehicles as well as other things and is able to reduce the use of primary raw materials by using recycled plastic in the production of street lamps. In this way leftover materials from the production of car parts are used to make new street lamps – a simple but resource-saving idea.

In addition to my contacts in industry I also met up with PhD student Cainos Mukandatsama of the Nelson Mandela Metropolitan University (NMMU) again (see photo). We first met in Germany at the Summer School "How Efficient is Electromobility?" at the Hanse-Wissenschaftskolleg Institute for Advanced Study (HWK) in Delmenhorst, which organised the Cascade Use group together with the PhD programme Renewable Energy at Oldenburg University last June. I am now looking forward to long-term collaborations with colleagues and partners from South Africa through my research activities.

Matthias Kalverkamp

South Africa: Big challenge for the partner uni

We had already visited South Africa before we left on sabbatical, but to travel to Port Elizabeth with the family and a project at the Nelson Mandela Metropolitan University (NMMU) was something very special. For us the long-term partnership between Oldenburg University and the NMMU was an opportunity to spend time abroad.

Both the guest university NMMU and the University of Johannesburg (UJ) were created by merging once white-dominated research universities with the more vocational Technikons and institutions of the once all-black Vista University. This type of university differs from the "formerly advantaged universities" of Stellenbosch, Witwatersrand and the University of Cape Town (UCT) not only as a result of integrating different institutions but because the students there mostly have poor school educations. All South African universities are called upon to play an active role in society and to act as motors of regional development – a task which presents an exceptional challenge for the NMMU, located in one of South Africa's poorest provinces with 36 percent unemployment (2011). This made the professionalism of the research institutes at the University – in particular those in the natural sciences – which took me on as visiting professor all the more impressive. And the strategy development and implementation throughout the university in areas of social engagement in townships, sustainability and diversity management is also remarkable.

During our stay the final workshops of the Clim-A-Net project (www.clima-net.uni-oldenburg.de) and the DASIK project (www.dasik.org) took place, as did the opening event of the East and South African-German Centre of Excellence in Educational Research Methodologies and Management (CERM-ESA; www.mu.ac.ke/cermesa). What is interesting about these projects for the South Africans is above all the development and implementation of interdisciplinary structures and working methods in Oldenburg and the wide-ranging experience in teacher training, business informatics, renewable energies and sustainability research.

Prof. Dr. Bernd Siebenhüner

Saudi Arabia: Fitting in prayers

After giving a keynote at a conference in Brazil the director of the Department of Educational Computing and Online Learning at the King Saud University asked me whether I would like to come to his university in Riyadh as a visiting scholar.

Aside from the difficult situation for women in Saudi Arabia, the story of blogger Raif Badawi was all over the news at that time, after he was condemned to 1000 lashes for his blog posts criticising strict interpretations of Islam. But I decided to take up the invitation in spite of all this in order to experience Saudi Arabia first hand. It's not so easy to travel around the country as it does not issue tourist visas.

So I spent two weeks in Riyadh during which I gave a workshop for fellow scientists (men only at Kind Saud University!) who want to integrate digital media into their teaching. The path to becoming a professor is obviously highly selective and heavily influenced by the American system. All colleagues in the department attained their PhDs in the US on full scholarships from the Saudi state. Scheduling the workshop proved tricky because the participants needed to fit in their prayer times.

I also gave a keynote at the International Conference on E-Learning and Distance Education organised by the Saudi Ministry for Higher Education. It is incredible how much money is being invested in digitising university teaching. By our standards, utterly unthinkable. The conference took place in a luxury hotel the likes of which I will probably never set foot in ever again.

The segregation of men and women can become quite ludicrous at times. Questions about my talk from women scientists were relayed from the "female section" of the conference hall. One colleague from Canada told me that he had given a workshop for female professors, but he was not allowed to be in the same room with them and had to sit in front of a video camera next door. He might as well have stayed in Canada doing a video-conference.

All in all, my trip to Saudi Arabia was definitely a unique experience. Even if we do spend a lot of time complaining about the university system here we should consider ourselves very lucky that we are allowed to work freely as scientists in Germany.

Prof. Dr. Olaf Zawacki-Richter

Iceland: Absolutely fascinating

Several hundred kilometres in a car on streets whose names no German could pronounce, many pleasant encounters and incredible landscapes everywhere you look. I travelled to Iceland for research; I returned captivated by its landscape and the openness of its people.

What I was actually doing was collecting marine sediments for my DFG-financed research on globally distributed microbial populations. The aim of the project is to collect data on the molecular diversity of cyanobacteria in the North Sea tidal flats and to compare these with their distribution in ecologically similar but geographically distant locations. "Is everything everywhere and nature selects?" This question was posed by Martinus Willem Beijerinck (1851-1931), a Dutch microbiologist in the 19th century. Until now marine benthic cyanobacteria had not been found in arctic regions.

Iceland has a strong influence on its inhabitants. Appearances are not overrated and yet everyone has their own style. Icelanders attach great importance to being able to make their own decisions. This is particularly noticeable even when it comes to tourist attractions. Natural wonders are not, as they are in Germany, plastered with warning signs. For example, at the entrance to hot springs there is a sign simply stating: Water temperatures may reach 100°C. And it is left to the individual to decide whether to dip in a finger to see if the water really is that hot.

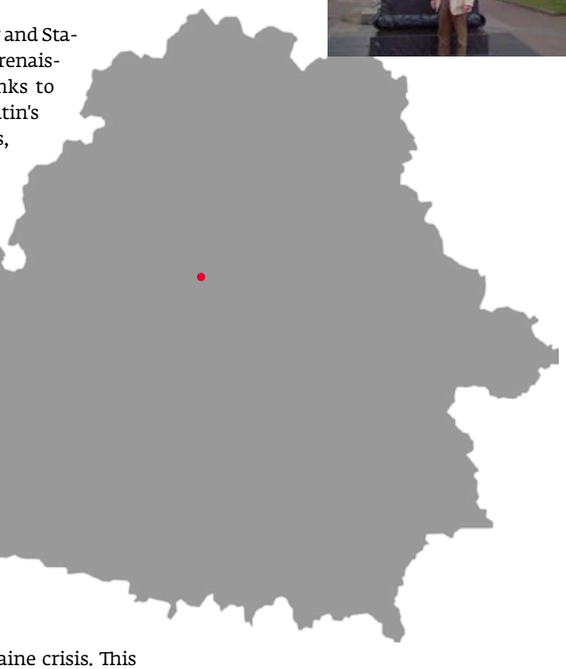
And cyanobacteria? In my samples, analysed by PhD student Janina Vogt, there were Cyanobacteria clearly present! So my trip was not only an amazing experience but also a big success.

PD Dr. Katarzyna Palinska

Quo Vadis, Belarus?

It is due to be re-erected in front of the infamous Lubyanka, the KGB headquarters in Moscow; in Minsk it is still standing today. I refer to the monument to Felix Dzerzhinsky, the founder of the Cheka, or Soviet secret police, who was born in Belarus to aristocratic Polish parentage. "Iron Felix", who organised the Red Terror in the early Soviet times, and myself are looking at the KGB headquarters in the centre of Minsk - Belarus retained the Soviet abbreviation KGB (in Russia it is now called the FSB). The photo was taken on my last research trip to study the linguistic situation in Belarus and Ukraine.

While Dzerzhinsky and Stalin are undergoing a renaissance in Russia thanks to former KGB officer Putin's traditionalist politics, the West hopes that the 'Minsk Protocol' will prevent any further escalation of the Ukraine crisis. This is an opportunity for the Belarusian President Lukashenko to present himself as a mediator between Russia and Ukraine, and the West.

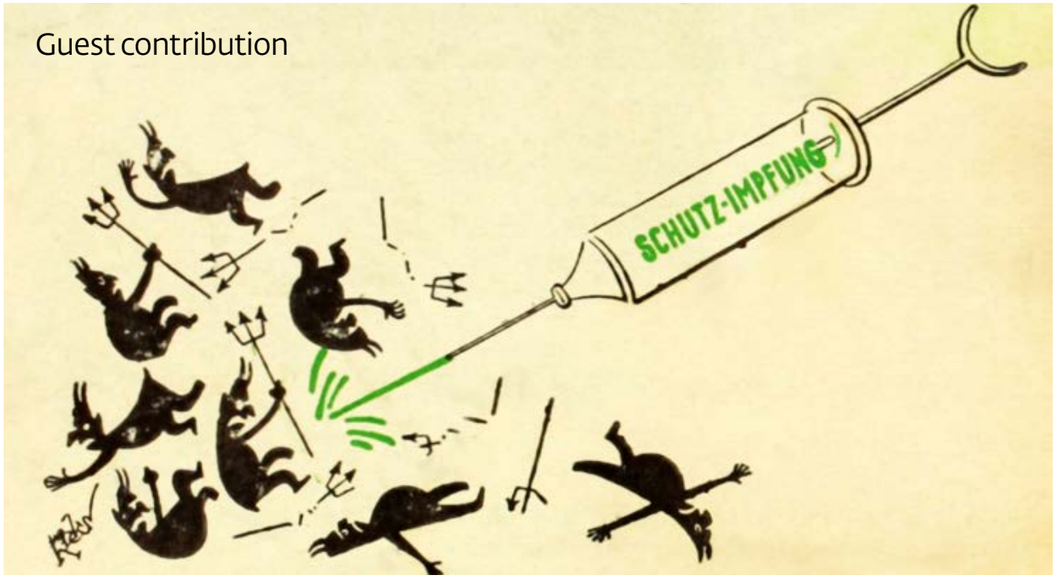


Lukashenko, whose country is economically dependent on Russia, has famously refused to adopt a clearly pro-Russian stance in the Ukraine conflict, stating instead: "... Everyone must respect our sovereignty and our independence. This must be remembered. And we will not cede our territory to anyone."

The Kremlin justified its actions in both the annexation of Crimea and the Donbass conflict saying that it was acting in the interests of the Russians, or Russian-speakers, who were supposedly either under threat or being persecuted in Ukraine. Although the Russian minority constitutes just 8 percent of the Belarusian population (considerably less than in Crimea or Donbass), three-quarters of that population speaks Russian! Is Lukashenko worried that veteran "Chekists" might also "find" reasons to invade his country as well?

Prof. Dr. Gerd Hentschel

Guest contribution



An injection against fiendish germs: picture from a 1950s polio pamphlet.

The age of immunity

What the history of vaccination can teach us about changes in modern societies.
An article by Malte Thießen

We live in the age of immunity. The "pandemics" of the past like diphtheria, smallpox or tuberculosis no longer scare us. The idea that we are protected against infectious diseases has become the norm, as everyday expressions about being “immune” to this or that confirm. Even the exceptions to this norm actually corroborate it. Again and again we hear about the imminent discovery of a vaccine for cancer or AIDS. Nowadays it is unthinkable, or at the very least hard to accept, that there might be diseases that we can't vaccinate against. The debates about an Ebola vaccine or the introduction of compulsory measles vaccination are two particularly current examples. Immunity has become part of everyday life, or even an attitude towards life.

This finding is not as trivial as it initially seems. Because this attitude is relatively new. It has only been prevalent in Europe and the US since the 1960s and 70s – and for many other nations immunity is still by no means the norm. So the history of vaccination is a history of the modern age, with all its contradictions. It raises questions that provide insights into the changes in modern societies. What fears and hopes fuelled vaccinations? How did they change perceptions of risk and safety? Which norms, hierarchies and social orders were negotiated in connection with vaccination programmes? The findings of an ongoing research project are providing some answers to these questions. In this article I examine the history of vaccination in the light of four trends that explain how, since the nineteenth century, immunity as an attitude towards life has become the norm: firstly through the politicisation of immunity, secondly through its mediatisation, thirdly through its marketisation, and fourthly through the internationalisation of vaccination.

Vaccination programmes are one of the most powerful weapons in the public health policy arsenal. This was not always the case. As late as the 19th century, doctors were still wandering around Europe on their own initiative, selling vaccines to the wealthy. For a long time vaccination was a private matter. That changed in Germany in the 1870s. Following the founding of the German Empire vaccination moved to the top of the political agenda. Immunity promised to protect the "body of the German people" and ensure a healthy workforce and growing population. In the times of the German Empire vaccinations became a kind of locational advantage in the race between nations, as the nationalist liberal MP Wilhelm Löwe once put it during a debate in the Reichstag: "We are talking here about preserving an incalculable number of workers and working days, which enhance the individual's quality of life and contribute greatly to the development of society and the state." For these reasons compulsory vaccination against smallpox was introduced in 1874. From then on, all German children aged one and twelve had to be vaccinated against smallpox – and if necessary this was enforced by the police.

Regulating Immunity: The Politicisation of Vaccination

This "compulsory vaccination" met with opposition from social democrats, liberals and the Catholic Centre Party. August Reichensperger, a member of parliament for the Centre Party, used a vivid example to underpin his criticism of compulsory vaccination in the Reichstag: "People are being threatened with prison sentences! Gentlemen, it seems to me there are already more than enough opportunities to be locked away in the German Empire; but to send a mother who is convinced that vaccination is harmful to prison for refusing it – that, gentlemen, does not tally with my concept of a civilised nation."

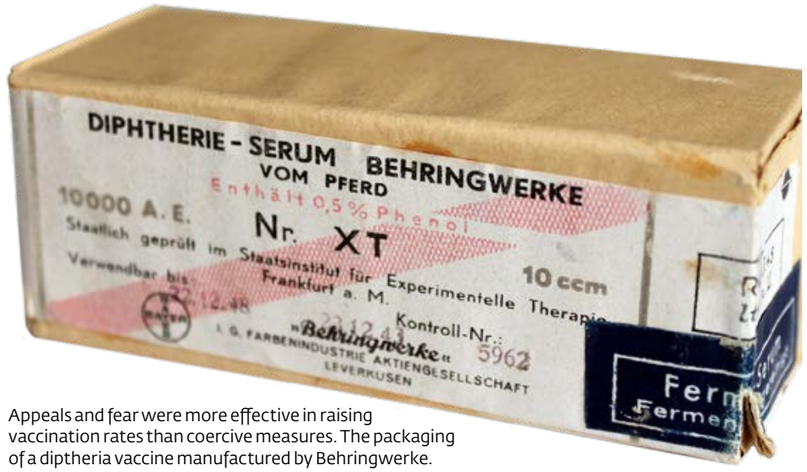
One rubs one's eyes in amazement at how familiar this debate sounds. Do we not hear almost identical arguments in today's debates about compulsory vaccination? As recently as the summer of 2013, the growing number of measles cases prompted Federal Health Minister Daniel Bahr to threaten to introduce compulsory vaccination, for which he was heavily criticised. Legal expert Ulrich Gassner, for example, spoke out clearly against such plans in the German daily Tagesspiegel: "Compulsory vaccination is the unimaginative approach of a total prevention state."

It is not my intention to draw easy parallels between the German Empire and the situation now. Nonetheless, I find the persistence of fundamental debates on the subject of vaccination remarkable. Because these debates were not 'just' about life and death. They were about society as a whole, about what is more important: the freedom of the individual or the safety of society? The history of vaccination therefore provides insights into concepts of society and how they have changed. And that is what is meant by the politicisation of immunity: the constant discussion about risk and safety, about the common good and individual wellbeing. Indeed it was this process of negotiation that made vaccination an ubiqitous point of reference for the Germans.

Seeing Immunity: The Mediatisation of Vaccination

A second trend, the mediatisation of vaccination, emerged at the start of the 20th century. Thanks to new forms of media people could read, see and soon even hear about immunity everywhere. Pictures, pamphlets and reports on the radio "translated" expert knowledge into everyday life. Mediatisation spread information to more people and changed the level of knowledge as well. At exhibitions, in magazines and radio broadcasts, medical knowledge was condensed into simple images that made immunity comprehensible to everyone. On the radio or in diagrams, immunity became tangible and personal, translating the hopes and fears of parents into everyday conversation.

The most important medium was film. From the late 1930s onwards, Germans could watch immunity at the cinema. These films were rated as "educational", probably as a result of the clarity of their depictions. The Mayor of Munich praised a film about vaccination against diphtheria in 1942 not only for showing "with particular clarity" the administration of a vaccine, but more importantly in his opinion for showing the threat, namely a child suffering from diphtheria. Precisely that was the crucial aspect of the mediatisation process, that it gave a face to people's fears and hopes – quite literally. Images of happy and sick children made a more



Appeals and fear were more effective in raising vaccination rates than coercive measures. The packaging of a diptheria vaccine manufactured by Behringwerke.

The media condensed medical knowledge into simple images that made immunity comprehensible to everyone. A late 1950s poster from the Federal Republic of Germany and an illustration from a GDR calendar of vaccination from the 1970s.

convincing argument than laws and punishments.

In short, the history of vaccination is a media history with social consequences. The mediatisation of immunity not only transformed the channels through which it was conveyed to people, it also changed knowledge itself. Popular images incorporated vaccinations into everyday life, so that they became part of the German pool of experience. The most recent example of this process is a media campaign by Germany's Federal Centre for Health Education (BZgA). The campaign references the popular TV talent show "Deutschland sucht den Superstar" [Germany Seeks the Superstar] using the slogan "Germany Seeks the Vaccination Certificate" for its poster, internet and film advertising campaigns.

Selling Immunity: Marketisation

A third trend is tied up with the media: the marketisation of immunity. Many posters, pamphlets and films on vaccination came from pharmaceutical companies with a specific interest in popularising immunisation. The marketisation of vaccination began in Germany in the 1930s, which is significant for two reasons. On the one hand, pharmaceutical companies introduced a new tone when addressing the public under National Socialism. While the German Empire and the Weimar Republic had often relied on state decrees, the Third Reich took a more pragmatic approach, no longer forcing new vaccines onto the population but relying on the influence of advertising to make people voluntarily accept vaccines. But how to explain that the discovery of voluntary action should come about, of all times, under this "bio-dictatorship"?

The involvement of pharmaceutical companies provides an answer. In the 1930s, large companies like "Behringwerke" coined a new brand of marketing. They not only worked closely with the press, but also made films, radio programmes and even plays for the public that played luridly on the fear of disease. This marketing was highly successful. By the end of the 1930s, voluntary vaccinations against diphtheria often reached higher levels of participation than compulsory vaccination against smallpox had. Appeals and fear were clearly more persuasive than coercive measures.

The marketisation of vaccination highlights another trend, namely a shift in public health care that continued until privatisation began in the 1970s. While the production of vaccines and organisation of vaccination programmes had previously been in the hands of the state, under National Socialism, companies gained more influence. The so-called "vaccination certificate", in which the public health department registered vaccinations against diphtheria from the 1930s onwards, testifies to this growing influence. Such vaccination certificates had a long tradition in Germany and were nothing unusual. Only when you look at the reverse of the document, which features an advertisement for Behringwerke, does it become clear why the document was unusual. The public health departments' vaccination certificates were not issued by the state but directly by the companies selling the vaccine. So by the 1930s, the connection between certain trends was clear: the marketisation of vaccination was promoted by its mediatisation and based on its politicisation, since pharmaceutical companies used state infrastructures for marketing and distribution.

It would be naive to describe this interaction between market, media and state as a harmonious relationship. At the very latest by the time the Federal Republic of Germany was established, major tensions became apparent, as the introduction of the polio vaccine illustrates. In 1958, Behringwerke presented a new polio vaccine for immediate launch on the market. When officials of the Federal Health Agency (BGA) demanded to inspect the production of the vaccine, they were shown the door – on the grounds of suspected "industrial espionage". This provoked outrage in West German newspapers. Interestingly the anger was directed more at the BGA than at the pharmaceutical company. "The BGA back-pedals" was one of the accusations levelled in the Süddeutsche Zeitung. At a time when polio diagnoses were rising all of a sudden, the state was viewed as a "naysayer" that was neglecting its duty to protect its citizens.

This case not only highlights the ties between the media and pharmaceutical companies, it also points to disputes over fundamental questions regarding the production of vaccines. Who was responsible for the safety of the German people now? The state, or private industry? The fact that this question is still controversial today, as the scandal over the swine flu vaccine in 2009 demonstrated, highlights the continued relevance of this trend: interactions between the market, media and state are still a problem today.

Exchanging Immunity: Internationalisation

The Germans took the final step towards the normalisation of immunity in the 1960s. During this period they witnessed the internationalisation of vaccination. At first glance this statement appears confusing; after all, infectious diseases don't stop at national borders, and international exchange had been observed since the 19th century. And yet in the 1960s, international cooperation in the area of vaccination took on a new quality. Only then did continuous international collaboration really get started, only then did international standards for vaccinations begin to apply, and only then did the whole world become the target of the systematic vaccination programmes of the World Health Organisation (WHO). Proof of this internationalisation can doubtless be found in most households in the form of the yellow "International Certificate of Vaccination" that was introduced in the Federal Republic of Germany in the 1970s. But why did the process of internationalisation start so late?

A key reason for internationalisation was a threat that wasn't all that new: the airplane. Airplanes were proving to be a nightmare from a health

Proof of the internationalisation of vaccination: a yellow Certificate of Vaccination like the one the author of this article also – naturally – owns.

perspective. Until that point, long sea journeys had played into the hands of immunisation concepts. To a certain extent they guaranteed that diseases broke out before being introduced into a new country, and could therefore be isolated. The airplane destroyed such safety concepts. In 1965, Berlin's health senator even warned that diseases like smallpox that were believed to have been eradicated had "once again become a constant threat because of modern travel." In the 1960s, several cases of smallpox in Germany made it clear that this warning was not exaggerated. Globalisation brought a new set of problems, for which different solutions were found by the experts.

First of all, advertising for vaccinations changed. The focus was no longer on the obligation to protect the "body of the German people" but rather on the safety of the individual. Vaccination programmes appealed to the interests of the individual, who was eager to become immune to global threats.

Secondly, the Germans, who were now participating in WHO programmes in Africa and Asia, were broadening their horizons. The vaccination programmes in those countries were not driven solely by humanitarian motives. The immunisation of "developing countries" was more a result of self-concern, because if distant centres of epidemics were brought under control, it lowered the risk of infection at home. International cooperation therefore created a win-win situation, as the BGA pointed out in 1961. In reaction to a case of imported smallpox in Düsseldorf, the agency demanded stronger commitment to vaccination campaigns in Asia and Africa because they were aimed at "fighting epidemics at their main places of origin rather than taking defensive measures predominantly in countries threatened by imported disease."

A third response to global threats was international cooperation between the US and Europe. However, the consensus on joint vaccination standards and the intensified exchange of scientific knowledge not only encouraged collaboration. It also increased the competition, and even fuelled new conflicts. This competition was particularly obvious in Germany. While from the late 1950s onwards, the GDR scored several victories against former "endemic diseases" thanks to systematic vaccination programmes, the West Germans had difficulties introducing new vaccination programmes. And naturally the GDR made no secret of its success, boasting in pamphlets, posters and reports of its vaccination victories and contrasting them with the problems West Germany was experiencing. Higher rates of vaccination served as proof that it was in the lead in the race for a healthier or "better" society.

The internationalisation of vaccination is also a trend that still shapes everyday life today. On the one hand, vaccination has become more flexible and individualised, increasingly tailored to estimated personal risk and conforming to international standards. On the other hand international collaborations have intensified international competition. Nowadays vaccination rates have become a kind of yardstick that measures a state's progress or failure. Debates about "failed states" in Africa, which have been unable to fight off malaria, polio or tuberculosis through vaccination are current examples of this.

Summary

The history of vaccination is not only a history of health and disease, of life and death. It is a history of modern society and the changes it has undergone. These changes can be understood by examining four trends: the politicisation of vaccination, its mediatisation, the marketisation of immunisation and its internationalisation. A study of the history of vaccination therefore makes us immune to over-simplified success stories of the modern age. It draws our attention to ambivalences and areas of tension in modern societies, to the fraught relationship between the state and its citizens, between safety and freedom, between us and the big wide world.

An investigation of these areas of tension confronts us with a double challenge. Firstly, the history of vaccination can be examined only from interdisciplinary perspectives. Historians and medical experts, sociologists, political scientists and cultural scientists are all called on if we want to explore immunity as a concept of the modern age. Secondly, immunity is a borderless project. We should look beyond national boundaries and observe international collaborations or conflicts to gain insights into the negotiations with fear and safety that still accompany us today.

Prof. Dr. Malte Thießen studied German Studies, History and Educational Science at the University of Hamburg, where he also gained his doctorate in 2006. Until 2009 he was a research associate at the Research Centre for Contemporary History in Hamburg (FZH), after which he completed his practical teacher training and Second State Examination in teaching. In 2010 Thießen was appointed Junior Professor of European Contemporary History at the University of Oldenburg. He is currently also a Research Fellow at the German Historical Institute London.

Prof. Dr. Dr. Volker Boehme-Neßler leafs through the facsimile of the medieval German law book the "Sachsenspiegel" at Oldenburg State Library. He sees the visualisation of medieval law in the book as nothing short of avant-garde.

How pictures change the law

What impact do the internet, the world of images and visualisation have on legal thought? Legal scholar Volker Boehme-Neßler is seeking answers in those areas where legal theory intersects with other disciplines

It's just a copy – the original is locked away in a safe. Nonetheless Volker Boehme-Neßler turns the pages very carefully, almost reverently. In his hands is the facsimile of the Oldenburg "Sachsenspiegel", a medieval German law book of which only four illustrated copies still exist. It contains something which Boehme-Neßler believes is lacking today in his discipline – law – something he would like to reintroduce into legal culture: namely images, visualisation – and with them the connection to people's everyday reality.

"With the exception of road traffic regulations, construction and trademark law, the legal world is almost entirely devoid of images – even verbal images are frowned upon," he explains. Boehme-Neßler, 53, joined Oldenburg University in autumn 2014 and teaches public law and media and communications law. Legal theory – in particular where it intersects with psychology, neuroscience, media science, politics or philosophy – is his favourite area of research.

Boehme-Neßler is examining legal culture from the perspective of legal theory, and describes that culture, which has also shaped his thinking since his days as a law student in Berlin and Heidelberg, as "text-fixated and even image-phobic". He is examining why the world of law refrains almost entirely from using images – and also the discovery that the growing power of images is nonetheless having an impact, or rather cannot but have an impact, on legal thinking.

His hypothesis: "If, in the digital age we live in, everyone communicates through images but the law does not, the gap between law and society becomes too great, with the result that the law loses relevance." He points out that after all most laws are enforced automatically, simply by the fact that people observe them. If, however, law becomes too far removed from people's everyday lives, there is the danger that this self-enforcing effect will be lost: "That would mean, for instance, that people would have to call the police about every little trivial thing," Boehme-Neßler explains.

A former lawyer, Boehme-Neßler says that it is also his contact with his students that has shown him how deep the discrepancy between the legal profession's perception of reality and that of wider society has become. "Legal professionals aim to be completely rational. The students, on the other hand, are heavily influenced by the internet and the world of images," Boehme-Neßler observes. "They are loath to use classic law commentaries that don't contain even a single picture."

Neuroscience has taught us, Boehme-Neßler explains, that the brain processes images and concepts in completely different ways. "Images have an emotional impact," he summarises. The fact that the legal system, in striving for professional distance, objectivity, and ultimately justice, tries to block out emotions along with images may be a triumph of civilisation, but it has a downside, he points out: "Many pieces of legislation block out parts of reality."

In addition, more visualisation could improve people's understanding of the law. "After all, psychologists specialised in learning also recommend combining pictures and text," Boehme-Neßler argues. "It's the right balance that counts." This is why classical Roman law and also medieval law placed a much stronger emphasis on visualisation. "The 'Sachsenspiegel' was created with the intention of making the law more accessible to the average citizen," Boehme-Neßler points out. But then, he explains, came the Reformation, in which Martin Luther wanted to distance himself from the "image-loving" Catholics, and Enlightenment culture, which postulated reason over emotion. The visualisation of the law came to an end.

"Many pieces of legislation block out parts of reality"

"In line with the Enlightenment's view of man, we legal experts revere reason. But progress has been made in this respect," Boehme-Neßler observes. Thanks to Sigmund Freud, he explains, we know about the importance of the unconscious and the power of emotions. He points out that neuroscience has also proven that "supposedly rational decision-making occurs at least in part in those areas of the brain that process images and emotions."

To strengthen the link between his areas of interest within jurisprudence and approaches from psychology and neuroscience, Boehme-Neßler is contemplating a collaboration with Wechloy Campus researchers. "I like to look beyond my own field – and to learn from other disciplines," says the jurist. This, he says, would open up a number of questions for discussion, such as the opportunities and risks of illustrating court proceedings – something that so far has been permitted only in Germany's Federal Constitutional Court.

Certainly in legal communication, Boehme-Neßler believes that it would be hugely beneficial to incorporate images and visualisation. And in the same way more frequent use of pictures would also help to reconstruct crimes in criminal trial law, to draft contracts in civil law, and in capital markets law too: "In fact there isn't really any area of law where it wouldn't work." After all, the law aims to fulfil its social function and help shape society, he points out. "Improving people's understanding of the law would also increase its legitimacy."

Will he himself set this process in motion and use his findings to author his own illustrated law commentary? Wouldn't that be something, "the Boehme-Neßler" on the bookshelf? The 53-year-old laughs. "There is indeed a gap there," he agrees. Fifteen years ago he intuitively included illustrations in a textbook he published, he recounts, so a further step in that direction would be perfectly consistent. "It would have to be an interdisciplinary project – with experts in graphics and design, and perhaps also art history, and certainly psychology." Then perhaps he could, in his own way, continue where the "Sachsenspiegel" tradition left off. (ds)

UGO launches two new event formats

This year the Universitätsgesellschaft Oldenburg (UGO) has launched two new event formats, the Impulse Forum and the Innovation Dialogue. These events are aimed at raising awareness of the University's vital role in regional development, UGO chairman Michael Wefers explained.

The Impulse Forum, which took place for the first time on March 5, brought together over 200 young scientists and junior executives from the business community, culture and local administration to discuss "The Necessity and Limits of Economic Growth". The event was designed to address socially critical issues – and at the same time to provide an exchange and networking platform for young executives and researchers. Initiator of the event and second UGO chairperson Swea von Mende explained that it aims not only to promote the interests of the target group itself but also to benefit the region as a whole. The Impulse Forum will be held annually.

The Innovation Dialogue, launched on 23 July 2015, is also designed to "promote future businesses in Oldenburg in and for the region" as the Junior Professor for Female Entrepreneurship Dr. Stephanie Birkner phrased it. Participants were also introduced to the University of Oldenburg's Founding and Innovation Center (GIZ) as part of the event. The GIZ is the central contact address for students, young scientists and former students of regional universities who want to start up a business. The service includes consultations on funding, coaching, qualifications and mentoring. 180 consultations have already been given. The University of Oldenburg received a funding award from the Federal Ministry for Economic Affairs, which commended it as one of the three best "Entrepreneur Universities" in Germany. This money supported the founding of the GIZ.

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Sabine Aisenbrey
Ophthalmology

Prof. Dr. Sabine Aisenbrey, previously acting consultant at the University of Tübingen's Department of Ophthalmology, has been appointed Professor of "Ophthalmology". She is also the director of the University Clinic for Ophthalmology at the Pius-Hospital Oldenburg. Aisenbrey studied Human Medicine and Philosophy at the University of Cologne, where she also completed her MD in 2001. From 2002 to 2004 she taught and carried out research as a post-doctoral fellow at Tufts University (Boston/USA). She then worked at the University of Tübingen Eye Clinic as a consultant before her Habilitation in 2008. In 2010 Aisenbrey played a key role in the introduction of retinoblastoma therapy and took charge of the interdisciplinary care centre for children with retinoblastomas at the University Hospital Tübingen. Aisenbury has received several awards for her research, including the German Ophthalmological Society's sponsorship award and the Macula Research Prize for Preventing Blindness awarded by the Pro Retina Deutschland Society.

Stephanie Birkner
Female Entrepreneurship

Dr. Stephanie Birkner has been appointed Junior Professor for Female Entrepreneurship. Previously at the Jade University of Applied Sciences she was Acting Professor of "General Business Studies in particular Corporate Strategic Planning Simulation". Birkner studied Business Consulting at what is now the University of Applied Sciences Emden/Leer. She then conducted research and taught at the Department for Business Administration, Economics, and Law at the University of Oldenburg where she as well acted as an equal opportunities representative. Birkner completed her PhD with research on the value of ambiguity in consultancy. She also trained as a counsellor/personal coach and has worked as a freelance counsellor and coach. In 2013, as part of the University of Oldenburg's Gründerpreis awards for business innovation, she won an award for supporting entrepreneurs. At the entrepreneurial University of Oldenburg Birkner aims to raise awareness about entrepreneurship among women and develop concepts to provide them with support. Her research findings flow directly into entrepreneurship teaching and start-up consultancy.

Alexey Chernov
Mathematics

Prof. Dr. Alexey Chernov has been appointed Professor of Mathematics Specialised in Numerical Methods and Simulation. Before coming to Oldenburg he taught numerical analysis and simulation as an associate professor at the University of Reading (UK). Born in Moscow in 1981, Chernov studied Mathematics at Lomonosov Moscow State University. He completed his PhD degree at the University of Hanover, where he also took a position as a research associate. From 2006 to 2008 he was a post-doctoral researcher in applied mathematics at the Seminar for Applied Mathematics of the Swiss Federal Institute of Technology ETH in Zurich, and then was appointed professor at the Cluster of Excellence at the Hausdorff Center for Mathematics, University of Bonn. His research focuses on the construction and analysis of numerical methods for solving partial differential and integral equations, in particular for use in models under uncertainty. His research interests include finite element methods, numerical integration, approximation for high-dimensional problems, numerical methods for contact problems and discretization of nonlocal operators.

New Appointments

Michael Feldhaus
Microsociology

Prof. Dr. Michael Feldhaus has been appointed Professor of Microsociology. Feldhaus, who had already taken on the professorship as deputy professor in 2013, was previously a research assistant at the EMPAS Institute, University of Bremen. Feldhaus studied Political Science, Sociology and Family Science at the University of Oldenburg and gained his PhD under the Oldenburg sociologists Prof. Dr. Dr. Rosemarie Nave-Herz and Prof. Dr. Walter Siebel on "Mobile Communication in the Family System". Between 2004 and 2010 he was project coordinator of the DFG Priority Programme "Panel Analysis of Intimate Relationships and Family Dynamics in Germany" at the University of Bremen. His research focuses include the analysis of social inequality in the life courses as well as biographical transitions – like partnership foundation, marriage, remarriages, separation – and their consequences for the life course. His research interests are the social conditions for development in children and youth, the relationship between the parental home and school, as well as the impact of occupational mobility on partnerships and family.

Michael Freitag
Health Services Research

Prof. Dr. Michael Freitag has been appointed Professor of General Medicine Specialised in Health Services Research. He was previously the deputy department director and leader of the residency programme for general medicine at the University Hospital Jena. Freitag studied Human Medicine at the University of Heidelberg. He took the United States Medical Licensing Examination and earned his MD at the Department of Neurology at Heidelberg University Hospital. He completed the post-doctoral programme "Master of Public Health" at Johns Hopkins University (Baltimore/USA), as well as the advanced programme "Public Health and Preventive Medicine". In 2006 Freitag was certified in the US as a specialist in Public Health and General Preventive Medicine, and in 2007 he was certified as a specialist in Internal and General Medicine. His research focuses on medical care epidemiology and drug therapy. Freitag aims to establish an alliance for residency training in general practice in Oldenburg, improve outpatient care and build a network of teaching and research centres.

Falk Hoffmann
Health Services Research

Prof. Dr. Falk Hoffmann has been appointed Professor of Health Services Research. Previously he worked in the Department of Health Economics, Health Policy and Outcome Research (ZeS) at the University of Bremen. After training to be a nurse Hoffmann studied Health Science and Nursing Studies Teaching in Bremen. As well as the first state examination he completed a Masters in Public Health. He then worked as a research assistant at the ZeS. His PhD in 2008 was followed in 2011 by his Habilitation with a thesis on "Health Services Research with Routine Data from Health Insurance Funds: Possibilities and Limits". Hoffmann is coordinator of the research group "Validation and Linkage of Secondary Data" at the German Network of Health Services Research (DNVF). His research interests include processes and quality of care for elderly and multimorbid patients as well as dementia sufferers. He also conducts research into pharmacoepidemiology, the results of decisions in health policy as well as care for patients with mental disorders.

Martina Kadmon
Medical Training

Prof. Dr. Martina Kadmon has been appointed Professor of Medical Training. Previously she was a senior consultant at the surgical clinic of Heidelberg University Hospital. Kadmon studied Human Medicine at the University of Heidelberg, where she also completed her MD. Her practical training year was spent at the university clinic at the Hebrew University of Jerusalem and at the teaching hospital in Bruchsal. Since 1996 she has been a specialist for general surgery and in 2008 she completed a "Master of Medical Education"at the University of Bern. She then habilitated in Surgery at the University of Heidelberg. At the medical faculty there she established a central programme for the evaluation of teaching and university quality management and developed among other things a concept for selecting students. Kadmon's research focuses include quality management in medical training and faculty development, as well as clinical questions regarding bowel disorders.

Frank Köster
Computer Science

Prof. Dr. Frank Köster, computer scientist, has been appointed Professor of "Intelligent Transport Systems Design". Köster also runs the “Automotive Systems” research department at the Institute for Traffic Systems Technology of the German Aerospace Centre (DLR) in Braunschweig. Köster was one of the first computer science students at Oldenburg University – he began his degree in 1989, a year after the department was founded. He went on to become a research assistant at the affiliated OFFIS Institute and completed his doctorate in 2001 in the research group "Programming Languages and Systems". He then became a research associate in the department "Data Systems" and earned his Habilitation in 2007. Köster has since led several research groups at the DLR German Aerospace Centre, and since 2009 he has led the 60-strong automotive team of engineers, psychologists and computer scientists which is working on assistance and automation systems for intelligent transport technology. In addition Köster also taught at the Universities of Osnabrück and Oldenburg.

Hubert Löwenheim
Medicine

Prof. Dr. Hubert Löwenheim has been appointed Professor of Otorhinolaryngology. He is also director of the University Clinic for Otorhinolaryngology at the Evangelisches Krankenhaus Oldenburg. Before coming to Oldenburg he was deputy medical director at the University Hospital Tübingen. Löwenheim studied Human Medicine at Goethe University Frankfurt, where he completed his doctorate in hearing research in 1995. He did his practical year in Otorhinolaryngology at Harvard University's Massachusetts Eye and Ear Infirmary (Boston, USA). After several research stays in the US and UK he earned his Habilitation at the University of Tübingen with research on Regenerative medicine of hearing. There he led the "Molecular Otology" research group at the university's hearing research centre. His clinical activities focus on otology and neurotology including hearing implants and cochlea implants, oncological head and neck surgery with plastic reconstructive microsurgical procedures, as well as interdisciplinary skull base surgery.

New Appointments

John Neidhardt
Human Genetics

Prof. Dr. John Neidhardt, molecular geneticist and biologist, has been appointed Professor of Human Genetics. Before Neidhardt came to Oldenburg he was deputy director of the Institute for Medical Molecular Genetics at the University of Zurich, where he also led a research group. A major aim of his research is to develop new forms of therapy in genetically transmitted diseases, particularly those related to the retina. Neidhardt studied Biochemistry at the University of Hanover and Molecular Biology at the University of Hamburg, where he also completed his PhD. He then moved to Zurich and attained his Habilitation with a thesis on retinal degeneration. The focus areas of his research include the genetic characterisation of patients and families with hereditary forms of retinal degeneration, the mutation screening of genes in retinal diseases as well as the functional analysis of the pathogenic effects of gene mutations. Neidhardt uses his findings to develop new treatment approaches based on procedures of gene therapy and to test their effectiveness.

Mehtap Özaslan
Electrocatalysis

Dr. Mehtap Özaslan has been appointed Junior Professor for Electrocatalysis. Previously she worked as a research assistant at the "Electrochemistry Laboratory" at the Paul Scherrer Institute in Villigen (Switzerland). Özaslan studied Chemistry at the TU in Berlin, where she also completed her PhD in 2012. Her thesis on "Oxygen Electroreduction on Core-Shell Nanoparticle Catalysts for Fuel Cells" won the European Umicore Scientific Award. In 2007 she won the Clara von Simson prize for the best diploma dissertation in the natural sciences and engineering. As a postdoctoral researcher Özaslan was awarded a sponsorship from the Fast Track Programme of the Robert Bosch Foundation – a career programme promoting excellence in young women scientists. Her research focuses include the development of new and improved nano-structured electrode materials for fuel cells and electrolysers. Özaslan is an alumna of the Lindau Nobel Laureate Meeting funding programme and was one of the speakers at this year's opening matinée.

Alexandra Philipsen
Psychiatry

Prof. Dr. Alexandra Philipsen, previously acting consultant at the Clinic for Psychiatry and Psychotherapy at the University Medical Centre Freiburg, has been appointed Professor of "Psychiatry and Psychotherapy". She is also the director of the University Clinic for Psychiatry and Psychotherapy at the Karl-Jaspers-Klinik. After studying Romance Studies and the Classics, Philipsen studied Human Medicine at the University of Freiburg, where she obtained her doctorate in 1999. She specialised in Psychiatry and Psychotherapy at the university hospital there. In 2006 she became a consultant and was then appointed acting consultant in 2011 and led a BMBF multi-centre study on the treatment of ADHD in adults. Philipsen, who earned her Habilitation in 2009, has taught at a number of institutions and also works as a supervisor and reviewer. She has received several awards including the DGPPN Prize for Medical Psychotherapy and the Saarland ADHD research award. Her scientific research focuses on developing new concepts for stress and emotion regulation.

New Appointments

Rainer Röhrig
Medical Informatics

Prof. Dr. Rainer Röhrig has been appointed Professor of Medical Informatics. Before coming to Oldenburg he was a physician and research associate at the Department for Anaesthesiology and Intensive Care Medicine, University Hospital Gießen. Röhrig studied Computer Science in Bonn before enrolling to study Human Medicine at the Universities of Gießen and Cologne. He obtained his doctorate with research on computer aided monitoring and predicting of adverse events during anesthesia. Röhrig has led the "Working Group Medical Informatics in Anaesthesiology and Intensive Care Medicine" in Gießen and was a member of the medical faculty's ethical committee. He is active in scientific societies, especially DIVI, gmds and TMF. In Oldenburg he intends to expand his two scientific emphases: on the one hand, the question how information technologies and methods can enable and support medical research, on the other hand, chances and risks of information technology in medical care, especially the complex interactions between patients, medical staff, IT systems and medical equipment.

Ralf Schwarzkopf
Didactics of Mathematics

Prof. Dr. Ralph Schwarzkopf has been appointed Professor of the Didactics of Mathematics. Previously he was academic senior councillor at the Institute for Development and Research in Mathematics Education at the Technical University of Dortmund. Schwarzkopf studied Mathematics at the University of Kiel. He then took a position as a research assistant at the Institute for the Didactics of Mathematics at the University of Munster. After obtaining his PhD in Munster Schwarzkopf transferred to the University of Dortmund. There he was a member of the research and development project "mathe 2000", which examined and implemented new concepts for maths lessons for kindergartens right up to upper secondary school classes. In his research Schwarzkopf is interested in substantial learning opportunities, which he approaches from a constructive and reconstructive perspective mainly in interactive teaching and learning processes. His research will focus primarily on elementary modelling processes and pre-algebraic argumentation processes in primary school and lower secondary school lessons.

Peter Ruckdeschel
Mathematics

Prof. Dr. Peter Ruckdeschel has been appointed Professor of "Mathematics Specialised in Applied Statistics". Ruckdeschel studied Mathematics and Mathematical Economics in Bayreuth and Bordeaux. He obtained his PhD in statistics at the University of Bayreuth, after which he remained at the university as a research associate. His dissertation entitled "Approaches for Robustifying the Kalman Filter" won him the award of the Fachgruppe Stochastik of the German Mathematical Society (DMV). In 2008 Ruckdeschel transferred to the Fraunhofer Institute for Industrial Mathematics (ITWM) in Kaiserslautern, where he led industry projects with the financial sector. He also focused on fraud detection. In 2011 he habilitated at the TU Kaiserslautern. His research focuses on robust statistics, in other words statistical methods that are not (so) prone to outliers. In addition, he has contributed to the open source statistical software R. In Oldenburg, among other things, Ruckdeschel plans to team up with the University of Bremen in a joint centre for applied statistics.

Doctorates

Fakultät I - Bildungs- und Sozialwissenschaften

Jana Alber, Thema: „Partnerschaften nach Schlaganfall – Untersuchung zu Förderfaktoren und Barrieren im Rehabilitationsprozess“ (Sonderpädagogik)

Jan-Patrick Braun, Thema: „Pädagogik im Museum. Eine Untersuchung zum Professionsverständnis aus der Perspektive museumspädagogischer Fachkräfte in Kunstmuseen.“ (Pädagogik)

Katharina Dutz, Thema: „Interessenförderung am Bereich der Technischen Bildung – Das Projekt ‚Technikschwerpunkt an der Robert-Dannemann-Schule in Westerstede‘.“ (Pädagogik)

Kaija Früchtenicht, Thema: „Wirksamkeit eines Hörtrainings bei Kindern mit Sprachverständnisstörungen im Vorschulalter.“ (Pädagogik)

Christian Geldermann, Thema: „Erfolgreicher Mathematikunterricht in der gebundenen Ganztagsschule. Eine qualitative Studie.“ (Pädagogik)

Dennis Hövel, Thema: „Adaption und Evaluation des Präventionsprogramms ‚Lubo aus dem All!‘ für Kinder mit hohen Risikobelastungen.“ (Sonderpädagogik)

Marianne Irmler, Thema: „Psychomotorisch orientierte Körper- und Selbstkonzeptförderung von Jungen mit Duchenne Muskeldystrophie. Einzelfallstudien im Multiple Baseline Design.“ (Sonderpädagogik)

Christa Lampe, Thema: „Das Bildungspotential des Schülerbetriebspraktikums. Die Perspektive von Schülerinnen und Schülern als Ausgangspunkt für eine Neuorientierung.“ (Pädagogik)

János Lilienthal, Thema: „Beeinflussungsfaktoren der Diffusionsgeschwindigkeit einer At-the-bottom-Innovation in einem regionalen Bildungswerk.“ (Pädagogik)

Berna Öney, Thema: „Mainstream parties‘ strategies on the ethnic dimension in new democracies: The case of kurdish opening-up process in Turkey 2009- 2011.“ (Sozialwissenschaften)

Christian Pfeil, Thema: „Zum Ausstiegsprozess aus rechtsextremen Szenezusammenhängen.“ (Pädagogik)

Carolin Reinck, Thema: „Lernförderung im Mathematikunterricht durch Advance Organizer. Eine quantitativ-empirische Erhebung zur Untersuchung der Wirksamkeit eines Advance Organizer für heterogene Lerngruppen im Mathematikunterricht der 3. Jahrgangsstufe.“ (Sonderpädagogik)

Jana Rogge, Thema: „Verteilungspräferenzen und Akzeptanz personenbezogener Priorisierung im Gesundheitssystem - gesellschaftliche Einstellungen im internationalen Vergleich.“ (Sozialwissenschaften)

Marie-Christine Vierbuchen, Thema: „Förderung sozial-kognitiver Informationsverarbeitung im Jugendalter. Konzeption und Evaluation eines Förderprogramms unter besonderer Berücksichtigung spezifischer Risikofaktoren für schulischen Dropout.“ (Sonderpädagogik)

Thorben Wist, Thema: „Feldtheoretische Analyse der Bedeutung von neuen Technologien für ein selbstbestimmtes Leben von Menschen mit einer Beeinträchtigung – Identifikation möglicher Förderfaktoren und Barrieren.“ (Sonderpädagogik)

Fakultät II - Informatik, Wirtschafts- und Rechtswissenschaften

Stefan Bickert, Thema: „Analyse der Integration von Elektromobilität in bestehende Mobilitätsstrukturen unter Berücksichtigung ökonomischer, ökologischer und politischer Aspekte.“ (Betriebswirtschaftslehre)

Jörg Bremer, Thema: „Constraint-Handling mit Supportvektor-Dekodern in der verteilten Optimierung.“ (Informatik)

Kai Brinkmann, Thema: „Neue Arbeitsplatzperspektiven für Mitarbeiter mit kritischen Tätigkeitseinschränkungen in der deutschen Automobilbranche.“ (Betriebswirtschaftslehre)

Christian Dänekas, Thema: „Integration von Technologieroadmaps in die Planung der Unternehmensarchitektur von Energieversorgungsunternehmen.“ (Informatik)

Andreas Eggers, Thema: „Direct Handling of Ordinary Differential Equations in Constraint-Solving-Based Analysis of Hybrid Systems.“ (Informatik)

Lena Marie Glunz, Thema: „Die Entwicklung eines Modells zur individuellen ressourcenorientierten Veränderungsbewältigung und eine Perspektive der Förderung ausgewählter Ressourcen im organisationalen Weiterbildungskontext.“ (Betriebswirtschaftslehre)

Erkan Gören, Thema: „Essays on the Impact of Ethnic and Cultural Diversity on Economic Growth and Development.“ (Volkswirtschaftslehre)

Kevin Grecksch, Thema: „Adaptive Water Governance. Conclusions and Implications Regarding Adaptive Governance and Property Rights.“ (Betriebswirtschaftslehre)

Philipp Gringel, Thema: „Unternehmensspezifische Anpassung von Enterprise Architecture Frameworks“ (Informatik)

Kim Grüttner, Thema: „Application Mapping and Communication Synthesis for Object-Oriented Platform-Based Design.“ (Informatik)

Jörn Heinrich, Thema: „Private Kapitalanlagen im Spannungsfeld von Produktvertrieb und Verbraucherschutz.“ (Rechtswissenschaften)

Sebastian Heldmann, Thema: „Dienstliche Nutzung privater Endgeräte (BYOD) und privater Gebrauch betrieblicher Kommunikationsmittel.“ (Rechtswissenschaften)

Christian Hinrichs, Thema: „Selbstorganisierte Einsatzplanung dezentraler Akteure im Smart Grid." (Informatik)

Tim Hoerstebrock, Thema: „Strategische Analyse der Elektromobilität in der Metropolregion Bremen/Oldenburg – Multiagenten basierte Simulation alternativer Antriebssysteme." (Informatik)

Hilke Hollander, Thema: „Essays on the Value Relevance and on the Term Structure Dynamics of Securitizations." (Betriebswirtschaftslehre)

Christian Jakob, Thema: „Gesellschaftsrechtliche Anforderungen an Risikomanagementsysteme." (Rechtswissenschaften)

Vera Kirchner, Thema: „Wirtschaftsunterricht aus der Sicht von Wirtschaftslehrpersonen – Eine qualitative Studie zu fachdidaktischen teachers' beliefs in der ökonomischen Bildung." (Ökonomische Bildung)

Ekaterina Korneeva, Thema: „Unternehmenspersönlichkeit als Corporate Identity bei der Entstehung und Fortentwicklung des Unternehmenspersönlichkeitsrechts." (Rechtswissenschaften)

Anastasia Kraft, Thema: „Essays on Accounting Choice and Auditor Independence." (Betriebswirtschaftslehre)

Florian Krohs, Thema: „Development of Novel Operation Models for Atomic Force Microscopy based Nanofabrication and 3D Nanometrology." (Informatik)

Steffen Kruse, Thema: „Co-Evolution of Metamodels and Model Transformations." (Informatik)

Mirja Kuhn, Thema: „Der verfassungsrechtliche Schutz von Betriebs- und Geschäftsgeheimnissen und seine Berücksichtigung bei der Herausgabe von Verbraucherinformationen durch die Behörden in Deutschland und den Vereinigten Staaten von Amerika." (Rechtswissenschaften)

Christian Kuka, Thema: „Qualitätssensitive Datenstromverarbeitung zur Erstellung von dynamischen Kontextmodellen." (Informatik)

Sven Linker, Thema: „Proofs for Traffic Safety: Combining Diagrams and Logic." (Informatik)

Myriam Lipprandt, Thema: „Entwicklung eines modellgetriebenen Verfahrens zur Abbildung sensorbasierter Daten aus häuslichen Assistenzsystemen auf medizinische Befundberichte." (Informatik)

Ammar Memari, Thema: „A Model for Adaptive Applications on the Semantic Web." (Informatik)

Miada Naana, Thema: „Data-Warehouse-basierte Konzeption eines strategischen Öko-Controllings." (Informatik)

Patrick Ndaki, Thema: „Climate Change Adaptation for Smallholder Farmers in Rural Communities: the Case of Mkomazi Sub-Catchment, Tanzania." (Betriebswirtschaftslehre)

Ha Xuan Nguyen, Thema: „Simulation, Validation and Optimization of Stick-Slip Drives for Nanorobotic Applications." (Informatik)

Astrid Nieße, Thema: „Verteilte kontinuierliche Einsatzplanung in Dynamischen Virtuellen Kraftwerken." (Informatik)

Dirk Peters, Thema: „Adaptive Lehr- und Lernsysteme zur Unterstützung der praktischen Ausbildung an ERP-Systemen." (Informatik)

Daniel Osberghaus, Thema: „Economics of Climate Change Adaptation. The Case of Private Households in Germany." (Volkswirtschaftslehre)

Benjamin Poppinga, Thema: „Sensor-Supported, Unsupervised Observation Techniques for Field Studies." (Informatik)

Mohammad Rabbath, Thema: „Re-Composition of Distributed Social Media Content." (Informatik)

Amir Rahbaran, Thema: „Die Rolle von Bricolage im strategischen Entrepreneurship: eine ethnografische Studie von Internet-Startups." (Betriebswirtschaftslehre)

Andreas Solsbach, Thema: „Document Engineering als Ansatz für eine überbetriebliche Nachhaltigkeitsberichterstattung." (Informatik)

Christoph Schwarz, Thema: „Untersuchung zur Steigerbarkeit von Flexibilität, Performanz und Erweiterbarkeit von Fahrerlosen Transportsystemen durch den Einsatz dezentraler Steuerungstechniken." (Informatik)

Christine Schweikert, Thema: „Anti-Fraud Management und Corporate Governance im Mittelstand." (Betriebswirtschaftslehre)

Sebastian Senge, Thema: „Ein Bienen-inspiriertes Schwarmintelligenz-Verfahren zum Routing im Straßenverkehr." (Informatik)

Marco Springmann, Thema: „Addressing Emissions Embodied in Trade: Options and Impacts for National and International Climate Policies." (Betriebswirtschaftslehre)

Benjamin Wagner vom Berg, Thema: „Konzeption eines Sustainability Customer Relationship Managements (SusCRM) für Anbieter nachhaltiger Mobilität." (Informatik)

Monika Walter, Thema: „Ein Konzept zur Identifikation von Unterstützungspotenzial für Simulationsstudien bei Verwendung multidimensionaler Datenmodelle." (Informatik)

Henning Wellhausen, Thema: „Die Veranstaltung staatsfernen Rundfunks durch Telekommunikationsunternehmen im lokalen/regionalen Raum." (Rechtswissenschaften)

Maik Winges, Thema: „Bestimmung der Klimaanpassungskapazität politisch-administrativer Akteure am Beispiel der Regionalplanung" (Betriebswirtschaftslehre)

Doctorates

Carsten Wissing, Thema: „ReFlex: Marktbasiertes Redispatch mit Flexibilitäten von Netznutzern für das Verteilnetz" (Informatik)

Bertram Wortelen, Thema: „Das Adaptive-Information-Expectancy-Modell zur Aufmerksamkeitssimulation eines kognitiven Fahrermodells." (Informatik)

Matthäus Wuczkowski, Thema: „Biodiversität und Unternehmen – Untersuchung nachhaltigkeitsorientierter organisationaler Lernprozesse zum Erhalt von Biodiversität." (Betriebswirtschaftslehre)

Fakultät III - Sprach- und Kulturwissenschaften

Anna Kathrin Auguscik, Thema: „Prizing Debate in Literary Interaction: The Fourth Decade of the Booker Prize and the Contemporary Novel in the UK." (Anglistik)

Till Knipper, Thema: „Mikrotonale Komposition und Integration am Beispiel der Musik von Klaus Huber: Fallstudien und Experimente." (Musik)

Tania Meyer, Thema: „Gegenstimmbildung. Aufklärungskonstruktionen in interkulturellen theaterpädagogischen Projekten gegen Kulturellen Rassismus." (Kunst und Medien)

Thomas Schopp, Thema: „Eine Klanggeschichte der Diskjockey-Show im US-amerikanischen Radio von 1930 bis 1970." (Musik)

Lüder Tietz, Thema: „Homosexualität, Cross-Dressing Transgender: Heteronormativitätskristische kulturhistorische und ethnographische Analysen." (Kunst und Medien)

Fakultät IV - Human- und Gesellschaftswissenschaften

Nils Baratella, Thema: „Das kämpferische Subjekt. Der Kampf als Subtext moderner Subjektphilosophie und seine Aufführung im Boxring." (Philosophie)

Jörn Esch, Thema: „Das Subjekt des Fußballs. Eine Geschichte kollektiv bewegter Körper." (Geschichte)

Saeed Ghorbani, Thema: „Observational learning of a Baseball-pitch: The effect of different model demonstrations." (Sportwissenschaft)

Frauke Kersten, Thema: „Camaradas en fe y alegria.Die Sección Femenina der Falange (1945- 1975)." (Geschichte)

Marc Thomas Voss, Thema: „Regimes of Modern Germany: A Concise Theory of and Empirical Study on Action Consciousness as an Integral Dimension of Historical Consciousness with specific Emphasis on National Socialist Germany and the GDR." (Geschichte)

Andrea Querfurt, Thema: „Auf den Spuren von Integrationslotsen. Eine praxeographische Analyse der Selbstbildung in Begegnungsräumen der Migration." (Sportwissenschaft)

Fakultät V - Mathematik und Naturwissenschaften

Maike Abbas, Thema: „Analysis of the effects of plant diversity on the ecological stoichiometry of grassland ecosystems including multiple element cycling and trophic interactions." (Meereswissenschaften)

Christian Adler, Thema: „Raumfüllende Amide des Titans und Zirconiums – Bindungsaktivierungen unter milden Bedingungen." (Chemie)

Tanja Badewien, Thema: „Ursprung und Charakterisierung von Pflanzensignalen in Oberflächen- und subrezenten Sedimenten des südwestafrikanischen Kontinentalhanges." (Meereswissenschaften)

Chistina Bauch, Thema: „Between-individual variation in the Common Tern: Linking phenotypic fitness components with telomeres and plasma metabolites." (Biologie/Umweltwissenschaften)

Florian Behler, Thema: „Synthese neuer Sulfonsäuren als Linker für Koordinationspolymere." (Chemie)

Matthias Bender, Thema: „Synthese neuer C19-Sterane zur strukturellen Aufklärung von Biomarkern für die Organische Geochemie." (Chemie)

Piotr Biernacki, Thema: „Model based sustainable production of biomethane." (Chemie)

Mareike Bolten, Thema: „Entwicklung und Praxiseinsatz interaktiver Visualisierungen für Chemievorlesungen an einer japanischen Universität." (Chemie)

Fabian Brockmeyer, Thema: „Realisierung neuer Synthesekonzepte zur Darstellung heteroatomhaltiger Ringsysteme Diversitätsorientierte Kombinationen von Multikomponentenreaktionen und gezielten Funktionalisierungen." (Chemie)

Jörn Bruns, Thema: „Oxoanionische Verbindungen ausgewählter Metalle durch innovative Synthese unter stark oxidierenden Bedingungen." (Chemie)

Sven Burdorf, Thema: „Photoexcitation and energy transfer processes in composite systems of dyes and microcrystalline silicon." (Physik)

Victoria Burke, Thema: „The impact of redox conditions on the attenuation of wastewater – derived organic micropollutants in groundwater." (Biologie/Umweltwissenschaften)

Peter Clawin, Thema: „Surface chemistry of oxygenates on rutile(110)." (Chemie)

Birthe Dorgau, Thema: „Analysis of the murine outer retina: Expression and function of pannexin1 and connexin50 and effects of horizontal cell ablation." (Biologie/Umweltwissenschaften)

David Dreyer, Thema: „The detection of the plane of polarization of linearly polarized light in the avian retina and the processing of magnetic field – related information in the central nervous system of migratory songbirds.“ (Biologie/Umweltwissenschaften)

Svenja Engels, Thema: „Orientation in birds and its underlying neurobiological mechanisms.“ (Biologie/Umweltwissenschaften)

Arne Feinkohl, Thema: „Psychophysical Experiments on Sound Localization in Starlings and Humans.“ (Biologie/Umweltwissenschaften)

Katja Fichtel, Thema: „Influence of crustal fluids on growth and activity of marine deep biosphere microbial populations.“ (Meereswissenschaften)

Robert Fischer, Thema: „Relative Importance of Mixotrophy in the Marine Pelagial.“ (Meereswissenschaften)

Karsten Fritzsch, Thema: „A Geometric Approach to Mapping Properties of Layer Potential Operators: The Cases of the Half-Space and of Two Touching Domains.“ (Mathematik)

Kai Sascha Gansel, Thema: „A New Perspective on the Organization of Neuronal Activity in Neocortex.“ (Biologie/Umweltwissenschaften)

Marit Gudenschwager, Thema: „Funktionelle Architekturen auf Basis neuartiger Nickel- und Selten-Erd-Polysulfonate.“ (Chemie)

Inga Heile, Thema: „Evaluation und Erweiterung thermodynamischer Modelle zur Vorhersage von Octanol/Wasser-Verteilungskoeffizienten und von Wirkstofflöslichkeiten.“ (Chemie)

Sebastian Hermann, Thema: „Adaptationsmechanismen inhibierender Netzwerke in der Fischretina.“ (Biologie/Umweltwissenschaften)

Kerstin Heusinger von Waldegge, Thema: „Biologielehrkräfte diagnostizieren die Schülerkompetenz ‚Bewerten‘ – Eine qualitative Untersuchung zu Orientierungen bei der Diagnose.“ (Biologie/Umweltwissenschaften)

Sabine Hochmuth, Thema: „Assessment of language- and talker-specific factors influencing speech intelligibility in noise: A multilingual comparison.“ (Physik)

Hendrik Kayser, Thema: „Auditory model-based machine localization.“ (Physik)

Björn Kempken, Thema: „Nanokristalline Legierungen aus Cu-In-Zn-S: ihre Synthese, Charakterisierung und Anwendungsmöglichkeiten.“ (Physik)

Olga Kichakova, Thema: „Axially Symmetric Non-Abelian Solutions with Anti-de Sitter Asymptotics.“ (Physik)

Martin Klein-Hennig, Thema: „Binaural auditory processing and temporal periodicity – Experiments and models.“ (Physik)

Peter Klement, Thema: „Optische-Emissions-Spektroskopie bei der Herstellung von Schichten für Solarzellen aus Silizium, Germanium und deren Legierungen.“ (Physik)

Angelika Klugkist, Thema: „Untersuchung ausgewählter organischer Schadstoffe und Zustandsindikatoren in Oberflächensedimenten des Jadebusens.“ (Meereswissenschaften)

Natalie Kordts, Thema: „Intramolekulare stabilisierte Organoelementkationen der Gruppe 14 in der C-F Bindungsaktivierung.“ (Chemie)

Denis Kröger, Thema: „Konzeptionelle Synthesestrategien zur diversitätsorientierten Darstellung anellierter N-heterocyclischer Scaffolds via Multikomponenten-Reaktionen.“ (Chemie)

Maike Köster, Thema: „Rac1 und PAK1 in Photorezeptorzellen von Vertebraten.“ (Biologie/Umweltwissenschaften)

Denis Krotov, Thema: „Weiterentwicklung der Gruppenbeitragszustandsgleichung VTPR zur Beschreibung von Elektrolyt- und Polymersystemen.“ (Chemie)

Michael Langner, Thema: „Stochastische Modellerstellung für das Verhalten von Fahrern im Straßenverkehr.“ (Physik)

Nele Lefeldt, Thema: „Avian navigation Sensors, cues and mechanisms underlying magnetoreception.“ (Biologie/Umweltwissenschaften)

Renke Lühken, Thema: „Mosquitoes and biting Midges: Data Collection, Identification, Species Distribution, and breeding Ecology.“ (Biologie/Umweltwissenschaften)

Edith Markert, Thema: „Habitat mapping of the seabed in the German Bight based on the study of small- and large-scale variability of macrofauna communities and their hy-droacoustic signals.“ (Biologie/Umweltwissenschaften)

Frank Meiners, Thema: „Oberflächenmodifikationen von Funktionsmaterialien mit organischen Dünnschichten zur Beeinflussung biologischer Zellen.“ (Chemie)

Glenda Kissi Mendieta Leiva, Thema: „Long-term dynamics of vascular epiphytes.“ (Biologie/Umweltwissenschaften)

Arndt Meyer, Thema: „Synaptic connections of three different amacrine cell types in the mouse retina.“ (Biologie/Umweltwissenschaften)

Arne-Freerk Meyer, Thema: „Statistical models of neural processing in the ascending auditory pathway.“ (Physik)

Jan Mitschker, Thema: „Quantenchemische und quantendynamische Untersuchungen zur Photochemie von Wasser auf einer Titandioxidoberfläche.“ (Chemie)

Godfrey Mmbando, Thema: „Hydrological Sensitivity of the Mkomazi River Basin (Tanzania) to Climate Change.“ (Biologie/Umweltwissenschaften)

Kai Neuschulz, Thema: „Synthese von Sulfaten und Sulfatderivaten ausgewählter Metalle unter drastischen Bedingungen.“ (Chemie)

Daniel Nickelsen, Thema: „Markov Processes in Thermodynamics and Turbulence.“ (Physik)

Monika Noack, Thema: „Die Rolle der Autophagie und von HDAC6 bei der Proteinaggregat - Bildung in Oligodendrozyten.“ (Biologie/Umweltwissenschaften)

Regina Elisabeth Nowak, Thema: „Electrochemically Deposited Zinc Oxide Nanostructures for Improved Light Management in Silicon Thin-Film Solar Cells.“ (Physik)

Jale Özyurt, Thema: „The Neurobiological Basis of Cognitive Deficits in Patients with Childhood-Onset Craniopharyngioma and Hypothalamic Involvement.“ (Psychologie)

Björn Piglosiewicz, Thema: „Physics and applications of a novel nanometer-sized femtosecond electron source.“ (Physik)

Muhammad Ramzan Luhur, Thema: „Stochastic Modeling of Aerodynamic Force Dynamics on Wind Turbine Blades Under Turbulent Wind Inflow.“ (Physik)

Michael Richter, Thema: „Electro-Optical Modeling and Simulation of Cu (In, Ga) (Se, S)2 Thin-Film Solar Cells.“ (Physik)

Jürgen Riedel, Thema: „Q-Balls and Boson Stars in asymptotically flat and Anti-de-Sitter space-time.“ (Physik)

Barhiem Schickmous, Thema: „Studien zur Synthese von Furanen und Butenoliden.“ (Chemie)

Stephanie Schlump, Thema: „Lehrerperspektiven über die fachdidaktische Strukturierung des Mathematikunterrichtes zur Entwicklung der Problemlösekompetenz.“ (Mathematik)

Stefan Schmit, Thema: „Schulbücher als Lehr- und Lernmaterialien: Das Thema ‚Bewegungsbeschreibung‘ in Physikschulbüchern der Sekundarstufe I.“ (Physik)

Hermann Sebastian, Thema: „Adaptationsmechanismen inhibierender Netzwerke in der Fischretina.“ (Biologie/Umweltwissenschaften)

Maya Soora, Thema: „Role of light in the survival of Dinoroseobacter shibae during starvation.“ (Meereswissenschaften)

Sandra Stein, Thema: „Explizite Methoden zur Konstruktion von globalen Funktionenkörpern mit hohem N-Rang.“ (Mathematik)

Eike Stut, Thema: „Wirkungen der Psychosynthese“. (Psychologie)

Karen Lesley Szostek, Thema: „Extrinsic Factors influencing Demographic Rates in the Common Tern (Sterna hirundo).“ (Biologie/Umweltwissenschaften)

Maria Tschikin, Thema: „Strahlungswärmetransport im Nano- und Mikrometerbereich: Von Nanoteilchen zu Metamaterialien.“ (Physik)

Martin Theuring, Thema: „Light Management in Flexible Silicon Thin Film Solar Cells.“ (Physik)

Reinhard Vetters, Thema: „Entwicklung und Evaluation eines Diagnoseinstrumentes zur Erfassung metakognitiver Fähigkeiten im Bereich Formelsprache.“ (Chemie)

Katrin Wagner, Thema: „Vascular epiphyte assemblages: The effect of habitat filtering within forest stands.“ (Biologie/Umweltwissenschaften)

Wei Wang, Thema: „Optical response and ultrafast dynamics of J-aggregate/metal hybrid nanostructures.“ (Physik)

Daniel Wetzel, Thema: „pde2path und Turing-Verbindungen zwischen Hexagon- und Streifenmustern.“ (Mathematik)

Georg Wirth, Thema: „Modellierung der Netzeinflüsse von Photovoltaikanlagen unter Verwendung meteorologischer Parameter.“ (Physik)

Diala Yacoub, Thema: „Topology and Spectrum in Quantum Layers.“ (Mathematik)

Christina Zitzer, Thema: „Untersuchungen zur Koordinationschemie neuartiger Polysulfonate.“ (Chemie)

Fakultät I Bildungs- und Sozialwissenschaften

Dr. Ines Oldenburg, Titel der Habilitationsschrift: „Perspektiven von Sachunterricht als mehrdimensionales Konstrukt. Unter besonderer Berücksichtigung von maßgeblichen Grundfragen der Schulqualitätsentwicklung.“

Fakultät IV Human- und Gesellschaftswissenschaften

Dr. Ingo Elbe, Titel der Habilitationsschrift: „Beiträge zu klassischen Begründungsversuchen von modernenm Privateigentum und bürgerlicher Staatsgewalt.“

Dr. Christine G. Krüger, Titel der Habilitationsschrift: “Dienstethos, Abenteuerlust, Bürgerpflicht. Jugendfreiwilligendienste in Deutschland und Großbritannien im 20. Jahrhundert.“

Dr. Stephan Scholz, Titel der Habilitationsschrift: „Vertriebenendenkmäler. Topographie einer deutschen Erinnerungslandschaft.“

Dr. Tobias Weger, Titel der Habilitationsschrift: „Großschlesisch? Großfriesisch? Großdeutsch! Die Schlesische Stammlandbewegung und die Großfriesische Bewegung, 1925-1945.“