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News from the Helmholtz Association

HELMHOLTZ ASSOCIATION

Reading room at the Jacob-und-Wilhelm-Grimm-Zentrum, University Library of the Humboldt University in Berlin.
Photo: Jacob-und-Wilhelm-Grimm-Zentrum

Rescind Cooperation Ban, Strengthen Universities

In the past few years, research political initiatives have stirred up the research landscape, most prominently so by creating increased competition. In June, further decisions will be made as regards the Initiative for Excellence, which are to set the course for the scientific system of the coming decade. The Higher Education Pact is devised for the period up to 2020, whereas the Pact for Research and Innovation is scheduled for the time being to run until 2015. However, we need to think beyond this time frame now already and develop new perspectives for the future. What kind of scientific system do we expect to have in ten years? How do we intend to contribute towards shaping it?

One thing is certain: The shift from basic to project-oriented funding has reached its limits. A simple continuation would no longer be constructive. In fact, we face the danger of risk averting decisions on part of institutions in their hunt for funds. The central part of the solution must be rather a sufficient basic funding scheme also for the universities. Yet the federal states cannot be expected to take on this task all on their own. The simple and obvious solution would be a rescindment of the cooperation ban as set forth in paragraph 91b of the German Basic Constitutional Law. A model of „Federal Government co-funded universities“ would strengthen the role of universities and non-university research institutions could contribute their expertise and infrastructure towards helping the universities develop core areas of activity. Thus the course set by the Initiative for Excellence would be continued in a meaningful manner. At the same time we need to further develop existing national and international strategic partnerships and establish more of these. Binding, institutionalised cooperations with the universities are necessary in order to jointly work on questions of overriding importance. Successful structures such as at the KIT or at JARA have set benchmarks in this respect. With the planned strategic partnership between the Helmholtz Association‘s MDC and the university hospital Charité we put to the test a third model. All models have in common a force of attraction as regards subject matter and similarities with respect to size and equipment of the institutions. Ultimately, these are the success factors for achieving the critical mass and external profile required in assuming a leading role in research, science and innovation.

Prof. Dr Jürgen Mlynek,
President of the Helmholtz Association

Dear Readers,

Researchers at the Helmholtz Association work at high pressure on the development of new, even more powerful computer concepts that are more energy efficient and require less space, thereby protecting the environment and cutting costs. In doing so, the scientists working at the large-scale facilities in the research field Structure of Matter in particular are the driving force behind the latest developments as regards computer technologies. These include the tiniest data storage devices of a size of a few atoms only, new computer architectures for faster data processing and efficient novel cooling systems for saving on energy. These and many other developments taking place today within the Helmholtz Association result in computer technologies that will give distinction to our future everyday life.

Wishing you enjoyable reading,

Prof. Dr Horst Stöcker,
Vice-President of the Helmholtz Association and Scientific Director of the GSI

In this issue:

In brief

Millions of Euros Funding for DKFZ System Biologists
At the DKFZ, three new research syndicates have started their work, funded by the German Federal Ministry of Education and Research (BMBF) programme „Systems Biology in Cancer Research - CancerSys“ with nine million Euro over three years. The syndicates LungSys-II, CancerEpiSys and MYC-NET combine experimental measuring methods with mathematical models in order to shed light on molecular processes in the development of cancer. To this end, the DKFZ scientists work closely together with researchers at the university hospitals in Heidelberg and Ulm and with enterprises such as Roche.

Individual Diabetes Treatment
The DIRECT initiative brings together partners from the world of research and the pharmaceutical industry to jointly work on the development of medication and treatments for diabetes mellitus type 2 subtypes with the objective of more efficient help for patients. The project is funded by the Innovative Medicines Initiative. The total amount of funding at the initiative‘s disposal is 45 million Euro, 2.4 million Euro of which go to the Helmholtz Zentrum München. The aim of DIRECT is to define the various diabetes mellitus type 2 subtypes, to determine and develop biomarkers or test procedures for early diagnosis and the establishment of potential personalised forms of treatment. To this end, the approximately 150 scientists involved in the project will evaluate phenotypical and genetic data of more than 100,000 samples from diabetes mellitus type 2 patients. The project is scheduled to run over a period of seven years.

Fuel Cell on Continuous Duty
A planar solid oxide fuel cell at the Research Centre Jülich has exceeded the threshold of 40,000 hours of operation. This corresponds to permanent operation over the course of almost five years and constitutes a world record to date. This puts an economic use in stationary applications within reasonable reach, for instance, for providing private households with energy. The test stack from Jülich transforms hydrogen into electrical power at 64 per cent degree of efficiency. Other fuels, such as natural gas, can likewise be transformed and ▶

Hurricane tree in southern Sweden: The pine trees that grew on a tree-shaped expanse fell victim to hurricane Gudrun. The fast-growing pine trees are less capable of resisting the increasing force of storms than are deciduous trees.
Photo: Joakim Berglund/airpictures.se

Bottom Up for the Sustainability Revolution

How can more than nine billion people in the year 2050 live off the planet‘s limited resources in a dignified, humane manner? What are the economic opportunities resulting from this scenario? Excellent opportunities, provided the economy shifts towards sustainability. This is the abbreviated answer from 29 enterprises, amongst them large corporations such as Allianz, Boeing, E.ON, Procter & Gamble, Philips Electronics, Sony and Volkswagen. They all are members of the World Business Council for Sustainable Development (WBCSD) and have jointly developed the „Vision 2050 – The new agenda for business“.

In their report, they demand to finally incorporate external costs, for example, CO2 emissions, ecosystem services and water use. This aims to halve the carbon emissions worldwide (based on 2005 levels) by 2050, for instance, by way of a shift to low-carbon energy systems, highly improved demand-side energy efficiency and climate-friendly mobility. Forests ought to be managed in a more sustained manner, the agricultural yield ought to be doubled without increasing the amount of land or water used and processes ought to deliver a four-to-tenfold improvement in the use of resources and materials. The companies involved in the project identify immediate economic opportunities arising from this „pathway to sustainability“, mostly in the emerging markets. The vast opportunities will open up innovative areas of business corresponding to an estimated three per cent of the global GDP or 6.2 trillion US Dollar in 2050 (based on the 2008 price level). The corresponding political vision is as follows: The global financial crises of the past years have shaken people’s faith in the existing model of business. In the decade ahead, the „Turbulent Teens“ (2010 to 2020), it becomes clear that swift actions are urgently needed and possible to achieve in order to move global growth onto a more sustainable path. As of 2020, the visible success of the green growth model in some pioneering countries introduces a period of innovation and social transformation. Business sees itself playing a key role, yet provides itself with a loop hole: Governments and civil society have to join the effort or else the model is doomed to failure. On this pathway to sustainability, science and research are assigned a high degree of social responsibility for social and technical innovation, which is not possible without scientific input. Another prerequisite: Not all companies involved agree with all statements in the report. A bottom up policy based on free will has its limitations after all. Even so, the „Vision 2050“ could serve as an impulse for Rio+20. After all, the involved companies thus send the signal of their willingness to act and thereby demonstrate a significantly greater degree of ambition at this present moment in time than does the world of international politics.

Prof. Dr. Reimund Schwarze, UFZ und CSC

Study:
www.helmholtz.de/studie-vision2050

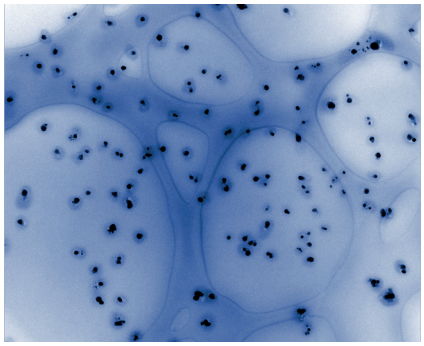
Basic Research Advances Computer Technology

Experiments at DESY or at the GSI, yet also at future facilities, such as FAIR and the X-ray laser European XFEL, create large amounts of data stream, which need fast and secure processing. This is the driving force behind the development of new computer architectures requiring significantly less energy at a greater performance capability. At the same time, basic research yields new ideas for future data storage. You will find a short overview over news from the past months from Helmholtz centres in the online version of the hermann newsletter. Here, we present to you four examples:

Green Cube at the GSI
A new high-performance data processing centre will be built at the GSI in the period between 2012 and 2014. The „Green Cube" features an innovative cooling system that reduces carbon emissions by at least 15,000 tonnes per year compared to conventional supercomputers.

Twelve Atoms Are One Bit
Using a scanning tunnelling microscope, researchers at IBM and CFEL have positioned iron atoms in such a manner, that a coupled two chains of six atoms per chain store one bit. These blocks of twelve iron atoms can be switched between two states of magnetisation and thereby constitute the smallest storage device of the world.

Salmon DNA Bio Data Storage
KIT researchers and their Taiwanese colleagues showed that a biopolymer film of salmon DNA with silver nanoparticles can store information. This DNA data storage unit consists of a thin layer of salmon DNA with added silver halides, that is embedded between two electrodes. If this unit is stimulated by UV light, silver nanoparticles form through which current can flow.



A biopolymer film made from salmon DNA with silver nanoparticles stores information. Photo (TEM): P. Mueller/CFN

Spin Vent for Data Storage
Together with colleagues from the University of Bochum, researchers from the HZB have developed a structure allowing for data storage devices of unlimited durability. This „spin vent" consists of ultra-thin layers with different magnetic characteristics. The spin vent allows for the construction of electronic devices that are operational immediately after they are switched on – as is the case with magnetoresistive random-access memory (MRAM) technology – and the data storage units of which can be written to practically endlessly over and again.

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New Research Vessel POSEIDON

Federal Chancellor Dr Angela Merkel during her visit to Kiel, here pictured with Prof. Dr Peter M. Herzig, Director of the GEOMAR. Photo: GEOMAR/Fred Dott

The 36-year old research vessel POSEIDON will be replaced by a new ship. Federal Chancellor Angela Merkel announced the news during a visit to the GEOMAR | Helmholtz Centre for Ocean Research Kiel, where she gained insight into the future challenges in the field of marine research. The visit began with a short trip aboard the Kiel-based research vessel ALKOR. The present POSEIDON, which was launched in 1976, is at present in the Mediterranean Sea on its 428th expedition. The new, by then third POSEIDON will again have Kiel as its port of registry. It is expected to be launched the earliest in 2015. The building costs are estimated to total an approximate 80 million Euro.

even at a higher degree of efficiency, as was verified during other experiments.

Glacial Melting Recorded from Space
The glacial retreat on Greenland could now be measured for the first time from space with a high degree of precision. In time for the tenth anniversary of the twin satellites GRACE (Gravity Recovery and Climate Experiment), the data provided by these satellites was processed to produce a high-resolution image rendering also a precise spatial distribution of the glacial melting. The Greenland ice sheet had to suffer up to 240 gigatonnes of mass balance loss per year between 2002 and 2011. This corresponds to a rise of the sea level by approximately 0.7 mm per year.

Air Quality Online and per App
As of now, citizens, businesses and public authorities all across Europe can check the degree of air pollution in their respective region online. Owners of a smartphone can obtain this information also via an app. The DLR provided the scientific know-how and supervises the project from an expert point of view. obsAIRve is a joint project in cooperation with T-Systems, the GAF AG and the Austrian Federal Environment Agency and is part of the European Union's Earth Observation Programme GMES (Global Monitoring for Environment and Security).
www.obsairve.eu

Research in Jülich – The Magazine per App
Four times per year, the Research Centre Jülich now publishes a new magazine for tablet computers and iPad. „Research in Jülich" reports on research policy, early career support and results from the fields of brain research, energy and environmental research as well as key technologies.
www.helmholtz.de/fzj-tablet-magazin

Renewables Create Jobs
In 2011, 381,600 people in Germany worked in the field of renewable energies, about four per cent more than in the previous year. This is the result of a study by the DLR and partnering institutions. Approximately a third of these worked in the field of biomass, another third worked in the field of solar energy. Wind energy featured a share of 26 per cent. 72 percent of these jobs in 2011 can be attributed to the effect of the German Renewable Energies Act (EEG).

New Appointments

The cell biologist Prof. Dr **Ingrid Grummt** can continue to head a working group at the DKFZ beyond the retirement threshold for another three years. This is made possible by a Helmholtz professorship, a funding instrument of the Helmholtz Association. Ingrid Grummt researches cellular processes that have an impact on chromatin and co-determine which sections of DNA can be read and which are permanently deactivated. In particular, the cell biologist focuses on so-called non-coding RNA molecules. With her future work, Ingrid Grummt intends to determine in which way non-coding RNA molecules are involved in these regulating processes and thus could constitute a first step towards the development of innovative drugs.

Prof. Dr **Katrin Amunts** is one of the six newly nominated members for the German Ethics Council. The neuroscientist is Director of the Institute of Neuroscience and Medicine at the Research Centre Jülich and since 2004 Professor for Structural-Functional Brain Mapping, Department of Psychiatry and Psychotherapy at the RWTH Aachen University. With its statements, the German Ethics Council, established in 2008, contributes decisively to social and political debates on bioethical issues and gives impulses towards a responsible weighing of benefits.

Famelab: Three Minutes of Science

Explaining one's research in three minutes only is difficult. All the more so, as it has to be done also in an entertaining, funny style. During the Famelab German final in Bielefeld on 31 March, 15 young scientists demonstrated to an enthusiastic audience that this is not an impossible task at all. Dr Timo Sieber from the University Hospital Hamburg will travel to Cheltenham for the international final. He demonstrated, with a rolling pin, how a skin cell can be reprogrammed back to the state of a stem cell. The second prize went to the UFZ biologist Iris Kröger for her „Mückentatort" (Mosquito Crime Scene). The audience award went to Jan-Marek Ache from the University of Bielefeld, who praised the leg coordination of stick insects in the form of sung rhymes. All videos can be accessed on the web!

Iris Kröger from the Helmholtz Centre for Environmental Researchcame second with her „Mosquito Crime Scene".
Photo: Bielefeld Marketing

More information in the internet:
www.famelab-germany.de
www.helmholtz.de/hermann

Awards

Prof. Dr **Boris Sharkov**, Scientific Managing Director of FAIR GmbH, together with his group of colleagues at the Institute for Theoretical and Experimental Physics in Moscow and at the Joint Institute for Nuclear Research in Dubna, has been awarded the National Prize of the Government of the Russian Federation for Achievements in Science and Technology. The award is endowed with one million rouble for the research group and entails privileges after retirement.

The Helmholtz Award for Precision Measurements endowed with 20,000 Euro goes to **Sven Sturm**, **Anke Wagner** and **Klaus Blaum** from the Max Planck Insitute for Nuclear Physics in Heidelberg and from the Johannes Gutenberg University Mainz. Their work was conducted in the context of the ExtreMe Matter Institute EMMI, the Helmholtz Alliance „Cosmic Matter in the Laboratory" and a Helmholtz Young Investigators Group located at the GSI and at the University of Mainz.

Prof. Dr **Peter Brust**, Dr **Winnie Deuther-Conrad**, Dr **Steffen Fischer** and Dr **Achim Hiller** from the Institute of Radiopharmacy at the Helmholtz-Zentrum Dresden-Rossendorf - HZDR were awarded the HZDR Research Award.

The American Physical Society awarded its Distinguished Referee Award to Prof. Dr **Oliver Boine-Frankenheim**, Head of the FAIR Accelerator Theory Department at the GSI and professor at the Technical University Darmstadt.

GSI researcher Prof. Dr **Sigurd Hofmann** received the Nicolaus Copernicus Medal of the Polish Academy of Sciences and the certificate of honour of the City of Toru, Prof. Dr **Marco Durante**, Head of the GSI Biophysics Department, was elected president of the International Association for Radiation Research (IARR). IARR is the International Association of the Radiation Research Societies from all over the world.

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