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News from the Helmholtz Association



The Karlsruhe Institute of Technology (KIT) - pictured here is the KALLA liquid metal laboratory - is regarded as a model for the merger of a university and a research centre. Photo: KIT/ M. Lober

## Partnerships for the Future

*In the coming years, German research policy is set to face important decisions: In 2017, the Excellence Initiative will come to an end. Moreover, the question remains unresolved as to how the Joint Initiative for Research and Innovation and the Higher Education Pact are to be continued. These funding instruments constitute fundamental elements in the budgets of research organisations and many universities and therefore exert considerable influence on our research landscape.*

Because of the impending changes, the German federal government has asked the German Science Council, in cooperation with the universities, the research organisations and the funding organisations, to devise new ideas for the further development of the German science system. Our contribution to this debate is the position paper "Helmholtz 2020 - Shaping the Future Through Partnership", expressing our thoughts as regards the involvement of the Helmholtz Association in the required further development. This paper constitutes an offer to universities, other research organisations as well as to funding bodies from politics and industry to jointly conceptualise perspectives and strategies for the future of Germany as a site for science. In our opinion, the consolidation of competences and resources is the most important process. Specifically, this means that we work

on our research topics in close cooperation with other scientific institutions and the industry. The universities, in particular, are our privileged partners, since, in addition to conducting research, they focus on training the future generation of scientists. The merger of the Research Centre Karlsruhe with the University of Karlsruhe to form the Karlsruhe Institute of Technology is a good example. The joint early career support within graduate schools as well as the provision and further extension of state-of-the-art large-scale facilities combine to create a highly desirable site for research, providing internationally outstanding scientists with an optimal environment. If it is impossible to concentrate sufficient competences in one site, then a decentralised institutional network such as the German Center for Neurodegenerative Diseases or networks targeting specific projects and incorporating additional Helmholtz project funding activities constitute partnership concepts that pave the way for the future. Such a qualitative development of the science system is necessary in order to maintain Germany's competitiveness on an international level. The conditions for doing so are very favourable and the potential is likewise given. As far as we can see, this potential can only be fully utilised by all stakeholders working together in close cooperation.

Jürgen Mlynek, Rolf Zettl

Dear Readers,



with the Excellence Initiative coming to an end in 2017 and the question remaining open as to how the Joint Initiative for Research and Innovation and the Higher Education Pact are to be continued,

the German research landscape faces the prospect of significant changes. In our new position paper "Helmholtz 2020 - Shaping the Future Through Partnership", we present our ideas for our intended involvement in the further development of the science system. We put our focus on the bundling of competences and resources, on winning over and retaining the best researchers as well as on the operation and further development of important research infrastructures. The further development as regards quality, however, we can only achieve jointly in close cooperation with other research institutions, first and foremost with the universities, and with the industry. In our view, simply holding on to existing structures would not allow for the progress and those breakthroughs, which are needed to meet the great challenges such as the energy transition, climate change and demographic change.

Yours faithfully, Jürgen Mlynek, President

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## In Brief

### Next Generation Energy Storage

The generation of electric power from wind and solar energy facilities is very volatile and therefore not linked to power consumption. The further development of renewable energy sources is thus dependent on the ability of storing large amounts of energy and their quick release when required. Innovative high-temperature batteries on the basis of metal-metal oxide compounds may provide a feasible alternative to this end. These materials are cost-efficient, non-explosive, not poisonous or only slightly so and are characterised by a great degree of safety.

### 14 New Young Investigators Groups

In a demanding competition, the Helmholtz Association has chosen 14 young scientists, who now can set up their own research group at Helmholtz centres. With annual funding of 250,000 Euro over five years and the option towards an unlimited employment contract, these grants are the ideal stepping stone towards a scientific career for early career researchers.

### Clear Messages in the Brain

Any kind of brain activity involves the passing on of signals from one nerve cell to the next. This can often result in up to 1,000 signals arriving at one single cell. In order to cope with these amounts, the brain features a well-thought out repression system. Scientists from the team around Prof. Dr Stefan Remy from the German Center for Neurodegenerative Diseases (DZNE) now have shown how this system works. "The system is like a filter, allowing only the most important impulses to pass", says Remy. In the case of patients suffering from Alzheimer's disease, this system is impaired.

### Monte Carlo Workshop

From 19 to 21 February 2013 in Hamburg, the Deutsches Elektronen-Synchrotron (DESY) hosts the international workshop "Monte Carlo-Methods in Natural Sciences, Engineering and Economics". Monte Carlo-methods are mathematical algorithms that are widely used in a very broad range of disparate disciplines.

[www.helmholtz.de/monte-carlo-2012](http://www.helmholtz.de/monte-carlo-2012)



The coypu or nutria, too, is an "alien" in Europe. It was introduced from South America for the sake of its fur.

Photo: A. Künzelmann/UFZ

## Alien as a Cost Factor

*Like the coypu or the Asian tiger mosquito, the Common Ragweed is not indigenous to Europe, but an alien invader. It looks quite harmless, however, its flowers are very potent: the pollen of the Common Ragweed (*Ambrosia artemisiifolia*) causes allergies and prolongs the affliction season for people allergic to plant pollen. The health system has to bear the treatment costs as well as the resulting absenteeism from work due to ill health. A study compiled by the Helmholtz Centre for Environmental Research - UFZ and the AllergieZENTRUM of the Ludwig Maximilians University in Munich for the first time provides an estimate of these costs totalling approximately 200 million to more than 1 billion Euro per year for the whole of Germany, depending on the scenario.*

The Common Ragweed originally comes from North America and therefore is classified as belonging to the group of non-indigenous species, also called invasive exotics or aliens. Ever since people travel, they either consciously or unconsciously carry along with them animals and plants. Yet the problems connected with this, such as the spreading of diseases, damages to agriculture and ecosystems, as well as the costs incurred by counteractive measures have been made the subject of research only for the past few decades. The more globalised our world economy becomes and the more wares are transported across large distances, the more frequently this will result in the transportation of invasive exotics. Although many species are harmless, even small plants or animals can cause great harm. For instance, since the 1990s, the Asian tiger mosquito (*Stegomyia albopicta*), which, in contrast to European mosquito species, can transmit also dan-

gerous tropical diseases such as dengue fever, has slowly been advancing northwards across Europe. Therefore, knowledge of invasive species is urgently required. Within the EU project DAISIE (Delivering Alien Invasive Species Inventories for Europe), more than 100 European scientists have compiled a kind of inventory. Now, after three years, this has been comprehensively updated. "Over the course of the past few months, both detailed information on 1,000 new species and updates regarding already existing data sets were included", explains Dr Marten Winter from the UFZ. The database contains information on a total of 12,177 species. "With a reach well beyond the borders of Europe, the DAISIE database portal has evolved to become one of the most important sources of information on non-indigenous species for scientists, conservationists, politicians as well as for people more generally interested in this issue", emphasises Dr Ingolf Kühn, who likewise works at the UFZ. Invasive species are one of many factors that can cause imbalances within an ecosystem. Intact ecosystems generate profit worth billions. Even so, they are often not appropriately taken into account by political processes. During an international expert forum in Brussels, this discrepancy was recently highlighted by seven European environmental research centres, which have joined forces within the PEER network (Partnership for European Environmental Research). The Helmholtz Association is a member through representation by the UFZ. Ultimately, the same old adage applies also for nature as a whole: a stitch in time can save nine or timely precaution can help to prevent gigantic costs for subsequent measures.

*Tilo Arnold*

## A Medication Taxi



Photo: Marc Schneider/cc-NanoBioNet/Deutscher Verband Nanotechnologie

No, what we see here is not sweet corn. It is a microscopically small transport vehicle that was developed by researchers from the Helmholtz Centre for Infection Research and the Saarland University. With this prototype of an "active agent taxi", they intend to test the transport of pharmaceutical drugs within lung cells. For this scanning electron microscope image, the scientists around Junior Professor Dr Marc Schneider and Prof. Dr Claus-Michael Lehr received the second prize

in the Germany-wide "Nano-Momente 2012" photography competition. The image shows a micro-taxi carrying tiny particles, which are to deliver the pharmaceuticals within the cells, in this case, lung cells. To protect itself from pathogens, our body maintains biological barriers such as the mucous membranes of the respiratory system. However, these make it also harder for drugs to reach their target. This is where the innovative transporter is to facilitate matters.

## Protection for People on Mars

The NASA plans to send people to Mars within the next 20 years. Because cosmic radiation causes cancer, the astronauts will have to protect themselves during their long sojourn in space. Upon commission by the European Space Agency ESA, the GSI Helmholtz Centre for Heavy Ion Research GmbH investigates whether rock from the Moon or Mars could be used for creating protective shields for ground stations. On Earth, the atmosphere and the magnetic field absorb most of the cosmic radiation that is the result of stars exploding. Yet on the Moon and on Mars it hits the ground almost unimpeded. Due to weight and cost issues, it is not possible to transport high-tech material from Earth into outer space. Therefore, ground stations on the Moon or on Mars would have to be built mostly using local material. "Rovers, having analysed samples, have provided us with information as regards the composition of the sand and stone on site", says Dr Chiara La Tessa, who is manager of experiments within the GSI



Astronauts are exposed to large amounts of cosmic radiation. Source: NASA, Photo: Hooter (Robert L. Gibson)

biophysics division. "With this information, it is possible to recreate Moon and Mars regolith on Earth and we test these as regards their properties." The cosmic radiation required for these experiments is created using the GSI particle accelerator, which is one of the few facilities able to reproduce a composition of ions similar to that of cosmic radiation.

### Fast Data Transfer

A team of KIT researchers around Prof. Dr Christian Koos has developed an innovative optical link between semiconductor chips. "Photonic Wire Bonding" allows for high rates of data transfer in the range of several terabit per second and is excellently suited for production on an industrial scale. In future, this technology could render possible the development of high-performance transceiver systems for optical data transfer and lower the energy levels consumed by the internet.

### 10 Years Quantum Leap Laboratory for Schools

For ten years now, the Quantum Leap Helmholtz Centre Geesthacht Laboratory for Schools has been sparking school children's interest in the natural sciences and in technology. So far, more than 35,000 pupils and 2,800 teachers have attended the range of courses on offer. Dirk LoBack, State Secretary to the Federal State of Schleswig-Holstein, visited the laboratory on occasion of the anniversary celebration.

### Five New German-Chinese Research Groups

The long-standing cooperation between the Helmholtz Association and the Chinese Academy of Sciences (CAS) now is further strengthened by a new programme. In the context of the "Helmholtz-CAS Joint Research Groups", five new research projects received a recommendation and will receive funding from the CAS and the Helmholtz Association's Initiative and Networking Fund totalling up to 150,000 Euro each per year over a period of three years.

### Natural Climate Archive in the Amazon Region

Oxygen isotopes in the annual growth rings of trees are an excellent archive of precipitation dynamics in the tropical Amazon region. This is the result of a study conducted by a group of researchers from the Helmholtz Centre Potsdam - GFZ, the universities of Leeds (GB) and Utrecht (Netherlands) and from the Institut de Recherche pour le Développement (IRD, Peru). The Amazon region is 17 times larger than Germany and has a central part in shaping the global climate conditions. The rates of isotopes in annual growth rings reflect the past precipitation dynamics to an as yet unrivalled degree of accuracy.

## Awards

The French Fondation for researching Alzheimer's disease honours Prof. Dr **Manuela Neumann** from the German Center for Neurodegenerative Diseases and the University of Tübingen by awarding her the "Grand Prix Européen de la Recherche sur la maladie d'Alzheimer". The award is endowed with 150,000 Euro.

Scientists from the **Forschungszentrum Jülich** research centre and the Heinrich Heine University Düsseldorf work on developing new methods for the early diagnosis of Alzheimer's disease. To this end, they have now been granted funding by the German Federal Ministry of Research totalling 64,400 Euro. The research projects receiving the funding are part of the international "BiomarkAPD" project, a network of over 70 research groups from more than 20 countries.

The computer scientist Prof. Dr **Tanja Schultz** from the Karlsruhe Institute of Technology was awarded the 2012 Research Award for Technical Communication. The award is endowed with 20,000 Euro and is awarded by the Alcatel-Lucent Foundation. Schultz has established the field of "Silent Communication" on an international level. The technology she has developed captures the activities of facial muscles during talking and thereby can deduct the content, even when people are speaking silently. This development can support people who have lost their voice.

In the worldwide university ranking based on 13 indicators and issued by the Times Higher Education magazine (THE ranking), the **Karlsruhe Institute of Technology (KIT)** has advanced 45 ranks to rank 151. It received a particularly good ranking in the category of "Industry Income". The KIT thus is one of the ten best universities in Germany. In the ranking by the National Taiwan University (NTU), which is based purely on publica-

## New Appointments



On 19 September 2012, the assembly of members re-elected Dr **Rolf Zettl** for another five-year term as managing director of the Helmholtz Association of German Research Centres e.V. (registered association). On this occasion and in this context, the assembly agreed also an amendment to the articles of association to extend the

managing director's authorisation and area of responsibility. In addition to his post as managing director, Dr Zettl now is also a member of the Helmholtz Association's executive board. Rolf Zettl is a doctor of biology. Prior to his joining the Helmholtz Association in 2008, he had occupied, amongst other engagements, the posts of managing director of the resource centre of the German Human Genome Project for the Max Planck Society, executive board member for two biotechnology start-ups and head of enterprise development for the Charité.

tions, the KIT even ranks first amongst the German universities in the fields of natural sciences and engineering sciences. On an international level, it is ranked 55th and 57th in the respective fields. [www.helmholtz.de/kit-unirankings-2012](http://www.helmholtz.de/kit-unirankings-2012)

With its project "Radar Eyes in the Sky – Revolutionary Technology for the Earth and the Environment", the German Aerospace Center was nominated for the German Future Prize for Technology and Innovation. Prof. Dr **Alberto Moreira** and his colleagues Dr **Gerhard Krieger** and Dr **Manfred Zink** have created a completely novel earth observation system, which allows for the obtaining of unique 3-D images. The jury has announced a total of four nominations. The prize, endowed with 250,000 Euro, will be awarded by Federal President Joachim Gauck at the end of November in Berlin.

## Calls for Applications

In future, the German federal government will annually award the CSR Award to responsibly acting enterprises of all sizes. CSR is an acronym for Corporate Social Responsibility and thus stands for the concept of sustainably economic, ecologically and socially compatible

business activity. The prize is more than a mere award: in addition, all participating enterprises are given individual evaluations. Applications can be submitted until **23 November 2012**.

With the "Freigeist" Fellowships, the Volkswagen Foundation launches a programme for post-docs of all disciplines, who intend to work across the established fields of research and want to realise unconventional projects. The first funding period runs over five years and can be extended by up to three more years. The first cut-off date for the submission of applications is **15 June 2013**.

For the 15th time, Science4Life e.V., a joint initiative established by the government of the Federal State of Hessen and by the health-care enterprise Sanofi, runs the Germany-wide Business Plan Competition. What is new in 2013: During the initial idea phase and even before the competition starts, interested parties can receive advice on the feasibility of business ideas free of charge. In addition to 66,000 Euro prize money, the business foundation initiative provides advice, supervision and continuing education for businesses in the life sciences and chemical industries.

## Imprint

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[hermann@helmholtz.de](mailto:hermann@helmholtz.de)  
[www.helmholtz.de/hermann](http://www.helmholtz.de/hermann)

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 Berlin Office  
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 Prof. Dr Angela Bittner (responsible according to the press law)  
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 Telephone +49 30 206329-57 · Fax +49 30 206329-60

Basic design: unicom-berlin.de

### Edited by

Dr **Andreas Fischer** (Editor-in-chief, Science), Prof. Dr **Angela Bittner** (New Appointments, Awards, Calls for Application), Franziska Roeder (Copy-editing and Picture Desk)