

CLICK

News from the Auditory Valley



Hearing for all. All people, all situations, at all time.

Cluster of Excellence Hearing4all again successful

New Collaborative Research Centre on Hearing Acoustics

Plans for implement the hearing clinic in Hanover



Winter 2018

CLICK - CLICK - CLICK.

Future hearing: This is the motto of the Auditory Valley research and development network, which bundles know-how on all aspects of hearing. With this magazine we would like to take you into the fascinating and varied world of researchers on a regular basis.

In this edition, the „Supersonic bang“ section focuses on the approval of the Cluster of Excellence Hearing4all 2.0 and the Collaborative Research Center Hearing Acoustics: Perceptive Principles, Algorithms and Applications (HAPPAA) at the University of Oldenburg. In the „Directional Filter“ we report on current plans for the hearing clinic in Hanover. We present a colourful mixture of research news and event reports in the „Rosa Rauschen“ section. A focus in this issue is again on the developments and results of Hearing4all, the cluster of excellence in the Auditory Valley.

We hope you enjoy reading it.
Your CLICK editorial team

P.S. Would you rather receive „CLICK“ as a PDF by e-mail? Feel free to contact us at info@auditory-valley.com

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*Prof. Dr. Dr. Birger Kollmeier,
Spokesperson of the Cluster of Excellence Hearing4all*

Dear Readers,

With Hearing4all 2.0 we remain excellent! On September 27th, the decision was made to continue the funding of Hearing4all's successful work and to rank it among the 57 clusters of excellence nationwide for the next seven years. This is why this issue of CLICK is entirely devoted to the motto: „From models, technologies and solutions for diagnosing, restoring and supporting hearing (Hearing4all 1.0)“ to „Medicine, basic research and technical solutions for personalised hearing care (Hearing4all 2.0)“!

Hearing loss affects 17% of the population - with an increasing tendency and, in some cases, a considerable reduction in the quality of life, including social isolation. Technical hearing rehabilitation using hearing implants, hearing aids and hearing assistance systems must therefore become even more effective. Hearing4all has all the expertise needed to conduct groundbreaking research into individual hearing solutions for all maladies, from mild hearing loss to complete deafness. Research-based functional hearing diagnostics, combined with models of normal hearing and hearing loss, will precisely predict the optimal therapy options for individual patients, based on innovative algorithms, biomaterials and system architectures for future personalized hearing systems. Its broad expertise, ranging from basic research, engineering sciences and machine learning to clinical medicine, makes it possible to implement the concept of precision medicine in audiology. The network of universities, non-university research institutions and industry in the „Auditory Valley“ network occupies a leading international position in finding solutions for the long-term goal of the Cluster of Excellence and represents a paradigm shift in the therapy of hearing loss: From empirical to quantitative, model- and data-driven science.

The new initiative builds on the structures and outstanding innovations of the cluster's first funding period, e.g. multilingual language tests, auditory midbrain implants or precise prediction of the benefits of hearing aids through machine learning. We take „hearing for all“ literally and aim to create a „virtual hearing clinic“ using mobile health solutions (including a software hearing aid that supports precision auditory medicine and breakthrough hearing-aid technology). A total of four ambitious, integrative research strands are being pursued, spanning two orthogonal dimensions: The „development chain“ from basic research to hearing technology and the „severity of hearing loss“. The Center of Excellence for Hearing Research with the Research Academy and the Translation Research Center will be developed into sustainable cross-university joint structures that combine basic research with clinical and translational research.

On behalf of all members of the Cluster of Excellence "Hearing4all", I would like to express my sincere thanks for the enthusiastic support and am delighted that, with the approval of the Hearing4all 2.0 Cluster of Excellence, we are once again coming a great deal closer to our literal goal of „Hearing for all: for all people, at all places, and at all times“!

Your

Birger Kollmeier



Foto: Universität Oldenburg

The speaker of the Excellence Cluster Prof. Dr. Birger Kollmeier (centre) and other leading scientists of the university are delighted with the success of the Excellence Strategy.

Cluster of Excellence Hearing4all again successful

A great success for Oldenburg University, Hannover Medical School and Leibniz University: The Cluster of Excellence proposal „Hearing4all: Medicine, Basic Research and Engineering Solutions for Personalized Hearing Care“ was successful in the Excellence Strategy of the Federal Government and the Länder and will be funded for a further seven years.

The funding applied for amounted to 55 million euros. Based on the results of the previous Excellence Cluster, the Oldenburg researchers developed their application together with hearing researchers from Hanover. In total, 57 of 88 finalists in the Germany-wide „Excellence Cluster“ funding line were awarded a contract. „The renewed success of the Hearing4all cluster is proof of the high level of hearing research in Lower Saxony. The research network from basic research to applied technology continues along the path towards personalised medicine. The researchers are thus improving the quality of life of a large number of patients,“ said Lower Saxony’s Science Minister Björn Thümler after the announcement of the funded clusters.

„We are proud of our hearing research. Further funding is a great success for our university, our university medicine and our strong partners,“ said University President Prof. Dr. Dr. Hans Michael Piper on the occasion of the decision. „Building on their many years of experience and scientific competence, the hearing researchers can now continue to work on their ambitious goals.“

„Following the decision in 2012, we can once again count ourselves among the top researchers in Germany,“ said the cluster’s spokesperson, the Oldenburg physicist and physician Prof. Dr. Birger Kollmeier. „We will continue our work with all our strength and, for all forms of hearing loss, develop solutions that are specially tailored to the needs

of those affected. Our goal is a modern, data-driven scientific- and precision medicine of the highest standard". The clinical spokesman for the new cluster is Prof. Dr. Thomas Lenarz, Clinical Director of the Ear, Nose and Throat Clinic at Hanover Medical School. „The commitment to the continuation of our hearing research within the framework of excellence promotion is, on the one hand, a recognition of our research; on the other hand, we are happy to accept the contract to continue research into the basics of hearing and to develop new forms of therapy with and around cochlear implants," Lenarz emphasized.

For many years now, the Oldenburg researchers have been working with their scientific partners to continuously develop technical hearing aids and treatment options for hearing impaired people - from mild hearing loss to deafness. In recent years, Hearing4all researchers have developed important building blocks for better diagnostics, hearing systems and assistive technologies: These include multilingual language tests, implants in the part of the midbrain that processes hearing signals, and the ability to use machine learning to predict the improvements provided by a hearing aid.

In the new Cluster of Excellence, the scientists are now bundling their research into four strands: These strands represent the developmental chain from basic research to hearing technology on the one hand, and the severity of hearing loss on the other. In the first strand, the scientists use modern neuroscientific methods to investigate the complex interplay between hearing, perception and processing in the brain over a person's lifetime and thus contribute to understanding these even better. The second strand involves IT-based research with the aim of establishing a virtual multilingual hearing clinic. In the third strand, the researchers will develop individually targeted diagnostic and treatment methods for patients with moderate to severe disabilities and even complete deafness. Based on the scientific and technical findings, a fundamentally new system technology for the hearing aids of the future will be developed in the fourth strand.

Twenty-five neuroscientists, physicians, psychologists, linguists, physicists and engineers from Oldenburg University, Leibniz University Hannover and Hannover Medical School will participate in the new cluster of excellence. In addition, the Jade University, HörTech gGmbH, the hearing centres in Oldenburg and Hanover, the Fraunhofer IDMT Institute for Hearing, Speech and Audio Technology,

the Fraunhofer ITEM and the Hanse-Wissenschaftskolleg (HWK) in Delmenhorst are project partners.

„Hearing4all“ is one of the world's leading centers in medical technology, hearing research, audiology, medical diagnostics and therapy. About 80% of all hearing aids worldwide contain know-how from Oldenburg. Since 2012, the Cluster of Excellence, which is currently still running, was funded with almost 30 million euros. In addition, the Lower Saxony Ministry of Science and the Volkswagen Foundation are supporting the cluster, which will be completed at the end of 2018, with an additional one million euros.

About the Excellence Strategy:

With the Excellence Strategy, the Federal Government and the Länder intend to continue and further develop their projects to strengthen universities, in particular those begun with the Excellence Initiative (running from 2005 to 2017). Specifically, scientific excellence, profile building and cooperation within the science system will be promoted in order to strengthen Germany as a science location. There are two funding lines: clusters of excellence and universities of excellence. Funding for clusters of excellence begins on 1 January 2019 and will run for seven years.

Center of Excellence for Hearing Research

The Center of Excellence for Hearing Research is an overarching, sustainable scientific umbrella structure that operates the Hearing4all project across the three supporting universities, Carl von Ossietzky University Oldenburg, Hannover Medical School and Leibniz University Hannover. The aim is to support and coordinate joint research between the universities, which builds on complementary expertise in basic, applied and clinical research on hearing aids and hearing implants at the internationally recognised and well-networked cluster locations of Oldenburg and Hanover. The Center of Excellence for Hearing Research contributes to ensuring the long-term sustainability of the cluster's hearing research and to achieving stronger links between the existing, inner-university and diversified research groups as well as the university structures oriented towards hearing research.



Foto: Markus Hübeler/Universität Oldenburg

Simulate complex hearing situations and visualize them at the same time: SFB leader Volker Hohmann in the „Virtual Reality Laboratory“.

New Collaborative Research Centre on Hearing Acoustics

Another success for the University of Oldenburg and its hearing research: The German Research Foundation (DFG) approved a new Collaborative Research Centre (SFB) „Hearing acoustics“, which is expected to receive around eight million euros in funding over the next four years. The SFB is headed by Prof. Dr. Volker Hohmann, a psychoacoustic specialist from Oldenburg, one of the leading researchers in the Cluster of Excellence Hearing4all and co-winner of the German Future Prize.

The SFB with the official title „Hearing acoustics: Perceptive principles, algorithms and applications (HAPPAA)“ aims to create the basis for improved hearing aids and hearing-assistance systems. Other leading institutions in the field of hearing research, including RWTH Aachen University, TU Munich, the Fraunhofer Institute for Digital Media Technology IDMT, Jade University in Oldenburg and HörTech gGmbH Oldenburg, are involved in this major project, which is scheduled to run for a total of twelve years.

„In the new Collaborative Research Centre, the Oldenburg hearing researchers are once again devoting themselves to their goal of helping hearing impaired people in the best possible way. With this funding, the German Research Foundation acknowledges the outstanding national and

international significance of our hearing research,“ explains University President Prof. Dr. Dr. Hans Michael Piper. The Collaborative Research Centre „Hearing Acoustics“ builds on the results of the DFG research group „Individualised Hearing Acoustics“, which Prof. Dr. Dr. Birger Kollmeier and Hohmann jointly headed since 2012. The researchers from Oldenburg University, the HörTech Competence Centre and the Jade University of Applied Sciences laid the foundations for the optimal adaptation of hearing technologies to the individual user and the respective acoustic environment in the future. The SFB now approved focuses on the complicated interaction between people with impaired hearing and their acoustic environment. „In reality, a hearing situation is constantly changing, because people react to voices and noises. For



In the research building of the Department of Medical Physics and Acoustics, test persons can immerse themselves in a virtual reality.

example, they turn their heads towards the sound source or move their eyes," explained Hohmann. "So far, however, this interaction has not been taken into account in hearing acoustics," said the researcher. Rather, hearing was regarded as a passive process. Test persons in the laboratory were instructed not to move if possible. „That's why many hearing aids work well in the laboratory, but not as well in reality," he said.

Hohmann and his colleagues describe the dynamic interaction between the hearing person and his environment as an „acoustic communication loop". They are now incorporating this process into hearing modeling for the first time. „Linguistic communication is the basis for social participation," emphasizes Hohmann. People whose hearing is already impaired due to age, but who do not yet need a hearing aid, can also benefit from the improved understanding of this „hearing loop". In order to understand their basic principles, the team is researching models, algorithms and applications in three areas of work, with a total of twelve subprojects. Based on models of speech perception and hearing quality in normal and hearing impaired people, Hohmann and his colleagues intend to improve the algorithms that process acoustic signals in hearing aids, and to investigate a number of possible applications - for example, to investigate how

loudspeaker signals can become more intelligible in an unsettled environment, such as announcements in train stations. Another goal is to develop an intelligent earpiece that offers high sound quality while suppressing feedback and reducing noise. The experts are also investigating how complex acoustic scenes can be realistically reproduced via headphones. In the future, test persons could immerse themselves in a virtual reality that resembles a real environment, both visually and acoustically - for example, a busy café or a restless classroom. At the same time, the technology could also be used, for example, to watch films at home using optimal acoustics. In the long term, the results of the SFB will also be used for other applications in the field of consumer electronics, such as speech recognition or human-machine communication.

The Collaborative Research Centre now approved also contributes to the active promotion of young scientists - thanks to an integrated Research Training Group. SFB spokesperson Hohmann emphasises: „We are creating the basis for further improving rehabilitation with hearing aids for the benefit of patients, training highly qualified young people for hearing research, and also supplementing the research of the Cluster of Excellence Hearing4all with important fundamental building blocks".



State of Lower Saxony commits itself: „We want to implement the hearing clinic.“

At the start of the 20th Cochlear Implant Congress in Hanover, Dr. Sabine Johannsen, State Secretary at the Ministry of Science and Culture of Lower Saxony, was accompanied by greetings from Science Minister Björn Thümler and a clear message: „The Ministry is committed to the plans to support a hearing clinic in the immediate vicinity of the Hanover Medical School (MHH).“

„We have a very great interest in implementing a hearing clinic within the framework of what is financially feasible in order to maintain and expand the internationally visible lighthouse of hearing and cochlear implants. Take us at our word,“ the State Secretary explained to around 150 guests at the congress. This is a long-term goal of ENT Clinic Director Professor Dr. Thomas Lenarz, MHH President Professor Dr. Christopher Baum, and MHH Vice President Dr. Andreas Tecklenburg, who is responsible for the Department of Health Care.

Currently long walking distances for patients and employees

Professor Lenarz and his team have already been improving the care structures for people with hearing disorders for many years - despite the structural situation of the

50-year-old MHH, which repeatedly poses great challenges to stringent diagnostics and therapy due to long walking distances for patients and a spatially fragmented team. This will change through the concentration at one location and with the establishment of the German hearing hospital. The project is to become reality within the next few years.

Outstanding research and care with international appeal

The MHH ENT Clinic is already outstanding in Lower Saxony in the provision of implantable hearing systems to people and in hearing research - with international appeal. „We are extremely pleased that the Excellence Initiative is now continuing. We are counting on further funding from the German Research Foundation to make progress. In any case, we will do everything we can to



The participants of the CI Congress tasted the anniversary cake. (1st row from left) State Secretary Dr. Sabine Johannsen, Hansjürg Emch from the management of Sonova, Dorothee Rhiemeier as head of the Hannover listening region, CI wearer Vincent Puppe and Managing Director of the Hannover-Braunschweig-Göttingen metropolitan region Wolfsburg, Kai Florysiak.

ensure that the long-term nature of this development remains guaranteed, and I wish all those involved on the research side and all those affected that these developments progress rapidly, so that we not only develop the location here, but also do the best for the people for whom these developments are necessary," reports MHH President Professor Dr. Christopher Baum. The ENT Clinic sees goals in hearing research, for example in the implementation of artificial intelligence, optoacoustics or micro-medication at the nanoparticle level. These are just a few of the catchwords that describe the future of hearing systems such as cochlear implants (CI) to increasingly align technically assisted hearing with biological hearing.

„Industry should listen more to patients“

Vincent Puppe, a future ear, nose and throat physician and cochlear implant carrier, expressed a wish from patients at the CI Congress: „It would be nice if the industry listened more to us patients and implemented our suggestions," he said. Like about 50,000 people in Germany, he only hears because his defective inner ears are supported by the cochlear implant. The number of children

and adults fitted with this hearing system is growing steadily, and the one millionth CI patient worldwide is predicted for the year 2020. The success of this neuroprosthesis goes back to the pioneering work of the Hannover Medical School in 1984 and its constant research to improve the system. The German Hearing Centre is an integral part of the ENT Clinic of the MHH and thus the basis for the development of excellence in the field of hearing science in Lower Saxony.



Prof. Prof. h.c. Dr. Thomas Lenarz, Clinic Director Ear, Nose and Throat Clinic of the Hanover Medical School, is delighted with the cochlea-shaped cake.

Dialog-oriented training system for communication at sea

Miscommunication is an important trigger for incidents at sea. In order to overcome language barriers in multilingual crews, the IMO Standard Marine Communication Phrases were introduced. At the Fraunhofer joint booth at SMM 2018, the Fraunhofer Institute for Digital Media Technology IDMT from Oldenburg will present a dialog-oriented training system based on automatic speech recognition for testing purposes.

Off-the-shelf speech recognition is not enough

The aim is to improve ship-to-ship and ship-to-shore communication by integrating speech recognition into communication, learning systems and crewing. „Fraunhofer IDMT has a high level of competence in the field of speech recognition, so that systems are already available that are hardly disturbed by normal ambient and background noises. Above all, our technology also works with



© Fraunhofer IDMT/Daniel Schmidt

Automatic speech recognition for maritime communication, crewing and eLearning.

hout a connection to the Internet, i.e. locally at the user's location. Our systems are optimized for communication at sea and adapted to specific everyday communication needs," explains Jens Appell, head of the Audio, Speech and Audio Technology department at Fraunhofer IDMT.

Experts for voice communication met in Oldenburg

Automatic speech recognition, active noise compensation and machine learning methods to improve speech quality were among the topics of a symposium on speech communication, which took place from the 10th to the 12th of October at the University of Oldenburg. The conference of the Informationstechnische Gesellschaft (ITG), a specialist society of the Association of Electrical, Electronic & Information Technologies (VDE), is one of the largest meetings of scientists and practitioners in the field of speech processing in German-speaking countries and

takes place every two years. For the first time, a satellite workshop on the topic of „Acoustic Sensor Networks“ will be attached to the meeting. The conference was organized by Prof. Dr. Simon Doclo from the Department of Medical Physics and Acoustics, one of the leading scientists in the Cluster of Excellence Hearing4all.

Speech processing plays an important role in many modern technologies, such as hands-free telephony, voice-controlled systems and hearing aids. „Thanks to speech processing, it is possible to suppress background noise and reverberation and thus improve speech intelligibility, not only for the hearing impaired but also for people with normal hearing," Doclo explained. „We are very pleased to have three high-profile speakers from the USA, Israel and Germany for the conference, who will give overview lectures on current topics in speech processing and speech intelligibility modeling. Furthermore, the conference programme consisted of lectures, poster sessions and so-called Show & Tell sessions, at which researchers demonstrated their latest developments.



Foto: Universität Oldenburg

Prof. Dr. Simon Doclo, one of the leading researchers in the Cluster of Excellence Hearing4all.

Andrea Hildebrandt's professorship for Psychological methodology and statistics

Prof. Dr. Andrea Hildebrandt has been appointed Professor of Psychological Methodology and Statistics at the Faculty VI of Medicine and Health Sciences at the University of Oldenburg. She was previously a Junior Professor of Psychological Diagnostics and Personality Psychology at the University of Greifswald.

„Her studies of social cognition, based on behavioral measurements, molecular-genetic and neuronal methods, are directly linked to the neuroscientific research focus of the Department of Psychology and to hearing research at the university,“ says Prof. Dr. Hans Gerd Nothwang, Dean of Faculty VI Medicine and Health Sciences.

Hildebrandt studied psychology at West University in Timișoara (Romania) and Humboldt University in Berlin. She received her doctorate in 2010 with a thesis on individual and age-related differences in facial recognition. Hildebrandt then researched and taught at the Universities of Duisburg-Essen, Berlin and Greifswald. During this time, she spent research and teaching periods in England, Hong Kong, China, Croatia, Iran and Vietnam. In 2013 she was appointed junior professor in Greifswald.



Foto: Universität Oldenburg

Prof. Dr. Andrea Hildebrandt, Professor of Psychological Methodology and Statistics.

Hildebrandt is a psychologist who studies individual and age-related differences in social cognition, i.e. the mental processes on which social perception, judgment or influence are based. Her focus is on facial recognition. She is also developing statistical methods that are widely used in the behavioural and neurosciences, as well as in biometrics.

Andrea Hildebrandt has received several awards, most recently the Visiting Fellowship Award of the British Academy for Psychology. She is a member of the German Society of Psychology (DGPs) and is a reviewer for third-party funding proposals of the German Research Foundation (DFG) as well as for numerous international and national journals. She is also involved in various monitoring programmes for young women scientists.

ZUSE-TAG REGIONAL shows strong commitment to sustainable industrial research

The privately organized research institutes in Germany make a central contribution to the transfer of scientific findings to small and medium-sized enterprises and industry. This became clear at the top-class events of the ZUSE-TAG REGIONAL, which took place on 20.9.2018 at around 30 locations throughout Germany with the participation of more than 60 institutes of the Zuse community.

In addition to the presentation of innovations, the ZUSE-TAG REGIONAL, which was held for the first time in this context, also focused on the exchange of ideas with politicians from federal, state and local governments.

„On ZUSE-TAG REGIONAL, our research institutions impressively demonstrated the high value and great diversity of their innovations. In return, we received a great deal of appreciation. We can build on this in our research work at the institutes as well as for our political concerns,“ said

Dr. Ralf-Uwe Bauer, President of the Zuse Community, in an initial assessment. The events in eleven federal states were attended by many prominent politicians, including members of the Bundestag, state governments, state parliaments and key positions in municipalities and regions.

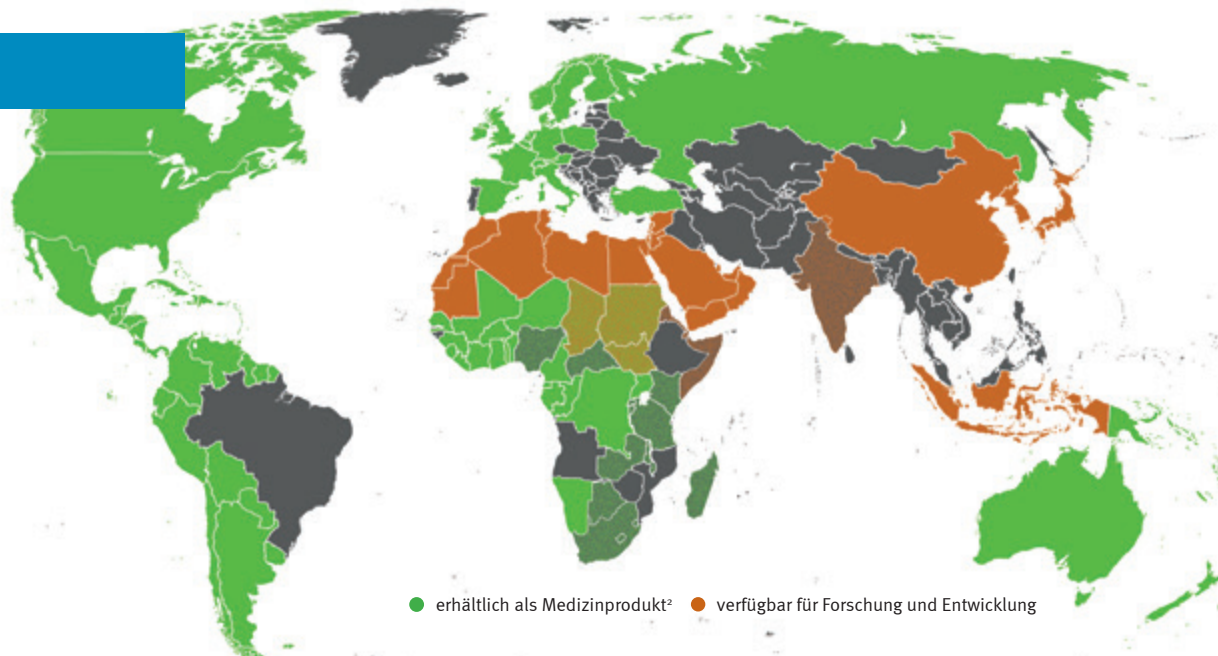
HörTech gGmbH has been a member of the Zuse community since April 2016 and used the open day at the Haus des Hörens to provide the general public with insights into sustainable industrial research.

Further information can be found at www.zuse-gemeinschaft.de



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Matrix tests available for more than 60% of the world's population

In 2018, the International Matrix Test was published as a medical device in eight additional languages: Five new matrix tests in English (UK), Swedish, Dutch, Norwegian and Danish, and three new, simplified matrix tests in Italian, Finnish and French. Now, hearing-care professionals can offer their customers modern speech audiometry in 18 different languages - in quiet and in background noise.

Matrix tests depict everyday situations (entire sentences must be understood in background noise) and are at the same time a very accurate measuring instrument. Therefore, the methods are very suitable for testing the performance of hearing aids in realistic situations and showing differences between different devices.

Available Matrix Test Languages

Arabic², Chinese, Danish², German^{1,2}, English (UK)², English (US)², Finnish^{1,2}, French^{1,2}, Hebrew², Indonesian, Italian^{1,2}, Japanese, Korean, Dutch², Norwegian², Polish², Russian², Spanish², Swedish², Turkish²

¹ Also available as a Simplified Matrix Test

² Available as a medical device in Germany and other European countries

Further languages are under development. HörTech is constantly looking for cooperation partners for the development and evaluation of further tests.

Open Day at the Haus des Hörens Oldenburg

What will the hearing system of the future sound like? What is actually the cocktail party effect? On September the 21st 2018, from 13:00 to 17:00, about 450 visitors heard a little "future" in the Haus des Hörens Oldenburg. The scientists opened the doors of the research facilities and, through lectures and simulations, gave all those interested visitors exciting insights into the future of hearing-aid technology and hearing acoustics. Those who wanted to know what their hearing is like were given the opportunity to carry out a hearing test and seek advice. The hearing-impaired simulator gave normal hearing people the chance to get an impression of hearing with a hearing loss and the compensation of hearing loss with a hearing aid. The worldwide, unique Communication Acoustics Simulator (KAS) took the visitors into various acoustic scenes. Guided tours through the listening garden provided a playful insight into complex listening processes. There was also something for children's ears.

The Oldenburg hearing researchers paid special attention to the young generation at this year's open day. Lectures, information stands and guided tours for high school graduates and students showed the variety of study opportunities and thesis topics in Oldenburg hearing research.





Foto: Universität Oldenburg

Celebrating the 25th anniversary of the Department of Medical Physics (from left): Prof. Dr. Volker Hohmann, Prof. Dr. Thomas Lenarz, Jörg Stahlmann, Prof. Dr. Dr. Birger Kollmeier, Petra Averbek, Stephan Albani.

From junior research program to top research: 25 years of medical physics at the University of Oldenburg

The Department of Medical Physics at the University of Oldenburg celebrated its 25th anniversary with a ceremony and a symposium in July. In addition, guests from science and politics celebrated the 60th birthday of the Oldenburg physicist and physician Prof. Dr. Dr. Birger Kollmeier. With his then Fiebigler professorship - a funding programme for young scientists - he and his team laid the foundation stone for Oldenburg hearing research in April 1993. Twenty-five years of medical physics: a success story that is, at the same time, inextricably linked to the success story of the university as a whole. Oldenburg hearing research stands for thematic diversity and is scientifically highly renowned. "It thus has national and international appeal", said Jörg Stahlmann, Vice President of Administration and Finance at the University of Oldenburg at the ceremony.

Petra Averbek, Mayor of the City of Oldenburg, and Prof. Dr. Thomas Lenarz, Clinic Director of the Ear, Nose and Throat Clinic of the Hannover Medical School (MHH) and Deputy Spokesperson of the Cluster of Excellence Hearing4all also paid tribute to the work of Oldenburg's Medical Physics. The speech was given by Stephan Albani, member of the Bundestag. At the subsequent symposium, international scientists presented current findings in various fields of hearing research.

At its start in 1993, the Department of Medical Physics, which was the first to combine the natural sciences with medicine, consisted of Kollmeier and his 16 colleagues. Participation in a newly established Research Training Group on Psychoacoustics funded by the German Research Foundation (DFG) gave the group a good start. In the meantime, almost 70 scientists are working in

five different research groups in the department. They are dedicated to the basics of hearing and speech as well as processes of processing acoustic signals in the human brain. The focus is on psychoacoustics, neuro-sensors, speech perception, signal processing in digital hearing aids and clinical hearing diagnostics. The "Cluster of Excellence Hearing4all" is anchored in the department, as are the Collaborative Research Centre "Hearing Acoustics" recently approved by the DFG and the DFG Research Group "Individualised Hearing Acoustics" launched in 2012.

The milestones of the past 25 years include participation in the Collaborative Research Centres "Neurocognition" (1996-2006) and "Active Hearing" (2005-2017) as well as the establishment of the Fraunhofer Project Group for Hearing, Speech and Audio Technology and the International Research Training Group "Neurosensorys" (2002-2009). In 1996, the University and the Protestant Hospital founded Hörzentrum Oldenburg GmbH. This was followed in 1999 by the establishment of the HörTech GmbH competence centre, which links research, development and industry. Since 2002, the House of Hearing with its acoustic laboratories has offered ideal research and working conditions. Since 1993, more than 60 scientists have completed their doctorates in medical physics. In addition, the study courses "Hearing Technology and Audiology" and - last year - "Physics, Technology and Medicine" were created.

Without a doubt, this success story is particularly closely associated with Birger Kollmeier, emphasized Stahlmann. "People like Professor Kollmeier are invaluable for science and a stroke of luck for a university".

Mathias Dietz appointed Professor of Physiology and Modelling of Auditory Perception

Prof. Dr. Mathias Dietz has been appointed Professor of Physiology and Modelling of Auditory Perception at the Faculty VI of Medicine and Health Sciences at the University of Oldenburg. Previously, the 39-year-old was Associate Professor at the National Centre for Audiology at Western University in London (Ontario, Canada). "With Professor Dietz, we have gained an outstanding scientist whose research on binaural hearing ranges from basic processes to individual therapies - for example cochlear implants - for people with hearing loss," explained Prof. Dr. Hans Gerd Nothwang, Dean of Faculty VI Medicine and Health Sciences.

Dietz studied physics at the University of Münster; he then worked as a research assistant in the Transregional Collaborative Research Centre "Active Hearing" at the University of Oldenburg, which is funded by the German Research Foundation (DFG). In 2009, he received his doctorate here with a thesis on directional hearing. From 2011 to 2012, he was a research fellow of the Alexander



Foto: Universität Oldenburg

Prof. Dr. Mathias Dietz has been appointed Professor of Physiology and Modelling of Auditory Perception.

von Humboldt Foundation at the Ear Institute of University College London (Great Britain). He then headed a junior research group in the Cluster of Excellence Hearing4all at the Department of Medical Physics and Acoustics at Oldenburg University until 2015. Since 2018, the European Research Council (ERC) has funded Dietz' work with a Starting Grant of 1.5 million euros. His research focuses on using detailed computer simulations of sound processing in the inner ear and brain to better understand how binaural hearing works. He is also working on using acoustic and electrical methods to better define the causes of hearing disorders and thus enable individual diagnoses and therapies.

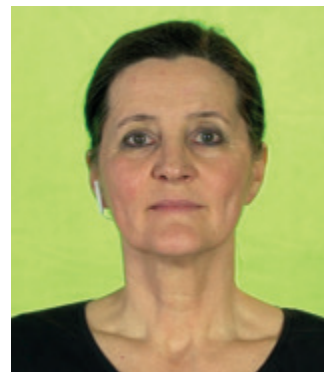
Audiovisual OLSA

One of the most established measures of hearing capabilities is speech intelligibility. Several years ago, the matrix sentence test OLSA was developed here in Oldenburg in order to evaluate systematically speech intelligibility, which has been widely used in numerous experiments.

Nevertheless, it is known that visual cues play a role in hearing. For example, there is a brain area dedicated to audiovisual signals, indicating that audio and visual stimuli are not always processed separately. In our particular case, we are interested in human communication and intelligibility, where visual stimuli provide relevant information through non-verbal behaviors. Specifically, the lip movements contribute substantially to speech intelligibility, making speech communication substantially easier by lip-reading. To augment the OLSA test visually, we contacted the original female speaker of the OLSA to help us record video material. We were lucky that the female version of the OLSA was not recorded too long ago and that the same female speaker was available for the task.

As the audio material of the OLSA is well-established and should not be changed, we recorded the female speaker

while speaking synchronously with the original audio material several times. The most synchronous video takes were chosen to create the final audiovisual OLSA. The video material was recorded with a green background (chroma key) in the Media Technology and Production at CvO Universität Oldenburg so



The video material was recorded with the original female speaker of the OLSA.

the background can be removed and changed. The video material for the male speaker has also been recorded, although with a different male speaker from the original OLSA, and the recordings are still being processed.

Currently, there are several studies running that are using the audiovisual OLSA: a study comparing virtual characters with lip-syncing to the video material, a longitudinal study to investigate the audiovisual integrative capabilities of the elderly and a study to measure listening effort when visual cues are present.



Foto: Fraunhofer IDMT

Björn Thümler (front), Lower Saxony's Minister for Science and Culture, together with Dr. Jens Appell (left) and Prof. Dr. Dr. Birger Kollmeier (right), tests the individual hearing support via the telephone.

10 years of the Fraunhofer Institute for Digital Media Technology IDMT's Hearing, Speech and Audio Technology division

For 10 years, the hearing, speech and audio technology (HSA) division of the Fraunhofer IDMT in Oldenburg has been a competent partner of industry and public authorities in the development of forward-looking technologies. In August, the tenth anniversary of the institute was celebrated in the Haus des Hörens in Oldenburg. Guest speakers included Björn Thümler, Lower Saxony's Minister of Science and Culture, Jürgen Krogmann, Mayor of Oldenburg, Stephan Albani, Member of the German Bundestag, and Dr. Hans-Otto Feldhütter, Director of Business Models of the Fraunhofer-Gesellschaft. Bernd Müller from Deutsche Telekom reported on the intensive cooperation with the Fraunhofer IDMT in the development of the acoustics of the speech assistant "Smart Speaker". Prof. Jörg Sennheiser also looked back on the joint success story in the development of headphone technology.

The Fraunhofer IDMT-HSA received 3.3 million euros in start-up funding from the state of Lower Saxony and has developed very successfully. "After 10 years, more than the total amount of the start-up financing is raised annually in industry and through publicly funded projects, around 40 employees are financed and almost 30 students are introduced to future topics and application-oriented research. With our work, we have opened doors to new markets for Oldenburg hearing research," said Dr. Jens-E. Appell, Head of Department Hearing, Speech and Audio Technology at the Fraunhofer IDMT in Oldenburg.

"The pure audiological and medical hearing research of the time now addresses customers in the areas of industry 4.0, automotive, consumer electronics, traffic, safety, telecommunications and health. The needs of these customers are reflected in the research at the Oldenburg location and thus also stimulate the basic research of the university partners", explained Prof. Dr. Dr. Birger Kollmeier, Head of the Institute Division of Hearing, Speech and Audio Technology at the Fraunhofer IDMT in Oldenburg.

"The hearing, speech and audio technology at the Fraunhofer IDMT in Oldenburg has been both a future field and a driver of digital transformation for a long time. In its development, the location has made the leap from medical hearing research to other attractive applied areas and is always at the cutting edge. Machine learning methods have been used practically from the outset to recognize acoustic events or to implement speech recognition in the field of human-technology interaction. This is digitalization in its purest form. This is why, for example, "the hearing car" is not just a vision, but the consistent implementation of acoustic recognition of approaching emergency vehicles is an essential contribution to autonomous driving," emphasizes Dr. Hans-Otto Feldhütter, Director of Business Models at the Fraunhofer-Gesellschaft.



Foto: E. B. und P. Petzold

Common hearing tests are performed with headphones - not always successful, because not all children like headphones.

Clinical Innovation Center KIZMO networks competencies in the new project PLOBI2go

The Clinical Innovation Centre for Medical Technology Oldenburg (KIZMO GmbH) was founded in 2015 to accelerate the market-driven development of innovative medical products. In addition to the topics dealt with since its foundation, a new multi-year project was added in September that demonstrates the unique possibilities of the Oldenburg research and innovation landscape. In cooperation between Jade University, OFFIS, HörTech, KIZMO and the audiometer manufacturer AURITEC, a new hearing-test procedure for children is being developed. The KIZMO assumes a central function as a mediator between research, development and application. By focusing on the context of use, application requirements and usability, it is ensured that a target group-oriented overall system will be created within the two-year project period.

The project PLOBI2go is funded by the Federal Ministry of Education and Research (BMBF) as a model project of the KIZMO. Specifically, a mobile system is to be developed to reliably and automatically test children's hearing, in a child-friendly manner. The development of hearing in children has a decisive influence on the development of speech. The social and emotional development process also depends on healthy hearing. Until now, hearing in children has only been examined at two points in time before they enter school: Two days after birth (Universal Newborn Hearing Screening, UNHS) and then at pre-

school age. The second hearing screening takes place at around four and a half to five years of age at the U8 pediatric check-up and at the publicly regulated school entrance examination (SEU). Prof. Dr. med. Karsten Plotz and his research assistant Katharina Schmidt from Jade University think that this is not enough. In addition, the current methods are not suitable for recognising hearing problems typical of old age.

Hearing disorders at kindergarten age

Cold-related middle-ear problems ("tympanic effusions") occur in about 80 percent of small children. "A tympanic effusion does not hurt, so children sometimes say nothing and the hearing disorder remains undetected - and this despite the fact that a hearing loss of 20 to 30 decibels is associated with it, as if one were covering one's ears", explains Karsten Plotz, who works as a specialist in pedaudiology alongside his professorship at Jade University. If these hearing disorders occur over a longer period of time or repeatedly, they can have an effect on hearing development. "Ten to twenty percent of children at school have chronic middle-ear hearing loss," reports the scientist. "This high proportion illustrates the relevance of the topic. Such hearing problems could have a massive impact on language development, literacy and behaviour, leading to school problems or fears.



Foto: Eberhard Petzold

To date, hearing testing in children was rarely examined until they start school, says Prof. Dr. med. Karsten Plotz, Professor of Otolaryngology at Jade University.

Current hearing screenings need to be optimized

Examination during the U8 screening determines the hearing threshold, i.e. the volume at which a child can perceive a very soft sound. From the point of view of those involved in the project, however, it is also particularly important to check the maturity of binaural hearing. Hearing with both ears makes it possible to recognize the direction from which a sound is coming. This improves speech comprehension in many everyday situations and is also particularly important in road traffic. One criticism of current hearing tests is the inadequate definition of normal hearing. All reference values refer to adults, and there are many different definitions. "It is methodically wrong to speak of 'normal hearing'," says Plotz. "Firstly, it is not exactly defined for adults and not at all for children. And secondly, the hearing ability called 'normal hearing' is not necessarily healthy or good hearing". The new system is therefore not intended to examine hearing thresholds, but rather areas of hearing that are relevant in everyday life. In addition, the usual tests have so far been carried out with headphones - not always successfully, because not all children like headphones. Instead of listening under laboratory conditions, hearing should be tested in the open air, i.e. under conditions close to everyday life.

Synergies through networking of competencies

The joint goal can only be achieved through the cooperation of the various project participants. The Jade University will provide the technical-audiological basis for the test procedure. The competence centre HörTech advises and supports the development of the audiometry software. OFFIS contributes its expertise to data exchange and data management between different clinical partners. At AURITEC, hardware and software for the new system are developed and prepared for later use.

The KIZMO will accompany the entire development process and will be in constant contact with future users. In the initial phase, the context of use will be recorded in order to better understand the system requirements. The KIZMO then supports the creation and testing of prototypes. This ensures that in the end, a hearing test will be developed that integrates perfectly into the daily work routine, but which also allows the children to participate in the test with enthusiasm and thus leads to better results.

Hearing the original sound - Acoustic transparency in hearing aids

Eyeglasses should compensate for visual defects and, at the same time, provide the impression of complete optical transparency without distortion - this apparent contradiction between correction by a sensory aid and simultaneous authenticity of the resulting sensory impression is largely resolved in modern visual aids - but by no means yet in modern hearing aids! The aim of the Cluster of Excellence Hearing4all is to enable "HiFi hearing systems" with the highest possible authenticity of sound impression and simultaneous correction of the hearing damage for hearing impaired persons in the mild to moderate range, i.e. such that the person concerned doesn't even notice that he or she is using a hearing aid.

Since our report in the "Autumn 2016" issue of the Cluster of Excellence Hearing4all, researchers have come a good deal closer to this goal: With the acoustically transparent earpiece, a development from the research group "Individualized Hearing Acoustics" and the working groups Kollmeier, Hohmann and Doclo, the hearing technology of the future has come a step closer: In addition to three microphones and two hearing-aid receivers as well as a large compensating opening between the inside and the outside ("vent"), this development from Florian Denk's dissertation, which has now been filed for patent, mainly depends on the signal processing associated with it. In order to compensate for the acoustic effect of the earmold as a sound obstacle, the incoming sound is automatically processed and reproduced with the aid of an "in-ear" microphone located in the auditory canal in

such a way that the hearing impression with a hearing aid is exactly the same as the sound impression without a hearing aid, but with a volume that can in principle be changed at will! This "trick" of adapting the transmission characteristics of the hearing aid to the individual conditions at the outer ear and ear canal allows a very natural, transparent sound impression to be produced, which is an indispensable prerequisite for further developments and plans of the Cluster of Excellence on the way to the hearing aid and hearing support system of the future.

For example, binaural (binaural) hearing is only particularly well supported by a hearing aid if the auditory impression of acoustic transparency prevails at each ear - at least this is the result of Tobias de Taillez's master's thesis that was carried out under the direction of Dr. Tobias Neher. This technology also offers the necessary space for future thought-controlled hearing solutions: the transparent earmold also accommodates additional EEG electrodes made possible by cooperation with the Debener working group. This allows the most important EEG signals to be derived near the ear both in the auricle and with the cEEGrid system according to Bleichner et al. and then analyzed. With this brain-computer interface technology it should be possible to recognize certain hearing-aid functions, for example due to the hearing effort of the listener or the concentration on an acoustic object, and thus to optimally adjust the hearing aid to the situation according to the hearing wish of the listener. But the transparent earmold also has other tasks to perform: feedback suppression through to active noise suppression in the open hearing system are still unsolved issues that will be dealt with in Prof. Dr. Simon Doclo's working group.

The aim of the developments that started with the demonstrator of the transparent hearing system is the "intelligent" HiFi hearing aid of the future, as a mixture of hearing assistant, augmented listening environments and hearing aids in one. The researchers of the Cluster of Excellence are convinced that only decisive developmental steps in the direction of high-quality reproduction systems adapted to the individual ear of the user can achieve substantial progress in the field of mild to moderate hearing loss. The aim is to keep the entry threshold for hearing-aid fitting as low as possible for these particularly critical first-time users.

The acoustically transparent earpiece can also be connected to the cEEGrid system.





from left to right: Prof. Dr. Dr. Birger Kollmeier (speaker of the Cluster of Excellence H4A) with Björn Thümmler (Minister of Science and Culture of Lower Saxony) and Prof. Prof. h.c. Dr. Thomas Lenarz (clinical spokesperson of the Cluster of Excellence H4A).

On the way to the permit: Parliamentary evening in Hanover

This was an exciting evening for cochlear implant carrier Jasmin: At the end of June, the ten-year-old impressed two important people - Lower Saxony's Science Minister Björn Thümmler and Hanover's Regional President Hauke Jagau. Together with other guests from politics and industry, the two had accepted the invitation of the Cluster of Excellence Hearing4all to the Parliamentary Evening in the Leineschloss in Hanover to inform themselves first-hand about hearing research at Oldenburg University, Hanover Medical School and Leibniz University of Hanover.

Since 2012, the Cluster of Excellence has been working hard to achieve its goal of improving hearing for all. At the end of the six-year funding period, the scientists presented the results at a parliamentary evening and gave an outlook on how they see the future of hearing. More than 100 guests attended, heard the Minister's greeting and four short lectures by selected researchers from the cluster. They then informed themselves in more detail at ten information stands about the various topics that the researchers are working on. Leibniz University, for example, showed their work on their highly efficient hearing-aid processor, the so-called KAVUAKA. Scientists from the University of Oldenburg presented their transparent earpiece for hearing as with the open ear without hearing loss, and the cEEGrid for the use of brain-computer interface technology to control hearing systems, i.e. by mind control. The third exhibit from Oldenburg was the

research hearing aids: mobile platforms for research and teaching, open-source solutions for good reproducibility of research results and the "cocktail party processor" in the hearing aid for restoring binaural hearing with signal processing and artificial intelligence. The young start-up company OtoJig from Hanover, which was only founded in March 2018 with the support of hannoverImpuls, was also present. The guided, minimally invasive drilling for safe and time-saving cochlear implantation was shown. The hearing researchers from Hannover Medical School presented their wide-ranging research on cochlear implants at several stands: starting with electrode design such as the intelligent self-forming of the electrode, through miniature medication in the inner ear to open up new opportunities for regeneration and therapy, to signal processing with MP3 technology and artificial intelligence. musIC 3.0 was also an exhibition theme, the concert specially designed for cochlear implant carriers, which Prof. Waldo Nogueira from the ENT Clinic of the MHH had organized for the second time.

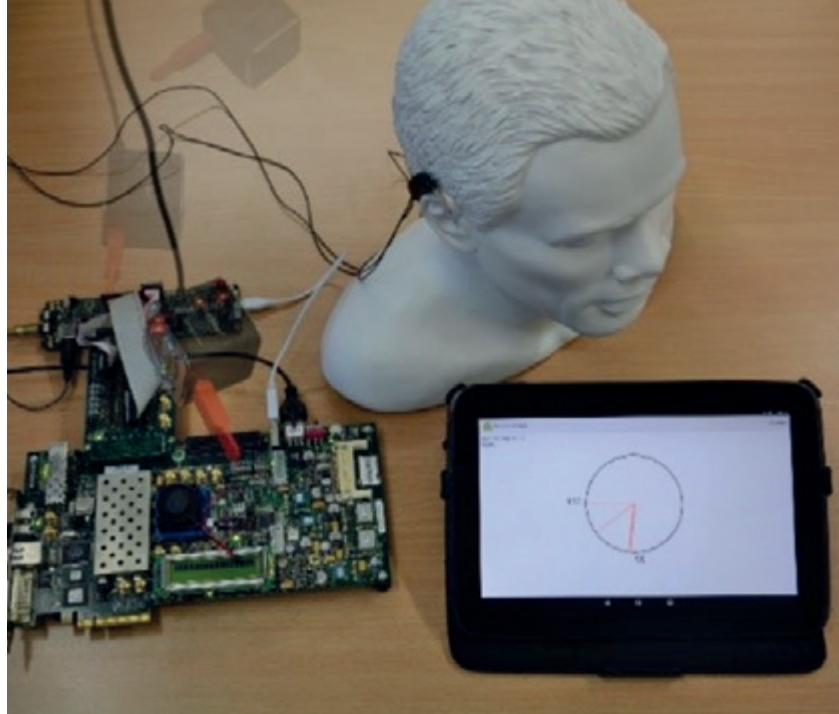
The evening was a success for the Excellence Cluster, as all the guests were impressed by the researchers' achievements. "The state of Lower Saxony is proud of its work in the Cluster of Excellence Hearing4all. In recent years, internationally visible successes have been achieved in individual hearing diagnostics and the correspondingly adapted provision of personal hearing aids," said Björn Thümmler, Lower Saxony's Minister of Science and Culture.

KAVUAKA Hearing-Aid Processor Chip arrived

The hearing-aid processor KAVUAKA, developed within the framework of the Cluster of Excellence "Hearing4all", has arrived as a chip at the Institute for Microelectronic Systems.

The KAVUAKA processor is a so-called application-specific instruction set processor (ASIP). The generic basic processor architecture was tested, adapted and optimized using the algorithms developed in the Excellence Cluster. Noteworthy optimizations and enhancements are a multiplication-addition-unit (MAC), which can calculate both with real and with complex numbers, architectures for power dissipation optimizations with register accesses and an audio interface with a low latency.

The highly specialized chip (ASIC) was designed as a System-on-Chip (SoC). The SoC consists of four differently optimized versions of the KAVUAKA processor and 10 additional co-processors. These can be activated se-



Test environment from KAVUAKA.

parately or simultaneously to increase computing power or minimize power dissipation. The chip technology provided and used by EUROPRACTICE is designed for low power dissipation and has a structure size of 40 nm. The chip is approximately 3.6 mm² in size and has a power consumption of a few thousandths of a watt.

Hearing4all on Tour

Whether the patient-individually printed cochlear implant electrode or the control of hearing systems by the mind, the so-called brain-computer interface: Our experts from the Cluster of Excellence Hearing4all are world leaders in many areas of hearing research and have again this year demonstrated this at the two most important exhibitions worldwide - the Hannover Messe and CeBIT. Hearing4all was represented at both fairs at the joint stand of the state of Lower Saxony, and was an impressive example of the worldwide appeal of our hearing research and thus of Lower Saxony as a research location. As every year, the Hannover Messe was extremely successful and attracted more than 210,000 visitors. This was also noticeable at the Hearing4all stand, because the demand for information on hearing disorders, possible therapies and research areas was enormous. This once again showed that the subject of hearing disorders affects many people - with all its negative consequences for communication and social participation or educational opportunities.

The newly organized CeBIT - for the first time on a new date in the summer and with more event character than before - attracted fewer participants than in previous years, but the interest of visitors in our hearing research was hardly affected.

Our cluster of around 20 researchers was also present at the annual conference of the German Society for Biomedical Engineering, BMT 2018, in Aachen. Among other things, they designed their own Hearing4all session, gave lectures or showed their scientific posters, flanked by their own exhibition stand.

At the 63rd International Congress of Hearing Practitioners in Hanover, the researchers of the Cluster of Excellence took the participants on a journey into the future of the industry, among other things with the interactive TASCAR demonstration. TASCAR - the toolbox for virtual acoustics - brings reality to the laboratory. TASCAR offers the possibility of simulating moving sources in realistic rooms and at the same time can take user interactions into account. For example, the individual hearing-aid benefit can be determined.

At the annual conference of the German Hearing Impaired Association 2018 in Essen, the Cluster of Excellence provided information on current research results and the future orientation of the research association.

Study at the air base: full commitment to research

As part of the Hearing4all project "Loudness Perceptions", the Hörzentrum Oldenburg is currently conducting a particularly complex field test at the former Oldenburg military airport 'Fliegerhorst'. Some of the test persons and investigators demonstrated their full commitment to research at temperatures of over 30° Celsius in the summer. (Note on the side: In contrast to test persons and test leaders, a tire of the truck unfortunately did not survive the heat).

The main question in this project, carried out by Hörzentrum Oldenburg GmbH, the University of Oldenburg, HörTechGmbH and Hannover Medical School, is to what extent the loudness perception of people with normal hearing and hearing impairment depends on the settings laboratory/clinic vs. free field and additional visual information linked to the acoustic signals. A literature search showed that the loudness perception of ambient sounds depends largely on other non-acoustic signals, such as visual information from moving sources, images (colors, size of objects) and vibrations. Based on these findings, we assumed that e.g. trucks or car noises without visual information are evaluated as much louder in the laboratory compared to free field situations and that additional moving images from the respective scene reduce this discrepancy between laboratory and natural environment. For future measurements and adjustments of new hearing-aid algorithms, it is very important that the scenarios within different laboratory settings reflect the ecological validity of loudness perception.



In the free-field test at the former military airfield Oldenburg, the subjects were exposed to traffic noise of three vehicle types: a) passenger cars, b) small and large trucks c) motorcycles with different conditions (traffic lights, acceleration, slow and fast driving and braking) and were asked to assess the volume of each scenario on a corresponding scale.

In comparative measurements in the TASCAR Birkenweg laboratory, road noises were also presented and subsequently evaluated - once only acoustically and then acoustically and visually. Similar measurements were carried out in ENT cabins in the clinic (MHH). Here, however, the visual component was presented via VR glasses. In addition, all volunteers completed a questionnaire on sound preferences, listening habits and subjective hearing ability.

We are looking forward to the results and will report!





IHear - Hearing Research for Argentina and Chile

A team led by Prof. Thomas Lenarz and Prof. Theodor Doll is working in the IHear - International Hearing Research project on scientific and technological networking between Chile, Argentina and Germany. The Federal Ministry of Education and Research is providing funds to link Germany as a research location with the knowledge producers in South American countries.

The project is carried out with researchers and doctors from the University of Chile, the Technical University Frederico Santa Maria in Chile and the University of Buenos Aires in Argentina, which belong to the Hearing and Cognition Centre (AUCO). AUCO is a well-networked cluster of interdisciplinary research groups, both in Chile and with international partners, in which specialists from a wide range of disciplines conduct research. The backbone and basis of IHear is scientific exchange between the project partners in the fields of hearing, medical-engineering research, and brain-computer interfaces (BCI) for cognitive science. The exchange will be implemented through a series of workshops, the first of which already took place in Chile. Further joint projects are planned as a result of this successful exchange, which can be supported with additional funds in the home countries. This will create a networked research structure with the cities of Santiago de Chile, Valparaiso, Buenos Aires and Auditory Valley in Germany. In the course of networking between all partners, a bilateral exchange programme for young researchers and doctors was set up. Three young doctors from Chile have already been received at the MHH.

In addition, it is planned to set up a Hearing Research Institute in Santiago de Chile in cooperation with the Auditory Valley and a German-Chilean Hearing Center as a one-stop shop, modelled on the German Hearing Center in Hanover. Here, all the steps necessary for the patient to receive optimal hearing care, such as diagnosis, intervention planning, implant selection, acute medical care, implant fitting and long-term patient care, will take place under one roof.

Auditory Valley and AUCO will use these facilities to ensure that the results of hearing research be transferred more quickly from basic and clinical research to medical care for patients. The partner countries are currently working on the introduction of BCI techniques to restore the so-called cocktail party capability. Another focus is on hair-cell regeneration, which makes it possible to improve hearing performance without technical assistance. New materials for hearing research are also being tested. Through findings on the molecular and physiological mechanisms of healthy and damaged ears, methods for prevention and diagnostics will be developed. After the successful workshop this year and the lively exchange so far, the project partners are already looking forward to the next larger workshop in Buenos Aires in April 2019.

Events and training in the Auditory Valley

November 16th, 2018

Concert: Timeless - J. Vogt and T. Brendgens-Mönkemeyer

Time: 19:30, place: House of Hearing Oldenburg
Tickets can be pre-ordered at 0441 2172-200.

20 November 2018

"...She only likes music when it's loud..."

A philosophical lecture about hearing

Time: 16:00 - 17:00

Location: Lecture Hall H, Library Building, Hanover Medical School

November 21, 2018

Central auditory implants - hearing even without a hearing nerve

Information and training event of the Auditory Valley with the Cluster of Excellence Hearing4all as part of the "November der Wissenschaft" in Hannover

Time: 16:30 - 18:00

Location: MHH, lecture hall G

26 November/ 03 December/ 10 December 2018

Test person café in the Haus des Hörens Oldenburg

The meeting point for test persons and those who would like to become one. Please register by telephone at 0441 - 21 72 100 or by email at info@hoerzentrum-oldenburg.de

Time: 15:00 - 17:00 o'clock

Further information is available at www.hoerzentrum-oldenburg.de

December 06, 2018

Music perception with hearing loss: principles and developments

The lecture by Dr. Kai Siedenburg, Department of Medical Physics and Acoustics at the University of Oldenburg, discusses relevant perceptual principles of music perception and offers an insight into current developments in research on music perception and hearing loss.

Time: 19:30 - 21:00

Location: Schlaues Haus, Oldenburg

December 14th, 2018

Concert: Trio Viaggio

Time: 19:30, place: House of Hearing Oldenburg
Tickets can be pre-ordered at 0441 2172-200.

23rd - 25th January 2019

HörTech Seminar "Intensive course in Audiological Technology for Beginners"

The aim of the intensive course is to provide an overview of the methods and procedures in the field and an understanding of the most important problems and framework conditions. The acquired knowledge enables, for example, new employees at hearing, CI and measuring instrument manufacturers to gain a comprehensive and competent introduction to the subject. Further information: www.hoertech.de

06 - 09 March 2019

22nd Annual Conference of the DGA

The main topics of the conference in Heidelberg are the objective measures with which many details of the normal and pathologically altered hearing process can be mapped, and the modelling of the hearing process with the aim of compensating hearing deficits, or the technical substitution of the organic structures causing these deficits.

26 - 29 March 2019

Otology Update

22nd course on skull-base surgery at the Hannover Medical School

Further information can be found at www.mh-hannover.de

May 15th, 2019

Advanced training in Oldenburg language tests

In this workshop, the question will be answered which of the test methods is best suited for which question and how it should be carried out. In addition, a comparison with previously established test methods will be made.

Registration at www.hoertech.de



Auditory Valley offices

The offices act as the contacts and coordinators for all Auditory Valley work. The offices have a broad range of tasks as active coordinators and points of contact for Auditory Valley. The team of staff from HörTech gGmbH and the Hanover Medical School research topics and trends, bring innovative minds together, determine Auditory Valley's strategic orientation, make sure the activities have a focus and work to give the region's expertise a clear profile.

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