



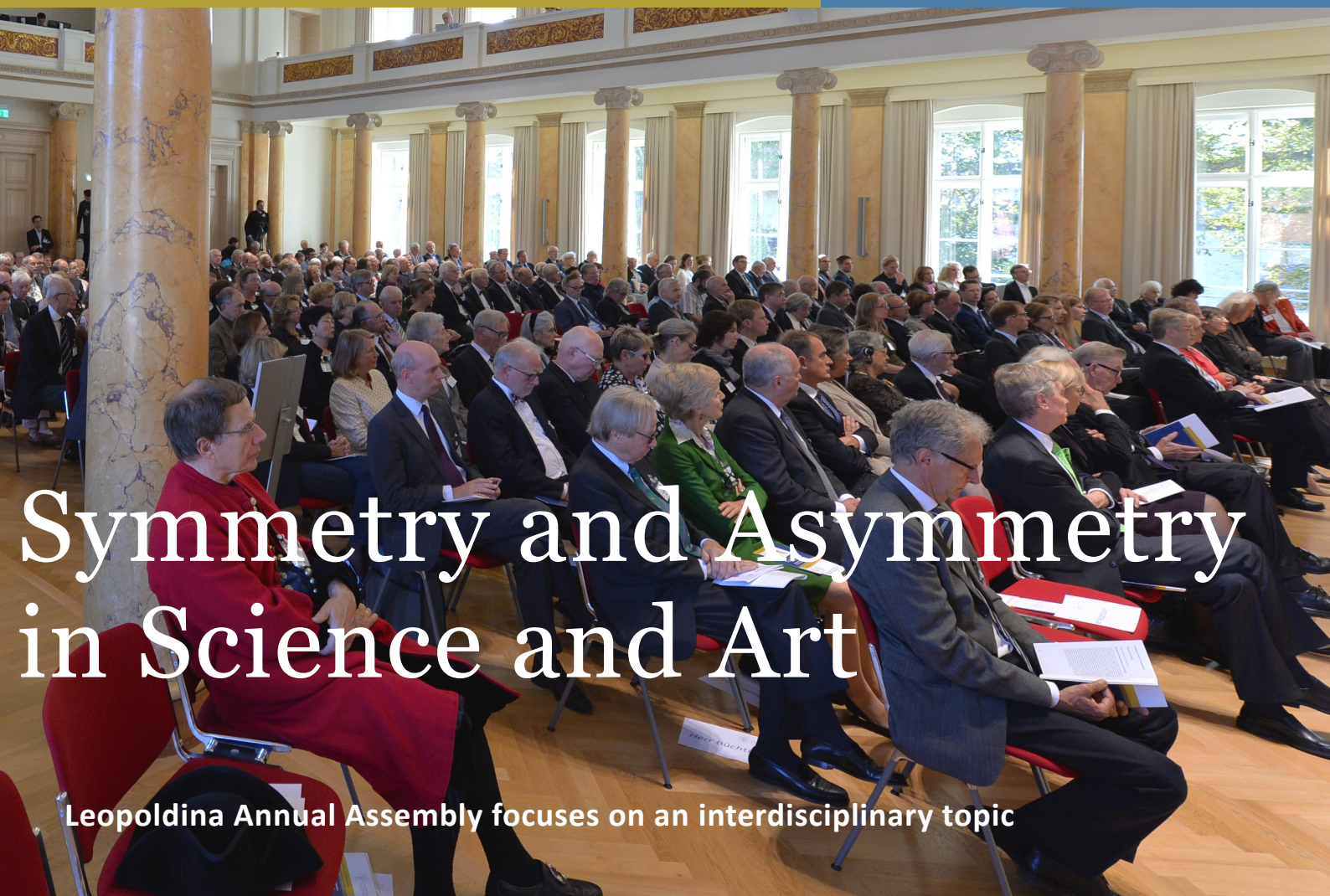
Leopoldina
Nationale Akademie
der Wissenschaften

Leopoldina news

5/2015

Deutsche Akademie der Naturforscher Leopoldina –
German National Academy of Sciences

Halle, 8 October 2015

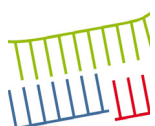


Symmetry and Asymmetry in Science and Art

Leopoldina Annual Assembly focuses on an interdisciplinary topic

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Development of robust
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Conference on the future
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Editorial

Dear members and friends
of the Leopoldina,



there are currently around 4.5 million people aged 80 or over living in Germany. Reaching a grand old age is no longer the exception in this country, and yet we do not always meet the needs of our older citizens. Medical care is one area where this is the case, particularly as many senior citizens suffer from multiple diseases. The treatment they receive has usually been tried out on middle-aged patients with just one disease. This can lead to inappropriate treatment of elderly patients.

Potential solutions to the problem are expounded in the statement "Medizinische Versorgung im Alter – Welche Evidenz brauchen wir?" (Medical treatment in old age – What evidence is needed?), published by the Leopoldina in partnership with acatech – the National Academy of Science and Engineering, and the Union of the German Academies of Sciences and Humanities. The paper addresses the following questions: How can we achieve evidence-based medical care of geriatric patients? How do the lifestyles and living conditions of these older patients differ from those of younger patients? What priorities do they have, and how can we ensure they live independent lives for as long as possible?

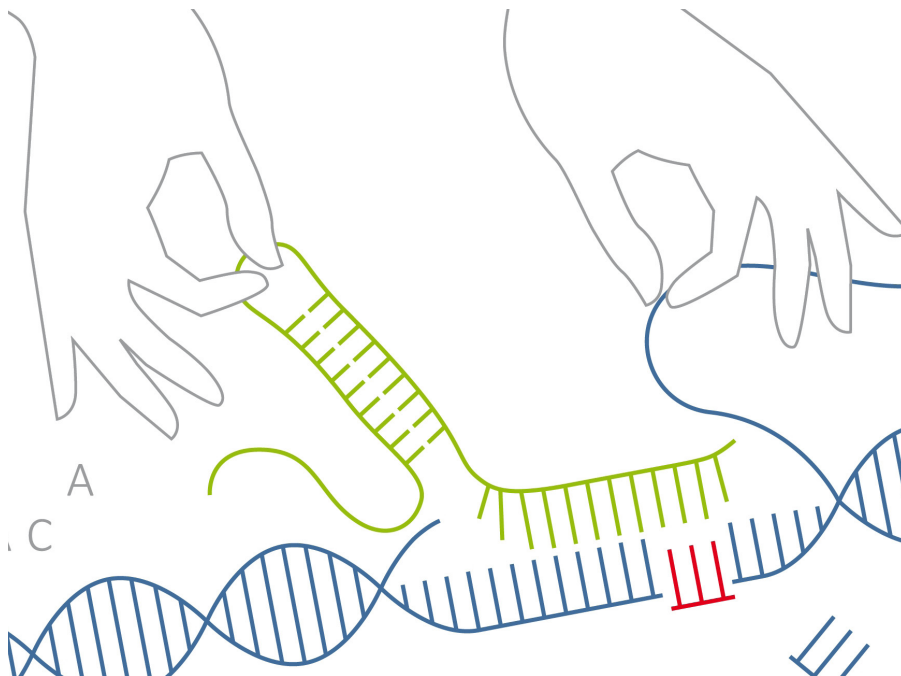
This statement is not the Leopoldina's first publication on the topic of aging. From 2009 to 2012 it produced a series of publications as part of the "Aging in Germany" working group, and in 2014 it was one of the academies of science behind the joint European statement "Mastering Demographic Change in Europe". Those publications are still attracting a great deal of attention to this day. I hope that the same will be true of our statement on medical treatment in old age.

I wish you a thought-provoking read!

Ulf G. Kluge

Prospects for genome editing

Academies present statement on new molecular genetic tools and how we should approach them



Genome editing is opening up new possibilities in biotechnology and medicine. Graphic: Sisters of Design

New genome editing techniques, particularly CRISPR-Cas, allow for controlled gene modifications that are more straightforward than conventional methods. The CRISPR-Cas components are part of the adaptive immune system of bacteria. The breakthrough in their biotechnological application came in 2012, when Emmanuelle Charpentier and Jennifer Doudna deciphered the system's basic mechanisms.

Within a short time, the CRISPR-Cas technique has already been successfully applied in the genetic modification of microbes, plants, animals and human cells. The techniques could be used to develop drugs that are capable of killing only specific pathogens without harming beneficial microorganisms in the human body. Bacteria and yeast, already being used to very efficiently make starting products for drugs and fuel, could be made even more efficient through genome editing. In plant breeding, these methods have allowed new varieties to be produced more quickly and in a more targeted manner. The techniques are also expected to benefit gene therapy for human cells.

But such interventions also raise questions about the responsible limits of genome editing. Experiments carried out by Chinese researchers on human embryos

using genome editing have retriggered the debate on whether and under what conditions gene therapies – particularly those affecting the germline – should be permissible in the future.

In the statement, published on 29 September, the academies and the German Research Foundation (DFG) stress that the use of genome editing is acceptable in many areas and should not be automatically equated with isolated examples of applications whose effects have not yet been assessed. They are in favour of an international moratorium on all forms of human germline engineering that could have an impact on the genome of the offspring. The moratorium should give scientists, politicians and society the opportunity to evaluate the benefits and potential risks of the techniques and to develop future regulations. This should not constitute a general restriction on methodological developments, and Germany should be contributing on all levels to these important developments, as well as helping to ensure a safe and responsible application of genome editing that respects the needs of humanity and the environment. (jf)

■ THE STATEMENT CAN BE FOUND HERE

On symmetry, symmetry breaking and asymmetry

Leopoldina Annual Assembly focuses on an interdisciplinary topic

Symmetry and asymmetry in science and art was the topic of this year's Leopoldina Annual Assembly, held on 18 and 19 September in Halle (Saale). High-ranking scientists explored the principles from the perspective of numerous different disciplines. In his evening lecture on Friday, astrophysicist Prof. Günther Hasinger gave a wider audience insights into the origins of the universe and the depths of space. On Saturday, the Young Academy held a workshop entitled A-Symmetrie zwischen Wissenschaft und Kunst (Asymmetry and symmetry in science and art). German chancellor Dr Angela Merkel and Saxony-Anhalt's minister-president Dr Reiner Haseloff both spoke at Friday's opening ceremony.

In her speech, Chancellor Merkel described the naming of the Leopoldina as Germany's National Academy of Sciences by the science ministers of the German states as a "golden hour". She said that globalisation had created an urgent need to name a national academy to create a kind of trademark for German academies abroad. Merkel thanked the Leopoldina for leading the preparations for this year's G7 summit, and for its involvement in the German government's Western Balkans initiative, which the Leopoldina contributed to by holding a conference on prospects for the science system in that region. The Chancellor also highlighted the Leopoldina's national statements, in particular those that deal with public health and personalised medicine.

Minister-President Haseloff, who spoke before Merkel, stressed how proud Saxony-Anhalt was to be home to the German National Academy of Sciences. Talking about his profession – politics – he described symmetries as short-term occurrences and asymmetries as dynamic moments. Haseloff, who, like Merkel, holds a doctorate in physics, also talked about his personal affinity for the topic. He even brought along the textbook *Symmetrien und Erhaltungssätze der Physik* (Symmetries and conservation laws in physics) from his library at home.

Philosopher Prof. Dieter Birnbacher ML (Düsseldorf) gave a keynote speech on



A gift for the Chancellor: President Jörg Hacker presents Angela Merkel with the etching "Leopoldina" by Hans-Christoph Rackwitz.

Photos: Markus Scholz



Taking a peek at the programme



Blue skies and sunshine during the lunch break

symmetry breaking in morality, in which he also introduced the audience to the scientific programme for the event. On his foray into philosophy, Prof. Birnbacher explored the relationship between ethics and morals, rights and obligations, the obligation to act or not to act, and moral convictions and behaviour.

Prof. Giora Hon (Haifa, Berlin) picked up on this thread and explained, from the perspective of the history of science, how the principle of symmetry has developed

and changed in mathematics, science, art and architecture. Over the course of his presentation, it became clear that the principle of symmetry has both a technical and an aesthetic meaning.

After Prof. Hon's talk, the first two scientific sessions were largely dominated by physics. During the sessions, the speakers – who included Prof. Harald Fritzsch (Munich), Prof. Gerald Gabrielse (Cambridge, Massachusetts) and Prof. Peter Jenni – immersed themselves in

symmetries and asymmetries, symmetry breaking, matter and antimatter, and in the Higgs particle and research at CERN. The last speaker, Prof. Martin Quack ML (Zurich), then radically expanded the field again by explaining the links between philosophy, physics, chemistry and biology.

In her introduction, Prof. Ursula M. Staudinger ML (New York), Vice President of the Leopoldina, described Prof. Quack as a “mastermind” who was a key driving force behind the Annual Assembly’s interdisciplinary character. In his very informative presentation he talked about many issues associated with the topic.

Higgs particle is the start of the journey into a new kind of physics

In the end, the talks frequently revolved around the Big Bang and the Higgs particle, the very early days of the universe, and attempts to solve the mystery of the origins of energy and matter. In particular, Prof. Jenni pointed out that the discovery of the Higgs particle in an experiment in the Large Hadron Collider at CERN means that the “voyage of discovery into a new kind of physics” has only just begun.

On Saturday, three more sessions expanded the focus to cover neuroscience, biology and art. Prof. Horst Bredekamp ML (Berlin) explained that symmetry is not an exhaustive principle of art and that the impression of life in an artwork and the connection to the lifeworld of the observer requires a minimum degree of symmetry breaking. Prof. Ansgar Büschges (Cologne) steered the talks into the field of biology and medicine. He drew a line from symmetry in the struc-

ture of living organisms, to symmetry in their movement patterns, to symmetry in the neural control of those movements.

Exploring symmetry breaking in art and biology

Next, Prof. Petra Schwille ML (Martinsried) embarked on a hunt for the protocell – the simplest possible cell capable of functioning. Prof. Sabine Werner ML (Zurich) interpreted carcinogenesis as excessive wound healing and the loss of a delicate balance. She impressively demonstrated that findings from cancer research cannot serve as a generalised basis

for dietary advice.

Finally, Prof. Andreas Kablitz ML (Cologne) and Prof. Anne Wienhard (Heidelberg) once again showed the diversity of the topic and discussed symmetry as a structural principle of thought in the modern world, and the central role that symmetry plays in geometry and mathematics. Prof. Daniel Shechtman (Haifa) gave the final talk of the day in which he focused on quasicrystals and their ordered but aperiodic structure. His discovery of quasicrystals earned him the Nobel Prize in Chemistry in 2011. (jk, dw)



Upper school students from all over Germany with a keen interest in science were guests at the Annual Assembly in Halle.

Photo: Christof Rieken

ANNUAL ASSEMBLY EVENING LECTURE ASKS: “IS THE SKY SYMMETRICAL?”

Astrophysicist Prof. Günther Hasinger ML (Honolulu, USA) wasted no time in answering the question posed in the title of his Friday evening lecture, “Is the sky symmetrical?”. He opened proceedings with a simple “No”.

However, this clear assertion right at the beginning took nothing away from the thrill of his talk. Prof. Hasinger seemed to effortlessly bridge the gap between academia and a popular lecture, and took his audience on a journey – as detailed as it was entertaining – back in time to the birth of the universe. He repea-

tedly used vivid comparisons that allowed the audience to get to grips with the theories and findings of astrophysics.

Prof. Hasinger explained that we owe the birth of the universe to a spontaneous instance of symmetry breaking – and that this is also responsible for the existence of matter and therefore ultimately of human beings, who in turn do research to find out how the universe came to be. As his lecture progressed, the astrophysicist moved from particle physics in the birth and expansion of our

universe to astrophysics, never straying from the central theme of symmetry and asymmetry. Using impressive images and animations, Prof. Hasinger helped the audience gain an understanding of how black holes form, their role in and influence on galaxies, and what happens when two galaxies collide. In closing, he gave the audience something to think about on the way home that evening – namely, that the answer to the question of symmetry or asymmetry can also depend heavily on the point of view of the observer. (jk)

Outstanding achievements

Ten scientists receive awards at the Annual Assembly

At its Annual Assembly, the Leopoldina presented awards to ten scientists. Cothenius Medals for outstanding lifetime achievements in science went to Prof. Herbert Gleiter ML (Karlsruhe) and Prof. Otto Ludwig Lange ML (Würzburg). Gleiter was one of the founders of nanotechnology. With the development of nanocrystalline materials, his research team opened up a whole new field of material sciences. Recently, Gleiter expanded this field of research to include nanoscale materials with a non-crystalline structure (nanoglasses).

Lange was one of the founders of modern ecophysiology, a field of study within biology that serves as a bridge between plant ecology and plant physiology. The aim is to quantitatively analyse how plants respond to environmental factors such as high and low temperatures, altered water availability and amount of sunlight.

Prof. Emmanuelle Charpentier ML (Berlin) and Prof. Hans Jakob Wörner (Zurich) were each awarded a Carus Medal for important scientific achievements. Charpentier is a pioneer in the field of targeted and precise gene modification with the help of certain enzymes. She developed the genome editing technique known as CRISPR-Cas9. Wörner is one of the world's most eminent physical chemists. He uses spectroscopic methods to observe chemical reactions at molecular level.

The Schleiden Medal for significant findings in the field of cell biology was awarded to Prof. Johannes Buchner ML (Munich). Buchner has made fundamental contributions to a central problem of cell biology: protein folding in cells.



Microbiologist Emmanuelle Charpentier, who received the Carus Medal at the Annual Assembly, in conversation with physicist Herbert Gleiter, holder of the Cothenius Medal.

Photo:

The Mendel Medal went to Prof. Detlef Weigel ML (Tübingen). Weigel has made important discoveries in flower development and the control of flowering in plants. Recently, his research has focused on the genetic diversity between individuals in a single species and the behaviour of hybrids.

Prof. Sonja Schrepfer (Hamburg) was awarded the Leopoldina's Thieme Award for Medicine, which is endowed with €15,000 from Thieme Medical Publishers. Schrepfer conducts research into the immune response to embryonic stem cells as well as the immune response to induced pluripotent stem cells and their derivati-

ves.

Dr Pascal Beese-Vasbender (Düsseldorf) and Dr Bart Kranstauber (Konstanz) both received a Leopoldina Prize for Junior Scientists for their outstanding research achievements in the fields of marine microbiology and zoology. As of 2015, thanks to extra funding provided by the Friends of the Leopoldina, prize money of €5,000 can now be awarded to two scientists.

The Georg Uschmann Award for the History of Science, endowed with €2,000, went to Dr Nils Güttler (Zurich) for his dissertation on the history of botanical distribution maps. (jk)

Young Academy: The symmetry and asymmetry of creativity

Whether as a starting point for scientific hypotheses or as a construction principle for compositions and choreographies, symmetry plays an equally central role in both art and science. The same is true of deviations and disruptions of symmetry: often it is precisely the experimental, the random and the unexpected that can result in innovative artistic creations or ground-breaking scientific observations.

On the basis of their varied experiences in art and science – as two discrete areas and at the interfaces between the two areas – two members of the Young Academy – mathematician Junior Prof. Ricarda Winkelmann (Potsdam) and music scientist and composer Dr Gordon Kampe (Essen) – participated in a discussion along with choreographer Eva Meyer-Keller (Berlin) during the Annual Assembly on

what separates and what combines their creative fields. In the discussion, they emphasised the potential for interaction and crossovers between art and science in their mutual search for truths, but also stressed that both areas are confidently assured of their own intrinsic value and should not be reduced to functioning as mere servants to market principles. (mt)

Senate elects two new Presidium members

Elections and co-option are discussed on the eve of the Annual Assembly

The Leopoldina Senate met on 17 September. As well as electing two new Presidium members (Prof. Ulla Bonas ML and Prof. Thomas Lengauer ML, see below) the Senate also confirmed that three existing members of the Presidium are to remain in their positions for another five years: Prof. Gunnar Berg ML (Halle), who represents the interests of Mathematics and the Natural and Engineering Sciences as Vice President, Prof. Peter Propping ML (Bonn), secretary of Class II – Life Sciences, and Prof. Frank Rösler ML (Hamburg), secretary of Class IV – The Humanities and Social and Behavioural Sciences.

The Senate discussed the recommendations of the commission established by the Presidium and the Senate to investigate the structural development of the Leopoldina and associated changes to the electoral regulations. As a first step, the Senate agreed to proposals to abolish the sub-sections and to set up an additional method for co-opting scientists working in heavily interdisciplinary fields. The new version of the election regulations will be made available to all members once it has been adopted by the Senate.

The Senate also unanimously appro-



The Leopoldina Presidium on the eve of the Annual Assembly

Photos: Christof Rieken

ved the Presidium's suggestion to extend by five years the decision first passed in 2005 not to include the female scientists co-opted into each class in the existing quota for women. As a consequence, the Presidium expects to see further positive developments in the proportion of female scientists in the Leopoldina.

Finally, the Senate decided on the topic of the 2017 Annual Assembly. The topic it selected from a choice of four was: "Die Veränderbarkeit des Genoms. Genome Editing – auf dem Weg zu einer geplanten Evolution?" (The adaptability of the genome. Genome editing – paving the way for planned evolution?). (jb)

Prof. Ulla Bonas

The Leopoldina Senate elected Prof. Ulla Bonas, who has been a member of the German National Academy of Sciences since 2008, as the new Vice President. She succeeds microbiologist Prof. Bärbel Friedrich.

"I am delighted," said Bonas following her appointment. "During my time in office, I hope to strengthen the Leopoldina and protect its role as a national and, above all, international voice in



New Vice President: Prof. Ulla Bonas

advising society and policymakers."

A plant geneticist, Bonas works at the University Halle Wittenberg conducting research on the interdependencies between pathogenic bacteria and plants. Her research has contributed significantly to understanding interaction between plants and microbes and could lead to innovative new therapy and plant protection concepts. (dw)

Prof. Thomas Lengauer

The Leopoldina Senate elected Prof. Thomas Lengauer to the Presidium; he has been member of the German National Academy of Sciences since 2003 and Class I spokesperson since 2013. He takes over from chemist Prof. Helmut Schwarz.

Prof. Lengauer stated that consolidating the Leopoldina as the independent voice of science was one of his goals. He also wants to create more space for digital informa-

tion processing as a scientific discipline and give it more significance within society.

Prof. Lengauer, Director of the Max Planck Institute for Informatics in Saarbrücken since 2001, has been conducting research into bioinformatics since the 1990s. He is currently researching medical topics such as analysis of resistance to viral infections and the analysis of epigenomic data.

(dw)



New Presidium member: Prof. Thomas Lengauer

Spotlight on the Western Balkans

Science Conference in Halle and Berlin

Chancellor Angela Merkel initiated the Western Balkans Process in August 2014. Aware of the crucial importance of science in bolstering the Balkans and securing the future of the region, the Federal Government asked the Leopoldina to take the helm in the area of science and society.

In a bid to facilitate exchange between various science representatives from the Balkan states, the Leopoldina organised the first “Joint Science Conference on the Western Balkans Process”, which was held from 15 to 17 July 2015 in Halle and Berlin. The participants came from the Western Balkan states of Albania, Bosnia and Herzegovina, Croatia, Kosovo, the Republic of Macedonia, Montenegro and Serbia, as well as France, Italy, Austria, Slovenia and Germany. National academies, rectors’ conferences, research institutes, and scientists were represented at the conference. Representatives from the Federal Government, the EU Commission and the embassies of the states involved had ob-

server status. The event highlighted the importance of science for diplomacy.

The results of the conference have been summarised in a joint statement, in which the participants call for increased funding in the science sector (three percent of GDP), the modernisation and integration of national science systems, and the institutionalisation of dialogue among science, politics and society. These recommendations had a direct influence on the negotiations in the second Western Balkans Summit, which was held in Vienna on 27 August. The closing statement of the Vienna conference largely adopted the recommen-



Conference participants during talks in the Federal Chancellery in Berlin on 17 July 2015.

Photo: Markus Scholz

dations made at the first Joint Science Conference organised by the Leopoldina. The Austrian Academy of Sciences will host the follow-up conference in Vienna in 2016. The Joint Conference is then to be held annually until 2019. (lb)

■ THE PAPER CAN BE FOUND HERE

The Leopoldina extends collaboration with African academies

Federal Ministry supports three-year extension

From 2011 to 2015, the Leopoldina collaborated with African academies of sciences as part of an initiative towards which the Federal Ministry of Education and Research contributed €1 million in funding. The German involvement was part of the Federal Government’s Africa Strategy.

The goal behind collaborating with the African academies in the NASAC network was mostly to support the process of drawing up science-based recommendations for African politicians on the topics of health, water management, biotechnology in agriculture, and adapting to climate change.

Recommendations on health, agriculture and climate change

The project came to an end in the third quarter of 2015 with the completion of

four NASAC reports on these subject areas. However, given the great success of the collaboration to date, the Federal Ministry of Education and Research has granted a three-year extension for the Leopoldina to continue collaborating with African academies.

New project partners

The Academy of Science of South Africa, Ghana Academy of Arts and Sciences, and the Global Young Academy will join the project until mid-2018. The main focus of the new partnerships will be to communicate existing science-based recommendations to politicians and society. To this end, African science journalists and outstanding young African scientists are being encouraged to get involved in the project. (csd)

New project at the Study Centre

The Leopoldina elected Russian princess Yekaterina Dashkova as its first female member back in 1789. Thanks to her, relations between the Leopoldina and the Imperial Academy of Sciences and Arts – where she was director at the time – were strengthened. Since summer 2015, a project associated with the Leopoldina Study Centre has been delving into German-Russian scientific relations in the 18th and 19th centuries. Many members of the Leopoldina collaborated with their Russian colleagues, contributing to the Russian academy finding its feet in those early days. Dr Hilmar Preuß’s post-doctoral project findings will provide an important foundation for research into the international history of the academies. The German-Russian scientific networks of days gone by will be revealed through the analysis of protocols, correspondence and other documents. (rgo)

People

Neue Mitglieder

Class I (addendum)

■ **Karl Leo ML**, Dresden, Technische Universität Dresden, Institute of Applied Photophysics (Physics Section)

Class II

■ **Stephan Becker ML**, Marburg, Philipps-University Marburg, Institute of Virology (Microbiology and Immunology Section)

■ **Emmanuelle Charpentier ML**, Berlin, Max Planck Institute for Infection Biology (Human Genetics and Molecular Medicine Section)

■ **Katrin Böhning-Gaese ML**, Frankfurt/Main, Goethe University Frankfurt and Senckenberg Biodiversity and Climate Research Centre (Organismic and Evolutionary Biology Section)

■ **Winfried Denk ML**, Martinsried, Max Planck Institute of Neurobiology (Biochemistry and Biophysics Section)

■ **Nicole Dubilier ML**, Bremen, Max Planck Institute for Marine Microbiology, Department of Symbiosis (Microbiology and Immunology)

■ **Dieter Ebert ML**, Basel, Switzerland, University of Basel, Zoological Institute (Organismic and Evolutionary Biology Section)

■ **Martin Eilers ML**, Würzburg, Theodor-Boveri-Institute for Biological Research, Professor of Biochemistry and Molecular Biology (Biochemistry and Biophysics Section)

■ **Bernd Fritsch ML**, Iowa, USA, University of Iowa, Department of Biology (Organismic and Evolutionary Biology Section)

■ **Wolf B. Frommer ML**, Stanford, USA, Stanford University, Biology De-

partment, and Carnegie Institution for Science, Stanford (Genetics/Molecular Biology and Cell Biology Section)

■ **Carl-Philipp Heisenberg ML**, Klosterneuburg, Austria, Institute of Science and Technology Austria (Genetics/Molecular Biology and Cell Biology Section)

■ **Christian Hertweck ML**, Jena, Leibniz Institute for Natural Product Research and Infection Biology, Department of Biomolecular Chemistry (Microbiology and Immunology Section)

■ **Beat Keller ML**, Zurich, Switzerland, University of Zurich, Institute of Plant Biology (Agricultural and Nutritional Sciences Section)

■ **Elisabeth Knust ML**, Dresden, Max Planck Institute of Molecular Cell Biology and Genetics (Genetics/Molecular Biology and Cell Biology Section)

■ **Eva Kondorosi ML**, Szeged, Hungary, Biological Research Centre of the Hungarian Academy of Sciences, Institute of Biochemistry (Organismic and Evolutionary Biology Section)

■ **Jan Korbel ML**, Heidelberg, European Molecular Biology Laboratory (Human Genetics and Molecular Medicine Section)

■ **Anita Rauch ML**, Zurich, Switzerland, University of Zurich, Institute of Medical Genetics (Human Genetics and Molecular Medicine Section)

■ **Jürgen Ruland ML**, Munich, Technische Universität München, Klinikum rechts der Isar, Institute of Clinical Chemistry and Pathobiochemistry (Microbiology and Immunology Section)

■ **Susan E. Trumbore ML**, Jena, Max Planck Institute for Biogeochemistry, and University of California, Irvine, (Agricultural and Nutritional Sciences Section)

■ **Andreas Weber ML**, Düsseldorf,

Heinrich Heine University Düsseldorf, Institute of Plant Biochemistry (Organismic and Evolutionary Biology Section)

Class III

■ **Michael Amling ML**, Hamburg, Universitätsklinikum Hamburg-Eppendorf, Institute of Osteology and Biomechanics (Surgery, Orthopaedics and Anaesthesiology Section)

■ **Michael Detmar ML**, Zurich, Switzerland, ETH Zurich, Institute of Pharmaceutical Sciences (Internal Medicine and Dermatology Section)

■ **Rupert Handgretinger ML**, Tübingen, University Children's Hospital Tübingen (Gynaecology and Paediatrics Section)

■ **Andreas Heinz ML**, Berlin, Charité – Universitätsmedizin Berlin, Department of Psychiatry and Psychotherapy (Neurosciences Section)

■ **Tobias Moser ML**, Göttingen, Center for Ophthalmology and Otorhinolaryngology, Institute for Auditory Neuroscience (Ophthalmology, Otorhinolaryngology and Stomatology Section)

■ **Ania C. Muntau ML**, Hamburg, Universitätsklinikum Hamburg-Eppendorf, Department of Paediatrics (Gynaecology and Paediatrics Section)

■ **Thomas C. Südhof ML**, Stanford, USA, Stanford University School of Medicine, Department of Molecular and Cellular Physiology (Neurosciences Section)

■ **Michael Thali ML**, Zurich, Switzerland, University of Zurich, Institute of Forensic Medicine (Pathology and Forensic Medicine Section)

■ **Ralph Weissleder ML**, Boston, USA, Harvard Medical School, Massachusetts General Hospital, Center for Systems Biology (Radiology Section)

Deceased Members

■ Lothar Berg

28 July 1930 – 27 July 2015 | Rostock

Mathematics

Lothar Berg's research focused on the field of functional analysis. He paid particular attention to operational calculus and made a significant contribution to the understanding of the method. Berg also studied the approximation of solutions to operator equations and investigated their asymptotic development. In 1965, Berg left his professorship in Halle and took up a position at the University of Rostock, where, in addition to his activities in the mathematics department, he also contributed to other areas of university life.

■ Hans-Jürgen Eichhorn

13 September 1919 – 5 August 2015 | Berlin

Radiology

Radiologist Hans-Jürgen Eichhorn did research in the field of diagnostic and therapeutic radiology. Two particular areas of focus were breast cancer and lung cancer. He was responsible for numerous developments, such as computer-aided radiotherapy, which facilitated significant advances in radiation therapy.

■ Raymond Kern ML

20 March 1928 – 6 November 2014 | Marseille

Earth Sciences

Raymond Kern studied the growth, formation and behaviour of crystals, and helped to establish the research field. As a professor in Marseille, he played a major role in the founding of the International Organisation for Crystal Growth in 1971. He also launched a summer school, which still takes place in Marseille every three years in the run-up to the International Conference on Crystal Growth. As a scientist, Kern was especially interested in the growth of twinned crystals and in crystal formation in cases of contamination and oversaturation of the nutrient solution.

■ Robert Fischer ML

7 February 1930 – 18 August 2015 | Hürth

Pathology and Forensic Medicine

Robert Fischer was director of the Institute of Pathology at University Hospital

Cologne. He was also a long-standing member of the board at German Cancer Aid, and chaired the organisation's medical advisory board. His scientific work focused on the pathology of Hodgkin lymphoma and on the exemplary development of pathological classifications and stage-appropriate therapies for this lymphatic disease.

■ Jacob Karl Frenkel ML

16 February 1921 – August 2013 | Santa Fe

Pathology and Forensic Medicine

Jacob Karl Frenkel worked in the United States as a medical parasitologist and experimental pathologist. He specialised in toxoplasmosis research and research into various infectious diseases.

■ Heinrich Köle ML

24 December 1920 – 30 June 2015 | Graz,

Ophthalmology, Otorhinolaryngology and Stomatology

Heinrich Köle was a professor in the Department of Dental and Maxillofacial Surgery at University Hospital Graz. In the field of orthodontic surgery, he was responsible for the international dissemination of segmental osteotomies and introduced surgical innovations. He also studied jaw fractures and, by carrying out plastic surgery, gained new scientific insights into medical and aesthetic surgery.

■ Paul Otte ML

14 November 1922 – 9 July 2015 | Großhansdorf

Surgery, Orthopaedics, Anaesthesiology

Orthopaedist Paul Otte dedicated his scientific work to researching articular cartilage. He was especially interested in its growth, its ability to regenerate, and in age-related changes. Otte also investigated diseases and damage of the joints – in particular osteoarthritis. He carried out histochemical, radiographic and histological studies for his work.

■ Gerhard Quinkert ML

7 February 1927 – 6 May 2015 | Lüdenscheid

Chemistry

A professor in the Institute of Organic Chemistry and Chemical Biology and

long-standing director of the Institute of Organic Chemistry at Goethe University Frankfurt, Gerhard Quinkert intensified close collaboration between chemical and biological research. His "Frankfurt model" has recently come to be considered the standard for interdisciplinary research. In his own work, Quinkert researched the chemical and physical synthesis of active ingredients that could be used in drug development. For example, he used photochemistry to synthesise substances.

■ Alois Stacher ML

16 February 1925 – 20 July 2015 | Vienna

Internal Medicine and Dermatology

Alois Stacher, a physician from Vienna, did research in the field of blood transfusions, anaemia and leukaemia. In 1960, he performed Austria's first bone-marrow transplant. In addition to his medical work, Stacher was active in Viennese city politics, serving as senior city official for health and social policy from 1979 to 1989.

■ Paul Schölmerich ML

27 June 1916 – 14 August 2015 | Mainz

Internal Medicine and Dermatology

Paul Schölmerich worked in cardiology research. His main focus was intensive-



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