



Leopoldina
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der Wissenschaften

Leopoldina news

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Deutsche Akademie der Naturforscher Leopoldina –
German National Academy of Sciences

Halle (Saale), 5 April 2019

Looking to the future of the European Research Area



ANNIVERSARY

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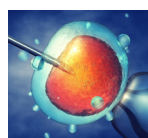
**Freiheit
ist unser
System.**

Gemeinsam für die
Wissenschaft,
70 Jahre Grundgesetz.

Alliance of
Science Organisations
70 years of Germany's
constitution and scientific
freedom

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Editorial

Dear Members and Friends
of the Leopoldina,



Soon, on 23 May, we will celebrate 70 years since the enactment of Germany's Basic Law, and so I was recently asked which is

my "favourite article" in our constitution. It will come as no surprise to you that it is Article 5, Paragraph 3: "Arts and sciences, research and teaching shall be free. The freedom of teaching shall not release any person from allegiance to the constitution."

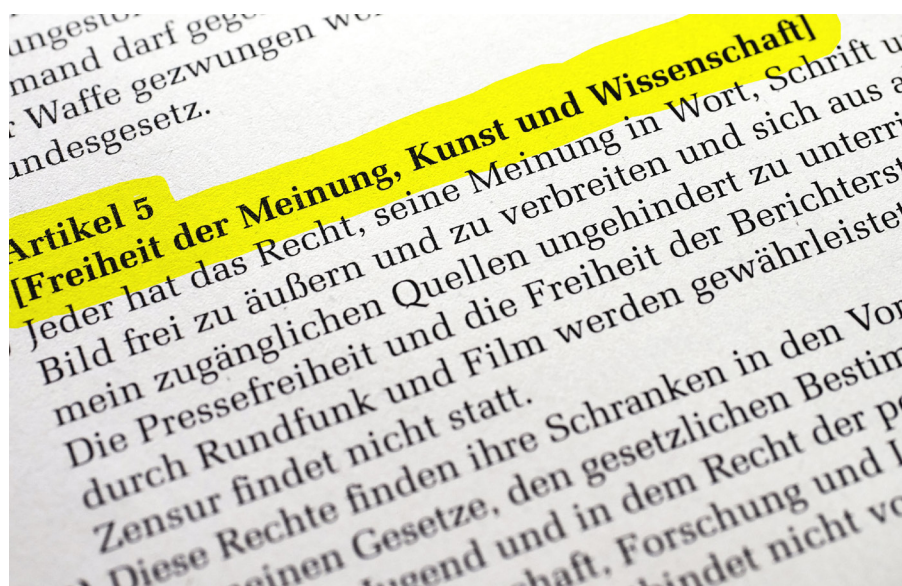
This constitutional article protects science from the greatest threat it has ever had to face throughout its history, and against which it must continue to struggle in many corners of the globe. This is because it makes absolutely clear that the state may not dictate to scientists what they must and must not recognise to be scientific knowledge. Likewise, the state may not prohibit them from conducting scientific investigations into certain topics, just because this research could lead to unpleasant consequences for the respective government. On the occasion of this constitutional anniversary, academic freedom is also the subject of a campaign launched by the alliance of the ten largest scientific organisations (see article opposite). The alliance has organised a series of events dedicated to the independence of research which also asks for the trust in science that is needed to enable society to enjoy freedom of science.

The situation surrounding such trust is also the topic of current international debate. This is expressed, for example, in the statement on "Trust in Science" currently being drafted by the science academies of the G7 nations in Paris in preparation for this year's G7 Summit (see also p 8). At a time when evidence-based knowledge is increasingly being called into question, we must intensify our efforts to win confidence again and again. I hope you find this issue an interesting and inspiring read.

U. J. K. h.

Standing together for scientific freedom

Leopoldina involved in events series celebrating 70th anniversary of Germany's Basic Law



The Basic Law for the Federal Republic of Germany was promulgated on 23 May 1949. Academic freedom is guaranteed by Article 5 Paragraph 3 of the constitution. Image: Manuel Schönfeld - Adobe Stock

On 23 May 2019, Germany's Basic Law will celebrate its 70th birthday. To this day, it represents a nation's absolute desire for freedom and has repeatedly demonstrated its capacity for integration throughout the decades. The basic right to academic freedom enshrined in Article 5 Paragraph 3 of the Basic Law plays a special role here.

To mark this anniversary, the alliance of the ten largest German scientific organisations has launched a campaign, initiated by the Max Planck Society, entitled "Freiheit ist unser System. Gemeinsam für die Wissenschaft" (Ours is the way of freedom. Together for science). In a series of events, talks, debates and opinion pieces, the scientific community aims to promote the independence of research and teaching whilst at the same time critically examining its own developments and looking at global threats to academic freedom.

As the National Academy of Sciences, the Leopoldina is particularly keen to contribute a range of events to the initiative. After all, scientific freedom is the structural principle underpinning modern science. The Joint Committee of the German Research Foundation (DFG) and

the Leopoldina thus sent out invitations to a discussion evening on 1 April where discourse centred on the handling of security-related research. Here, scientific freedom, and the responsibility it brings with regard to potential exploitation of research findings for malicious purposes, was debated from a number of viewpoints.

On 19 June, members of the Young Academy will subsequently join us in presenting short films and leading discussions illustrating what young scientists, in particular, understand by academic freedom, what restricts it and what independent research is reliant on. Finally, as part of the Leopoldina Annual Assembly entitled "Time in Nature and Culture" taking place in Halle on 20 September, Federal Constitutional Court judge Susanne Baer will examine the complementarity of scientific freedom and responsibility from the perspective of constitutional law.

An event at Berlin's Futurium, where guests will be joined by Federal President Frank-Walter Steinmeier, will conclude the alliance's campaign on 26 September. The topic of the evening will be the future of science. (nhm)

■ INITIATIVE OF THE ALLIANCE OF SCIENCE ORGANISATIONS (GERMAN ONLY)

Aiming for the perfect child?

Interview with Wolfgang Holzgreve on questions of prenatal diagnostics and reproductive medicine

Together with the Konrad-Adenauer-Stiftung, the Leopoldina published a discussion paper in mid-February entitled “Planbare Schwangerschaft – perfektes Kind? Wechselwirkungen von Medizin und Gesellschaft” (Plannable pregnancy – perfect child? Interactions between medicine and society). It identifies medical and technological progress in reproductive medicine and places them in the context of society.

What led the Leopoldina to publish a discussion paper on modern reproductive and prenatal medicine?

Wolfgang Holzgreve: Reproductive medicine and prenatal medicine are characterised by the fact that they are repeatedly the source of significant progress which raises questions for society and politics. Current controversies are once again up for debate, including at the German parliament this coming autumn. That’s why we decided the time was right.

Why did the discussion paper focus on social egg freezing, i.e. on oocyte cryopreservation – or the freezing of egg cells for fertilisation at a later date – and non-invasive prenatal testing (NIPT) in pregnant women?

Holzgreve: In the case of social egg freezing, there is currently a need to provide clarification and to separate fact from fiction. Where NIPT is concerned, a decision is pending as to whether it should be covered by state health insurance providers, and thus whether it constitutes a benefit of a mutually supportive community. Since ethical aspects are key to both of these issues, it is important to discuss objectively.

Both procedures are very popular among expectant parents. Why is that?

Holzgreve: Reproductive medicine is very widely accepted because from 1978 onwards, the techniques have finally provided effective treatment for those wishing to conceive. Ovarian tissue cryopreservation was developed for women planning pregnancies for whom required prior conservation of intact ovarian tissue was necessary because they underwent cancer treatment involving radiation therapy or cytostatic chemotherapy, though of course



Prof. Dr. med. Dr. h.c. mult. Wolfgang Holzgreve ML is one of the authors of the discussion paper “Planbare Schwangerschaft – perfektes Kind” (Plannable pregnancy – perfect child). He has been Medical Director and Chair of the Board of Directors at the University Hospital Bonn since 2012. The 63-year-old conducts research on ultrasound diagnostics and genetics, as well as on invasive and non-invasive prenatal diagnostics. He is a representative of the International Federation of Gynecology and Obstetrics (FIGO) at the UN and the WHO in Geneva, where he works on many committees and projects.

Image: University Hospital Bonn

the indications can be extended to social egg freezing. Thanks to NIPT, we now have an excellent screening technique at our disposal – as well as a diagnostic method for Down’s syndrome with very few false positive results. Consequently, this could unobtrusively become standard in prenatal care. However, this would not satisfy the ethical requirements for the individual decision on its use.

For many couples, the desire to conceive a child that is as healthy and perfect as possible is becoming seemingly more tangible. The aim is to better plan pregnancies. What social consequences does this have?

Holzgreve: Every decision concerning prenatal testing should only be taken following a comprehensive consultation at the outset, which not only provides information on the technical possibilities and their significance, but also on the ethical dilemmas that they pose. After all, the results may reveal a severe abnormality for which there is no cure. A couple may then decide not to carry the pregnancy to term. This is why we insist on adequate, sensitive advice and room for reflection accompanying any diagnostic investigation. Procedures should only be carried out once the potential consequences of the medical possibilities have been fully understood.

How do you recommend policymakers handle this?

Holzgreve: Policymakers should recognise the fact that with NIPT, for example, testing may lead to the termination of a pregnancy in a worst-case scenario. This poses a dilemma: On the one hand, we must consider the protection of life to be the greatest good, whilst on the other, we need to respect the autonomy of pregnant women when prenatal tests show that an expectant mother or couple may give birth to a disabled child with a chromosomal disorder or a serious hereditary disease. Policymakers therefore need to create a framework that acknowledges this and offers alternatives for providing comprehensive advice to pregnant women. It would not be appropriate for political parties to split into simplistic camps over this issue; rather, it is a matter that calls on the conscience of individuals.

What has been the response to the discussion paper so far?

Holzgreve: The paper showed what an academy of sciences can achieve by communicating facts. The topic was debated in both the media and in public not ideologically, but in objectively.

THE INTERVIEW WAS CONDUCTED BY
BENJAMIN HAERDLE

The future of mobility and the impact of traffic

Class I Symposium and Presentation – Mathematics, Natural Sciences and Engineering

“The future of mobility” was the focus of the Class I symposium held in late March. At the evening lecture, Prof. Dr. Armin Grunwald (Karlsruhe Institute of Technology, KIT) gave an outline of developments in the traffic sector. He related how the number of traffic-related deaths stopped decreasing in 2010 and a reduction in emissions was only seen in years of recession, after which they increased all the more sharply. All technological efficiency gains were more than counterbalanced by changes in consumer behaviour. Since over 90 percent of accidents are caused by human error, autonomous driving may, in the long-term, lead to greater safety.

According to Prof. Dr. Barbara Lenz from the German Aerospace Centre’s Institute of Transport Research in Berlin, driverless vehicles have long been accepted in the railway sector. However, surveys show that confidence in self-driving cars is low. By way of contrast, Prof. Dr. Martin Doppelbauer from KIT demonstrated that e-mobility is now suitable as a practical, everyday technology. Once a market penetration of 10 percent is achieved, electric cars will rapidly become widespread.

Prof. Dr. Peter Gratzfeld from the KIT spoke about developments in rail traffic. It is anticipated that the Europe-wide digital railway safety system ETCS will enable infrastructural savings and increase capacity. At present, however, more than 20 different analogue systems are in use within Europe, restricting cross-border



The new members of Class I

The new members of Class I received their membership certificates on 20 March. From left: Secretary-General of the Leopoldina Prof. Dr. Jutta Schnitzer-Ungefug (Halle), Prof. Dr. Manfred Scheer ML (Regensburg), Prof. Dr. Benjamin List ML (Mülheim), Prof. Dr. Dan Frost ML (Bayreuth), Prof. Dr. Yuri Tschinkel ML (New York), Prof. Dr. Liane G. Benning ML (Potsdam), President of the Leopoldina Prof. Dr. Jörg Hacker (Halle), Prof. Dr. Thomas Wiegand ML (Berlin), Prof. Dr. Horst Fischer ML (Aachen), Prof. Dr. Viola Vogel ML (Zurich, Switzerland), Prof. Dr. Stefan Grimme ML (Bonn), Prof. Dr. Gabriele C. Hegerl ML (Edinburgh, UK) and Prof. Dr. Catharina Stoppel ML (Bonn).

Image: Leopoldina | Markus Scholz

traffic. Prof. Dr. Jos Lelieveld ML from the Max Planck Institute for Chemistry in Mainz reported on the traces our mobility leaves in the atmosphere. Satellite data for Germany show the highest concentrations of nitrogen oxides covering the Ruhr area and down as far as Cologne and Bonn. The long-term effects for people in high-

risk groups are said to be asthma, chronic bronchitis and heart attacks. Further talks were also given by Prof. Dr. Daniel Büscher (Freiburg) on the technological status of driverless vehicles and by Prof. Dr. Kay Axhausen (Zurich) on the opportunities that would arise with autonomous taxi fleets. (ca)

International network of academies positions on nutrition

On 15 February, a general statement from the academies of science entitled “Opportunities for future research and innovation on food and nutrition security and agriculture” was presented in Washington (USA) at the annual conference of the American Association for the Advancement of Science (AAAS). This was preceded the day before by an in-depth discussion on the academies’ position during the scientific conference of the International Food Policy Research Institute (IFPRI), also in Washington.

The InterAcademy Partnership IAP

global network of science academies had published the statement in November 2018. It contains analyses and recommendations from over 130 national academies of science and medicine, which were compiled as part of a Leopoldina project sponsored by the German Federal Ministry of Education and Research.

The academies make clear that the challenges of quantitative and qualitative food security need to be understood as interlinked with global changes to the climate and environment. They call for the

identification of scientific and technological opportunities that will contribute to sustainable, healthy nutrition worldwide. Consciously shaping the confluence of science and politics at local and international levels is absolutely imperative. Proposed measures include improving research infrastructure and investing in innovations within food systems, the ultimate goal being the ability to face the challenges posed by climatic and environmental changes. (csd)

■ IAP REPORT ON FOOD AND NUTRITION

Nobel Prize winner investigates new antibiotics

Structural biologist Ada Yonath to give Leopoldina Lecture in Berlin on 12 June

The title of the Leopoldina Lecture set to take place in Berlin on 12 June is “Next Generation Environmentally Friendly Antibiotics”. The talk will be given by guest speaker Prof. Dr. Ada Yonath ML, who won the Nobel Prize for chemistry in 2009 and has been a member of the Leopoldina since 2013.

“By all accounts, we will soon be back where we were before antibiotics were discovered,” warns the Israeli structural biologist and Nobel Prize winner Prof. Dr. Ada E. Yonath ML. This results from the fact that bacteria are becoming increasingly resistant to all available medicines, and there is little medical help still available for infected patients. As a consequence, the World Health Organisation (WHO) made an urgent appeal to governments across the globe two years ago, calling on them to create more incentives for researchers and pharmaceutical companies to develop new antibiotics. Ada Yonath has played her part in this for many years. She will present her latest results at the Leopoldina Lecture in Berlin on 12 June.

Discoveries on the structure and function of ribosomes

The scientist at the Weizmann Institute of Science in Rehovot, Israel, is to thank for the new, detailed understanding of the mode of operation for a series of typical antibiotics. This knowledge is underpinned by her discoveries on the structure and function of ribosomes – tiny molecular complexes responsible for synthesizing vital proteins in the cells of all organisms. Many antibiotics bind to bacterial ribosomes and inhibit their protein production, thus putting the microbes out of action. In honour of her pioneering work, Yonath was awarded the Nobel Prize for Chemistry in 2009 together with Dr. Venkatraman Ramakrishnan ML (Cambridge, UK) and Prof. Dr. Thomas A. Steitz (Yale, USA).

Since then, she has been involved in fundamental research on new antibiotics. In this work, as in the research honoured with the Nobel Prize, she employs X-ray crystallography – a technique for determining the three-dimensional structure of molecules. This tool allowed her to identify areas in ribosomes that are only pre-



Ada Yonath was awarded the Nobel Prize for Chemistry in 2009. The Israeli biologist won the honour for her research on the structure and function of ribosomes in cells. Image: private source

LECTURE ON 12 JUNE

Nobel Prize winner Ada Yonath will talk about environmentally-friendly antibiotics at the Leopoldina Lecture on 12 June. The presentation entitled “Next Generation Environmentally Friendly Antibiotics” will be given in English and begins at 6.00pm. A reception at 8.00pm will follow the lecture. The venue for the event is the Kaiserin-Friedrich-Haus at Robert-Koch-Platz 7, Berlin. Admission is free.

PROGRAMME AND REGISTRATION

sent in pathogenic bacteria. These structures offer targets for novel medicines which will hopefully act more selectively than current preparations, have fewer unwanted side effects and put less strain on the environment.

Today’s antibiotics not only attack pathogens, they often cause damage to the millions upon millions of beneficial bacteria in the digestive tract. This can cause the microbiomes they constitute to lose their equilibrium, which in turn has an impact on health. Problems are also posed by the degradation products of antibiotics, increasing quantities of which are finding their way into bodies of water, and are now even detectable in drinking water. The residues ingested from both this and

foodstuffs increase already existent levels of the resistance, thus creating a vicious circle.

Using a new generation of active substances to target bacteria

Instead of pursuing broad spectrum antibiotics, Ada Yonath is working on a new generation of medicines which are targeted directly against individual bacterial species and are biodegradable. The Nobel Prize winner believes there are already suitable starting points for developing these medicines. It is now up to the pharmaceutical industry to take the next steps. Ada Yonath spent many years conducting research in Germany. From 1979 to 1983, she developed the foundations for the crystallization of ribosomes at Berlin’s Max Planck Institute for Molecular Genetics. She later worked at Deutsches Elektronen-Synchrotron (German Electron Synchrotron, DESY) from 1986 to 2004, where she and her research group shed light on biological structures.

Looking back, Yonath describes how for many years she was derided; almost no one believed in her approach. Her well-founded publications in 2000 and 2001 finally won the credence of the scientific world. The tenacious researcher intends to uncover even more of the ribosomes’ secrets. (lb)

SILBERSALZ brings together media and researchers

Second edition of Science & Media Festival at the Leopoldina in Halle

The worlds of film and research will meet at the SILBERSALZ Conference in the university city of Halle on 22 and 23 June. Like last year, the event is being organised by the Robert Bosch Stiftung and Documentary Campus as part of the public SILBERSALZ festival. The Leopoldina is a partner of the event and will provide the venue.

The conference, taking place on the third weekend of June, will once again be a highlight of the SILBERSALZ festival programme. The two-day event at the Leopoldina's headquarters in Halle will focus on "The Science of Love" and bring together representatives from the media and technology industries with researchers working on new approaches in neuroscience, philosophy, evolutionary biology, sociology, history and psychology.

Dr Helen Fisher of the Kinsey Institute at Indiana University, USA, will give the opening keynote speech: "The Science of Love and its relevance for today's world". The anthropologist researches human relationships and will provide an introduction to the three focal points of the rest of the conference: "Body – Are we programmed by nature for love?", "Mind – Is love all in our head or are we making it up?" and "Community – Does love conquer all?".

With lectures, panel discussions and the Science & Media Pitch, the conference will be a hub for interaction and concrete collaboration between the media industry and researchers. One theme running through the programme will be "The Fu-



Researchers and media representatives attending the first festival developed a deeper understanding of one another through lectures, discussion panels and workshops. Image: Documentary Campus e. V.

ture of Love", which is also the focus of the closing panel.

A number of national and international media organisations will be participating, including arte, ARD broadcasters, VICE, ZDF, NHK, National Geographic Germany, CuriosityStream and the Wellcome Trust. Other media representatives on the guest list include the Hamburg-based TV writer and director Judith König, the Cologne-based film producer Tristan Chytroschek, and Patrick Levy-Rosenthal from New York, USA, founder of the tech firm Emoshape. Researchers who have already confirmed they will be attending include Brian Earp, a philosopher and psychologist at Yale University, USA; Dr Liat Yakir of the Center for Educational Technology in Tel Aviv, Israel; and Dr Moira Weigel of the Harvard Society of Fellows, USA. (nk)

SILBERSALZ¹⁹
SCIENCE & MEDIA FESTIVAL

CALL FOR PROJECTS

Partnerships between media and research can be initiated directly as part of the SILBERSALZ festival. Applications for the SILBERSALZ Science & Media Pitch are open until 15 April. 15 projects will be selected to be presented on the 23 June and will receive feedback from an international audience including media and industry experts.

The accompanying public festival begins on 20 June and will feature SciArt installations, a youth programme and film screenings across Halle.

■ PROGRAMME, APPLICATION, CONTACT

ACCREDITATION TO THE SILBERSALZ CONFERENCE

The two-day SILBERSALZ Conference is a closed format consisting of lectures, panel discussions, a science and media pitch as well as keynotes given by experts at the German National Academy of Sciences, the Leopoldina. This year, a hand-picked line-up of scientific minds, researchers and thinkers will guide an interdisciplinary audience through the surprises and controversies behind the theme "The Science of Love". Bringing together new influential approaches across neuroscience,

philosophy, evolutionary biology, sociology, history, psychology as well as narrative media and technology to unlock the secrets of love, the conference explores how scientists and storytellers can collaborate to create science programming that fascinates global audiences.

By embedding debates and case studies within larger discussions of bioethics, epistemological limits, sexism and anthropocentrism in science, dividing lines between the

sciences and the humanities, as well as the market forces shaping knowledge production, the SILBERSALZ Conference sheds light on underlying challenges that scientists and science communicators must tackle together.

A contingent for free participation is reserved for members of the Leopoldina and associated scientists. If you are interested, please send an e-mail to presse@leopoldina.org until 18 April 2019. After that, you will receive an information regarding the accreditation.

Forum Future Europe looks to the future of research

Improving communication of science-based advice / Strengthening support for individuals



President of the Leopoldina Jörg Hacker opens the second day of Forum Future Europe at the Leibniz Association headquarters in Berlin.

Image: Leopoldina | Markus Scholz

VOICES FROM THE FORUM



Prof. Dr. Tarmo Soomere, President of the Estonian Academy of Sciences: “The proportion of research that is privately financed in Europe is 50 percent on average,

while in Eastern Europe it is 10 percent or less. This has to change. We need more privately financed research and development. With ‘Horizon Europe’, it is clear to me that a chain is only as strong as its weakest link. We therefore need a combination of top-class research infrastructure, a decent, family-friendly work ecosystem and the use of native language(s). If we want Europe to be globally competitive, we need to bring infrastructure and professional environments, at the very least, to a comparable level across the whole of the EU.”

Dr. Jana Kolar, Executive Director of the Central European Research Infrastructure Consortium CERIC-ERIC: “I am convinced that we need more of



Europe in research and innovation. To put it simply, we need a more comprehensive EU programme and a functional European Research Area. The idea behind “Horizon Europe” is good, but there are still improvements to be made. I expect a respectable budget that will both enable societal challenges to be dealt with and ensure the promotion of research excellence along with the growth of innovative companies. I hope that the core ideas of the High Level Group of Innovators supporting development of the European Innovation Council are being upheld in the current negotiations in Brussels. In addition, it will be extremely important to create synergies in the combined use of EU structural, investment and research funds.”

What measures are necessary in education, research and innovation for the future of the European Union (EU)? How can the inclusivity and performance of the European Research Area be increased? How can Europe retain its position as a global leader in this field? What is expected of the next EU Framework Programme for Research, “Horizon Europe”?

Scientists and key stakeholders from academic systems in the new EU member states (EU13: Bulgaria, Estonia, Croatia, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia, the Czech Republic, Hungary and Cyprus) discussed all these questions and more at the Forum Future Europe in Berlin on 21 and 22 February. The meeting was held at the invitation of the Leopoldina and the Leibniz Association. President of the Leopoldina Prof. Dr. Jörg Hacker ML and Prof. Dr. Donald B. Dingwell ML (Munich) chaired the proceedings.

In a joint communiqué on the results of the forum, the signatories argue that decisions on the future of the EU must be evidence-based. There is an intention and desire on the part of research bodies to supply and better communicate the science-based advice needed for policy makers and the general public. The commu-

niqué speaks out against a multi-speed Europe. The belief is that the strength of Europe depends instead on all member states intensifying their efforts based on a set of laws and obligations. It is necessary to safeguard the EU’s capacity to act and to ensure modern administration at the EU level.

Emphasis is also placed on the fact that excellence should be the guiding evaluation criterion with regard to development of the European Research Area. It should be scientists, not politicians, who have the final say on funding decisions. Furthermore, new networking tools should be used to specifically encourage the involvement of member states where research is not as strong.

“Horizon Europe” is meant to incorporate useful new measures to rapidly and effectively combat the enduring gulf between East and West, North and South, and to address brain drain. Funding tools for specific individuals are proposed as a way of encouraging brain gain and brain circulation within Europe. The communiqué also states that synergies between modern research infrastructure and science’s many different stakeholders should continue to receive systematic support. (1b)

■ KOMMUNIQUE FORUM FUTURE EUROPE

Protecting oceans from plastic debris and impact of climate change

Academies of science advise G20 Summit in Japan



Representatives from the academies of sciences of the G20 countries handed over their recommendations to the Japanese Prime Minister, Shinzō Abe, for later consultation at this year's G20 Summit.

Image: Official Website of the Prime Minister of Japan and His Cabinet

The recommendations for improving marine conservation were jointly drafted by the Leopoldina and the G20's academies of sciences under the leadership of the Science Council of Japan. The academies call on the G20 nations to introduce rapid and effective countermeasures to respond to the threats facing seas and oceans as a result of elevated carbon dioxide emissions, overfertilisation, toxins, plastic debris and overfishing. Furthermore, the G20 academies describe central elements of a future research agenda and recommend improving international scientific coordination.

At the Science20 Dialogue Forum in Tokyo, climate researcher Prof. Dr. Gerald Haug ML spoke in favour of developing the systems of national emissions trading and carbon taxes, which to date have been largely uncoordinated, to create a globally synchronised pricing system for CO₂ and other greenhouse gases, thus providing

incentives to reduce CO₂ emissions. Together with marine researcher and microbiologist Prof. Dr. Antje Boetius ML, Prof. Dr. Haug was involved in drafting the statement issued by the G20 academies of sciences on behalf of the Leopoldina.

The summit meeting of the heads of state and government of the 20 most important developed and newly industrialised countries will take place in Osaka, Japan, from 28 to 29 June. It is the third to involve scientists through the specially dedicated dialogue forum Science20.

The G20 summits began drawing on expert scientific advice in 2017 under Germany's Presidency. It was then that the G20 academies of sciences produced their recommendations for improved global health care provision under the leadership of the Leopoldina. (chw)

■ G20-STATEMENT 2019

Leopoldina's new publication concept

During the course of 2019, the Leopoldina's scientific journals, *Nova Acta* and *Acta historica* (NAL and AHL), will be completed by "NAL live". In this new publishing format, the intention is to update articles on a continuous basis, thus creating so-called living documents. The new Chief Editor is Prof. Dr. Diethard Tautz ML, Director of the Max Planck Institute for Evolutionary Biology.

"NAL live" will make its articles freely accessible online (open access), with all publications written in English. Authors will submit scientific articles with a focus on interdisciplinary topics that have a high degree of social relevance. The articles undergo a peer review process and are published under Creative Commons licences, and both the authors and other scientists can refine and develop them. The documents thus represent open scientific discussions. In undergoing constant updating, the texts will also offer a source of fundamental information on the respective issues for those working in politics and the media.

Diethard Tautz is taking up the office of Director *Ephemeridum*, as the Academy's Chief Editor of *Nova Acta* and *Acta Historica* Leopoldina is traditionally known. Working alongside him on "NAL live" are editors from all four of the Leopoldina's classes. (rg)

EASAC focuses on bioenergy

Over the past two years, EASAC, the association of the national academies of sciences of the EU member states, Norway and Switzerland, has increasingly sought to address the complex issue of bioenergy. As a result, this topic was the focus of two statements entitled "Multi-functionality and sustainability in the European Union's forests" (2017) and "Negative emission technologies: What role in meeting Paris Agreement targets?" (2018). Now, in their commentary on "Forest bioenergy, carbon capture and storage and carbon dioxide removal" published in February 2019, the European academies emphatically bring together the most important facts and arguments surrounding these technologies. (csd)

■ EASAC COMMENTARY ON BIOENERGY

G7 POLICY ADVICE 2019

For more than 10 years now, summit meetings between the G7 nations' heads of state and government have drawn on the expertise of the academies of sciences. This year, under the leadership of the Académie des Sciences, the G7 partner academies are drafting scientific advice on artificial intelligence, trust in science and citizen science in the Internet Age. The Leopoldina and other academies finalised their joint statements at a working meeting in Paris, France, at the end of March. The statements will be submitted to the French G7 Presidency at a science conference preceding the G7 summit.

People

Deceased members

■ **Sir Michael Francis Atiyah ML**
22.4.1929 - 11.1.2019 | Edinburgh, UK

Mathematics

Sir Michael Francis Atiyah was appointed Royal Society Research Professor at St Catherine's College, Oxford, in 1973. In 1990 he moved to Cambridge (UK), becoming director of the newly founded Isaac Newton Institute for Mathematical Sciences, where he remained until 1996. At the same time, he was appointed Master of Trinity College, a post in which he served until 1997. In his early research, Atiyah focused primarily on theoretical mathematics. He principally became well known for proving the Atiyah-Singer index theorem, which is deemed to be one of the most important mathematical theorems of the 20th century. Atiyah later conducted research on physics and increasingly advocated that mathematics and theoretical physics be brought closer together. For his work on the index theorem, he was awarded the Fields Medal in 1966 and the Abel Prize in 2004. In addition, Atiyah received a knighthood in 1983 and was appointed president of the Royal Society in 1990. He became a member of the Leopoldina in 1977..

■ **Winslow R. Briggs ML**
29.4.1928 - 11.2.2019 | Stanford, USA

Genetics/Molecular Biology and Cell Biology

Winslow R. Briggs was appointed a professor in the Department of Biology at Harvard University, Cambridge (USA) in 1967. He moved to Stanford (USA) in 1973, where he remained as both a professor at the Stanford University Department of Biological Sciences and as Director of the Department of Plant Biology at the Carnegie Institution of Washington (now Carnegie Institution for Science) until his retirement in 1993. Briggs made an international name for himself as a pioneer of plant genetics, setting new standards, particularly in research on phototropism – the changes observed in plant growth as the result of unilateral exposure to light. Together with his working group, he dis-

covered and identified the photoreceptor phototropin, which regulates the direction of plant growth through the absorption of blue light. He was presented with the Adolph E. Gude, Jr. Award by the American Society of Plant Biologists in 2007, followed by the International Prize for Biology from the Japan Society for the Promotion of Science in 2009. He became a member of the Leopoldina in 1986.

■ **Manfred Eigen ML**
9 May 1927 - 6 February 2019 | Göttingen, Germany
Biochemistry and Biophysics

In 1964, Manfred Eigen was appointed Director of the Department of Chemical Kinetics at Göttingen's Max Planck Institute (MPI) for Physical Chemistry which, upon his incitement, became the MPI for Biophysical Chemistry in 1971. He was head of the Department of Biochemical Kinetics here until his retirement in 1995. During the 1950s, he achieved a scientific breakthrough by developing the relaxation techniques – measurement methods that enable scientists to observe ultra-fast reactions. He was awarded the Nobel Prize for Chemistry in 1967 for his work in this field, which also helped to clarify key issues in biochemistry. Throughout his later scientific career, Eigen devoted more and more of his attention to biology. During the 1980s, his theories on the self-organisation of molecules and the origin of life provided foundations for the new research field of evolutionary biotechnology. In addition to the Nobel Prize, he was honoured with a number of other prestigious awards, including the Lifetime Achievement Award from the Institute of Human Virology in Baltimore (USA) in 2005 and the Paul Ehrlich and Ludwig Darmstaedter Prize in 1992. Eigen had been a member of the Leopoldina since 1964.

■ **Wolfgang Frühwald ML**
2 August 1935 - 18 January 2019 | Augsburg, Germany
Cultural Sciences

From 1974 until his retirement in 2003, Wolfgang Frühwald was Professor of Modern German Literature at the Ludwig Maximilian University of Munich. As a specialist in German studies, he prima-

rily explored German literature from the Romantic and Biedermeier periods. His work on Clemens Brentano and Adalbert Stifter earned him an excellent reputation far beyond Germany's borders. However, he also pursued a focus on modern German literature, for example studying authors who left Germany after 1933. Alongside his activities as a literary scholar, Frühwald likewise played an active role in science management. For instance, in his capacity as President of the German Research Foundation from 1992 to 1997, he instigated striking advances in international academic exchange, and from 1999 to 2007 was the first humanities scholar to hold the position of President of the Alexander von Humboldt Foundation. Frühwald received many honours for his achievements, such as the Alfred Krupp Science Prize in 2002 and the Grand Cross of the Order of Merit of the Federal Republic of Germany in 2010. He was elected a member of the Leopoldina in 2003.

■ **Jean Gayon ML**
15 June 1949 – 28 April 2018 | Paris, France
Epistemology

Jean Gayon was a professor at Université Paris 1 Panthéon-Sorbonne (France) from 2001 to 2016 and was appointed Director of the Institute for the History and Philosophy of Science and Technology there in 2010. Even as a young scientist, Gayon succeeded in bringing together the research disciplines of philosophy and biology. He explored ethical and social questions in the life sciences, as well as their political implications, and produced numerous studies on the history of biology. It was his historical-epistemological studies on evolutionary biology that earned him great fame. In his major work "Darwinism's Struggle for Survival – Heredity and the hypothesis of natural selection" (1998), he analysed the development of the theory of natural selection both pre and post Darwin, and produced a philosophical interpretation of Darwinism on which scientists around the globe still base their work today. He was awarded the Grammaticakis-Neumann Prize of Philosophy of Science by the French Académie des Sciences de Paris in 2002.

Gayon had been a member of the Leopoldina since 2002.

■ **Walter H. Munk ML**

19 October 1917 – 8 February 2019 | La Jolla, USA
Earth Sciences

Walter H. Munk was appointed Professor of Geophysics at the Scripps Institution of Oceanography at University of California, San Diego (USA) in 1954. There, he founded the Cecil H. and Ida M. Green Institute of Geophysics and Planetary Physics in 1960, which he led until 1982. During World War II, Munk developed a system for forecasting wave development on coastlines, which played a key role in planning the US army's amphibious landings. In the 1970s, he began research on ocean acoustic tomography, discovering a method for measuring long-term changes in ocean temperature. This work led to development of the Acoustic Thermometry of Ocean Climate project in 1991, which investigated whether the temperature changes caused by global warming can be determined using sound. Munk was awarded several prizes for his discoveries, including the National Medal of Science, which was presented to him in 1983. The oceanographer and earth scientist was elected to the Leopoldina in 1970.

■ **Erich Muscholl ML**

3 July 1926 – 17 January 2019 | Mainz, Germany
Neurosciences

Erich Muscholl was appointed Chair of Pharmacology and Toxicology in the Faculty of Medicine at Johannes Gutenberg University Mainz in 1973, and was head of the Department of Pharmacology until his retirement in 1991. He was particularly known for his fundamental research on neuropharmacology and above all, thanks to several major discoveries, increased knowledge on the sympathetic nervous system and its neurotransmitter, noradrenaline. The German Society for Experimental and Clinical Pharmacology and Toxicology (DGPT) made him an honorary member in 1996 for organising and implementing Mainz's Frühjahrstagung, or spring meeting, for many years. In 2010, he was presented with the O. Schmiedeberg Plaque – the DGPT's highest honour

– for his life's scientific work. In 2008, he was awarded the Order of Merit of Rhineland-Palatinate, the highest recognition granted by the federal state. Erich Muscholl was elected a member of the Leopoldina in 1983.

■ **Helmut Rössler ML**

22 March 1922 – 9 February 2019 | Bonn, Germany
Surgery, Orthopaedics, Anaesthesiology

Helmut Rössler was Director of the newly founded Clinic and Polyclinic for Orthopaedics at the University Hospital Bonn from 1960 to 1987. During this time, he developed the hospital in line with modern standards and established new departments that provided the capacity to treat orthopaedic disorders using both surgical and non-surgical methods. As a professor, Rössler was appointed Chair of Orthopaedics at the University Hospital Bonn in 1967, where he taught until 1987. He also occupied executive and advisory roles in many institutes and organisations outside the hospital. He was elected President of the Deutsche Gesellschaft für Orthopädie und Orthopädische Chirurgie (German Society of Orthopaedics and Orthopaedic Surgery) in 1971 after having already been Chair of the Nordwestdeutschen Orthopädenvereinigung (Northwest German Association of Orthopaedic Surgeons) from 1962 to 1963. Rössler was awarded the Officer's Cross of the Order of Merit of the Federal Republic of Germany in 1987. He had been a member of the Leopoldina since 1972.

■ **Wilhelm Thal ML**

30 June 1933 – 3 February 2019 | Colbitz, Germany
Gynaecology and Paediatrics

In 1974, Wilhelm Thal was appointed to the Second Chair of Paediatrics at the Medical Academy of Magdeburg as a professor. Thal became Professor of Paediatric Pulmonology in 1992 and in 1994 was made Director of the Clinic for Paediatric Pulmonology and Cardiology at the newly founded Paediatrics Centre of the Otto von Guericke University of Magdeburg. He worked as Executive Director of this centre from 1996 onwards. Thal was well-known both nationally and interna-

tionally, chiefly for his research and publications on paediatric bronchology. In his 1972 monograph entitled "Paediatric Bronchology", he presented a comprehensive overview of the specialist field for the first time. Subsequently, in 1973, Thal established the "Bronchopneumology" committee within the German Democratic Republic Society of Paediatrics, which developed into an internationally recognised association under his leadership. Amongst the awards he received for his clinical research activities were the gold Hufeland Medal in 1967 and the Arthur Schloßmann Prize from the German Democratic Republic Society of Paediatrics in 1974. He was elected to the Leopoldina in 1996.

■ **Ewald R. Weibel ML**

5 March 1929 – 19 February 2019 | Bern, Switzerland
Physiology and Pharmacology/Toxicology

From 1966 to 1994, Ewald R. Weibel was a Professor of Anatomy and Director of the Institute of Anatomy at the University of Bern (Switzerland), and in 1984/1985 he also served as Rector of the university. As a pulmonary specialist, Weibel's research goal was to understand the quantitative correlations between structure and function in the respiratory system. Here, he focused on developing and applying morphometric methods, which he used to conduct integrative studies on comparative physiology, particularly on the structural foundations of the oxygen pathway from the lungs to the mitochondria in muscle cells. Weibel occupied several science management positions, including as President of the Swiss Academy of Medical Sciences from 1997 to 2000. For his work, he was awarded the Swiss Confederation's Marcel Benoist Prize in 1974 and the Anders Retzius Gold Medal of the Swedish Society for Anthropology and Geography in 1987. Weibel became a member of the Leopoldina in 1989.



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