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News from the Helmholtz Association



Photo: André Künzelmann

Energy Transformation Requires Research

The fast transformation of our energy supply requires new solutions for grids and intermediate storage facilities as well as an increase in efficiency in all technologies. Energy research within the Helmholtz Association addresses these tasks and invests an additional 135 million Euro to close the gaps in our research, to pool and further develop our competences and to promote the energy transformation to our best ability.

The Helmholtz Association thus allocates at least 1,331 million Euro for energy research in the period 2010 to 2014. The targeted reinforcement of energy research is made possible in particular by the annual increase in the budget the federal government has promised to the extramural research organisations within the Joint Initiative for Research and Innovation.

The additional 135 million Euro are invested in the following measures: The Helmholtz Association invests some 63 million Euro in six portfolio topics on energy storage systems and electrochemical storage facilities, on bioeconomics, emission-free power plants, materials research and geo-energy. The Helmholtz energy initiative helping to develop future-oriented energy

technologies is funded with 24 million Euro. 20 million Euro each go to the Helmholtz Institute for Energy Storage Technology Research in Ulm and the Helmholtz Institute Freiberg for Resource Technology. The common denominator of all this measures is the inclusion of universities and other partners, so that hitherto scattered competences now are pooled.

Yet the energy transformation requires not only technological innovation, but constitutes also a social challenge, that is dealt with by experts from the social and engineering sciences within the Helmholtz Alliance "Future infrastructures for meeting energy demands - ENERGY-TRANS". Transforming our energy supply necessitates also new infrastructures, such as power lines, pumped-storage hydroelectric power stations or wind parks. Citizens therefore must be given the opportunity for voicing their opinion, also regarding new forms of participation. The energy transformation is likely to fail without wide-ranging acceptance throughout society.

www.helmholtz.de/energiewende

Dear Readers,



One year ago, the German federal government decided to phase out nuclear energy faster than initially planned and to transform the energy supply to renewable energies. The Helmholtz Association is expected to contribute substantially to the successful energy transformation. We therefore now invest, in addition to our long-term programme research in the research field Energy, 135 million Euro in research on storage technologies, electricity transport, renewable energy sources and efficiency increase. The energy transformation is an ambitious project reducing the dependence on fossil raw materials, slowing down climate change and increasing the pressure to innovate. We now consciously close the gaps in our research and pool all our resources towards the aim of rendering our energy supply fit for the future.

Wishing you enjoyable reading,

Yours faithfully, Jürgen Mlynek, President

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In Brief

Helmholtz Social Media Newsroom

The Helmholtz Social Media Newsroom is online as of now. The newsroom automatically renders the social media activities within the Helmholtz Association. Actually, it is not one but 20 newsrooms: 18 newsrooms from the centres, the head office newsroom and an overview room. In addition, there is a jointly maintained blog. social.helmholtz.de

Little Scientists' Day

The "Little Scientists' House" Foundation calls a Germany-wide day of activity on 13 June. This year's guiding question is: "How does our planet Earth actually work?". More than a million children will be conducting experiments regarding this topic and, for example, investigate the ground structure. By now, this foundation supported by the Helmholtz Alliance is active in more than 20,000 day-care centres, after-school care clubs and primary schools all across Germany. The children's interest in the natural sciences and technology is triggered by way of simple experiments and targeted pedagogic support.

Gene Mutation Affects Tactile Sense and Hearing

People, who are hard of hearing, have also an inferior tactile sense. Dr Henning Frenzel and Prof. Gary R. Lewin from the MDC now have discovered the connection behind this phenomenon. They were able to show that both senses are based on the same genetic information. They discovered a gene mutation in patients affected by Usher syndrome, an hereditary form of hearing impairment coupled with a visual impairment, that causes also the inferior tactile sense these patients display. The research was preceded by studies on monozygotic (identical) and dizygotic (fraternal or non-identical) healthy twins. The researchers examined a total of 518 volunteers.

Epstein-Barr Virus

Herpes viruses can cause not only dangerous infections in humans, but also cancer. Researchers from the Helmholtz Zentrum München and the Ludwig Maximilians University in Munich now have demonstrated, which molecular auxiliary means facilitate pathogen settlement within host cells. ▶



Intensified land use causes the disappearance of insects and thereby also of products dependant on pollination, such as coffee, cocoa or strawberries.
Photo: Franziska Roeder

Land Is a Limited Resource

More and more people want to use the resource of land to an increasingly intensive degree. This leads not only to conflict, but changes also the face of our planet in many ways: Today, more than 50 per cent of the population already live in urban regions, agriculture is increasingly industrialised and only a small part of the earth's surface (approx. 10 to 11 per cent) enjoys the status of declared protected area.

At the Helmholtz Centre for Environmental Research – UFZ in Leipzig, we research concepts for a sustainable utilisation of the limited resource land. The IPCC report indicates that 20 to 30 per cent of greenhouse gas emissions are due to intensified utilisation by agriculture as well as by settlement and transport areas. This promotes soil degradation and soil surface sealing, cuts through landscapes and leads to the loss of biodiversity and ecosystem services.

Regional studies in the framework of the funding programme "Sustainable Land Management" (funded by the Federal Ministry of Education and Research with about 115 million Euro over the period 2010 to 2016) now are to develop knowledge-based recommendations for the utilisation of land. The funding programme is scientifically supported by the UFZ project GLUES (Global Assessment of Land Use Dynamics, Greenhouse Gas Emissions and Ecosystem Services). As part of the funding programme, GLUES supports the various projects within the programme by public relations activities and by putting regional aspects in a global context. In doing so, we pursue the goals that serve also as guide-

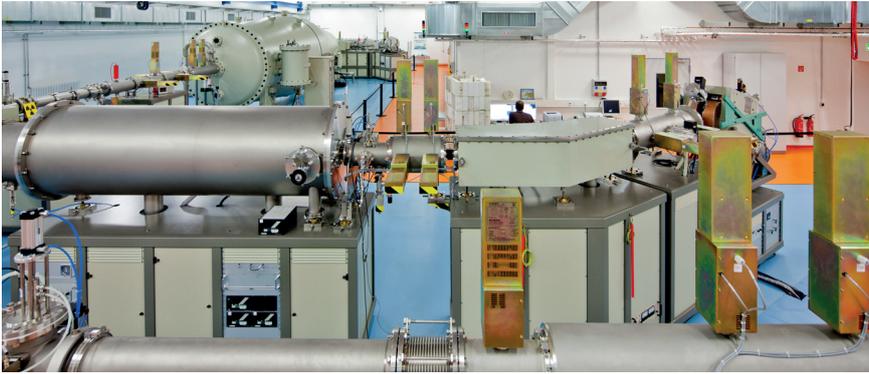
lines to development during the imminent Rio+ Conference: Minimising poverty and safeguarding environmental protection against the background of a steadily increasing global population.

Ecosystem Services Example: Pollination of Crops

Many agricultural crops are pollinated by insects, such as honey and wild bees, butterflies or bumblebees. If land use is intensified, for instance, by the increased dispersion of pesticides on the fields, by intensified fertilisation and by the transformation of structural elements of the landscape, such as hedges and rows of trees, into fields, the insects disappear. Together with colleagues from the Technical University Dresden and the University of Freiburg, we conducted a closer investigation of this correlation on the example of 60 agricultural crops, including cocoa, coffee, apples and soy beans. The result: The value of ecological services by pollination has steadily increased, from some 200 billion US dollar in 1993 to approximately 350 billion US dollar in 2009. The benefit derived from products dependent on pollination is particularly high in countries such as China, India, the USA, Brazil and Japan. Accordingly, the prices for pollination-dependent products, such as cocoa, coffee or fruits and berries, will rise more than those for products not depending on pollination, such as rice, grain or maize. In future, we may therefore continue to be able to feed ourselves, but we will be less and less able to afford vitamin-rich fruit or an invigorating espresso.

Andreas Werntze, UFZ

Tonnes of Equipment for Nanogramme Measuring



View into the 6MV accelerator hall at the Helmholtz Centre Dresden-Rossendorf.

Photo: Oliver Killig

On 9 May 2012, a secondary ion mass spectrometer (SIMS) weighing several tonnes was hauled from the GFZ Potsdam to the HZDR Dresden-Rossendorf. These two affiliated Helmholtz institutions thus embark on a course of intensified cooperation, which in future is to include also other Helmholtz research centres and universities. As early as in 2013, new equipment will be installed at the UFZ in Leipzig to investigate biological processes. Networking based on a remote control protocol is planned to vouchsafe for the efficient use of the investment at these three Helmholtz centres. As of 2015, the equipment will be available to researchers worldwide. Secondary ion mass spectrometry is one of the most important micro-measuring methods for determining trace element concentration. First, ions are directed at the surface of a sample, removing the

material, which then is partly re-ionised. These secondary ions are subsequently examined with the mass spectrometer. The GFZ operates a SIMS since 1998, and will be able to conduct measurements five times more precisely and ten times faster with a new device as of winter 2012. At the HZDR, the SIMS is connected to a tandem accelerator, increasing the detection limits by a factor of one hundred to one thousand. A comparable super SIMS existed only at the ETH Zürich so far. In Dresden, the new super SIMS is available to the Helmholtz Institute for Resource Technology Freiberg. This allows for the tracing of the finest distribution of trace metals in deposits. The measuring device can be employed also in the processing and recycling of metallic and mineral raw materials.

HZDR

Zeppelin Flight for Climate Research

Since May 2012, a team of researchers from Jülich, Switzerland, Estonia and the USA conducts measuring flights aboard the research zeppelin PEGASOS. The first mission from Friedrichshafen to Rotterdam now was successfully completed; the second mission is headed for Italy, where measurements above the Po Valley and the Adriatic Sea are scheduled. The third mission direction Northern Europe will take off in 2013. The campaign focuses on floating particles in the air on the one hand, and on hydroxyl radicals, the atmosphere's "washing agents", on the other. Hydroxyl radicals initiate the degradation of most harmful substances and therefore is a measure for the atmosphere's cleaning power. Given a natural cycle, it is also

recycled. Yet Jülich-based researchers hit upon some inconsistencies in this field. The zeppelin flights are intended to clarify the matter. As regards the floating particles or aerosols, the following questions are pursued, amongst others: From which sources do they derive? How do they agglomerate to form larger particles? What are their chemical and physical effects on climate and the quality of air? What is their role in the recycling of the natural "washing agent", hydroxyl radicals? The campaign is part of the major EU research project PEGASOS, combining the research on the interrelation between atmosphere chemistry and climate change of 26 partnering institutions from 14 European countries as well as from Israel.

They analysed the function of RNA molecules, which are transferred together with the genetic material DNA during infection. The researchers were able to show, that these molecules allow a fast manipulation of host cells in the early stages of infection. This is apparently necessary for guaranteeing a permanent settlement within the DNA genome.

Weight Loss Curbs Cancer Promoting Inflammations

Excess weight promotes inflammations that are regarded as fostering cancer. Together with American colleagues, Cornelia Ulrich from the DKFZ and the National Centre for Tumour Diseases (NCT) Heidelberg conducted a study on overweight women to find out, whether the inflammation values could be reduced by sportive activity and/or a reduction in calorie intake. Both changes in lifestyle were highly effective: The reduction of calorie intake on its own or in combination with sportive activity lowered the inflammation parameters by more than a third and thus to an extent comparable to anti-inflammatory medication. Weight loss can therefore be regarded as an effective contribution towards cancer prevention. Epidemiologists attribute about 25 per cent of all cancer incidents worldwide to excess weight and a lack of physical exercise.

HZG Involved in Material CRC

The Collaborative Research Centre "Maßgeschneiderte multiskalige Materialsysteme – M3" (Tailored Multi-Scale Material Systems) has been approved by the German Research Foundation DFG. Teams from the Technical University Hamburg and the Helmholtz Centre Geesthacht work together to develop materials and construction components featuring tailored mechanical, electrical or photonic characteristics. The CRC is scheduled for a period of four years and is funded with a total of 10 million Euro.

Climate-Engineering Assessment

Dispersing sulphur particles in the atmosphere or fertilising the ocean with iron: Numerous large-scale measures for artificial climate regulation are currently being discussed. A new Priority Programme by the German Research Foundation DFG now is intended to investigate the risks and side effects of this so-called "climate engineering". The programme is coordinated by Prof. Dr Andreas Oschlies from the GEOMAR | Helmholtz Centre for Ocean Research Kiel.

Awards

Prof. Dr **Walter Rosenthal**, Scientific Director of the Max Delbrück Centre for Molecular Medicine (MDC) Berlin-Buch, is one of 13 new Leopoldina members. The new Leopoldina members were awarded their certificate of membership by the president of the German Academy of Sciences Leopoldina, Prof. Dr Jörg Hacker, in the context of the annual symposium in May of this year. The new members belong to the category II, incorporating the life sciences disciplines.

Prof. Dr **Peter Sanders** from the Karlsruhe Institute of Technology (KIT) receives the Baden-Württemberg Federal State Prize for Applied Research 2011. The computer scientist is awarded the prize endowed with 100,000 Euro for his research on the topic of route calculation. The award ceremony will take place in Freiburg in July. Sanders has developed a process for route planning devices allowing for the extremely fast calculation of optimal routes for driving. The technology enables the realisation of millions of route calculations per second. The basic idea is to use the hierarchy of street networks in such a manner, so as to obtain verifiable optimal routes although only a fraction of streets actually are looked at. For instance, motorways, the highest level in the hierarchy, suffice for calculating the route between Hamburg and Munich. The lowest level can be sufficient for travelling between a city's suburbs. The fields of application include, in addition to classical route planning, also traffic simulations, energy-efficient logistics and the intelligent placing of shared lifts. In the spring of this year, Sanders already received the Gottfried Wilhelm Leibniz Award for his research.

News Appointments



The board of trustees of the GEOMAR | Helmholtz Centre for Ocean Research Kiel has appointed **Michael Wagner** as its new administrative director. Together with the scientific director, Prof. Dr Peter Herzig, the 59-year old head of department at the Schleswig-Holstein Ministry of Science, Economy and Transport will manage the well-established research centre, presumably as of 1 July 2012. The incorporation into the Helmholtz Association required the GEOMAR to staff the newly created position of administrative director. Wagner has been Head of the Research Department at the Science Ministry in Kiel since 1993. In the context of this employment, he was responsible for, amongst other things, the institutes preceding what now constitutes

the GEOMAR. In parallel, he is a long-standing member in various committees of the Joint Science Conference (GWK - Gemeinsame Wissenschaftskonferenz) of the German federal and state governments, of the German Research Foundation DFG and of the Leibniz Association.

Thomas Gazlig, Head of Communications and Media Relations for many years, will leave the Helmholtz Association for the Charité – Universitätsmedizin Berlin as per 1



July 2012. After eight years of successful work at the head office, the biologist, journalist and economist will assume the post of administrative director at the Charité Centers for Basic Sciences (CC2) and for Therapy and Research (CC4).

Calls for Applications

Together with the Helmholtz Centre for Infection Research, the Haus der Wissenschaft ("House of Science") Braunschweig organises the Germany-wide photographic competition "Infektös" (Infectious). The competition focuses on images providing unusual insights into infection research. The cut-off date for submissions is 31 August 2012; the best photographs will be awarded with endowments of up to 5,000 Euro.

The Federal Minister for Economy and Technology has launched the competition

"Deutscher Rohstoffeffizienz-Preis 2012" (German Raw Materials Efficiency Prize). The competition aims at sensitising the public towards an even more efficient treatment of raw materials and other materials. It asks for innovative approaches for particularly resource-conserving products, processes and services as well as for new application-oriented research results. Scientific institutes and enterprises with up to 1,000 employees can submit their applications at the Deutsche Rohstoff Agentur (German Raw Materials Agency) until 17 September 2012. www.deutscher-rohstoffeffizienz-preis.de

More information in the internet:
www.helmholtz.de/en/hermann

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