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RESEARCH MAGAZINE

EINBLICKE 61



Main Topic:
Marine
Research

Editorial

Dear Readers,

New species are spreading across the Wadden Sea in Northern Germany. Marine biologists have discovered bacteria that were hitherto unknown and which influence the climate. At the same time, however, species are dying out at an ever increasing rate - faster than ever before. What sounds like something out of a science fiction novel shapes the daily routine of the scientists at the Institute for the Chemistry and Biology of the Marine Environment (ICBM). They are exploring the biological diversity of the Earth's oceans, studying the tiniest living organisms and asking the big question of how much biodiversity our planet needs.

This issue provides further exciting insights into the world of marine research. ICBM director Bernd Blasius and the future director of the new Helmholtz Institute in Oldenburg Helmut Hillebrand talk in an interview about the current challenges and goals in this field. Microbiologist Meinhard Simon explains how Roseobacter bacteria help create a healthy climate. And landscape ecologist Michael Kleyer gives a pro-

gress report on a unique project: two years ago he supervised the construction of a group of small artificial islands in the Wadden Sea which he and his team are using as an open-air laboratory.

Understanding how wind works is the goal Oldenburg University's turbulence researchers have set themselves. They are studying the interaction between atmospheric currents and wind energy systems. In a picture series we show the scientists at work – modeling, creating simulations and making measurements.

Our EINBLICKE reportage looks at diversity in the classroom. Special needs educators Clemens Hillenbrand and Carolin Reinck go back to school to find out how inclusion can be put into practice with successful results. Their extraterrestrial colleague Lubo gives them a helping hand.

Mathematician Peter Ruckdeschel proves how versatile statistics are, and how close to our everyday lives. The statistician uses his expertise in many

different domains – including crime investigations. Mark Siebel is another expert with numbers, but he applies them in a different area altogether. In addition to thought experiments the philosopher uses empirical methods to find answers to questions in his field.

„Hands off the Steering Wheel“ – Frank Köster is convinced that this will soon be the reality on Germany's motorways. The computer scientist is developing solutions for automated and integrated driving. In this issue you can read about why he represents both basic research and the testing of these new technologies at the University.

And last but not least we have our „Globetrotting Scientists“ section, which features reports on the various missions and activities of Oldenburg scientists who have been abroad recently.

We wish you a most pleasurable read!

Yours,
the EINBLICKE editors.

[Anzeige]



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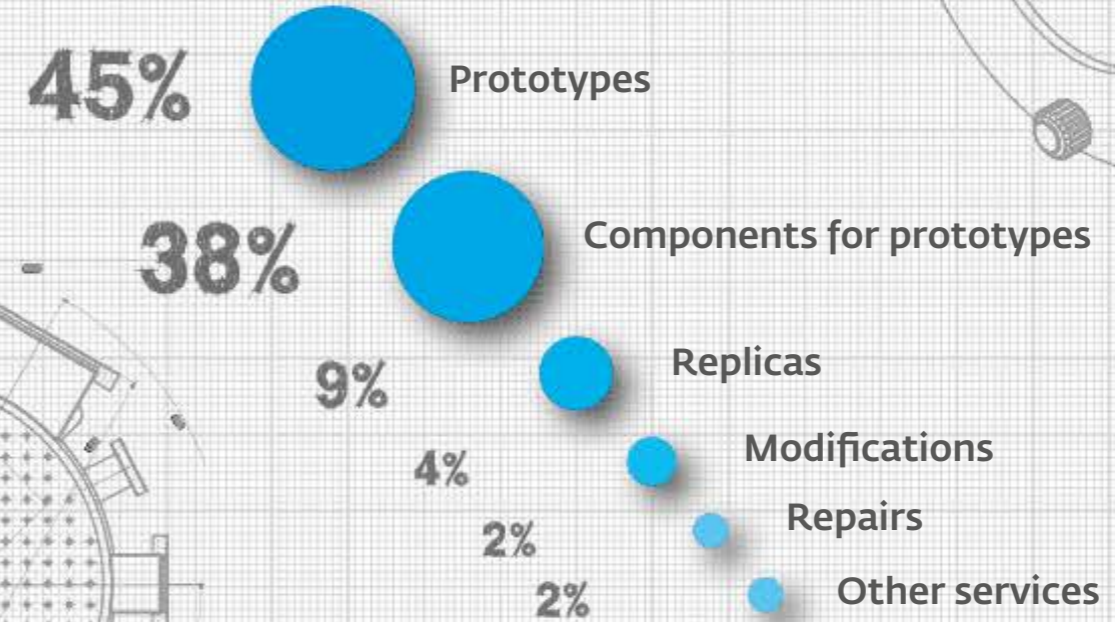
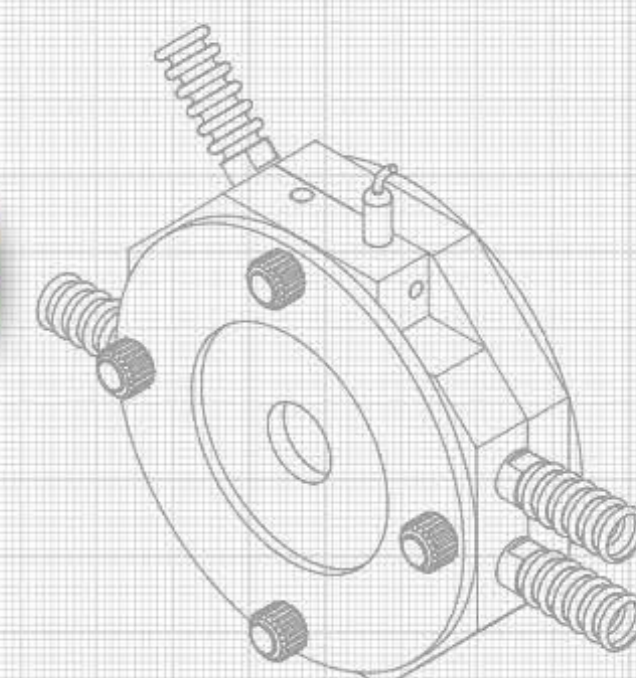
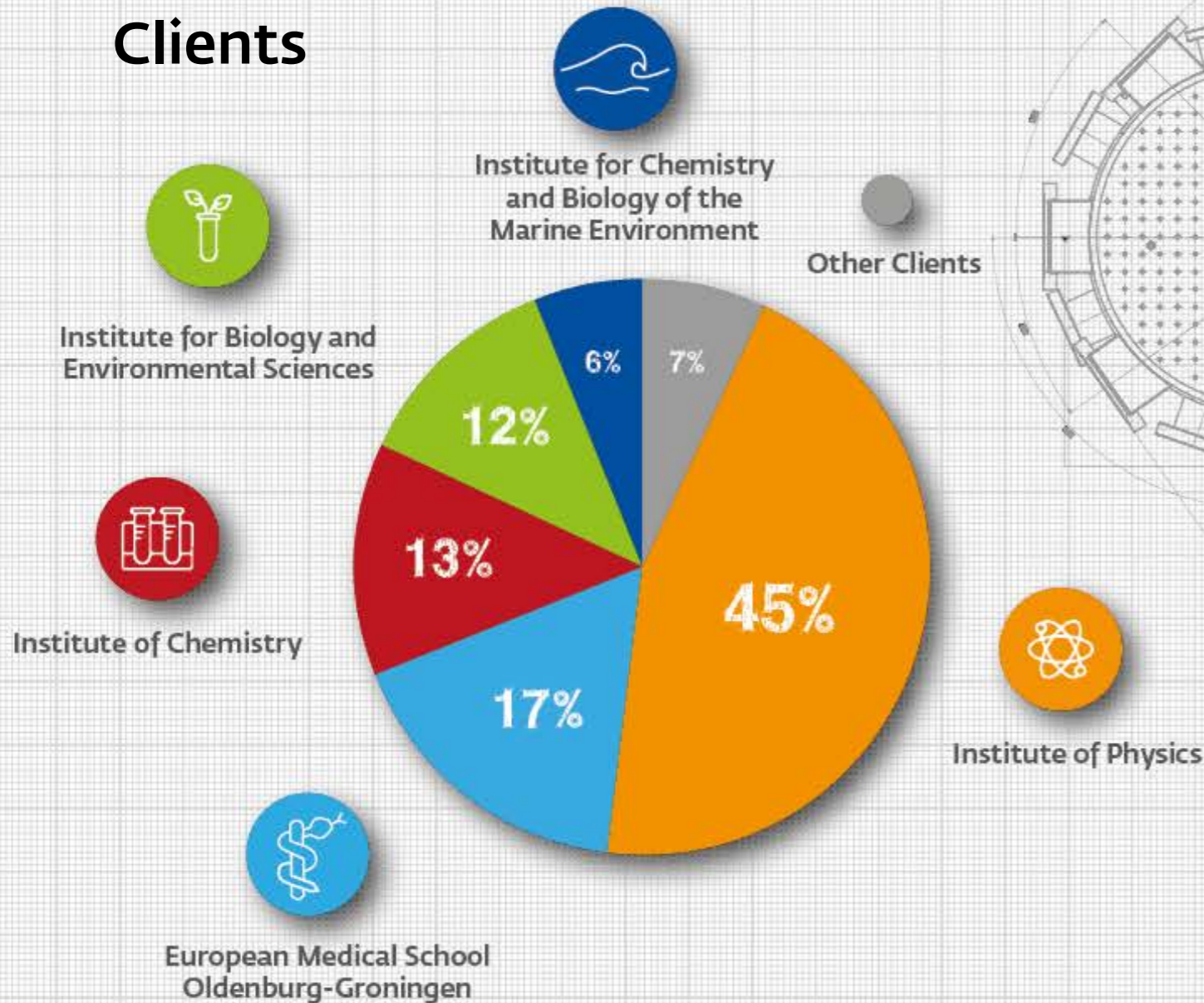
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Prototypes for Cutting-Edge Research

If you want to do experimental research you need equipment and components that fit in perfectly with your experimental design. So it's often the staff at Oldenburg University's Mechanical Workshop who pave the way for peak results in research and teaching. The 29 members of the Mechanical Workshop team work together to ensure that the scientists have everything they need for their research, including customised prototypes and special equipment, from ultra-high vacuum recipients to acoustic simulators. Here are a few numbers and facts about the Mechanical Workshop.

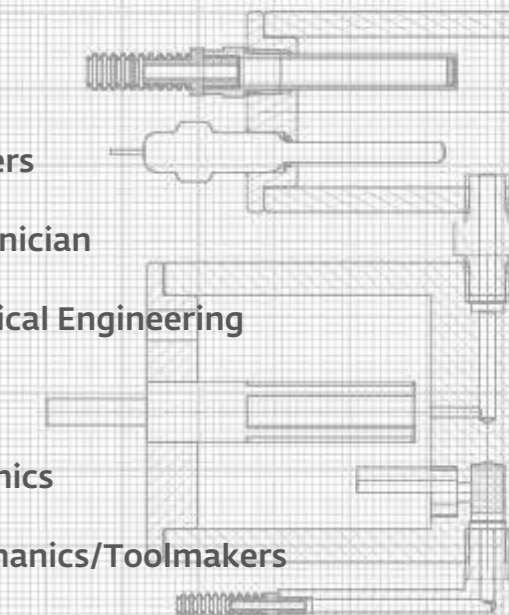
All data for 2015

Clients



Expertise

- 3 Dipl.-Ing. Mechanical Engineers
- 1 Mechanical Engineering Technician
- 3 Master Craftsmen in Mechanical Engineering
- 1 Technical Draftsman
- 4 Mechanics / Precision Mechanics
- 4 Mechanical Engineering Mechanics/Toolmakers
- 2 Metal Workers/Welders
- 11 Trainees in Precision Mechanics





The vehicle of the future: Frank Köster's car, designed at the German Aerospace Center, features a host of technical innovations, but the computer scientist still has to drive it – for now. A few years from now the car will drive itself.

Hands off the Steering Wheel

Frank Köster has a vision: a car that he doesn't need to drive so he can read on the motorway or simply watch nature go by. Together with his colleagues, the computer scientist is working to ensure that that vision goes into serial production within a few years' time

When he's not working Frank Köster prefers to leave the car in the garage. He particularly enjoys going for long walks with his daughter. Walking through the woods and letting nature work on all his senses is his idea of relaxing.

His job, however, involves lots of travelling. He commutes between his two workplaces in Oldenburg and Braunschweig, but also travels a lot around Germany and Europe. He uses a car every now and then but prefers taking the train because then he can work at the same time. Around half his working hours are spent on the go.

For Köster, driving a car is a waste of time. So it seems logical that his field of research is automated and networked driving.

This is a complex subject that still requires plenty of basic research, but which is already seeing extensive testing. Köster feels privileged to be able to participate in both research and testing. His professorship at Oldenburg University, „The Design of Intelligent Transport Systems“, is oriented towards basic research, Köster explains. „Together with colleagues from other fields I'm examining questions like

what embedded systems for automated driving should look like.“ These systems take over monitoring and steering functions in vehicles. „They perform their tasks largely unnoticed by the user“, Köster notes. Air bags and cruise control are examples of embedded systems that were introduced in vehicles more than 30 years ago. Köster and his colleagues are developing integral systems in which a number of otherwise autonomous embedded systems come together and, for instance, make it possible for vehicles to communicate with each other.

Köster applies scientifically grounded basic knowledge in Braunschweig, where he heads a team of more than 60 engineers, psychologists and computer scientists working in the automotive department of the German Aerospace Center (DLR). „There, too, we are working on assistance and automated systems for intelligent vehicle technology, but with a stronger focus on practical applications“, he says explaining the differences between his two workplaces. The team tests such things as emergency systems that combine braking and swerving manoeuvres, key components of automated driving. Köster sees his work in Oldenburg and Braunschweig as „a perfect combination“ – and he is the bridge between the two locations.

„I find the developments in computer science incredibly exciting“

The computer scientist is clearly passionate about his field of research. „I find the developments in computer science incredibly exciting“, he says. „They are taking on a new form and being integrated into the automation of vehicles in technical systems that haven't changed in a long time.“ He points out that although there is a lot of technology in vehicles nowadays, „the principle of using the steering wheel and pedals to drive them has remained the same.“ But Köster is convinced that this will change in the next five years. „At least on motorways, automated driving will also be possible in serial products“, he predicts. Partially automated vehicle functions are already available on the market today.

However, they have one crucial disadvantage: the driver still has to concentrate on the traffic and be ready to take over in an emergency. Köster and his colleagues have more ambitious goals: they want the driver to be able to give the car complete control. If a vehicle is controlled by cameras, sensors, radars and laser scanners, the

systems in the background need to function efficiently. „The vehicle must be able to identify and interpret its surroundings. It must register objects and know where they're coming from and in which direction they're moving. The systems must decide how to react to these objects: move out of their way, drive behind them, or overtake them? On top of that the vehicle must not make any dangerous manoeuvres, and it must behave logically so that other vehicles can react accordingly.

But this is not just about making things more comfortable for people. When Köster decides not to drive, it's mainly for safety reasons. „Most accidents are the result of drivers' mistakes. Assistance and automation systems can therefore boost safety and efficiency in the long term“, Köster stresses. But first the systems themselves need to be tested. „And for this we also need to develop new methods. To obtain reliable road results we would have to drive well over 200 million test kilometres“, Köster explains. But because this kind of testing is unfeasible, simulators are being developed. This is another thing the scientists at Oldenburg and Braunschweig are working on together.

Once automated driving on motorways becomes possible it won't be more than a few years before cars can do even more on their own, Köster says. You could be sitting at the hairdresser's while your car goes to the supermarket

to pick up groceries ordered online in advance. Connected to servers, the car's embedded systems calculate the route, park the car and pay parking tickets online. Trips to the charging point when the vehicle needs refuelling are also included.

Different areas of life become interconnected

This interconnection of various increasingly automated areas of life is also an aspect of so-called „smart cities“ - development concepts for making cities more efficient, more high tech, more environmentally friendly and more socially inclusive. Köster is involved in this area of research too. At Fliegerhorst, a former military airbase just outside Oldenburg, a „living lab“ for testing digital innovations is already in planning. Its various housing complexes will be used for testing innovations like an automated parking service and networked telemedicine.

Köster lives with his family in Braunschweig. Here, too, he is involved in the construction of a „smart city“. One day he may be able to use the innovations he is helping to develop today. And if his car can make the trip to the charging point on its own, that will be one small task less for Köster to take care of - leaving him more time for taking walks with his daughter. (dr)



Cars will soon be able to do even more on their own, like looking for a free parking space.

Veterinary drugs in the soil and water

In addition to nutrients that promote plant growth, liquid manure also contains residues of veterinary medicinal products. A new team of junior researchers led by Oldenburg hydrogeologist Dr. Victoria Burke is studying the effects these residues have on soil where manure is used and also their impact on the groundwater from which we source our drinking water. The Kurt Eberhard Bode foundation is providing a total of 460,000 euros in funding for the research group at the University's Institute for Biology and Environmental Sciences. The funding period ends in 2019.

The use of industrial fertilisers such as liquid manure on areas used for agriculture is considered to be one of the principal ways in which veterinary drug residues are released into

the environment. Animals excrete significant amounts of these drugs – in some cases up to 100 percent of the dose – either unchanged or as breakdown products. A certain amount is retained in the ground (initially), some of it seeps away, and the rain washes some of it into the deeper soil layers, with each substance behaving differently in the process. Together with two PhD candidates Burke wants to find out which drug residues quickly make their way into the groundwater, how, in what concentration – and also which substances are retained in the unsaturated upper layers either temporarily or for longer periods of time. Their research will also examine how these tracers are broken down. What happens with antibiotics for example? How quickly are they broken down in soil

and in groundwater? Which drugs leave residues in the ground, meaning that – depending on the concentration – the local water supplier needs to take action? Water suppliers must adhere to stringent limits here because studies have proven that drugs and other chemical residues have negative effects on humans, animals and the environment. In experiments of varying scales, from laboratory tests to field tests on a section of land provided by the Lower Saxony Chamber of Agriculture, Burke hopes to gain an understanding of the entire process, from the point at which the residues enter the ground to the point where they reach the groundwater. The research will also focus on the question of how laboratory results can be designed to better reflect events as they occur in nature.



Hydrogeologist Victoria Burke: tracing the pathways of veterinary drugs at three different levels of analysis.

Traffic safety on land and waterways

The "Interdisciplinary Research Centre on Safety-Critical Systems Engineering for Socio-Technical Systems" at Oldenburg University has secured an initial sum of one million euros in follow-up funding from the State of Lower Saxony. The team of scientists in this joint project began their research into safety in human interactions with complex technical systems in 2013. The key goals of the second 18-month funding period are to expand knowledge in basic research and to build up a unique pan-European research network in the field of safety-critical systems. The University and its affiliated OFFIS institute are cooperating with the DLR

Institute of Transportation Systems in Braunschweig and the competence network SafeTRANS on the project. The basic research already covers a broad spectrum: one project is studying how motor vehicles can proactively compensate for driver weaknesses, while another is analysing the potential risks of new methods for safe ship navigation. A third project is examining safety issues in highly interconnected socio-technical systems, and in addition there are research projects on the safe design of offshore operations and on adaptive integrated ship bridges which are able to adjust to different nautical tasks.

New insights into the theory of relativity

Fresh impetus for research in the field of gravitational physics in north-west Germany: the German Research Foundation (DFG) has approved the continuation of the Research Training Group "Models of Gravity". The group will receive a total of 4.2 million euros in funding. It is led by Prof. Dr. Jutta Kunz of Oldenburg University's Institute for Physics and Prof. Dr. Claus Lämmerzahl of the Center of Applied Space Technology and Microgravity at

the University of Bremen. Gravitational physics has become an increasingly topical and exciting field of research in recent years thanks to confirmation of the existence of gravitational waves and the fact that these are created through the merging of two stellar-mass black holes. The scientists hope to gain fresh insights about the equivalence principle and by extension about the foundational basis of the theory of relativity.

Kale prevents cancer

Kale is considerably more effective at protecting against cancer than other vegetable varieties, a team of Oldenburg researchers led by Prof. Dr. Dirk Albach of the Institute for Biology and Environmental Sciences working together with chemists from the Jacobs University Bremen has discovered. They were looking for kale varieties that were low in bitter-tasting compounds but rich in cancer-preventing substances, and during this search

they made an amazing discovery: northern German kale varieties contain ten times more cancer-preventing substances than broccoli, the front runner up to now. Kale owes its cancer-preventing properties to its high content of glucosinolates, which the human organism breaks down into sulphur compounds. Certain sulphur compounds have been proven to have chemopreventive effects, which means they help protect against cancer.

Four new marine research groups

Oldenburg University is in charge of four out of six new groups in Lower Saxony that are engaged in marine and coastal research. Two of these projects involve members of the general public in the research.

The four new research groups will receive 5.1 million euros in funding provided by the Ministry of Science and Culture of Lower Saxony and the Volkswagen Foundation's "Niedersächsisches Vorab" fund. Together with colleagues from the Institute for Biology and Environmental Sciences, as well as cooperation partners both inside and outside Germany, by 2020 the scientists at the Institute for Chemistry and Biology of the Marine Environment (ICBM) hope to find answers to a number of questions.

A project led by Prof. Dr. Oliver Zielinski is investigating whether the amount of light penetrating the water in coastal areas is decreasing, and what impact this would have on the North Sea coast's ecosystem. Citizens can contribute to the project by providing sea colour data obtained using the EyeOnWater app specially developed for this purpose.

To study the sources, dispersal pathways and contamination zones of macroplastics in Germany's North Sea coastal areas, another research team led by Prof. Dr. Jörg-Olaf Wolff is putting some 100,000 pieces of wood into the water. The team would like people who find these "drifters" to report the location online at macroplastics.de.

A team of researchers led by Prof. Dr. Helmut Hillebrand and Prof. Dr. Bettina Meyer is studying the impact on a marine ecosystem when one marine animal species gradually ousts another from the system as a result of climatic factors in the Southern Sea. The fourth research team, headed by Prof. Dr. Thorsten Dittmar and Dr. Hannelore Waska, is focusing on groundwater and the underground transport of nutrients from land to sea.

High-tech for cutting-edge research

Large machines are indispensable for top-level research. In 2015 the University received funds to the tune of several million euros to acquire high-end technology. Most of the money came from federal and state budgets.

Chemists and physicists at Oldenburg University will now be able to use a new X-Ray Photoelectron Spectrometer (XPS) for their research. This device performs chemical analyses of solid object surfaces – an important function in materials research. The layers it analyses are five nanometres thick, or just one ten-thousandth the diameter of a hair. In a group led by Prof. Dr. Gunther Wittstock, professor of chemistry, Oldenburg scientists are using this technology among other things to

optimise layer structures in batteries and solar cells.

The University has also acquired two new supercomputers. Together “CARL” and “EDDY” are among the fastest supercomputers in the world and one of the most powerful computer clusters in Germany’s university research landscape. Around 200 scientists from more than 30 research groups are using the newly available computing power for numerical simulations. The computers receive funding from two separate budgets: the German Research Foundation (DFG) and the State of Lower Saxony provided the funds for one of them while the ForWind Centre for Wind Energy Research received the funding

to purchase the second from the Federal Ministry for Economic Affairs and Energy. The total investment amount is five million euros.

The University’s scientists in the fields of psychology and medicine will be able to use the new magnetic resonance imaging (MRI) scanner at the School of Medicine and Health Sciences (Faculty VI) for their research. The MRI scanner has already been used for a study on the effects of chronic pain which was carried out by the University in collaboration with the Klinikum Oldenburg. The scanner is also an important new research tool for the “Hearing4all” Cluster of Excellence, which can use it for imaging brain structures involved in the hearing process.

Education for Sustainability: Four new projects

Making socially challenging educational topics accessible for youths is the goal of four closely interconnected projects at the University which will receive a total of 800,000 euros in funds from the German Federal Environmental Foundation (DBU). The educational materials and concepts developed within these projects are to be made available to school and non-school educational establishments.

Technology educationalist Prof. Dr. Peter Röben and project manager Dr. Katharina Dutz view teaching pupils and trainee teachers the knowledge and skills necessary to carry out repairs as an integral component of education in technology and computer science aimed at sustainability. In a project titled RETIBNE, and together with computer science educationalist Prof. Dr. Ira Diethelm, they are developing exercises involving repairs to help pupils acquire the practical skills necessary to carry out such tasks.

Physics educationalist Prof. Dr. Michael Komorek sees the discussion of the physical mechanisms at work in mud

flats and in coastal areas as an important task in schools and non-school learning environments. In his project aspects of marine and coastal dynamics in the context of climate change will be analysed and prepared as teaching content and then integrated into the educational activities of the Lower Saxony Wadden Sea National Park.

Chemistry educationalist Prof. Dr. Verena Pietzner wants lessons with a greater emphasis on vocational orientation. In her school laboratory CHEMOL, pupils are given special exercises that serve as an introduction to careers in trade and industry, landscape conservation, administration and environmental analysis. Biology educationalist Prof. Dr. Corinna Hößle and her colleagues Anja Wübben and Dr. Holger Winkler advocate transfer of knowledge about current marine research in schools, teacher training and national park facilities. They aim to build up a network that connects the University with national park facilities and to launch innovative educational initiatives at the “Learning Laboratory Wadden Sea”.

“Hearing for all”

Excellent hearing research: the “Hearing4all” Cluster of Excellence competed successfully in the „Cutting-Edge Research in Lower Saxony“ competition organised by the Lower Saxony Ministry for Science and Culture and the foundation VolkswagenStiftung. With the one million euros in funding they secured, the researchers from Oldenburg and Hanover plan to begin research in new fields and at the same time work on boosting the Cluster’s chances of receiving follow-on funding in the German Universities Excellence Initiative.

The new two-year research unit “Hearing for all” aims to bridge the gap between specialised hearing research and a sustained impact on patients’ everyday lives. To this end the researchers are focusing on three important and pioneering challenges: audiological precision medicine, improved machine processing of language, and new materials and control mechanisms for the hearing aids of the future. Prof. Dr. Birger Kollmeier is the coordinator of the Oldenburg research unit.

Junior Research Group: How knowledge is created through music

With the support of her own junior research group and funding from the German Research Foundation’s prestigious Emmy Noether Programme, musicologist Dr. Anna Langenbruch is investigating “The History of Music on the Stage”. The group will receive a total of 1.1 million euros in funding from the five-year programme. With the addition of musicologists and drama experts Daniel Samaga and Clémence Schupp, who joined Langenbruch’s project in August, the team is now complete.

The musicologists are studying how musical history is reconstructed in musical theatre – for example in operas, operettas and musicals. There are hundreds of works that deal with musicians such as Mozart, Farinelli, Clara Schumann, Edith Piaf or the Beatles. These historic figures have frequently been presented on stage as dramatis

personae themselves. In such productions the history of music is presented and experienced in a very special way: it is sung, spoken, played or composed. In this way the history of music itself becomes an aesthetic event. The researchers are interested in examining how this form of production of knowledge functions, or in other words how knowledge about music is conveyed through the medium of music. Through the project they hope to gain new insights for the historiography of music, as well as for the historiography of the arts in general.

The project is divided into three parts, each with their own specific emphasis as regards content and method. Under the heading “Music|History|Theatre” Anna Langenbruch is exploring the history of musico-historical knowledge production. Her methodological reflections are based on the analysis of

selected case studies stretching across time and space, from the Parisian beginnings of historiographic musical theatre in the 18th century and the problematic nature of voice historiography to the stage expertise of contemporary opera houses.

In the sub-project “Mozart on Stage”, Daniel Samaga is analysing typical narrative strategies of historiographic musical theatre using the example of Wolfgang Amadeus Mozart, a central figure in musical theatre history. The third sub-project, “The History of Music in Popular Musical Theatre from 1970 Onwards”, focuses on perception processes. Here, Clémence Schupp is using a selection of productions about historic chanson and jazz singers to examine how the actors involved in these productions experience and shape the confrontation with the history of music on stage.



A prestigious programme for junior researchers: Anna Langebruch has put together her own team of researchers.



In the many and ever new areas in which Ruckdeschel now applies his expertise, suspected crimes, criminal investigations or substantial economic interests are quite often involved.

The Appeal of Numbers

His domain is statistics, but thanks to his expertise in this field he is active in a number of other fields too. Peter Ruckdeschel gives us a few insights into his research, the details of which are often confidential

It was not your usual cowboy film. It was an epic documentary about the last cow herders in Italy and he saw it with a fellow student at a film festival in Hof, Upper Franconia, some 20 years ago. Peter Ruckdeschel is a film enthusiast, but this is not why he is telling this anecdote from his university days – he’s using it to illustrate one of the downsides of his academic discipline, mathematics.

Because while one advantage of maths is that it can be done anywhere – “all you need is pencil and paper” – it also means that “once you have a pro-

blem in your head, you can’t let it go and it keeps popping up at the most inconvenient moments.” Like back then at the film festival, recalls Ruckdeschel, who is now a statistics professor and has been teaching and conducting research at Oldenburg since 2015.

Right at the beginning of the documentary an old cattle herder talks about how, on his first day of work, his boss gave him 20 cows to look after and told him each of their names. At the end of the day – much to his dismay – he could only remember five of their names. “As a mathematician

you can’t let this drop, you keep asking yourself whether five is good or not. It’s a classical problem with a beautiful solution. And according to that solution five is extremely good. But we didn’t know that at the time and so we walked through town as if on autopilot, discussing different approaches.”

Today Peter Ruckdeschel seeks solutions in a number of different fields: How much capital should a bank set aside as a buffer to cover vast sums lost by employees on the stock market, for example? How can tax inspectors most efficiently track down offenders who

may have evaded millions of euros in taxes? How to calculate the total cumulated damages if a physician has systematically submitted false claims for reimbursement? These are the sort of questions that the 46-year-old mathematician and his working group spend their days trying to answer.

When he talks about his research, he weighs his words carefully. Because whether he’s dealing with banks or flood protection, whether the search is for tax evaders, fraudsters or the right combination of planned operations to achieve maximum cost-efficiency in a hospital – in the many and ever new areas in which Ruckdeschel is applying his expertise, suspected crimes, criminal investigations or substantial economic interests are quite often involved. “For obvious reasons many of the specific details in these cases are confidential and are therefore not published” he says.

One of the focal points of Ruckdeschel’s research is risk quantification, in which he addresses such things as so-called operational risks for banks. Banks are obliged to protect themselves against losses, for example through fraud, by setting money aside. “But capital is expensive, which is why banks need these risk quantifications to be as accurate as possible,” he says. And this is where statistics come in. What is the probability of specific events occurring, and what is the severity distribution of the respective damages or to which degree is the bank exposed to these risks?

But even for a statistics expert the answer is anything but trivial. Because damages that occur frequently but mostly on a relatively small scale – credit card fraud, for example – cannot be assessed in the same way as cases like that of former trader Jérôme Kerviel, who accrued stock market losses running into billions. “Damages on this scale don’t occur very often so the statistics are trickier,” Ruckdeschel says, explaining that statistics achieve their full potential and precision when case numbers are higher.

In order to also do justice to rare and

extreme events he resorts to so-called robust statistics. “They bring a fundamental scepticism to calculation models designed to describe reality, because in this school of thought you never know whether a past event will be recurrent, reproducible in the future or whether it was just a one-off,” Ruckdeschel explains. “Consequently you try not to give too much weight to any single event, including the more extreme ones.”

This approach is also applied in fraud detection: “When you generate a procedure that picks out Uli Hoeneß from thousands of tax files, it is doubtful that there will be another Uli Hoeneß any time soon,” the statistician stresses. “In other words, it is doubtful whether a procedure tailored to the specificities of a small minority can be used to make predictions in other cases. And here the robust approach is more sceptical. It demands empirical evidence that such – or similar – cases won’t just occur once, but more often.”

“Tackle problems that actually come up”

Aside from isolated cases involving millions in dodged taxes the statistician is aiming for “a procedure that substantially improves on tax inspectors simply reaching blindly into the files.” Ruckdeschel elaborates: “It’s about being able to quantify more precisely how valuable the presence of a particular feature might be for identifying something as suspicious.” In this task, as a mathematician, he says, here, as in all domains, he relies on the domain knowledge of experts in the respective field. This is crucial to avoid false alarms, as a computer easily needs to check thousands of features in order to sort tax returns, for example, into the more suspect ones and the less suspect, he explains.

To ensure that statisticians everywhere are able to make calculations according to the latest technical standards, for several years Ruckdeschel

has also been involved in contributing to the statistics software “R”, together with many other experts. Using this open source software – “which is actually the computational foundation of what we are working with here” – together with his group, he is maintaining about 20 extension packages. When it comes to large data sets parallelization, i.e. dividing the workload among many computing units, helps to substantially reduce computation time, and “R” provides a powerful infrastructure to this end. “We have the necessary computing clusters here in Oldenburg so that a task that a normal computer would take 100 days to perform can be completed in one and a half days.”

Large volumes of data are also the reason why Peter Ruckdeschel has been called in as an expert witness in lawsuits in cases of medical billing fraud. When the prosecution is not able to check each individual bill submitted for reimbursement, a carefully selected sample is decisive in helping to determine a lower confidence limit for damages with 99.5 percent certainty. This, too, requires the expertise of a statistician like Ruckdeschel who, together with other colleagues, is currently setting up the “Centre for Statistics in Oldenburg & Bremen” as a hub for other scientists from the two universities, as well as for businesses.

He has already started to create links between his research and a number of other disciplines in Oldenburg, for example healthcare research, biology, economics and the neurosciences. Statistics is by definition an “interface science”, Ruckdeschel believes, “and going outside the field provides a constant source of new ideas. In this way, its applications trigger new research. You tackle problems that actually come up.” Indeed this is one reason why he ended up in statistics in the first place. “One day you’re working with a biologist, the next with a judge – it’s very varied. You have to constantly reassess your ideas, but that’s what makes it so exciting.” (ds)

Pioneering Work in Marine Research



Bernd Blasius (left) and Helmut Hillebrand: "There is still plenty of room for proper pioneering work in the field of biodiversity."

Biologist Helmut Hillebrand and physicist Bernd Blasius are representative of the interdisciplinarity in Oldenburg University's marine research. In an interview the two scientists from the Institute for Chemistry and Biology of the Marine Environment (ICBM) talk about dramatic extinction rates, open questions, invasions and valuable "green soup". And about the new Helmholtz Institute for Functional Marine Biodiversity in Oldenburg, which got the green light from the Helmholtz Association in October

What does the topic of biodiversity mean for you?

Hillebrand: Biodiversity is a concept that aims to describe the diversity of life forms. These can be different species, different types of habitat within a certain region, or populations comprising different genetic information. It has been a key concept of ecology ever since ecology came into being. Already in the 19th century the zoologist and naturalist Ernst Haeckel, who coined the term "ecology", spent most of his time making wonderful scientific drawings of biological diversity. For me personally, biodiversity was what motivated me to study ecology in the first place. The question of why some species live together and others don't, and how they interact has always fascinated me.

Blasius: Incidentally, from a scientific point of view it is truly amazing how little we know about biodiversity. We don't know exactly how diverse our planet is, nor do we understand the function of biodiversity. Is there a minimum level of biodiversity we need here on Earth? This question has yet to be answered. At the same time it's alarming to see that we live in an age in which biodiversity is declining dramatically. Faster than ever before on Earth. This discrepancy is a strong motivation for many of our students to study biodiversity.

The loss of biological diversity is one of the greatest threats to humanity – would you subscribe to this sentence from a Green politician?

Hillebrand: First of all it's important

to ascertain how many species really have died out and how quickly this has happened – in other words the number of species that have become extinct and the rate at which they are dying out. If we take the example of amphibians, many of which are at great risk, the actual number of properly documented extinction events is not particularly high. Of course today we are still well below the kind of extinction quotas reached during the five major mass extinctions of this geological era. Between 75 and 98 percent of all species died out during these events. What really worries us today is the rate at which species are becoming extinct. This has the same impact for mankind as climate change.

Blasius: But the problem is that we can't even assess the scope of these

developments accurately. There are basic theoretical papers from the 1960s which say that more complex, more diverse systems are inherently unstable. Conversely, that would mean that lower diversity leads to more stable systems, which in theory would be a good thing. These theoretical statements, however, stand in stark contrast to the findings of numerous field studies which show that systems with lower biodiversity are considerably less stable and more vulnerable to invasion and parasites. We have already observed this with monoculture farming. To date, the whole diversity-stability debate per se is entirely unresolved. We still don't know whether lower diversity means that vital functions of the ecosystem as a whole are lost.

Hillebrand: ... and for me, too, this is

precisely the question that drives my research. With climate change we already have global models that can tell us with relative certainty how the temperatures or rainfall in specific regions are going to change. But we don't have them for biological diversity.

Speaking of the climate, what impact do climate changes have on biodiversity? Is it possible to make any clear statements on this?

Blasius: No. Or at least there is no clear pattern. It may well be that changes in the climate increase biodiversity in certain regions because they allow other species to specialize there. But they may also have the opposite effect – so when it comes to species diversity there are winners and there are losers. That's why it's very difficult to make these predictions. A key factor that contributes to changing biodiversity patterns on our planet is invasion ...

Your speciality ...

Blasius: That's right – we are working with several colleagues on this topic. The vectors of bioinvasion are global transport systems like ships, which carry species and organisms back and forth across the world. If we look at the impact, once again there are no clear patterns: in some areas invasion can lead to greater biodiversity. The Pacific oyster in the Wadden Sea is a good example. So far it hasn't caused any apparent damage and in fact appears to have enriched the ecosystem. But from a global point of view such invasions could lead to increased homo-

genization and ultimately to less species diversity on our planet. In this scenario all that would be left across the world is a handful of dominant species that are very similar to each other. Particularly in coastal regions, invasion is a significant factor behind changes in aquatic communities.

"We're still in the very early stages when it comes to marine conservation"

Helmut Hillebrand

You're talking about marine biodiversity. Is the knowledge gap here as large as it is in terrestrial research? Or even larger?

Hillebrand: Unfortunately our knowledge of marine biodiversity is far more limited. The little we do know is deduced on the one hand using global distribution data on organisms that can be identified relatively easily. For example we know that Steller's sea cow has been wiped out because it is no longer to be found anywhere. On the other hand we work with long-term monitoring data. Unfortunately, long-term time series as done on Helgoland, where data has been gathered for decades, are the exception to the rule. We can't make any realistic projections about the biodiversity of the North Sea in 100 years' time at this stage. Another thing that is lacking is "citizen science": research carried out by enthusiastic amateurs that provides us with additional data, as is the case with terrestrial biodiversity. Unlike

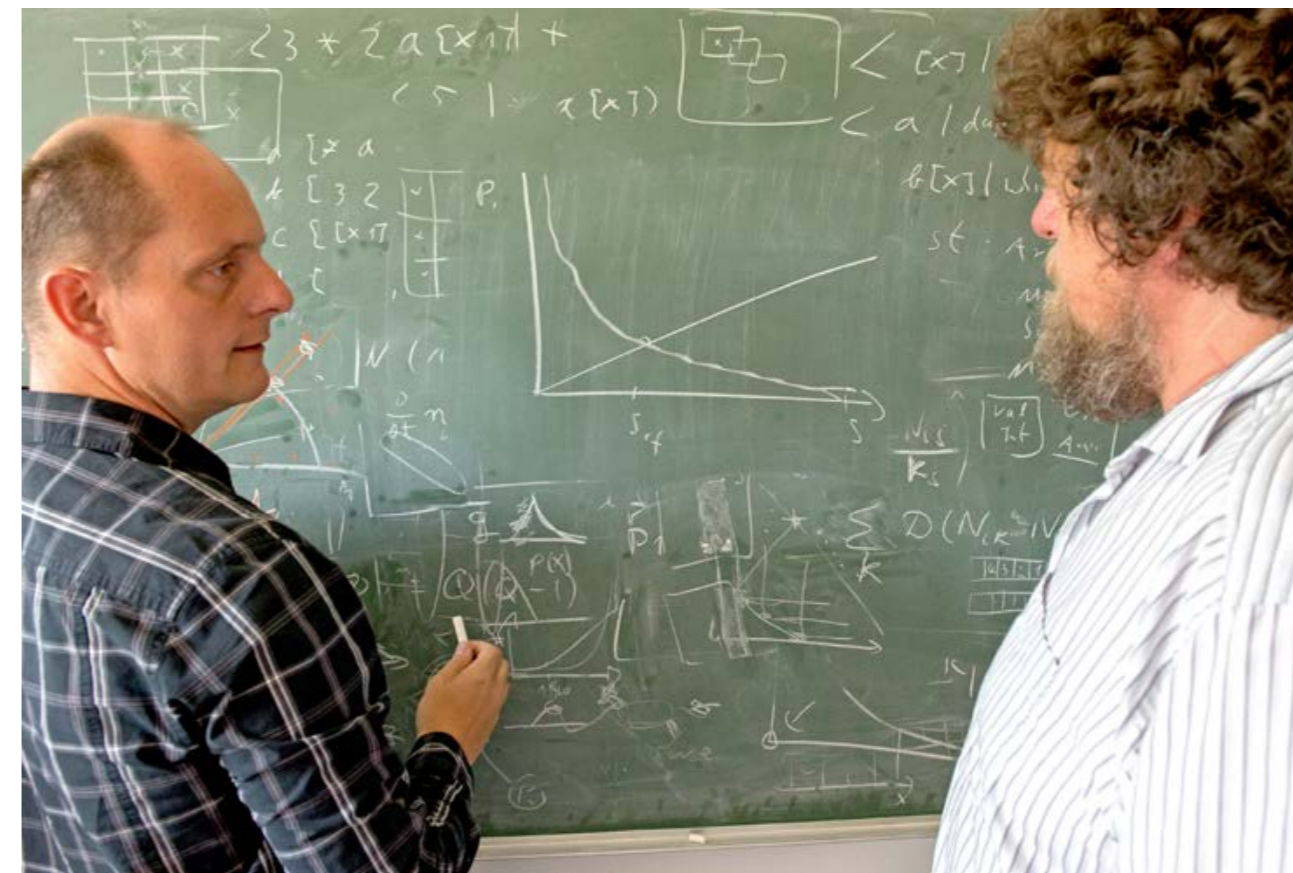
birds and butterflies, marine species are hard to get to, and for many people they often remain abstract.

Biodiversity and marine science is a focal topic of research at Oldenburg University. What makes it so special?

Hillebrand: There are above all two things that set us apart from similar research institutions. Firstly we study biodiversity both in the sea and on land. The Institute for Biology and Environmental Sciences is an important partner here. Take the artificial islands near the East Frisian Island of Spiekeroog – created to find answers to questions about species diversity and the colonization of newly formed islands. Thereby we also examine the intersection between land and sea. Secondly, at ICBM we focus on interdisciplinarity. Elsewhere research is primarily organismic and biological, which accounts for only about a third of the work. We also have access to enormous expertise in chemistry and physics.

So a genuinely interdisciplinary approach?

Hillebrand: Absolutely, and it is very rewarding. We can team up with modelling and hydrodynamics experts so that theory and empirics go hand in hand. We can exchange insights with our geochemists about organic substances in the sea – in other words the products and resources of microbes which would normally be the preserve of a biologist. This makes the aspect of ecosystem functioning far more tan-



Interdisciplinarity in action: Biologist Helmut Hillebrand watches physicist and modeller Bernd Blasius at work.

gible. Around 90 percent of the studies on this topic focus mainly on primary production, or in other words the production of biomass via photosynthesis. By integrating physics and geochemical research groups here at the ICBM we have acquired an unusually strong understanding of the processes involved. With our projects we have become an integral part of interdisciplinary environmental research. This is how we see ourselves and this is what defines biodiversity research in Oldenburg.

What does that mean for you as a physicist and modeller?

Blasius: That's exactly how I see it too. The fitness of a species, which determines whether or not it is threatened by extinction, depends as much on its chemical and physical environment as it does on its biological environment. It is only through the interaction between biologists, geochemists, modellers and physical oceanographers that we can gain a comprehensive understanding of an environmental system. Another exciting incentive is

that there is still plenty of room for proper pioneering work in the field of biodiversity! Even students often explore unknown territory during their research internships.

So what are the questions of the future for you?

Hillebrand: One area we want to focus on in future is the fundamentals of marine conservation. The central question here is: How do you protect marine ecosystems? The problem is that the underlying concepts all come from terrestrial nature conservation research. The focus so far is on establishing areas for conservation, thus reducing or stopping exploitation in certain protected areas. There are already professorships for the conservation of terrestrial ecosystems. We don't have all these things in marine research yet. For very plausible reasons: for example how does one go about protecting mobile species that use extensive areas? Would an area-based approach using so-called "Marine Protected Areas" be adequate here? Firstly, most of the areas in question don't belong to any

one nation. That means that national legislation and initiatives can't achieve much here. Secondly, the things that can be used to change and influence marine biodiversity are not localised. On land the situation is clear: a square metre of land that I convert into farmland is definitely no longer uncultivated land. At sea, by contrast, it's mainly about food extraction, but this doesn't change the sea's surface. There is no impact on the surface, which means area-based conservation would be extremely difficult to implement. So we're still in the very early stages when it comes to marine conservation.

A second important question is strongly linked to the social sciences.

Hillebrand: Yes, the second topic we want to make headway with is so-called "ecosystem services". This refers to the services that the ecosystem performs for us which benefit society. These can be anything from providing food in the form of fish to breaking down harmful substances. They can't be defined from the perspective of the



Prof. Dr. Helmut Hillebrand

Marine biologist and biodiversity expert Helmut Hillebrand heads the „Planktonology“ research group at the ICBM and coordinates the „Marine Biodiversity“ research centre with the University of Bremen. Also a coordinator of the BEFmate research project on biodiversity and ecosystem function relationships, his research topics include monitoring concepts for the German Bight and marine food chains in the Southern Ocean. Hillebrand has been appointed as the director of the new Helmholtz Institute for Functional Marine Biodiversity in Oldenburg, which will commence its activities in 2017. He is one of the most frequently cited scientists worldwide in his field.



Prof. Dr. Bernd Blasius

Physicist Bernd Blasius is the director of the ICBM and heads the interdisciplinary research group „Mathematical Modelling“ there. Blasius is an expert in global transport routes, bioinvasion and the spread of infectious diseases, and is also one of the ICBM's researchers at the Helmholtz Virtual Institute „Polar Time“. There he is developing mathematical models for developing krill populations and also studying the adaptability of marine invertebrates.

natural sciences. Expertise in the social sciences is what is needed here! Take the ocean, for example: it extracts most of the carbon dioxide from the atmosphere and deposits it in the deep sea, using it as a kind of warehouse. It's like a biological carbon pump. This process requires the production of large

"Data and knowledge about all the world's oceans at our disposal"

Bernd Blasius

amounts of algae. So one conclusion would be that stopping climate change will require large-scale production of algae. In other words, this green soup may not look very nice but it is incre-

dibly valuable. But try telling that to a tourism manager! So there are ecosystem services that definitely have a divisive impact. This calls for a perspective that takes into account society in all its complexity. This is the second big gap we would like to close in marine biodiversity research.

Blasius: And we want to do this together with the Alfred Wegener Institute (AWI). We've just started setting up a research cluster called "Marine Diversity", and at the same time we're establishing the Helmholtz Institute for Functional Marine Biodiversity. This means we will have a Helmholtz centre here on the Oldenburg campus. The key elements of this project are two new professorships: one for "Marine Conservation" and one for "Marine Ecosystem Services". In addition we

are planning a theory and computer science professorship to advance modelling in these areas. It's also worth mentioning that Germany's two largest research vessels will be among this new research consortium's "resources". The ICBM is the home institute of the "Sonne" research ship and the AWI has the "Polarstern". If we add the Senckenberg am Meer research centre and the Centre for Tropical Marine Ecology to the equation, both of which we also work closely with, we have data and knowledge at our disposal about all the world's oceans, from the tropics to the polar regions. In combination with the interdisciplinarity we practice in Oldenburg this puts us in a unique and clearly visible position internationally.

Interview: Volker Sandmann, Deike Stolz



Further research needed: Realistic predictions about how the North Sea's biodiversity will develop over the next 100 years are not yet possible.



Cover Topic

What is the secret of the Roseobacter clade's success? Microbiologist Meinhard Simon is edging closer to unravelling this mystery.

The Allrounders of the Oceans

Marine Roseobacter reduce the greenhouse effect, supply algae with vital vitamins and help fish to grow. Professor Meinhard Simon is studying these multi-talented and versatile marine bacteria in a Collaborative Research Centre at Oldenburg

A library full of mutants – what sounds like something out of a horror film is actually cutting-edge biological research. The scientists of the "Roseobacter" Collaborative Research Centre (CRC) keep 4,000 bacteria with genetic variations, mutants, at the ready. Frozen in little plastic tubes at minus 80 degrees, they are kept on standby to be activated whenever needed. These genetically manipulated tiny living organisms serve as comparison material for various analyses conducted on "normal" organisms. All with the sole objective of unravelling the mystery of the Roseobacter clade bacteria and

discovering the secret of their success. Prof. Dr. Meinhard Simon started working towards this vision almost 20 years ago. He is a microbiologist at Oldenburg's Institute for Chemistry and Biology of the Marine Environment (ICBM) and the coordinator of the Collaborative Research Centre "Ecology, Physiology and Molecular Biology of the Roseobacter Clade: Towards a Systems Biology Understanding of a Globally Important Clade of Marine Bacteria". Eighty researchers, from PhD students to professors, are investigating the particularities of this group of bacteria at three different locations:

Oldenburg, Braunschweig and Göttingen. The team comprises microbiologists, physiologists, ecologists, geneticists, genomics scientists, biotechnologists, organic chemists, and geochemists. "We have the leading German experts in this field of research all working together here, so we can cover every conceivable question almost perfectly," Simon explains.

And there are plenty of questions. "These bacteria are capable of pretty much anything," the scientist says. They are found in almost all oceanic ecosystems – from the surface to the deep sea, and from the tropics to the



The scientists use a rosette system for collecting water samples at different depths (l.). The bacteria are then subjected to detailed analysis in the laboratory (r.).

polar regions. They even colonise oxygen-free sediments and pack ice, earning them a reputation as the "opportunists" among marine bacteria, and they can adapt better than any other group to changing conditions. "They are truly unique in this respect," Simon notes, adding: "We have probably all encountered them somewhere – on seaweed, shells, snails, starfish and also worms." Particularly in open water they play a major role.

The story of the Oldenburg scientist and his "multi-talented bacteria" began in autumn 1997. Simon was just settling in as a newly appointed professor at Oldenburg University when the State of Lower Saxony launched a programme on the biotechnological uses of marine bacteria. He signed up – and with great success: "We were fortunate enough to be able to isolate a bacterium that produces a highly effective antibiotic." It was closely related to a bacterium that had already been discovered but was still relatively unknown, and which the researchers then examined more closely in a comparative study. Both bacteria proved extremely interesting because not only do they synthesise tropodithietic acid, an antibiotic, but they can also produce other natural substances which benefit the various organisms around them. Vitamin B12, for example, which helps algae grow. The researchers named the bacterium "Phaeobacter inhibens T5" – it was the first „Oldenburg“ Roseobacter bacterium. The newly discovered

organism was rod-shaped and approximately three micrometres in length, a micrometre being one millionth of a metre.

In the years that followed the researchers in Simon's team continued to come across members of this family of bacteria – in mud flats, in the North Sea and during a research trip in the Southern Ocean. "That was when we realised that this clade was incredibly interesting," the microbiologist recalls. The US-based Moore Foundation and the Ministry for Science and Culture for Lower Saxony financed the first genome analyses. "By then we already had nearly everything we needed to apply for a CRC," Simon says. Their application was approved by the German Research Foundation (DFG) in November 2009. "We were delighted. It was like a reward for the enormous amount of work we had put into this subject," he recalls. But that was only the beginning.

45.000 litres taken out of the Pacific

Auckland, 1 May 2016: The sun shines brightly as 40 scientists set off to sea in the research vessel "Sonne". Thirty-four days out on the open Pacific lie ahead. The plan is to arrive in Alaska at the beginning of June. The researchers want to gather samples from the ocean's various biogeographical provinces. These provinces each have their

own characteristics, just like provinces on land. How do the bacteria of the Roseobacter clade live together with other bacteria in the individual provinces? This is one of the questions the researchers are now hoping to answer, by extracting a total of 45,000 litres of water from the Pacific at 19 different locations. Everything is running smoothly, including the transport of the samples to Oldenburg in huge cool boxes. Next comes the analysis, which will take several years.

Nonetheless already Simon concludes: "The Sonne expedition has been a complete success." The high-tech ship – whose home institution is the ICBM – is an excellent platform for this sort of work. On-board comfort is also excellent, he says, with the mess (the eating area) situated well above the waterline and featuring large panoramic windows. "Just having a view like that makes it special," he adds. Another research expedition with the "Sonne" is planned for January to the end of February 2017, starting from New Zealand and heading for the Subantarctic. "Then we'll have covered practically the whole Pacific, from the Subarctic to the Subantarctic. There has never been anything like it, not even for other marine bacteria," Simon points out.

Living on a ship for weeks on end, collecting and filtering thousands of litres of water, then analysing it in the laboratory – are these tiny living organisms really worth all the trouble? "Absolutely," says the microbiologist. Although the

researchers know relatively little at this stage about the role they play in their environment, what they do know sounds very promising. Their rapid metabolism helps the surrounding organisms such as algae, for example, which cannot produce their own vitamin B12. Even humans benefit: eating algae is considered healthy in many cultures. "We believe that what makes algae so healthy are the roseobacters living on them, and humans benefit from their vitamins," says Simon. Roseobacters producing the antibiotic substance mentioned above, tropodithietic acid, are now being used in aquaculture to protect fish larvae from harmful germs.

Clouds for a healthy climate

Roseobacters also help maintain a healthy climate by promoting cloud formation. If algae come under stress, for example due to high temperatures, many of them produce a sulphur compound which roseobacters can convert into dimethyl sulphide. This rises into the air and causes clouds to form. The clouds block the sunlight and the temperature drops. When temperatures drop the algae calm down; they produce less sulphur and the bacteria have less material to convert, and fewer clouds

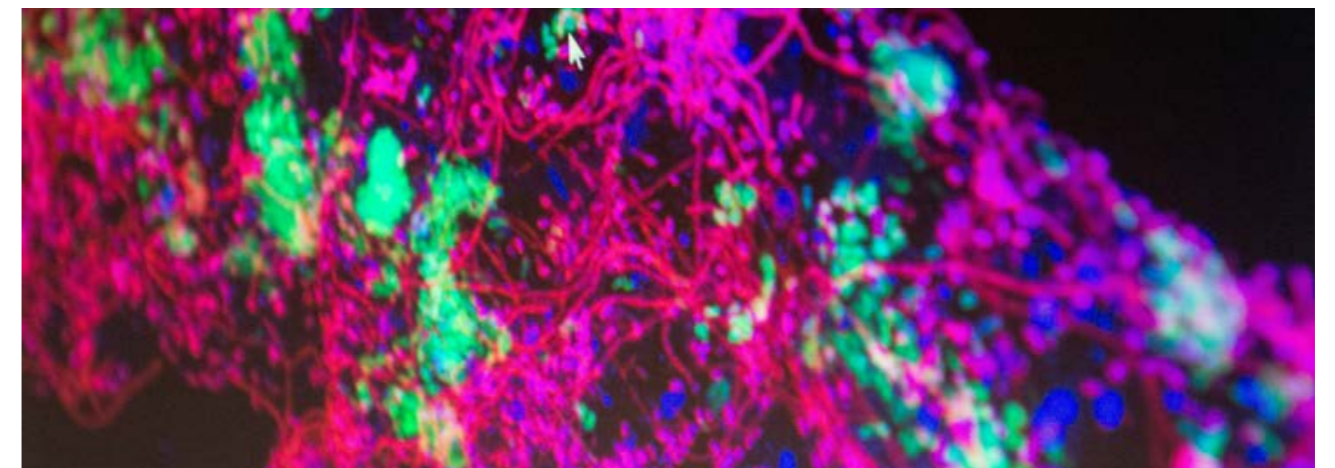
are formed. This natural "air conditioning" would not function without the roseobacters. Some scientists even believe that in certain places algae and bacteria could neutralise the global warming caused by humans. Simon is reluctant to go that far, but he too is convinced that "roseobacters definitely contribute to a healthy climate."

The Roseobacter Collaborative Research Centre is now in its second funding phase. To avoid drowning in the overwhelming diversity of the Roseobacter bacteria the researchers are focussing on just two clade members: "Phaeobacter inhibens", which Simon's team has been studying since the start of the millennium, and "Dinoroseobacter shibae". The latter has a less versatile metabolism but possesses other notable abilities: it can use light as an energy source and can even survive in anaerobic environments. Scientists are continuously discovering bacteria that are genetically related to the Roseobacter clade, new-found relatives, so to speak. So how many branches are there in this family tree? Hundreds – and their number is growing. "This almost automatically raises new questions. That's what makes it so exciting," Simon believes.

In the Collaborative Research Centre's first phase of funding from 2010 to 2013 the focus was on the meta-

bolism of these bacteria – precisely how it works and how the metabolites affect other living organisms, for example the algae that benefit from the vitamins. For the last two years the emphasis has been on genomic analysis, in other words studying the genetic makeup and the role it plays in metabolic processes. This is where the mutant library comes into play, which Simon describes as "a fantastic instrument for finding answers to highly specific questions." In a sub-project, his team, led by marine microbiologist Prof. Dr. Thorsten Brinkhoff, is investigating how algae react when a bacterium suddenly stops producing certain substances. To do this the researchers put together an alga and a mutant that has been genetically manipulated to not produce certain signalling substances. They then compare the result with the interaction between an alga and a normal bacterium. In this way they are piecing together the puzzle of the perfectly coordinated interplay between organisms in the sea.

The researchers of the Collaborative Research Centre are convinced that they will be able to solve some of the mysteries of these vital marine bacteria. Next year they will apply for a third funding phase, and Simon is confident that they will secure it. There is certainly no shortage of open questions. (bb)



A colourful display under the microscope.



Landscape ecologist Michael Kleyer is studying how islands form in the Wadden Sea. He coordinated the construction of a group of small artificial islands for his research.

An Open-Air Laboratory between High and Low Tide

There is nothing like it anywhere else in the world: the twelve artificial islands near the North Frisian island of Spiekeroog are a one of a kind large-scale project. Marine and terrestrial ecologists and biologists from the universities of Oldenburg and Göttingen are working together for the first time to gain transdisciplinary insights into the biodiversity of one of Europe's most dynamic habitats

Haematopus ostralegus is not a rare bird species in the mudflats – quite the contrary, the oystercatcher with its red beak and black and white feathers is a

common sight in the North Sea region. But last summer it was a source of some excitement for Professor Michael Kleyer and his team at the Institute for

Biology and Environmental Sciences (IBU) when, for the first time, a pair of oystercatchers set up a nest on one of the twelve artificial islands built

by terrestrial ecologist Kleyer and a team of students, PhD students and postdoctoral researchers off the coast of Spiekeroog in the summer of 2014. The metal containers used to construct the islands are clearly visible from the ferry; they flash in the sunlight, and in rainy or stormy weather they look like mini fortresses. Seen from the ship you would never guess that this is an unique large-scale project.

In the joint research project BEF-mate (Biodiversity effects on ecosystem functioning across marine and terrestrial ecosystems) marine and terrestrial scientists from the universities of Oldenburg and Göttingen are working side by side for the first time to gain transdisciplinary insights for biodiversity research. They have built a huge open-air laboratory covering a surface area of 120 square metres – a scientific Garden of Eden for biologists, geologists, ecologists and environmental scientists. Eight PhD students and several post doctoral researchers from Oldenburg and Göttingen are documenting how mudflat communities turn into salt marsh communities; how what was initially a marine ecosystem becomes a predominantly territorial ecosystem. Here, in one of Europe's most dynamic habitats, they are studying the functional importance of species diversity and how it changes as sea levels rise – a subject that is gaining importance against the backdrop of global climate change.

Only shovels and wheelbarrows are allowed at the UNESCO World Heritage Site

“The artificial islands help us to understand how plant and animal communities, and indeed entire ecosystems, would reassemble if new islands were to form in the Wadden Sea. So this is an experiment that recreates this process so that we can analyse it scientifically,” Kleyer explains. He coordinated and

organised the construction of the artificial islands – back-breaking work, as the researchers weren't allowed to use anything but shovels and wheelbarrows in this highly protected UNESCO World Heritage Site. The project suffered a terrible setback early on when the first island constructions built in the summer of 2013 were completely destroyed by Cyclone Xaver in December of the same year. “We were pretty disappointed,” Kleyer recalls, but the team refused to be discouraged and went ahead with a second attempt – this time successful. The new metal cages, made of the same steel used for ships, have withstood the wind, weather and storm tides for just over two years now. Situated at a distance of between 300 and 500 metres from the salt marshes near the National Park Centre Wittbülten, they are waiting to be colonised – by plant seeds washed up by the sea or carried by the wind, and also by insects, worms or birds – like the oystercatcher. But the researchers don't just want to know which plants and animals will cross the barrier between old and new habitat first, but also how they affect each other: who drives out whom? How important are the different communities for the new ecosystem? How much new biomass does the colonization process generate, and how much carbon dioxide is stored?

To answer all these questions the scientists walk out to the islands on a regular basis as soon as the tide goes out. Each time they have six hours to make key measurements such as salinity, temperature and soil moisture and to document the plants and animals that have settled there. So while some team members are working outdoors, others are sitting at their computers in Oldenburg and Göttingen using the collected data to develop models for long-term projections or designing simplified ecosystems in the laboratory. At the end of this process the researchers will put together all the pieces of the puzzle in order to understand the fundamentals of ecology and evolution.

The colonization of these miniature islands is a dynamic process that will continue for years – too long for this research project, which was initially designed to last just three years and comes to an end in 2017. “This is a long-term experiment: it involves the growth of generations of plants that could provide us with solid answers to urgent questions. We hope it will be extended to 12 years, but the funding is not yet secure,” says Kleyer. Ecological processes take time – especially in highly dynamic habitats like coastal areas. The balanced conditions found in woodland ecosystems never develop in this kind of habitat. The only constant in the Wadden Sea is the interaction between high and low tide.

Three flood zones for “saltwater showers” of varying duration

Each little island has a surface area of 12 square metres and is split into three levels, each at a different height. These levels simulate the three flood zones of salt marshes and ensure that the plants are exposed to “saltwater showers” at varying intervals. The plants in the so-called “pioneer zone” need to be particularly robust: glassworts and cordgrass can withstand several hours of submersion twice a day. The lower salt marsh zone is also in the eternal battle zone between sea and land. It, too, is flooded every day, but only by a few centimetres of water and for 30 minutes maximum, so for a much shorter period than the pioneer zone. Typical for this zone are species such as common saltmarsh grass and sea-lavender. The upper salt marsh zone is only ever flooded by storm or spring tides. Species such as sea couch, red fescue and thrift grow here.

“Our hypothesis on this pronounced zoning is that at the stressful end of the gradient plants will be limited by their physiological ability to deal with the salt factor and the flooding, while the plants on the more benign side will



One of twelve artificial islands in Lower Saxony's Wadden Sea (above). When the tide goes out the scientists walk out to the islands – in the summer almost every day (centre). They gather samples that are then brought to the laboratory for further analysis (below).

be limited by competition with other species," Kleyer explains. To verify this hypothesis the researchers constructed six zones in Spiekeroog's salt marshes and cleared them entirely of plants and roots to eliminate all resident plants. "We expect that the plants that we find at the most stressful end of the gradient, namely glassworts and cordgrass, will also grow in the most benign zone, namely the upper salt marshes," he says. But in the long term, he explains, they will be displaced by the species of the upper salt marshes in their immediate vicinity because they are more competitive. The observations and data gathered so far appear to confirm this hypothesis.

Stress test for the plants: How resilient are they?

The researchers left six of the twelve islands as "bare" as the six areas in the salt marshes, filling them with sand only. This is where, alongside competition, another factor comes into play: dispersal. Which plant seeds will establish here first – far away from Spiekeroog – and which will come to dominate the community in the long term? Initial trends are already apparent: The team can now confirm the hypothesis that the islands would be mainly populated by plant species that are particularly good at dispersing: "Some seeds float, others are carried by the wind. We have found specimens of these species on the artificial islands even in the zones where they wouldn't normally exist in the salt marshes because there they would be eliminated by more competitive species." The conclusion is clear: if dispersal is hindered, it takes far longer for the kind of balance the researchers observe in the natural salt marshes to emerge here.

The researchers planted seeds on the remaining six islands: "We planted species that are typically found in low salt marshes in both the upper salt marsh zone and the pioneer zone," Kleyer explains. The idea is to deliberately expose these plants to stressful

conditions and observe how well they adapt to a "higher sea level" and changing environmental conditions. How long before they die out or are replaced by species better adapted to the more stressful conditions? How resilient are they? In view of rising sea levels, the increasing frequency of extreme weather events, changing species diversity and bioinvasions, these questions urgently need answers. Kleyer and his team expect common saltmarsh grass and sea purslane to die out quickly in the pioneer zone because they can't cope with the frequent flooding and high salinity, thus making way for typical pioneer zone plants. "We have data to confirm this," he says.

But it's a very different matter when common saltmarsh grass and sea purslane are planted in the upper salt marsh zone on the artificial islands – where at first they have zero competition from other species. "We had assumed that these plants would thrive here until the day came when the more competitive species of the upper salt marshes colonized the zone and eliminated the alkali grass and the sea purslane. But we haven't observed this process so far because it takes much longer here than in the comparison zones in Spiekeroog's salt marshes," Kleyer explains. The seeds of the upper marsh plants can disperse far more quickly there because they don't have to first pass the mudflats that form a spatial barrier between the "dry land" of Spiekeroog and the artificial islands.

This project is without doubt one of the most important research projects of recent years in the Wadden Sea National Park. By gaining an understanding of how balance is achieved in plant and animal communities, how ecosystems are formed and which factors lead to certain species surviving or dying out, the scientists will be able to make concrete predictions about biodiversity and ecosystem functions. So Spiekeroog is not just a touristic highlight but is also developing into a biodiversity research site with international appeal. (kl)

[Anzeige]





Research in the classroom: Clemens Hillenbrand observes the goings-on in a school class.

With Help from Outer Space

A school for everyone. Inclusive teaching is particularly important at a time when there are so many refugees, Prof. Dr. Clemens Hillenbrand believes. The special needs educator and his team take to the classroom to research and test how to make lessons work for everybody

Leon* moves from table to table, a look of deep concentration on his face. The eight-year-old who was born with Down Syndrome hands out pieces of a puzzle to his fellow pupils. The girls and boys in 2a have arranged their tables into groups on this Thursday morning. They wait expectantly until Leon has handed out all the pieces of

the puzzle and taken his seat again. Then the special needs educator Carolin Reinck gives the go-ahead and each group fits its pieces together to complete a puzzle. Leon works alongside other pupils who find tasks like this one easy. And so, quite naturally, he learns from them. Igor, Kimberly and Niko also look for guidance to the

children in their group who find school easier than they do: Igor is learning German as a second language, Kimberly struggles with solving problems step by step and Niko is often agitated and even aggressive.

Until a few years ago children like Leon, Igor, Kimberly and Niko would have attended a special needs school.

Today girls and boys with disabilities or challenging behaviours form a normal part of ordinary schools – the buzzword here is inclusion. It means that everyone has the possibility to participate everywhere: at school, at work and in leisure activities. And the respective institutions should adapt to the various needs of their users instead of the other way round. The United Nations has defined inclusion as a human right in the Convention on the Rights of Persons with Disabilities. Germany has signed the agreement.

Scientists in the classroom

In many places it has become the norm for pupils with and without disabilities to share lessons. This is the case in Leon's school, too, but something is different here. His classroom receives regular visits from researchers at Oldenburg University who want to find out how the challenge of inclusion can best be tackled. But they are not only in the classroom to observe; they also bring their knowledge and experience to bear. Every Thursday special needs educator Carolin Reinck structures the lessons in 2a. Here she pays particular attention to children who need help with learning, whether or not they have been diagnosed as such. "The other children are important role models whom they can use for orientation," Reinck says. But the children who are higher achievers also benefit from the shared lessons, Reinck adds, because they learn to work with children of different abilities and to accept and make use of the different strengths and weaknesses within the classroom community.

Reinck completed her doc-

torate at Oldenburg University and now works closely here with Prof. Dr. Clemens Hillenbrand. Hillenbrand is conducting research on teaching children with learning disabilities at the University's Department of Special Needs Education and Rehabilitation. The special needs educator knows that the new diversity in the classroom can entail a number of challenges. "Every now and then situations arise that can be very difficult for teachers to control," he says. Hillenbrand is referring in particular to children with challenging behaviour, such as aggression and attention deficit disorder. "It can ruin the entire lesson, especially if there are a few such children in one class. International studies also corroborate this," the researcher says.

To pre-empt such situations his team,

together with researchers from Cologne, has initiated a number of projects that aim to improve children's emotional-social skills and basically help them learn to get along with others. A key "member" of this preventative team is "Lubo from outer space" – a bright green hand puppet with multicoloured hair, wonky flying goggles and a broken spaceship. "After an emergency landing on Planet Earth Lubo needs friends to help him repair his spaceship," Hillenbrand explains. He takes this story into classrooms – in Northern Germany and beyond. Lubo has now become a highly successful export and visits kindergartens and schools all across Germany, and even in a number of neighbouring countries. The idea is that the children show Lubo how to make friends here on Earth. In this situation they are

the experts who share their knowledge. "That's the trick.

They are called upon to share their skills, and this is very good for learning," the pedagogue explains.

Lubo's classroom visit demonstrates how this works. The children in 2a are a little too old for hand puppets but after Lubo landed here several times last year all of them were keen to see him again. Lina remembers it well: "Each time we spent an hour with Lubo. We talked about being brave and things like that." Today Lubo has brought along lots of coloured puzzle pieces for the children to put

together. A task which requires them to work together. Each group places its puzzle in the middle of the classroom in a circle.

The teacher calls it "Lubo's problem-solving circle" – it is meant to be a guide for difficult situations. "Imagine you're in the cor-





Better together:
the children solve tasks in teams.



How do you feel when
another child pushes you?



Carolin Reinck and Leon take
a look at what Lubo brought along.

ridor and someone pushes you. How do you feel and what do you want to happen?" asks the special needs educator. Theresa knows the feeling and points to the appropriate Lubo picture. "I feel angry and I want them to say sorry." The teacher nods in approval. The cuddly little alien has helped the children to become aware of their feelings and shown them how to solve a potentially tricky situation.

The success of the Lubo programme has been proven in a number of studies involving some 700 pre- and primary school children. "We observed a positive impact especially when it came to solving social problems and prosocial behaviour," Hillenbrand explains. The results also show that children with risk factors benefit even more than others. "It seems that we reach precisely the children who need it the most. As special needs educators this is of course music to our ears."

A targeted approach to promoting learning

Of course, Lubo is just one of many building blocks. The Oldenburg researchers are also focussed on targeted teaching support so that no one

falls behind in class. Here they make use of the so-called "Advance Organizer" – a learning method that orders new information according to existing thought structures and thus aids memory retrieval. "It is based on cognitive psychology," Hillenbrand explains. Carolin Reinck is applying the method today in a religious education class to teach children about the Creation story. While she recites a passage from the Bible the children place corresponding objects, words and pictures in the middle of a circle of chairs. When God creates the seas, Leon lays down a bowl of water. A little later Niko is allowed to add some small wooden trees, and Theresa takes care of the cows which represent "the animals of the earth". "The objects help the children remember the Creation story later on – especially those who are less confident readers and would have problems with a printed text," Reinck says.

The researchers also use other Oldenburg projects for assisting learning: they teach kindergarten children a basic understanding of numbers using the children's book "The Hungry Caterpillar" or, once children have transitioned into class 5, they use "Olympic Number Games" to train basic arithmetic skills. Progress is charted

using questionnaires, teachers' assessments and targeted parent surveys. Here, too, Hillenbrand says that if the methods are right, in particular children with learning difficulties benefit significantly. A further key point for Hillenbrand is that they should learn in a group rather than be singled out and "schooled" separately. "What's the best way to learn? Not with a work sheet but through interaction with others," the pedagogue emphasises.

Learning as part of a heterogeneous group – for Hillenbrand the idea has never been more relevant than it is today. He is thinking in particular about the children with a refugee background who are currently being integrated into the German school system. "Many of the children initially end up in so-called "welcome classes" where they are meant to learn German. This strikes me as problematic in the long term," the expert says. The problem is that these children are supposed to make an effort to learn a new language, but unless they have contact with German-speaking children the idea will remain completely abstract, he observes. According to Hillenbrand, after a brief, intensive practice period the refugee children should be integrated into normal classes as quickly

as possible. He even regards their learning German as enriching for the rest of the class. "When the teacher points out specific features of the language, incorporates a grammar or vocabulary exercise here and there, all the children benefit."

Extending inclusion to refugees

Learning together – the underlying concept of inclusion – also applies for refugee children, Hillenbrand says. "The general structure is there after all." In many primary schools special needs teachers teach reading, writing and arithmetic to children with learning difficulties in small groups. So it makes sense to integrate refugee children into these groups. In the "welcome classes" by contrast, according to media reports, the children are rarely taught by trained teachers. The staff are very committed and are provided with suitable teaching materials – but that cannot replace proper teacher training, the researcher believes. A number of Oldenburg projects have shown that there are better ways to successfully implement inclusion, Hillenbrand points out. This is something

the researchers teach in various continuing education courses. In a focus project for North Rhine-Westphalia, for example, they train teachers to be "inclusion experts" who then pass on their knowledge to their colleagues. "We have already trained 300 teachers, and a further 150 are currently in the process of obtaining their qualification," says Hillenbrand. They also offer special courses for head teachers in Lower Saxony, who are likewise confronted with the challenges of inclusion, in issues such as legal matters. "We were preaching to the converted in schools. There seems to be huge demand for a more objective approach to the issue and concrete support," Hillenbrand says.

Schools come under additional pressure due to a general shortage of teachers in Germany. In many places there are simply not enough trained professionals – and special needs teachers are in even shorter supply. Hillenbrand points out that in Lower Saxony since the education act on inclusion was passed in 2012 most primary schools are obliged to make basic teaching provisions for children with special needs. "But this is just an extra two to five hours maximum with a special needs teacher – in primary schools,

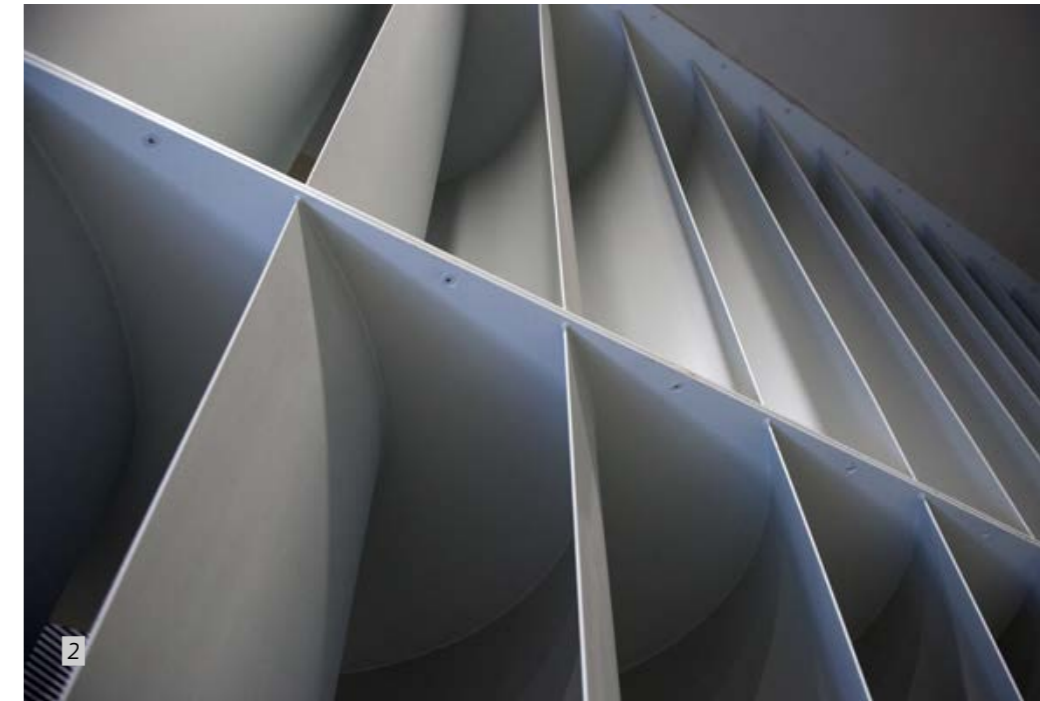
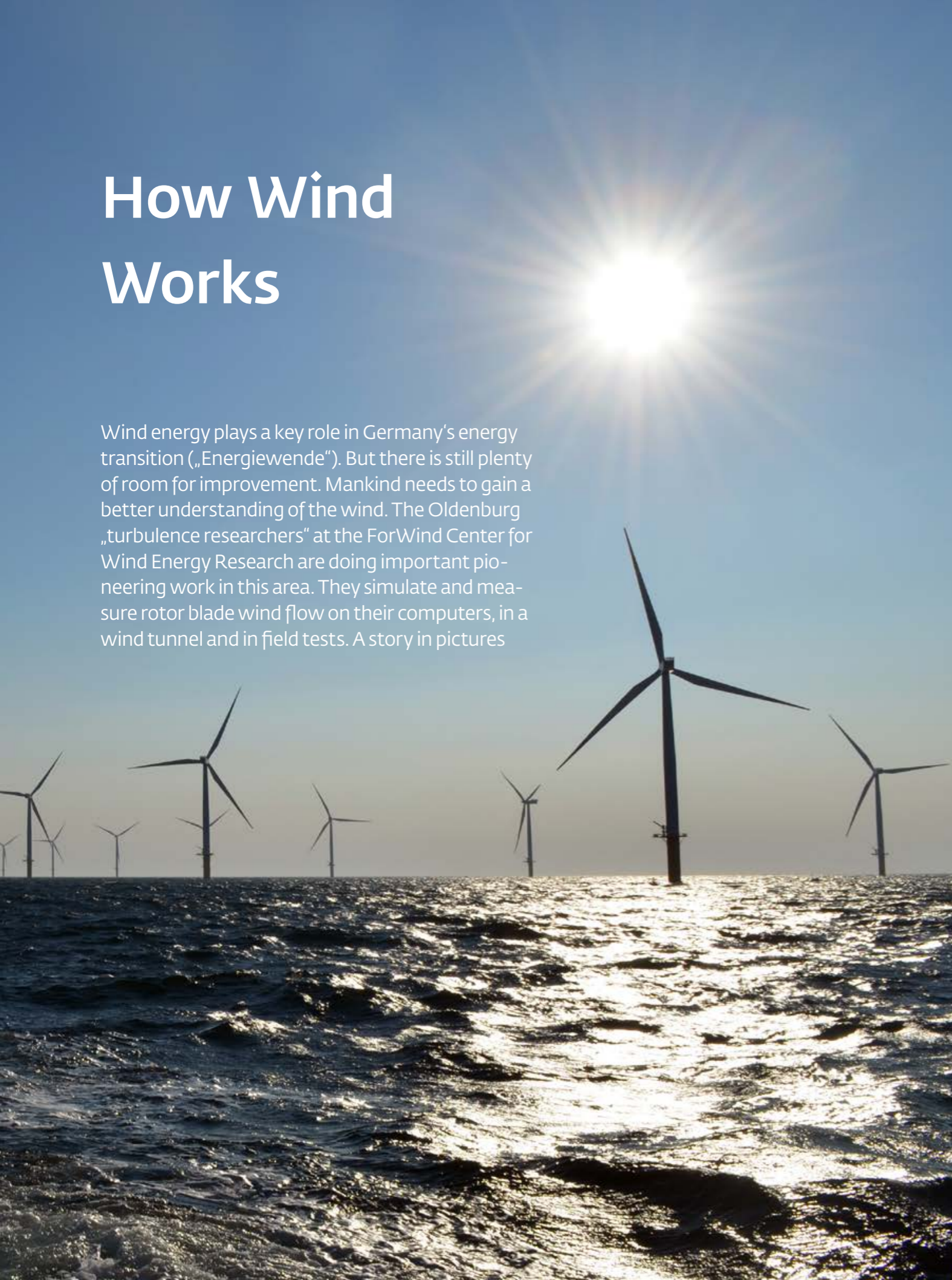
Many secondary schools are not even able to provide this basic support," Hillenbrand explains. The government of Lower Saxony has now taken initial steps to address the shortage of teachers, considerably increasing the number of places on courses at Oldenburg University's Department of Special Needs Education and Rehabilitation. In a few years' time three times as many young people will be trained as special needs educators here as have been up to now. And nine new professorships are being created to help teach them.

This is one of the reasons why Hillenbrand is confident that the German education system will be able to meet the challenge of "schools for everyone". Recently he visited a class in Oldenburg that offers basic special needs support in which refugee children sat next to children with learning difficulties. He was very encouraged to see how well the pupils worked together. "One of our students works there voluntarily. She is Kurdish and can translate for them. She doesn't understand all the children but if need be they translate among themselves. For me that shows that it's always possible to find a way to put good ideas into action." (bb)

* The children's names were changed

How Wind Works

Wind energy plays a key role in Germany's energy transition („Energiewende“). But there is still plenty of room for improvement. Mankind needs to gain a better understanding of the wind. The Oldenburg „turbulence researchers“ at the ForWind Center for Wind Energy Research are doing important pioneering work in this area. They simulate and measure rotor blade wind flow on their computers, in a wind tunnel and in field tests. A story in pictures

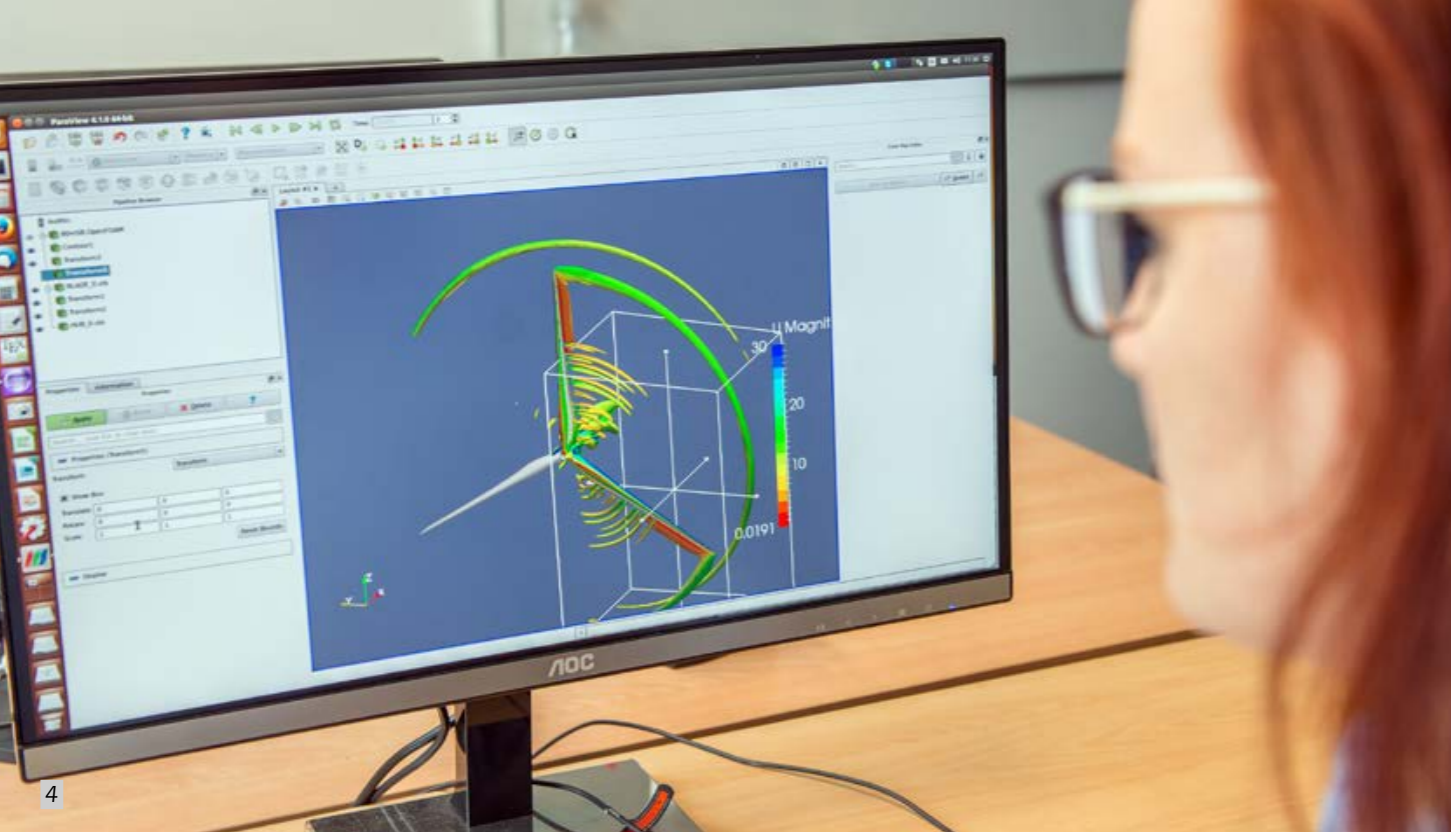


1 ForWind, the joint Centre for Wind Energy Research of the Universities of Oldenburg, Hannover and Bremen, recently acquired one of the largest turbulent wind tunnels in Germany. Inside this tunnel and with the help of four huge turbines they can simulate the wind fields, or wind patterns, that occur in nature.

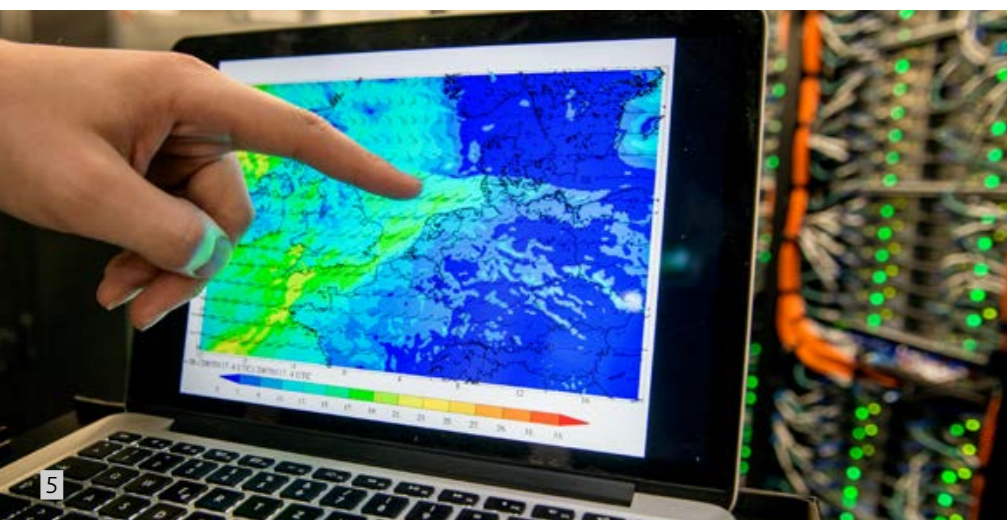
2 Thanks to air baffles up to six metres high, the wind blows at constant speeds of up to 40 meters per second around the curve of the wind tunnel without any loss of flow.

3 The wind tunnel is a prominent feature of the new "WindLab". This four-storey building accommodates more than 130 scientists from the fields of physics, meteorology, oceanography and engineering. Together they are studying the interactions between turbulent atmospheric currents and wind farms, wind turbines and their components.





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4 Tests in the wind tunnel require a lot of preparation. One important step is computer modelling.

5 Thanks to its high-performance computing cluster ForWind can create large-scale simulations. For instance the Oldenburg wind researchers can calculate the extensive impact of windstorm Kyrill, which raged across Western Europe in 2007, on Europe's energy system.

6 Laboratory tests are performed to check the computer-generated simulations. The picture shows a laser measurement of the wind flow around a rotor blade segment.

7 At open area test sites the scientists measure the "real" external influences to which the wind farm is exposed. The photo shows a 3D scanner being set up.



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8 For large-volume measurements of wind fields ForWind uses the laser-based measuring system LiDAR, a method of optical distance and speed measurement that is related to radar.

9 With its measurements ForWind also provides accurate data about the operational behaviour of large offshore wind farms. The tests help to increase the efficiency of the farms and to avoid technical and financial risk factors.

Globetrotting Scientists



Oliver Kramer, Berkeley (USA)

Oliver Kramer, a computer scientist and junior professor for computational intelligence, visited the International Computer Science Institute (ICSI) in Berkeley in March, where he set up a collaborative research project on the subject of "Artificial Intelligence and Machine Learning." The research focuses on "deep learning", a new method of information processing using artificial neuronal networks that has led to breakthroughs in image recognition and speech processing. In his research group at Oldenburg University Kramer employs algorithms to process data from various domains that can be used among other things to make predictions about wind and solar energy.

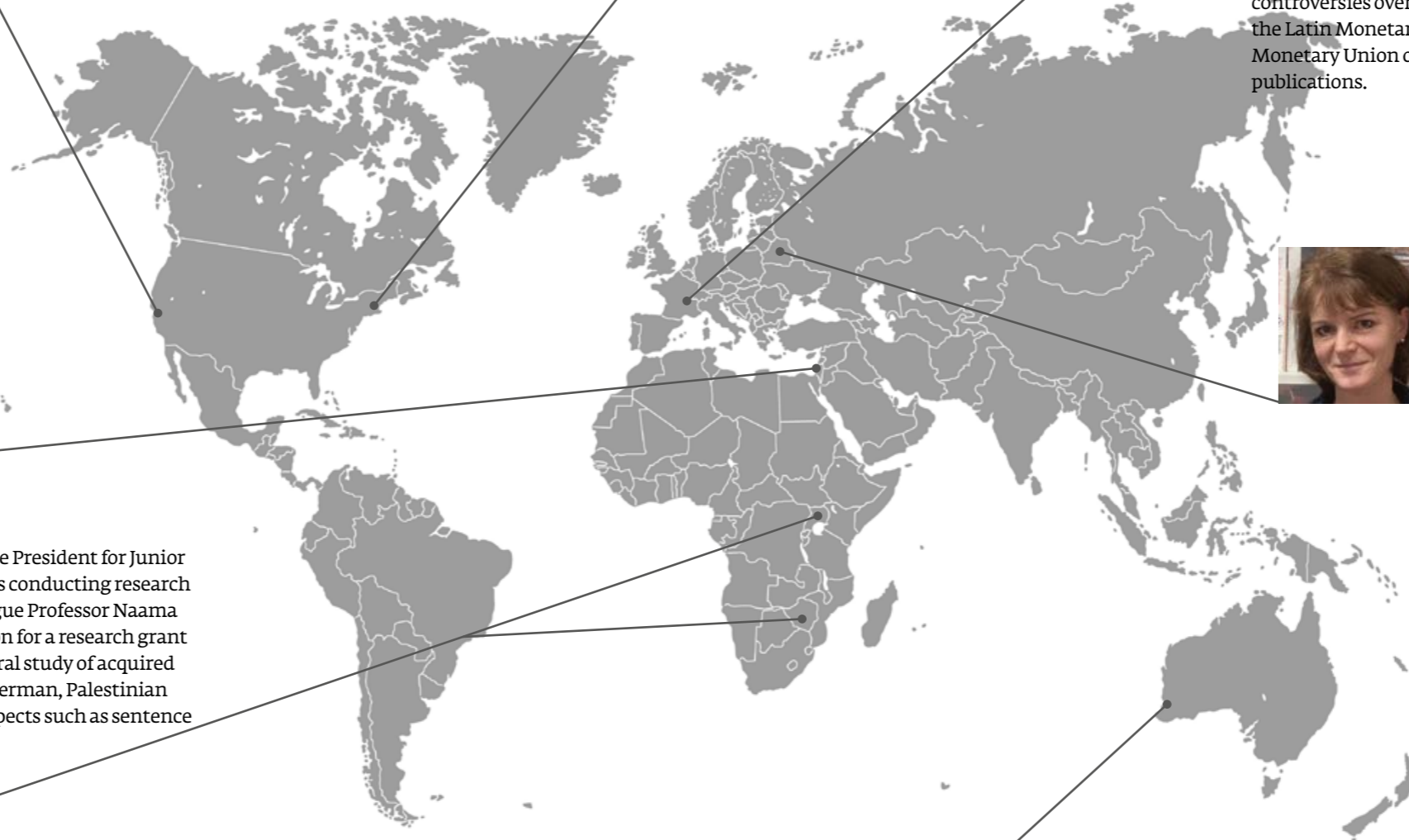
Katharina Al-Shamery, Harvard (USA)

Katharina Al-Shamery, professor of physical chemistry, former Acting President of the University, and Vice President for Research, accepted an invitation to Harvard University in July 2016. Professor Al-Shamery used the one-month visit to exchange insights with scientists at the Harvard-based "Energy Frontier Research Center for Sustainable Chemical Production" as well as with junior researchers at the Rowland Institute. She also took part in a workshop titled "How to Prevent Terrorism by Steering Youth Away from Violent Extremism." Professor Al-Shamery is planning a cross-faculty series of events on this topic in Oldenburg.



Hans-Michael Trautwein, Saint-Étienne (France)

Hans Michael Trautwein, professor of international economic relations, spent a month as a visiting professor at the Université Jean Monnet in Saint-Étienne last March, where he researched crisis measures adopted by central banks in contemporary European currency unions and in the years leading up to World War I in a project on monetary theory controversies. The project compares the current controversies over European Central Bank policies with the debates surrounding the Latin Monetary Union, the Scandinavian Monetary Union and the German Monetary Union of 1871/76. It is to be continued in a series of conferences and publications.



Esther Ruigendijk, Tel Aviv (Israel)

Esther Ruigendijk, professor of Dutch linguistics and Vice President for Junior Researchers and International Affairs, spent two months conducting research in Tel Aviv in the spring. Together with her Israeli colleague Professor Naama Friedmann, Professor Ruigendijk compiled an application for a research grant for a comparative study titled "Psycholinguistic and neural study of acquired and developmental language impairments in Hebrew, German, Palestinian Arabic, and Dutch." The main focus is on grammatical aspects such as sentence construction, word order and case marking.



Gun-Britt Kohler, Minsk (Belarus)

Gun-Britt Kohler, professor of Slavic literature and director of the Institute for Slavic Studies, spent a research semester in Minsk. During her visit she examined archive materials and normative documents with a view to publishing an annotated volume on the literature market of the first third of the 20th century in a project funded by the German Research Foundation (DFG). Together with colleagues in Minsk, Professor Kohler also prepared a nationwide survey on perceptions of current cultural policy and contemporary Belarusian literature in Belarus. Her agenda also includes the compilation of a "Literary History of Belarus."



Lydia Potts, Harare and Kampala (Zimbabwe/Uganda)

Lydia Potts, political scientist and coordinator of the "European Master in Migration and Intercultural Relations (EMMIR)" programme, travelled to Africa twice in the spring to act as scientific director for the exhibition "Kabbo ka Muwala" (The Girl's Basket) in Zimbabwe and Uganda. The exhibition's theme was migration and mobility in contemporary art in Eastern and Southern Africa. The project was funded by the German Federal Cultural Foundation. The National Gallery of Zimbabwe, the Makerere Art Gallery and the Städtische Galerie Bremen were partners in the project.



Simon Doclo, Perth (Australia)

Simon Doclo, professor of applied physics with a special emphasis on signal processing and lead researcher in the "Hearing4all" Cluster of Excellence, travelled to Perth in September. At Curtin University he met with recognised experts in the development of signal processing algorithms for assistive hearing devices, also known as "hearables". Together with his Australian colleagues, Professor Doclo aims to develop new technologies for inhibiting acoustic feedback in innovative hearing aids and to see them quickly integrated into industrial products. The project is funded by the German Academic Exchange Service (DAAD).



Mark Siebel: "I strive for theories that are empirically informed."

From the Armchair to the Street

Can empirical methods be applied to philosophical questions? Mark Siebel is convinced they can. He compares his thought experiments with people's intuitive common sense

The armchair philosopher gains his insights through a process both conscious and rational. He arrives at his conclusions "a priori", independently of experience – having posed questions to himself or grappled with the positions of other philosophers. Thought experiments are another proven method of his: "The old-school

philosopher thinks up a situation that might be very difficult to recreate in reality. He then considers how to assess the situation 'intuitively', and what happens when the theory is applied to this situation. All of this takes place exclusively in his head," Mark Siebel explains. Siebel (52), a professor at the University of Oldenburg's

Institute for Philosophy, knows what he is talking about. But he does not spend all of his time in his armchair. He is interested in what reality makes of his thought experiments: "In the end philosophy is also about ideas for a better world, ideas you want to share. But when these are deduced on a level that goes completely over the head of

the average person on the street, you don't get very far."

Mark Siebel's passion is precision. As a distinguished representative of "analytical philosophy" it is important to him to formulate philosophical problems as clearly as possible. "In our discipline terminology is paramount. Only when the language is precise, can we assess things clearly and develop new theories that go on to gain greater scholarly importance," the philosopher says. If need be, he can reach into his methodological portfolio for instruments from other disciplines. "Mathematics helps me to describe theoretical situations as precisely as possible." The "fact checking" is then performed empirically. "I strive for theories that are empirically informed." The aim, Siebel says, is to take into consideration people's everyday lives – also in order to identify consequences for philosophical concepts and theories.

Academically, Siebel is moving between two worlds here – something he refers to as "interplay". On the one hand he sits in the philosopher's armchair, on the other he regularly gets out of it to address people's actual convictions. This approach is known as "experimental philosophy" and it is not uncontroversial. People's intuitive common sense, critics say, may suffice to cope with local, familiar problems, but when it comes to fundamental theoretical and societal challenges, the intuitions of ordinary people are too limited.

And yet the findings of "experimental philosophy", which is also gaining popularity, can be astonishing. Siebel is currently involved in two policy-related research units funded by the German Research Foundation (DFG). In both research designs, test persons are asked questions in "vignette experiments". These centre around short stories, descriptions of situations and people from everyday life – so-called vignettes. The participants in the experiment are asked to give their opinion on a hypothetical situation using a set rating scale. To avoid distorting their

"pure opinions" Siebel and his research team do not offer participants financial incentives. The vignette opinions are then subjected to a more exact statistical analysis.

In one of the research units Siebel works alongside psychologists, social scientists, and economists, researching questions related to need-based justice and distribution procedures. Specifically his research deals with "Measures of Need-Based Justice, Expertise and Coherence". Siebel says: "In simple terms need-based justice means that each person gets what they

How fair was the distribution of the lemons?

need. But since things are not always available in sufficient quantities, we are looking at what should happen with a commodity that is in short supply." The researchers are examining the question of how to determine the degree of need-based justice provided by a particular distribution. "Take the example of how to allocate a limited amount of lemons in order to cover certain vitamin C requirements. We are interested in determining to what extent different ways of distributing the lemons are perceived in the end as fair," Siebel continues.

The armchair philosopher already has some ideas on the theory. His team's thought experiments focus primarily on normative axioms – in other words, the question of which basic properties a measure for need-based justice should have. One of these properties, Siebel says, is monotony. "We work on the premise that the more the resources in the described scenario are allocated in line with actual needs, the more just the participants in our experiment will perceive the situation to be," explains the Oldenburg professor.

Practice follows theory. The survey involving a total of 174 or so test subjects has yet to be analysed in detail – but initial findings are already

available. The test survey has shown that the monotony correlation indeed holds. Siebel gives an example from the vignette survey: "A family of three is allotted a 100-square-metre apartment by the state, a second family of three receives an 80-square-metre apartment, and a third a 40-square-metre apartment. As expected, the less a family's needs are catered for, the greater the unease." But there were also surprises. The so-called "monotony sensitivity", for example, was not confirmed. The researchers had assumed that the perceived injustice would increase overproportionally the greater the gap was between what an individual in the scenario needs and what they actually get. The opposite was the case. "The resulting policy recommendation would be: Take from the poorest and give to those whose needs are almost fulfilled! This, of course, puts us in a difficult situation. We now need to find out how these findings can be explained. Perhaps the test subjects are missing some important information," the philosopher observes.

Information is another key factor in this project's underlying hypothesis. The researchers are examining the so-called "expert hypothesis". This centres around the question of how expertise affects the test subjects' ratings on justice. "We assume that greater expertise will lead to greater coherence in the justice ratings," Siebel explains. To test this, the test subjects are provided with information that elevates them to the status of experts on the one hand, and the recommendations of experts are integrated into the vignettes on the other. "We expect that in both cases overall there will be less divergence in the opinions, or in other words, more consistency. Naturally it makes a difference whether the scenario features a well-known expert expressing his opinion or a fortune-teller looking into a crystal ball," Siebel comments with a smile.

The second research unit in which Mark Siebel is currently involved with a team of two assistants also uses me-

thods from “experimental philosophy”. Under the heading “New Frameworks of Rationality” psychologists, philosophers and computer scientists are studying the way people make decisions and what actually constitutes a rational decision in the context of wars, climate change and other disasters. In their subproject the Oldenburg researchers are examining the aspect of coherence. “One of the things we are looking at is the extent to which statements from different witnesses which are similar and therefore fit together are more reliable.”

Here, too, the philosophers first apply mathematical logic then empirical testing – “although the empirical comparison is on a much smaller scale in this case,” Siebel adds. The first step

is to develop so-called probabilistic measures of coherence – measures which, on the basis of the probabilities of the given statements, calculate how well they fit together. In a second step the researchers “confront” their own

“I attain the precision I was striving for in my statements.”

measurements and competing measurements with reality, again using vignette surveys. “For example we presented the test subjects with witness statements from different people on identical situations,” says Siebel. The test subjects were then asked to rate how well the various statements fitted

together. The result: “Our theory was confirmed empirically. The coherence measure that we brought into play corresponds most closely with the results of the survey. Therefore the rational assessment is consistent with the verdict of lay persons.”

Mark Siebel is a man of numbers – mathematics comes naturally to him. Which is why the philosopher so enjoyed the “Introduction to Logic” course at the start of his studies. “I felt I was in good hands because I realised that here I could attain the precision I was striving for in my statements,” Siebel says. Yet he would never claim that this is the only way to go about philosophy. “Sometimes being imprecise is just what you need. It encourages creativity!” (vs)

[Anzeige]



In the Oldenburg philosopher’s research designs test persons give their verdict on a hypothetical situation. Siebel and his team then subject these lay verdicts to statistical analysis.

A New Chairman and the UGO Excellence Prize

Honorary Professor Dr. Werner Brinker is the new Chairman of the Universitätsgesellschaft Oldenburg e.V. (UGO). He was elected at the suggestion of his predecessor Michael Wefers, who did not run for re-election for professional reasons. Wefers has served on the UGO board since 2005 and been its chairman since 2008. Under his leadership the UGO's membership has risen to more than 1,100 members.

With the election of Werner Brinker the members' meeting has chosen a chairman who is extremely well connected in the regional network and at the same time has a deep understanding of the University, Wefers said. Brinker was a member of the University Council of Oldenburg University for ten years, and as Chairman of the Board

of Management and Chief Executive Officer at EWE Aktiengesellschaft he was also one of its main sponsors. He also has other close ties with science. Among other posts he was a member of the Association of Sponsors for the Promotion of German Science (Stifterverband für die Deutsche Wissenschaft) and Chairman of the Board of Managing Directors at Forum für Zukunftsenergie e.V.

Physicist receives award

This year the UGO Award for Excellent Research, which includes prize money of 5,000 euros, went to physicist Dr. habil. Svend-Age Biehs. Biehs,

who is thirty-nine, was awarded for his work in the area of nanoscale radiative heat transfer.

He completed his degree and his PhD at the Institut of Physics, where he also earned his habilitation in 2014. His thesis earned him the 2008 Weser-Ems-Wissenschaftspreis awarded by the OLB Foundation. A scholarship from the German Academy of Sciences Leopoldina took him to the renowned Institut d'Optique in Paris, where during a two-year stay he conducted further research on radiative heat transfer.

In recent years Biehs has been researching theoretical concepts for diodes, transistors and capacitors that are based not on electric currents but on heat flux.

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New Appointments



Pascal Dohmen
Cardiac Surgery

Prof. Dr. Pascal Dohmen has been appointed full Professor of Cardiac Surgery at the University's School of Medicine and Health Sciences. This was made possible through the establishment of an endowed professorship by the Klinikum Oldenburg, where Prof. Dohmen has also become the new director of the University Clinic for Heart Surgery. Born in the Netherlands, Prof. Dohmen studied human medicine at the University of Leuven (Belgium) and completed his M.D. After residency training at the Charité Berlin he completed a doctor medicinae at the HU Berlin in 2003. Following his Habilitation in 2006 he returned to the Charité, where he was first a consultant and later vice-director at the Department of Cardiovascular Surgery. In 2010 Prof. Dohmen was appointed to Professor of cardiac heart surgery at Leipzig University. In 2014 he returned to the Berliner Charité as a consultant, lecturer and head of research and teaching at the Department of Cardiovascular Surgery. Prof. Dohmen's research focuses on the artificial production of biological tissue and the development of bio-compatible heart valves. His special areas of interest are heart failure, endocarditis and heart valve surgery.



Sascha Laubinger
Evolutionary Genetics

Prof. Dr. Sascha Laubinger has been appointed Professor for the „Evolutionary Genetics of Plants“ at the Institute for Biology and Environmental Sciences. Laubinger took his degree in biology at the Heinrich Heine University Düsseldorf and also earned his doctorate there focusing on how plants use light as a source of information to adapt their growth. He then took a position as a post-doctoral researcher at the Max Planck Institute for Developmental Biology, where he studied how and when plant genes are switched on and off. Professor Laubinger founded his own research group in 2010 with funding from the Max Planck Institute of Molecular Physiology in Dortmund and the Center for Plant Molecular Biology at the University of Tübingen. There he studied gene regulation mechanisms in plants subjected to different stress situations. In Oldenburg Laubinger will focus on how plant genes are regulated under different stress situations and what influence plant communities have on the stress-related gene regulation.



Sebastian Lehnhoff
Energy Informatics

Prof. Dr. Sebastian Lehnhoff has accepted the post of Professor of Energy Informatics, which he had held as a junior professor since 2010. Lehnhoff, who works at the University's Department of Computing Science, leads the "Energy" research at the University-affiliated OFFIS Computer Science Institute and has been executive head of this research area since 2012. He earned his degree in core informatics at the Technical University of Dortmund, where he then took a position as a research assistant and obtained his PhD in 2010. Lehnhoff is the coordinator of the German Informatics Society's Special Interest Group "Energy Informatics" and a research fellow with the School of Information Technology and Electrical Engineering at the University of Queensland (Australia). His research deals with intelligent energy systems, so-called "smart grids", and is aimed at developing an environmentally friendly, economic and secure power supply network for the future. The main focus of Lehnhoff's research is real-time capable methods for safety-critical applications in electronic energy systems. He is also conducting research on network-oriented decentralized business management, as well as the co-simulation of complex energy systems.

New Appointments



Arne W. Nolte
Ecological Genomics

Prof. Dr. Arne W. Nolte has been appointed Professor of Ecological Genomics at the Institute of Biology and Environmental Sciences. With this appointment Nolte returns to his home city, where he began studying biology in 1997. Prior to his return to Oldenburg he conducted research and taught at the Max Planck Institute for Evolutionary Biology in Plön, Schleswig-Holstein. Nolte, an expert in freshwater fish, earned his degree in biology at the Institute for Genetics of the University of Cologne in 2001, where he also completed his doctorate in 2005. His thesis dealt with the question of why the European bullhead fish has been able to multiply so rapidly in the Lower Rhine area in recent years. A year later, with funding from the German Research Foundation, he took a position as a postdoctoral researcher at the Université Laval in Québec (Canada). In 2008 he moved to the Max Planck Institute in Plön, where he has led a research group since 2011. Nolte's main area of research is the evolution of fish species, with a special focus on the conditions under which hybridisation - the cross-breeding of different species - promotes evolution.



Sebastian Schnettler
Social Research

Prof. Dr. Sebastian Schnettler has been appointed Professor of Social Research Methods at the Institute of Social Sciences. Before his appointment in Oldenburg and since 2011, he was a research scientist and lecturer at the University of Konstanz's Institute of Sociology. After earning a degree in sociology, economics and statistics at Free University of Berlin Schnettler worked for a strategy consulting firm in Washington DC. In 2004 he enrolled as a PhD student at Yale University (USA), where he also became a fellow at the Center for Research on Inequalities and the Life Course. He completed his PhD in sociology in 2010. He then took a post as a research scientist with the Max Planck Institute for Demographic Research in Rostock. His main research interests are analytical sociology, evolutionary and social demography, social inequality and family sociology.



Ulrike Raap
Dermatology

Prof. Dr. Ulrike Raap has been appointed Professor of Dermatology. Prior to her appointment in Oldenburg she was a deputy and adjunct professor at the Department for Dermatology and Allergology at Hannover Medical School (MHH). She is also the new director of the University Department of Dermatology and Allergy at the Klinikum Oldenburg. Raap studied human medicine at the University of Lübeck and MHH, where she obtained her M.D. in 1999. In 2001, following a post-doc phase at the University of Marburg, she returned to the MHH, where she was appointed as a junior professor and deputy. She habilitated in 2013. In Hannover Raap established the research in autoimmune bullous skin diseases. She also focuses on immunological mechanisms of inflammatory skin diseases. Raap's research is currently funded by the German Research Foundation (DFG) with a project in the clinical research group "Autoimmunity". She has received several awards for her work, including the TUI Foundation's Rudolf Schoen Prize.

New Appointments



Heinz Wilkes
Organic Geochemistry

Prof. Dr. Heinz Wilkes has been appointed Professor of Organic Geochemistry at the Institute for Chemistry and Biology of the Marine Environment. Wilkes earned his degree in chemistry at the University of Hamburg, where he also completed his PhD in 1993. He then became a research fellow with the Institute for Petroleum and Organic Geochemistry at the Forschungszentrum Jülich. In 2001 he switched to the German Research Centre for Geosciences in Potsdam. Wilkes earned his Habilitation in 2004 at the Technical University of Berlin. Before taking the post as professor at Oldenburg University he was an adjunct professor at the Technical University of Berlin. Wilkes is a board member of the European Association of Organic Geochemists. His main research topics include molecular mechanisms of biogeochemical key reactions and metabolic pathways in environmentally relevant microorganisms. He also studies the fate and transformation of hydrocarbons and petroleum in the environment and uses organic indicators to reconstruct climate conditions of the past.



Joachim Willems
Religious Education

Prof. Dr. Dr. Joachim Willems has been appointed Professor of Religious Education at the Institute for Evangelical Theology and Religious Education. Willems, who had already held the chair as deputy professor for two semesters in 2014/15, previously taught and conducted research at the Technical University of Dortmund. He studied theology and musicology in Neuendettelsau, Bonn and Hamburg. Having obtained his degree in theology he went on to earn his PhD in 2003 at the University of Hamburg with a thesis on Lutheran communities in Russia. In 2008 Willems also completed an educational science dissertation dealing with the introduction of religious education lessons into the school curricula in Russia at the University of Hildesheim. In addition to religion in Russia, Willems's research also focuses on developing diversity-sensitive religious education: he studies how Christian, Muslim and non-religious youths deal with religious plurality. This picks up on the theme of his Habilitation thesis, "Interreligious Competence", for which the Humboldt University of Berlin awarded him his Habilitation in 2010.



Michael Winklhofer
Sensory Biology

Prof. Dr. Michael Winklhofer has been appointed Professor of the Sensory Biology of Animals at the Institute for Biology and Environmental Sciences. Winklhofer studied geophysics at the Ludwig-Maximilian University of Munich and completed his PhD there in 1999 with a thesis on the physical foundations of magnetoreception in animals. After several years as a post-doctoral researcher in Tennessee and California (USA) and as a Teaching Fellow in Southampton (England), he obtained his Habilitation at the University of Munich in 2007 and was awarded a Heisenberg fellowship by the German Research Foundation (DFG) in 2008. During this period he also taught and conducted research in California and Zurich (Switzerland). In 2013 Winklhofer was appointed as an adjunct professor at the University of Munich. Before coming to Oldenburg he was a visiting professor at the University of Duisburg-Essen. His main areas of research are biogenic magnetic nanoparticles and their potential function in animal orientation using the Earth's magnetic field.

Doctorates

Fakultät I - Bildungs- und Sozialwissenschaften

Dennis Bürjes, Thema: „Interventionsökonomie – Der Zielkonflikt ‚War on Terror‘ versus ‚State Building‘ in Afghanistan.“
Sozialwissenschaften

Lars Eichen, Thema: „Interventionsstudie zur Genauigkeit von Beobachtungseinschätzungen elementarpädagogischer Fachpersonen. Empirische Untersuchung diagnostischer Kompetenzfacetten mittels Videovignettest.“
Pädagogik

Ulrich Klügel, Thema: „Das Studienseminar Oldenburg 1892-1983: Der lange Weg zur Professionalisierung der Lehrerbildung an höheren Schulen.“
Pädagogik

Burkhard Leimbach, Thema: „Verschenkte Chancen – Schülerinnen und Schüler als Optimierer ihrer Schulkarrieren? Optimierung der Zusammenarbeit von Schule und Eltern und ihren Kindern – eine Befragung von Schülerinnen und Schülern mit türkischem Migrationshintergrund bezüglich der Einstellung zu schülerorientierter Elternarbeit an Gymnasien. Eine explorative Studie.“
Pädagogik

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

Carolin Reinck, Thema: „Lernförderung im Mathematikunterricht durch Advance Organizer. Eine quantitative-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.“
Sonderpädagogik

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

Sonja von Waaden, Thema: „Mathematiklernen von ‚Risikokindern‘ in der Jahrgangsmischung – Eine empirische Studie zur Auswirkung kindlicher Handlungs- und Lageorientierung auf die Leistungsentwicklung.“
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

Fakultät II - Informatik, Wirtschafts- und Rechtswissenschaften

Holger Achtermann, Thema: „Wahrung von Betriebs- und Geschäftsgeheimnissen der Wirtschaftsauskunfteien bei Datenschutzaufsichtsbehörden.“
Rechtswissenschaften

Nazime Assly, Thema: „Vertrauensbruch als Kündigungsvoraussetzung im deutschen und türkischen Arbeitsrecht am Beispiel der Bagatellkündigung.“
Betriebswirtschaftslehre

Florian Axel Hendrik Berding, Thema: „Der Einfluss epistemischer Überzeugungen auf Lehr- und Lernprozesse in der kaufmännischen beruflichen Bildung.“
Wirtschaftspädagogik

Marita Blank, Thema: „Reliability Assessment of Coalitions for the Provision of Ancillary Services.“
Informatik

Dirk Brunnberg, Thema: „Zur Wirkung von Sentiment in der Kapitalmarktcommunication auf Finanzanalysten.“
Volkswirtschaftslehre

Petra Dünhaupt, Thema: „Financialization and Income Distribution – Empirical Evidence from OECD Countries.“
Betriebswirtschaftslehre

Florian Fortmann, Thema: „Augmenting Monitoring Performance during Multi-UAV Supervisory Control with Adaptive Displays.“
Informatik

Tim Grönemeyer, Thema: „Datenschutzrechtliche Probleme bei der Nutzung des ‚Web 2.0‘ im Intranet eines Unternehmens.“
Rechtswissenschaften

Bernd Hackmann, Thema: „Social Learning Processes in International Environmental Governance; as applied in the case of Addressing Greenhouse Gas Emissions from International Shipping.“
Betriebswirtschaftslehre

Lydia Illge, Thema: „Entwicklung und Erprobung einer Methode zur Abschätzung der Beiträge einer Branche zur nachhaltigen Entwicklung mit einem Indikatorensystem.“
Betriebswirtschaftslehre

Reemda Jaeschke, Thema: „The Effects of Corporate Corruption and Corporate Sustainability on Firms' Financial Disclosures.“
Betriebswirtschaftslehre

Lars Klostermann, Thema: „Erwartungsnutzentheorie und Regret Theorie als Erklärungsansatz preispolitischer Entscheidungen – Ergebnisse eines Quasi-Laborexperiments zum deutschen Automotive Aftermarket.“
Betriebswirtschaftslehre

Michael Koch, Thema: „Analyse der Rahmenbedingungen und Gestaltungsanforderungen onlinegestützter Maßnahmen der dritten Qualifizierungsphase von Lehrkräften in der ökonomischen Bildung.“

Ökonomische Bildung

Hanno Kortleben, Thema: „Eine empirische Untersuchung zur Rolle von Qualitätssignalen bei der Finanzierung von Start-ups auf deutschen Crowdfunding-Plattformen.“

Betriebswirtschaftslehre

Tobias Krahn, Thema: „Flexible Detektion von Arzneimittelnebenwirkungen für die Versorgungsforschung.“

Informatik

Steffen Kruse, Thema: „Co-Evolution of Metamodels and Model Transformations.“

Informatik

Matthias Lachenmann, Thema: „Datenübermittlung im Konzern.“

Rechtswissenschaften

Jessica Lange, Thema: „Werteorientiertes Management von Chancen und Risiken in der kommunalen Energieversorgung.“

Betriebswirtschaftslehre

Christopher-Marcel Meinecke, Thema: „Der Privathaushalt als Klimarettter? Eine empirische Wirkungsanalyse Smart Meter-basierter Feedback-Systeme und Stromtarif-Modelle in einem Feldtest.“

Betriebswirtschaftslehre

Silke Neumeyer, Thema: „Naturschutz als Schwelle zur nachhaltigen Regionalentwicklung.“

Betriebswirtschaftslehre

Anna Pechan, Thema: „Utilities in a Changing Environment – Adaptation to Climate Change and the Energy Transition.“

Volkswirtschaftslehre

Jan Pinkowski, Thema: „Prozessgetriebene Risikoanalyse zur Bewertung maritimer Operationen.“

Informatik

Frank Pothen, Thema: „Raw Materials, International Trade, and Numerical Models.“

Volkswirtschaftslehre

Dennis Rendschmidt, Thema: „Growth by Electricity - Elektrifizierung bei kleinen Unternehmen und Wachstum in Entwicklungsländern sowie als Business Case bei Energy Shops in Namibia.“

Betriebswirtschaftslehre

John Brian Robertson, Thema: „Climate-Change Risk-Management Institutions in Major Banks Understanding Institutional Diffusion.“

Volkswirtschaftslehre

Stanislaw Schmal, Thema: „Konsolidierungswellen und Prognoseverhalten von Finanzanalysten.“

Betriebswirtschaftslehre

Klaas Schmidt, Thema: „Wissensbasierte Entscheidungsunterstützungssysteme zur Übertragung und Wiederverwendung von Erfahrungswissen aus Entscheidungsprozessen.“

Informatik

Jan Schneider, Thema: „Unilateral Climate Policy – Carbon Leakage, Efficiency, and Incidence.“

Volkswirtschaftslehre

Thomas Schwenke, Thema: „Private Nutzung von Smartglassen im öffentlichen Raum.“

Rechtswissenschaften

Andreas Solsbach, Thema: „Document Engineering als Ansatz für eine überbetriebliche Nachhaltigkeitsberichterstattung.“

Informatik

Mani Swaminathan, Thema: „Quantitative and Structural Analysis of Real-Time and Probabilistic Systems.“

Informatik

Thomas Vogelgesang, Thema: „Multidimensionales Process-Mining für die Analyse medizinischer Versorgungsprozesse.“

Informatik

Monika Walter, Thema: „Ein Konzept zur Identifikation von Unterstützungspotenzial für Simulationsstudien bei Verwendung multidimensionaler Datenmodelle.“

Informatik

Fakultät III - Sprach- und Kulturwissenschaften

Ilka Flöck, Thema: „Requests in American and British English: A contrastive, multi-method analysis.“

Anglistik

Jan Michalsky, Thema: „Frageintonation im Deutschen. Zur intonatorischen Markierung von Interrogativität und Fragehaltigkeit.“

Germanistik

Miriam Schumacher, Thema: „Erzählen vom Widerstand als Erzählen von Gemeinschaft – Literarische Repräsentationen des Widerstands gegen den Nationalsozialismus in Westdeutschland (1945-1989).“

Germanistik

Gerrit Vorjans, Thema: „Von der ‚Torheit, wählerisch zu sterben‘. Zur Funktion und Bedeutung von Suizidarten in Texten der deutschsprachigen Literatur um 1900.“

Germanistik

Fakultät IV - Human- und Gesellschaftswissenschaften

Ute Beyer-Henneberger, Thema: „Supervision und Burnout-Prophylaxe in pastoralen und schulischen Berufsfeldern.“

Ev. Religion u. Religionspädagogik

Oliver Hirt, Thema: „Rekonstruktion des moralischen Standpunkts nach dem Freiheitskapitel der Negativen Dialektik.“

Philosophie

Martin Kowalewski, Thema: „Veräumlichung in der Musik.“

Philosophie

Fakultät V - Mathematik und Naturwissenschaften

Mohsen Alavash Shooshtari, Thema: „Complex Functional Brain Networks and Their Relation to Capacity Limits in Working Memory and Multi-Tasking.“

Psychologie

Lena Albers, Thema: „Mechanistic Investigations on Lewis Acid-Catalysed Skeletal Rearrangement Reactions of Polysilanes and Germanopolysilanes – Subtle Capture of Intermediates.“

Chemie

Matthias Augustin, Thema: „The electrocatalytic ORR activity of nanostructured manganese oxides in aprotic media.“

Physik

Elisabeth Bauma, Thema: „Entwicklung Numerischer Lösungsstrategien zur Steuerung von Werkzeugmaschinen für die Mikrofertigung.“

Mathematik

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

Chemie

Imke Büsing, Thema: „Physiological and molecular characterization of genetic mutants of the anaerobic aromatic compound degrader ‚Aromatoleum aromaticum‘ EbN1.“

Meereswissenschaften

Christina Delfs, Thema: „Isogenies and endomorphism rings of abelian varieties of low dimension.“

Mathematik

Gerlinde Dingerkus, Thema: „Organisations- und Bewusstseinskultur in Hospizteams. Entwicklung eines Fragebogeninstruments unter Berücksichtigung der Dimension Bewusstsein.“

Psychologie

Daniela Dirnberger, Thema: „Uncertainties in Energy Rating for Thin Film PV Modules.“

Physik

Martin Dörenkämper, Thema: „An investigation of the atmospheric influence on spatial and temporal power fluctuations in offshore wind farms.“

Physik

Jaika Dörfler, Thema: „Präparative Studien zur regioselektiven inter- und intramolekularen Hydroaminoalkylierung von Alkenen.“

Chemie

Georg Fiedler, Thema: „Macht – Regional Governance – Herrschaft. Eine vergleichende Untersuchung von zwei Regional Governance-Regimes in Extremadura (Spanien).“

Biologie/Umweltwissenschaften

Viktor Gerliz, Thema: „Charakterisierung des metastabilen Verhaltens der Chalkopyritdünnschichtsolarzellen mit der zeitaufgelösten Photolumineszenzspektroskopie.“

Physik

Saskia Grunau, Thema: „Geodesics and Thermodynamics of Black Objects in Five Dimensions.“

Physik

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

Chemie

Hassan Hadi Al Karawi, Thema: „Phytic acid in green leaves.“

Biologie/Umweltwissenschaften

Tim Homeyer, Thema: „Aeroakustische Untersuchungen von Strömungsinstabilitäten an gekrümmten Flächen mit darin eingearbeiteten Kavitäten.“

Physik

Marta Jacuniak-Suda, Thema: „Regional Governance im Kontext der Regionalentwicklung in peripheren ländlichen Räumen am Beispiel von regionalen Netzwerken in Ermland-Masuren (Polen) und auf den Western Isles (Schottland).“

Biologie/Umweltwissenschaften

Constantin Junk, Thema: „Statistical methods for probabilistic wind and wind power forecasting.“

Physik

Christopher Krause, Thema: „Ladungsträgergeneration in organisch/anorganischen Hybridsolarzellen mit CuInS₂ Nanopartikeln.“

Physik

Viola Kretschmer, Thema: „Schnelle Signalverarbeitung visueller Informationen beim Jagdverhalten in der Schützenfischretina.“

Biologie/Umweltwissenschaften

Max Kronberg, Thema: „Explicit Construction of Rational Torsion Divisors on Jacobians of Curves.“

Mathematik

Nils Köne, Thema: „Molekularer Wärmetransport einzelner Moleküle.“

Physik

Matthias Langemeyer, Thema: „Der Energiefluss in offenen, zeitperiodisch angetriebenen Quantensystemen.“

Physik

Ann-Katrin Meinhardt, Thema: „Anorganisch-geochemische Untersuchung quartärer Sedimente des Arktischen Ozeans.“

Meereswissenschaften

Bianca Michalik, Thema: „Star compass orientation in birds: Learning, perception and interaction with the magnetic compass.“

Biologie/Umweltwissenschaften

Rany Miranti, Thema: „Charge transport and transfer processes in CuInS₂ nanocrystal-based hybrid solar cells.“

Physik

Safaa Mothna, Thema: „Anhydromonosaccharide als Biomarker für den Eintrag von Holzverbrennungsprodukten in marine Sedimente.“

Meereswissenschaften

Niklas Oehl, Thema: „Nano-structured anode materials for lithium-ion batteries. Crystal structure and phase evolution.“

Physik

Jan Ohlert, Thema: „Hydrothermale Carbonisierung (HTC) von Klär- und Faulschlämmen.“

Chemie

Jana Packmor, Thema: „Harpacticoida (Crustacea, Copepoda) of Madeira and Porto Santo – Inventory and first comparison with seamounts of the ‚Madeira Hot Spot Track‘.“

Biologie/Umweltwissenschaften

Till Preuß, Thema: „Titankatalysatoren für die intermolekulare Hydroaminoalkylierung von 1,3-Dienen.“

Chemie

Doctorates

Jaroslav Puczyłowski, Thema: „Sensor development for highly resolved measurements in turbulent flows.“

Physik

Katharina Pukaß, Thema: „Ursachen der α -Synuclein Aggregation in oligodendroglialen Zellen.“

Biologie/Umweltwissenschaften

Daniel Ritterskamp, Thema: „Evolutionary Dynamics in Food Webs: Influence of Resources and Space“

Meereswissenschaften

Sunke Schlüters, Thema: „Unconditionality in spaces of holomorphic functions“

Mathematik

Wiebke Schubotz, Thema: „Performance of Current Models of Speech Recognition and Resulting Challenges.“

Physik

Veronika Seiberlich, Thema: „Das Mikrotubuli assoziierte Protein Tau und Proteinaggregatbildung in oligodendroglialen Zellen.“

Biologie/Umweltwissenschaften

Ravail Singh, Thema: „Biodiversity of deep-sea nematode communities from commercially important manganese nodules areas.“

Biologie/Umweltwissenschaften

Stephan Späth, Thema: „Statistische Korrektur von Ensemblevorhersagen der regional aggregierten Windleistung.“

Physik

Benjamin Steffen, Thema: „Negiertes Bewältigen – Eine Grounded-Theory-Studie zur Diagnose von Bewertungskompetenz durch Biologielehrkräfte.“

Biologie/Umweltwissenschaften

Georg Steinert, Thema: „Microbial Diversity of Temperate and Tropical Sponges.“

Meereswissenschaften

Alexander Stollenz, Thema: „Die Coelenterata der Deutschen Bucht in Abhängigkeit von den Umweltbedingungen.“

Meereswissenschaften

Eike Stut, Thema: „Wirkungen der Psychosynthese.“

Psychologie

Jaybalan Tamahrajah, Thema: „Experimental and theory-based studies of silicic acid formation under hydrothermal conditions – evaluation of various methods.“

Chemie

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

Physik

Reinhard Vettters, Thema: „Entwicklung und Evaluation eines Diagnoseinstrumentes zur Erfassung metakognitiver Fähigkeiten im Bereich Formelsprache.“

Chemie

Cordula Walder, Thema: „Development of a High Voltage Top Cell for Silicon Thin-Film Solar Cells.“

Physik

Heidi Wichmann, Thema: „Effects of the marine natural products tropodithietic acid and dimethylsulphoniopropionate on neuronal and oligodendroglial cells as well as Caenorhabditis elegans.“

Meereswissenschaften

Fakultät VI – Medizin und Gesundheitswissenschaften

Ling-Chia Chen, Thema: „Cortical plasticity in cochlear implant users.“

Psychologie

Martin Chi-Sing Lam, Thema: „Haut-elektroporation mit einem für humanes Host Defense Peptid hCAP-18/LL-37 kodierenden Plasmid zur Förderung der Wundheilung.“

Humanmedizin

Frauke Eenboom, Thema: „Entwicklung und Evaluierung eines Dosimetersystems für die moderne Strahlentherapie.“

Medizinische Physik

Ina Kodrasi, Thema: „Dereverberation and noise reduction techniques based on acoustic multi-channel equalization.“

Medizinische Physik und Akustik

Daniel Marquardt, Thema: „Development and evaluation of psychoacoustically motivated binaural noise reduction and cue preservation techniques.“

Medizinische Physik und Akustik

Hu Niandan, Thema: „Metoprolol increases TIPMP-2 expression in mice bearing acute complex atherosclerotic plaque.“

Humanmedizin

Nicolás Palanca-Castán, Thema: „Interraural time difference processing in the auditory brainstem of two bird species.“

Neurowissenschaften

Frederice Pirschel, Thema: „Coding of Touch in Neurons of the Medicinal Leech *Hirudo medicinalis*.“

Neurowissenschaften

Johannes Voßkuhl, Thema: „Effects of transcranial alternating current stimulation on cognition and brain activation.“

Psychologie

Maren Weber, Thema: „Entwicklung inhibitorischer Synapsen im auditorischen Hirnstamm: Immunhistochemische, molekulare und massenspektrometrische Analysen.“

Neurowissenschaften

Habilitations

Fakultät I - Bildungs- und Sozialwissenschaften

Dr. Vera Busse, Vortrag: „Unterrichtsansätze für eine plurilinguale Gesellschaft“. Schrift: „Sprachliches und interkulturelles Lernen: individuelle Voraussetzungen und schulische Förderung.“

Pädagogik

Fakultät II - Informatik, Wirtschafts- und Rechtswissenschaften

Dr. Marlen Arnold, Vortrag: „Stakeholder-Integration als Pflicht oder Kür unternehmerischen Managements? Möglichkeiten und Grenzen offener Managementkonzepte.“ Schrift: „Nachhaltigkeit als strategische Implikation zur Verankerung in Innovationsprozessen.“

Betriebswirtschaftslehre

Fakultät III - Sprach- und Kulturwissenschaften

Dr. Michaela Keck, Vortrag: „The Pleasures and Challenges of a Parallel Culture: Childhood Constructions in Early and Contemporary African American Children's Literature“. Schrift: „Deliberately Out of Bounds: Women's Work on Classical Myth in Nineteenth-Century American Fiction.“

Amerikanistik: Literatur und Kultur

Fakultät IV - Human- und Gesellschaftswissenschaften

Dr. Ralph Hennings, Vortrag: „Die Kwami-Affäre' im September 1932. Deutsches kolonial-missionarisches Erbe und nationalsozialistischer Rassismus treffen in Oldenburg aufeinander“. Schrift: „Kirchengeschichtliche Studien. Alte Kirche, Russlanddeutsche und Oldenburg.“

Ev. Theologie u. Religionspädagogik

Fakultät V - Mathematik und Naturwissenschaften

Dr. Michael Jürgen Raupach, Vortrag: „Die Kambrische Explosion“. Schrift: „The application of molecular methods in animal species identification and classification.“

Zoologie

Dr. Bert Engelen, Vortrag: „Bakterieller Elektronentransport über mehrere Zentimeter“. Schrift: „Prokaryotes and viruses in the marine subsurface: From Coastal sediments to the deep-subseafloor biosphere.“

Mikrobiologie

Dr. Petra Groß, PhD (Umhabilitation), Schrift: „Development of laser sources and microscopy techniques for laser spectroscopy and confocal laser scanning microscopy.“

Physik

Fakultät VI – Medizin und Gesundheitswissenschaften

Dr. Heiner von Boetticher, Vortrag: „Fledermäuse und Phantome – unterschiedliche Zugänge zur klinischen Farbdopplersonografie“. Schrift: „Description, recording and analysis of X-ray dose deposition in radiology for procedure optimization and risk estimation.“

Medizinische Strahlenphysik

Apl.-Prof. Dr. med. Uwe Maus, (Umhabilitation), Schrift: „Therapie der chronischen, MRSA-induzierten Otitis mit bakteriziden Knochenersatzstoffen.“

Orthopädie und Unfallchirurgie