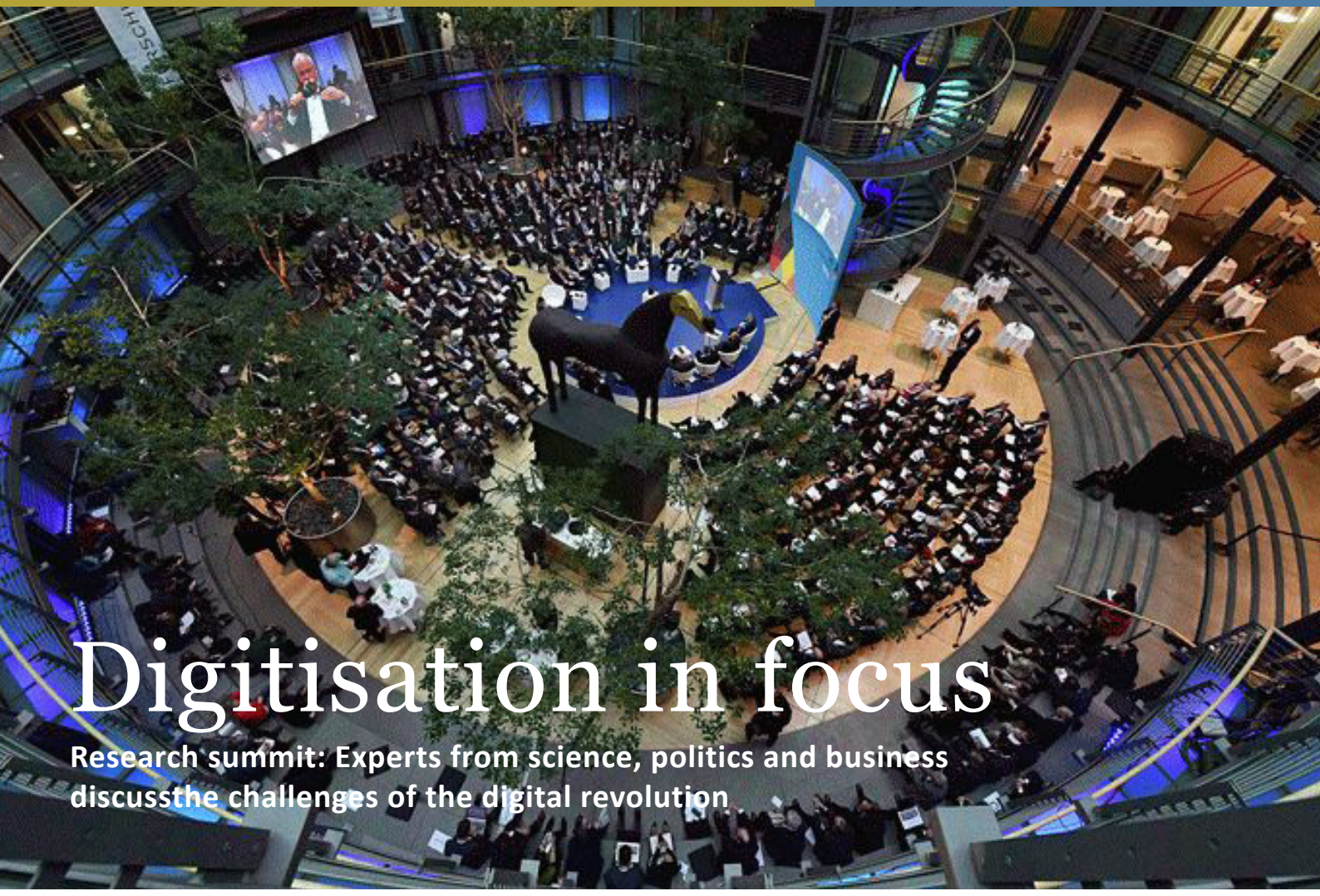
Leopoldina
Nationale Akademie
der Wissenschaften

Leopoldina news

3/2016

Deutsche Akademie der Naturforscher Leopoldina –
German National Academy of Sciences

Halle, 2. June 2016



Digitisation in focus

Research summit: Experts from science, politics and business discussthe challenges of the digital revolution

Editorial

Dear members and friends of the Leopoldina,

digitisation is changing science, business, politics – and, not least, daily life. Increasing amounts of data are being electronically recorded, processed and exchanged. The second research summit, held in Berlin this April, was dedicated to the topic of digitisation (see following text). The event, hosted jointly by the Stifterverband für die Deutsche Wissenschaft, the Commission of Experts for Research and Innovation, and the Leopoldina showed that businesses and politicians highly value the potential of research on digitisation and wish to provide even greater support to scientists working in the field.

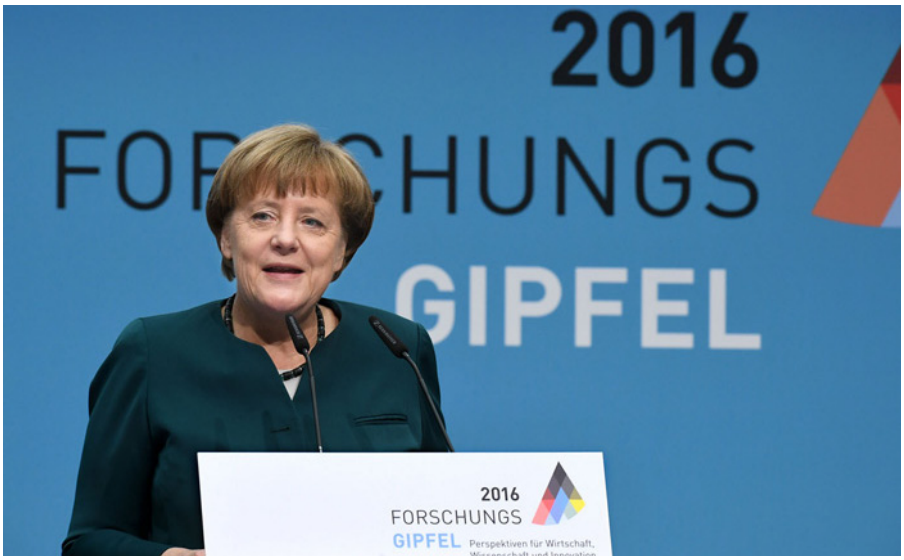
The Leopoldina has been monitoring this topic for some time. It has published statements and reports on "Challenges and Opportunities of Integrative Taxonomy for Research and Society", "Personalised Medicine", and "Radical Changes in the Life Sciences". The "Digitised Society" standing committee investigates the technical, legal, ethical and societal aspects of the topic. Within the "Big Data – Data protection – Privacy" working group, the Leopoldina is working with acatech and the Union of German Academies to devise recommendations on the best approaches to digitisation.

Most recently, the Leopoldina joined forces with the Robert Bosch Foundation to tackle the issue during the "Diving into Science" seminar programme for journalists. The topic of the fifth seminar programme is "Data – the Commodity of the Future?". The Academy wants to equip journalists with the skills they need to critically and competently report on the digital revolution. Leopoldina aktuell will bring you regular updates on the progress of these endeavours.

I wish you a thought-provoking read.

Digitisation: Social outcome of the transformation is unclear

Chancellor Angela Merkel speaks at the second research summit held by the Stifterverband, the Commission of Experts and the Leopoldina



Angela Merkel seeks policy advice on the topic of digitisation. photo: David Ausserhofer

After successfully launching the research summit last year, the Stifterverband für die Deutsche Wissenschaft, the Commission of Experts for Research and Innovation, and the Leopoldina held a second summit this year, on 12 April at the Allianz Forum in Berlin. Speakers included German Federal Chancellor Dr Angela Merkel, Daimler-Benz CEO Dr Dieter Zetsche, Deutsche Telekom CEO Timotheus Höttges and more than 40 other decision-makers and experts from business, science, politics and civil society. In front of an audience of almost 400 participants, they presented and opened up for discussion their ideas on how Germany as a centre of research and innovation can use digitisation to its advantage in the medium term.

In her keynote speech, Chancellor Merkel stressed that the outcome of the wide-reaching social transformation being triggered around the world by networked information and communication technologies is as yet unclear: "The battle is not yet won." Merkel said her government was therefore relying on critical analyses of Germany's current strengths and weaknesses compared to other countries. She explained that she would very much welcome recommendations that are as concrete as possible from all societal groups involved, on matters such as improving the legal frameworks for driverless cars.

Despite having differing opinions on individual issues, the participants agreed on important matters during three rounds of talks. Prof. Jörg Hacker, President of the Leopoldina, highlighted these in his closing speech. He noted that consensus had been reached on, for instance, the view that digitisation is not primarily about advances in technologies and forms of organisation, but rather about transforming the way people think and act. The challenges associated with this and the possible solutions are largely already on the table, argued Prof. Hacker. The biggest problem, however, seems to be implementation – for instance, teaching digital skills in the education system, or striking a balance between demands for data protection and the capabilities of new data-driven business models. These issues are forcing our transparency and cooperation structures to undergo evolutionary changes, which will make it possible (and imperative) for Germany to exploit the immense potential of digitisation – culturally, socially, scientifically and commercially. Prof. Hacker urged the participants to incorporate into their life and work the stimuli that emerged during the intense discussions at the summit. (art)

EASAC celebrates anniversary

Successful cooperation for 15 years

Guests listened attentively to the lectures at EASAC's 15-year jubilee event.

photo: Eirik Furu Baardsen/DNVA

A special event to celebrate the 15th anniversary of the European Academies Science Advisory Council (EASAC), which consists of the national academies of the EU member states, Norway and Switzerland, was held as part of the biannual general assembly from 11 to 13 May 2016. The event was hosted by the Norwegian Academy of Science and Letters, which was able to secure Norwegian Nobel Prize laureate Prof. Edvard Moser (Trondheim) as the keynote speaker. Moser gave a lecture about his research into the spatial orientation of living organisms through highly specialised nerve cells in the hippocampus.

Prof. William J. Sutherland (University of Cambridge) was also among the speakers at the event. He talked about the incorporation of scientific findings into political decision-making. Norwegian Minister of Education and Research Torbjørn Røe Isaksen presented the Norwegian view on European scientific collaborations.

The special event was also an opportunity to present EASAC statements and illustrate their role in policy advice. In addition, guests learned more about the 2015 reports on the effects of neonicotinoid-based insecticides and on gain-of-function in virology. The statement on marine sustainability published in early 2016 and the EASAC report entitled "Electricity Storage", due to be published in autumn 2016, were also presented at the event.

The gala occasion was followed by the regular EASAC General Assembly, also dedicated to the organisation's 15th anniversary. Dr Peter Collins, former director of the Royal Society and former head of the EASAC Secretariat at the Royal Society (2001 to 2007), held an evening lecture on the foundation and history of EASAC. A special anniversary volume that vividly documents EASAC's achievements and developments over the past 15 years was published to mark the occasion. (cd)

International discussion on genome editing

The Leopoldina is actively involved in international debates on the use of new methods of genome editing in humans. International experts from science, business, politics and society met at the International Summit on Human Gene Editing in Washington D.C. in December 2015. The experts agreed that safety and effectiveness must first be clarified before the discussion on the ethical and legal questions regarding germline gene therapy in humans can be taken further in the light of scientific advances in the field.

Conference in Washington

The main initiators of the summit – the US National Academy of Sciences and National Academy of Medicine – subsequently set the consensus study in motion. Within the study, researchers will conduct extensive investigations into the scientific foundations of genome editing technologies and their potential use in biomedical research and medicine. They will also discuss interventions in the germline and the clinical, ethical, legal and social implications of using the new technologies.

Meetings in Paris

The experts involved in the consensus study came together for the third time at the Académie nationale de médecine in Paris on 29 April. The previous day, the Federation of European Academies of Medicine (FEAM), the UK's Academy of Medical Sciences, and France's Académie nationale de médecine held a workshop entitled "Human Genome Editing: Opportunities and Challenges for Europe" at the same location, focusing on the conditions required to create a European legal framework for the safe and reasonable application of genome editing in humans. The goal is to establish foundations for European guidelines that are as uniform as possible. Prof. Bärbel Friedrich, Prof. Jochen Taupitz and Prof. Ernst-Ludwig Winnacker represented the Leopoldina at both events. (jf)

Mathematics symposium in South Africa

The Leopoldina, the Academy of Science of South Africa (ASSAf), and the Alexander von Humboldt Foundation held a mathematics symposium on "Partial Differential Equations and their Applications" in Stellenbosch, South Africa, from 9 to 11 March 2016.

The scientific coordination of the symposium was in the hands of Prof. Helmut Hofer (Princeton, USA) on the side of the Leopoldina and Prof. Fritz Hahne (Stellenbosch) on behalf of ASSAf. Scientists from Germany, South Africa, Brazil, Russia and China took part in the event, where they discussed the latest research findings in mathematics and exchanged ideas in a series of of talks. In addition, junior scientists from Germany and Africa presented their current research projects in poster sessions. (jn)

Computers that can read minds

Leopoldina Lecture and Symposium, Class I: Mathematics, Natural Sciences and Engineering

In the wake of the NSA affair, the idea of a computer that can read minds will probably raise grave concerns for most people. In his Leopoldina Lecture on 23 March 2016 in Halle (Saale), Prof. Klaus-Robert Müller ML (Berlin) explained why computer science, whose findings are widely used, is so fascinating and how machine learning could be applied in various fields.

Fast, accurate measurement technologies have caused the volume and quality of data available in all areas of society to increase so much that scientists are reaching the limits of their abilities to evaluate it. In order to generate and analyse meaningful information from big data, patterns have to be identified in those data. The mathematical formalisation of such pattern recognition is the foundation of machine learning.

Prominent example of machine learning: Driver assistance systems

In terms of applications for machine learning, one prominent example can be found in driver assistance systems, which use cameras to identify obstacles and dangers on and along the roads. For this automated object recognition to work, the system must be able to quickly identify whether, for instance, a vertical shadow at the side of the road is a pedestrian or a tree. During his lecture, Prof. Müller repeatedly emphasised that computers have to learn what, for example, a bike or a horse looks like in order to make safe decisions during actual use.

He said that getting a computer to the point where it could be controlled via thoughts also required intensive training of the test subjects and of the computer itself. The training involved measuring the test subjects' brainwaves using an EEG. The resulting brain-signal patterns that occurred during a specific train of thought were identified and connected with instructions on the computer. This so-called brain-computer interface could, for instance, allow patients with locked-in syndrome to control a cursor and use a PC to communicate.

Applications based on machine learning are also being developed in the field of cancer medicine. Researchers feed huge numbers of images of healthy and diseased tissue into computers. The idea is that, by analysing and comparing patterns, the computers should then be able to differentiate between positive and negative results. This could support medical examinations and make diagnoses more accurate.

Latest insights from solar system research

In addition, Prof. Müller pointed out that machine learning now carries considerable economic weight, with companies such as Google, Facebook and Amazon deriving their power from the automated collection and interpretation of enormous volumes of personal data. Prof. Müller also noted that the Higgs boson – whose existence nuclear physicists proved in 2012 – was discovered with the help of machine learning.

The second day of the symposium saw other speakers from Class I – Mathematics, Natural Sciences and Engineering take the floor. Prof. Stuart Parkin ML (Halle) talked about basic research on new data storage technologies. Prof. Tresa Pollock ML (Santa Barbara) gave a talk on materials development for extreme environmental conditions, and Prof. Ulrike Diebold ML (Vienna) presented her research on surface physics. Prof. Tilman Spohn of the German Aerospace Center (Berlin) revealed the latest insights from solar system research, which were made possible by the Rosetta mission, and Prof. Martin Hairer ML (Warwick) reported on the challenges of probability theory. (ca)

New members of Class I

The new members of Class I are presented with their membership certificates. From left: Prof. Marion Merklein ML (Erlangen), Leopoldina Secretary-General Prof. Jutta Schnitzer-Ungefug (Halle), Prof. Stuart S. Parkin ML (Halle), Leopoldina President Prof. Jörg Hacker ML (Halle), Prof. Johanna Stachel ML (Heidelberg), Prof. Ulrike Diebold ML (Vienna), Prof. Franc Meyer ML (Göttingen), Prof. Tresa Pollock ML (Santa Barbara), Prof. Klement Tockner ML (Berlin), Prof. Karl Leo ML (Dresden), Prof. Lorenz S. Cederbaum ML (Heidelberg), Prof. Martin Hairer ML (Coventry), Prof. Johannes Lelieveld ML (Mainz) and Prof. Heike Riel ML (Munich). (jk)/Foto: Markus Scholz

A pioneer of science-based policy advice

The Leopoldina mourns Presidium member Prof. Peter Propping

PROF. DR. MARKUS NÖTHEN ML

Prof. Peter Propping (Dr. med.) ML, died on 26 April at the age of 73. Propping was born in Berlin and studied medicine at Freie Universität Berlin. He chose to focus on human genetics as he was fascinated by the field's strong theoretical side and interdisciplinary character. After working under Friedrich Vogel in Heidelberg, Propping concentrated his research on the genetics of psychiatric disorders. For a long time, this was considered a hopeless undertaking, and he made almost no progress at first. After taking over from Prof. Weicker at the Institute of Human Genetics in Bonn in 1984, Propping therefore entered into another, more genetically accessible research field: hereditary colorectal cancer.

Propping played a major role in this field by helping to establish uniform standards of care for human-genetic family guidance, and for risk-adapted early cancer detection. Then came the much-hoped-for breakthroughs in the psychiatric disorders. Propping certainly deserves the credit for the important part that Germany played here. He shaped the content of programmes on medical human genome research, and in so doing emphasised the enormous potential of genetics for researching the causes of multifactorial disorders.

An exemplary aspect of his approach was that he always considered and openly discussed ethical implications. He was no stranger to self-doubt and viewed the past abuses of genetics as a permanent warning. His advice was in great demand, and he served on the German Ethics Council.

Propping enjoyed taking on responsibility and was, among other things, chair of the German Society of Human Genetics, a member of the board at German Cancer Aid, and a dean and pro-rector at the University of Bonn. He was also committed to disseminating knowledge on human genetics among the medical profession.

In 2001, Propping was elected to the Leopoldina in recognition of his achievements: he innovatively yet responsibly integrated the possibilities of genetics into efforts to identify the causes of diseases and made a great contribution to translating this into medical action. Upon election, he immediately took an active role in the Academy's work. For example, he led the working group on predictive genetic diagnostics, which was the first to produce a statement for science-based policy advice after the Leopoldina was named the German National Academy of Sciences. Not only did the statement set an example in terms of content, it also resulted in pioneering work regarding future formats. In particular, it was thanks to Propping that medical topics were always a highly regarded focus of the Academy's work, and he made it a priority to pay special attention to ethical matters.

Peter Propping was a member of the Leopoldina Presidium from 2010. photo: David Ausserhofer

Propping was very actively involved from the outset in the Leopoldina Study Centre, which focuses on the interplay between science and society. In collaboration with his close associate Prof. Heinz Schott ML, he raised the topic of otherness and identity in human societies. He played a major part in helping to shape the symposium that will be held from 4 to 6 October 2016. Sadly, it must now be dedicated to his memory.

As one of the most distinguished German researchers working on the human genome, Propping received the Leopoldina's Mendel Medal in 2003. He was awarded the Karl Heinrich Bower Medal by German Cancer Aid, and the Medal of Honour by the German Society of Human Genetics. He also received the Lifetime Achievement Award from the International Society of Psychiatric Genetics.

As a member of the Leopoldina Senate from 2008, a member of the Presidium from 2010, and secretary of Class II – Life Sciences, Propping was a trusted contact for his fellow scientists and for all Leopoldina employees. His openness and empathy had a great influence on the working atmosphere at the academy. With Propping's death, the Leopoldina has lost a highly dedicated colleague who was always concerned with people as well as with his work and was very well liked by all he came into contact with. The academy will cherish his memory.

A guiding light is extinguished

The Leopoldina mourns Honorary Senator Hans-Dietrich Genscher

Hans-Dietrich Genscher (Free Democratic Party FDP) was a great statesman who will be remembered above all for his sterling work during the Reunification of Germany and his efforts to ensure peaceful coexistence between states. In his roles as Minister of the Interior, Foreign Minister and Vice-Chancellor, he played a pivotal role in shaping German politics for decades. He died on 31 March at the age of 89. The Leopoldina has thus lost its first Honorary Senator and a long-standing supporter who actively advised and guided the Academy in the years following German Reunification. Throughout his life, Genscher, who was born in Reideburg on the outskirts of Halle, had a close bond with the city of Halle and the scientific and cultural institutions based here. He supported and advised the Leopoldina particularly around the time of Reunification.

Genscher first made contact with the Leopoldina back in the summer of 1990. He travelled to Bad Lauchstädt to witness Prof. Heinz Bethge hand over the presidency to Prof. Benno Parthier at the Goethe-Theater. Following their initial encounter, Genscher and Parthier engaged in regular dialogue about the Academy's position within the federal system of a reunified Germany. Genscher, who was Foreign Minister at that time, approached his cabinet colleagues and put forward the idea of jointly financing the Leopoldina through federal and state government funds. At the time, this special arrangement ensured the survival of the oldest academy in Germany and enabled it to subsequently develop into the National Academy of Sciences.

Benno Parthier übergibt Hans-Dietrich Genscher die Ehrensenatoren-Urkunde Foto: Archiv

In February 1992, Genscher invited Leopoldina President Prof. Parthier to Japan as a member of a 30-person delegation. Parthier used this opportunity to establish important contacts abroad on behalf of the Academy. He also enjoyed plenty of in-depth discussions with Genscher and his wife Barbara on the plane there and back. As Parthier fondly remembers, Genscher was an extraordinarily entertaining conversation partner who loved to make others laugh.

Genscher was appointed the first Honorary Senator of the Leopoldina at the Annual Assembly the following year. In this way, the Academy honoured his "attachment to the Leopoldina and his generous and far-sighted support of it, combined with the many and various ways he has promoted science and medicine in Halle, the city of his birth – all set against the backdrop of his historic achievements in domestic and foreign policy during the Reunification of Germany," as Parthier said in his laudatory speech. (bp/jk)

GENSCHER FACILITATED RETURN OF VALUABLE BOOKS

In 1996, Genscher helped the Leopoldina retrieve valuable books that had gone missing after World War II. The Academy had stored around 7,000 books in a former potash shaft to protect them from damage during the war. At the end of the war, the books were taken away by the Red Army and distributed throughout the Soviet Union. The books that had been sent to Georgia were for the most part given back to Germany in 1996, including twelve valuable Leopoldina volumes. Genscher's commitment to this undertaking and his friendly relations with the Georgian president, Eduard Shevardnadze, were key to the uncomplicated retrieval of the missing books. (jt)

Young Academy hosts symposium on refugees

Numerous university initiatives geared towards supporting refugees have emerged in recent months. In a bid to link these initiatives together and ask whether universities can do more than just improve access to higher education, the Young Academy organised a conference entitled "Refugees Welcome? Refugees at German Universities".

Individual projects, initiators and official institutions were brought together at the conference in Berlin on 13 May. In workshops, the participants discussed access to education services and specific aspects of daily university life. Taking a look at Switzerland and Austria and at integration attempts outside academia also suggested some interesting approaches. The various initiatives presented their work during the breaks, in the event's "open space".

Manal Altizini, a medical student from Syria, Prof. Julia von Blumenthal (Berlin), Dr Stephan Dünnwald (Bavarian Refugee Council), Prof. Yasemin Karakaşoğlu (Bremen), and Member of the Bundestag Swen Schulz (SPD) participated in the evening panel discussion entitled "Universities in the Middle of Society – Responsibility and Sustainability in light of the 'Refugee Crisis'". The participants initially discussed language barriers, missing academic certificates, and admission requirements for refugees before eventually agreeing that the so-called "refugee crisis" actually represents an opportunity for society and that refugees are an asset to the education system, as they are usually highly motivated and help highlight and promote diversity at universities.. (as)

Personalia

New members Class I

Gerhard Fettweis ML, Dresden, Technische Universität Dresden, Communications Laboratory (Informatics Section)

Heiner Igel ML, München, Ludwig-Maximilians-Universität München, Faculty of Geosciences (Earth Sciences Section)

Ferenc Krausz ML, Garching, Max-Planck-Institute of Quantum Optics and Ludwig-Maximilians-Universität München, Faculty of Physics (Physics Section)

Beat H. Meier ML, Zürich, Schweiz, Eidgenössische Technische Hochschule Zürich, Laboratory of Physical Chemistry (Chemistry Section)

Peter Schlosser ML, New York, USA, The Earth Institute, Columbia University, Department of Earth and Environmental Engineering (Earth Sciences Section)

Peter Schneider ML, Münster, Westfälische Wilhelms-Universität Münster, Departement Mathematics and Informatics (Mathematics Section)

Bernhard Schölkopf ML, Tübingen, Max-Planck-Institute for Intelligent Systems (Informatics Section)

Volker Springel ML, Heidelberg, Universität Heidelberg, Department of Physics & Astronomy (Physics Section)

Hans-Peter Steinrück ML, Erlangen, Friedrich-Alexander Universität Erlangen-Nürnberg, Department Chemistry and Pharmacology (Chemistry Section)

Burkhard Wilking ML, Münster, Westfälische Wilhelms-Universität, Department Mathematics and Informatics (Mathematics Section)

Katja Windt ML, Bremen, Jacobs University Bremen ((Engineering Sciences Section)

Frank Würthner ML, Würzburg, Julius-Maximilians-Universität Würzburg, Institute for Organic Chemistry (Chemistry Section)

Deceased members

André Aeschlimann ML
26 September 1929 – 4 March 2016 | Geneva
Veterinary medicine
Zoologist André Aeschlimann was appointed a member of the Leopoldina in 1987. Aeschlimann made a name for himself with his research into ticks as vectors of pathogens. As the president of the Swiss National Science Foundation and the Swiss Academy of Sciences for many years, Aeschlimann played a strong role in shaping science policy in his home country.

Bernhard Hassenstein ML
31 May 1922 – 16 April 2016 | Freiburg im Breisgau
Organismal and evolutionary biology
Bernhard Hassenstein became a member of the Leopoldina in 1965. His experiments imitating the optomotor response of snout beetles allowed him to gain important insights into the movement perception of insects. His work also helped establish the use of cybernetic methods in biology.

Eberhard Schnepf ML
4 April 1931 – 10 April 2016 | Heidelberg
Organismal and evolutionary biology
Eberhard Schnepf was appointed a member of the Academy in 1974. For many years a professor of cytology at Heidelberg University, Schnepf was interested in the function and development of plant cells. He conducted research into cell compartmentalisation and membrane flow. Schnepf also studied the phylogenetic origins of plastids and mitochondria through endosymbiosis.

Peter Propping ML
21 December 1942 – 26 April 2016 | Bonn
Human genetics and molecular medicine
Peter Propping was admitted to the Academy in 2001. From 2010 he was a member of the Leopoldina Presidium. He was secretary of Class II – Life Sciences. In his work as a neurogeneticist, Propping studied the molecular basis of mental illnesses. He received the German Cancer Aid Award for his research into hereditary cancers and for his initiative to provide screenings for families at risk in Bonn. Propping was a member of the German Ethics Council.

Hans J. Eggers ML
26 July 1927 – 5 May 2016 | Cologne
Microbiology and immunology
Virologist Hans Joachim Eggers was a pioneer in the field of selective antiviral therapy. He has published studies into antiviral chemotherapy and the development of resistance. He was a founding and honorary member of the Gesellschaft für Virologie. He was admitted to the Academy in 1982.

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Imprint

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Design:
Agentur unicom, Berlin

Abbreviations:
ML = Member of the Leopoldina