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Maintaining open access to genetic databases for research purposes

Publication of an ad hoc statement
from the Leopoldina



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The Leopoldina on Social Media



Editorial

Dear Members and Friends of the Leopoldina,

We are currently looking ahead with mixed feelings to the next few months. On the one hand, progress made in vaccinating against COVID-19 gives us cause for cautious optimism. On the other hand, it is clear that there is hardly any room for relaxation for the time being, not least due to the coronavirus variants in circulation. Scientists will continue to play a vital role in fighting the pandemic.

As the German National Academy of Sciences, the Leopoldina will maintain its efforts to support this important work. The seven ad hoc statements published to date – in which more than 90 researchers have been involved – have been perceived as important contributions to the debate on suitable measures to combat the pandemic. On page 6, you will find some thoughts on the role of science-based advice in times of crisis as well as comments on the challenges faced by the Leopoldina when publishing ad hoc statements. These statements need to provide guidance quickly while also imparting the latest reliable scientific information.

Thanks to its work surrounding the pandemic, the Leopoldina has improved its standing as an independent voice for science. Both the Academy's body of publications and the comments issued by its individual members are currently attracting considerable attention. It is encouraging to see politics and the media showing so much interest in scientific institutions and renowned scientists. At the same time, these developments mean that every single one of us needs to take even greater responsibility for what we say in public.

I would like to take this opportunity to thank everyone who contributes to and supports the Leopoldina's science-based policy advice work. I hope you find this issue an interesting and inspiring read.



Prof. (ETHZ) Dr. Gerald Haug, President of the Leopoldina

Image: David Ausserhofer

A handwritten signature in blue ink, which appears to read "Gerald Haug".

“It is always a good idea not to use only one vaccine”

Leopoldina International discussion series: Challenges in COVID-19 vaccination



The global demand for COVID-19 vaccines currently significantly exceeds supply.

Image: M.Rode-Foto / Adobe Stock

In early February, the Leopoldina held a virtual international panel discussion on the challenges presented by vaccination against COVID-19 in cooperation with its Indian partner academy, the Indian National Science Academy (INSA). More than 300 people from 50 countries watched the discussion, which was hosted by Leopoldina Vice President Regina T. Riphahn.

The panel all agreed that, alongside better treatment options, effective and safe vaccines against the novel coronavirus SARS-CoV-2 are the most promising way out of the COVID-19 pandemic. Florian von der Mülbe, Co-founder of biotech company

CureVac, explained how the rapid development of the successful novel mRNA vaccines could be attributed to the decades of research into the principles behind them. At CureVac, the biochemist and business economist is responsible for the technical development and manufacture of mRNA-based products and the establishment of the world's first good manufacturing practice (GMP) production system for mRNA.

Richard Hatchett emphasized the importance of defeating the virus worldwide to prevent it from mutating further and spreading again. This is why the Chief Executive Officer of the Coalition for Epidemic Preparedness Innovations (CEPI) called for an equitable global distribution of COVID-19 vaccines.

Heidi Larson, Director of the Vaccine Confidence Project at the London School of Hygiene & Tropical Medicine, stressed that greater public trust needs to be instilled in the vaccines to be able to reach the required level of immunity. In addition to informing the public, she particularly recommended building trust as a means of overcoming hesitancy toward the vaccine.

Another member of the panel was Gagandeep Kang, a fellow of INSA and Chair of the World Health Organization's South-East Asia Regional Immunization Technical Advisory Group, who shared her belief that it is important not to rely on mRNA vaccines alone. She explains the reasons for this in the interview on page 5.

Professor Kang, what types of vaccine against COVID-19 are available?

Gagandeep Kang: There are many vaccines in development and a few are already available. Vaccines concentrating on the spike protein of the virus have shown high efficacy, for example mRNA vaccines such as the ones of BioNtech/Pfizer or Moderna. There are also virus vector-based vaccines such as the one of AstraZeneca in which a virus acts as a Trojan horse which carries the spike protein information into cells. So we have multiple platforms that have been shown to work, which means that we are in a very good position already, and there are other vaccines about which we are likely to have results soon.

Are they all equally effective in preventing disease and transferring the virus?

Kang: The newly developed mRNA vaccines show initial results of more than 90% efficacy and can prevent severe and moderate disease. This is phenomenal. If the results hold, the vaccines will be very good at protecting individuals and populations from the disease and most likely from infection as well. The viral vector-based Oxford-AstraZeneca vaccine also shows good results.

In comparison, an oral vaccine such as the one against poliomyelitis has an efficacy of 50 to 60 percent.

Kang: The newly developed mRNA vaccines against COVID-19 are up there with the best performing vaccines we have, for example the measles or rubella vaccines. However, it is important to remember that the data we have right now is early data, and early after immunization is where you see the best protective efficacy. It is possible that when we study real-world effectiveness, protection may be a bit lower and we will also have to account for how vaccines will work against emerging new variants of the virus.

Do we need so many different vaccines, wouldn't one be enough?

Kang: From a country or a global perspective, it is always a good idea not to



Gagandeep Kang ...

... investigates the complex relationships between infection, gut function and physical and cognitive development. She is Professor of Microbiology at the Wellcome Trust Research Laboratory (Christian Medical College in Vellore/India) and has chaired the World Health Organization's South-East Asia Regional Immunization Technical Advisory Group since 2015. Kang, a fellow of the INSA, also seeks to build a stronger human immunology research in India.

Image: Christian Medical College, Vellore/India

use only one vaccine because not all vaccines will work in exactly the same way or have the same characteristics when it comes to ease of use. There is also the question of security of supply. That's why it is always important to have alternatives and a buffer, to have definitely more than one.

Which significance do the different characteristics of the vaccines have?

Kang: Limiting factors such as high costs or logistical concerns only apply to some types of vaccines and can be avoided by using others. In case of BioNtech/Pfizer's and Moderna's products, the vaccines are much more expensive than any vaccine we have ever had in vaccination programs in India. In addition there is the aspect of cold storage for mRNA vaccines. The BioNtech/Pfizer vaccine which requires -70 degrees for long-term storage may not be suitable for the Indian program. In the Indian context, Moderna's vaccine might be rolled out easier as it has to be stored at -20 de-

grees, something we have done before for the polio vaccine.

We might want to preferentially use some vaccines directed at circulating variants in some parts of the world, so vaccines that can be rapidly changed would be helpful. Having different types of vaccine might also be beneficial with regard to tailoring the vaccines to different recipient groups. For example, we might use one vaccine in the elderly, another in the young and healthy, and yet another in pregnant women who might safely be given inactivated vaccines but cannot be given vaccines that have live virus in them.

What are major messages to be drawn from the development of SARS-CoV-2 vaccines for future epidemics?

Kang: The timeframe for the vaccine development has been incredible. It is like we have taken 10 years of vaccinology and squashed them into 10 months. I think this is hugely promising not just for the SARS-CoV-2 virus but for the field of vaccinology in general. We now have so much more understanding of what we can do with vaccines and vaccination than we had at the beginning of last year. This is great, not just for this but also for future outbreaks, epidemics and pandemics.

However, there are currently also concerns about the new variants that are appearing.

Kang: We know vaccines work well, and we have a deeper understanding of the immune response than we did before, so staying ahead of a changing virus by quickly adapting new vaccines is potentially feasible. With all of the global collaboration of the past year, we know how quickly we can respond and we can do it well.

■ THE INTERVIEW WAS CONDUCTED
BY RUTH NARMANN AND
CHRISTIAN WEIDLICH

▶ Virtual Panel Discussion
"Challenges in COVID-19
Vaccination"
▶ Topic in focus "Pandemics"

Science-based advice for society and policymakers in times of crisis

Science-based policy advice strives for interdisciplinarity, independence and transparency

The COVID-19 pandemic has prompted a call for data and findings, possible courses of action and recommendations from reliable sources to help handle the crisis. This is where science needs to make its contribution – also through science-based policy advice. In a nutshell, science-based policy advice joins scientific knowledge and facts from various disciplines and brings them into a social context. In doing so, it always shares the latest research findings on the topic in question and uses these findings to recommend courses of action.

The discussion on the various aspects and specifics of this process is still ongoing. This is because policymakers and society expect unambiguous findings which legitimize political decisions.

Interdisciplinarity

Science is composed of a range of disciplines and research fields. When facing complex challenges, interdisciplinarity provides access to various topics, contributes a wide array of findings and perspectives, and presents them in relation to one another. This is exactly what happens when scientists draft statements as part of the policy advice work conducted by the Leopoldina. The resulting consensus is a better reflection of the complex reality than a statement produced by an individual voice ever could be.

Independence

Science-based policy advice is completely different from interest-driven lobbying. Independent policy advice is guided by the latest research and is not motivated by a desire for economic gain or political power. It presents possible courses of action or recommendations without inducing a binding decision on which political measures should be introduced. Making such decisions is the



Image: Christoph Rieken | Leopoldina

responsibility of the democratically legitimized legislature or executive.

Transparency

With regard to science-based policy advice, it is crucial to consistently mention that research results can be fraught with uncertainties. At the same time, scientific controversies play an essential role in generating knowledge, and discussing disagreements is crucial for scientific quality.

However, in times of crisis like the COVID-19 pandemic, it is particularly important to remember that some facts or findings are only provisional or can be interpreted differently. To avoid creating false expectations, it is the task of scientists to explain and clarify these limitations in knowledge.

Science-based policy advice is increasingly becoming a matter of speed. Traditional statements from the Leopoldina include detailed discussions and explanations of the scientific background to the matters being presented. They are backed up by sources and are evaluated by experts before finally being approved. This process can take many months or even several years. In contrast to this, ad hoc statements are often prepared in a matter of weeks – or even more quickly in exceptional cases. They are much shorter and do not include long lists of references. In 2020, the COVID-19 pandemic resulted in seven instances of the

Leopoldina convening scientists at short notice into ad hoc working groups.

Drafting ad hoc statements is a challenging task. They, too, must provide scientific information as precisely as possible while formulating clear possible courses of action and effectively supporting policymakers in their decision-making. This means they need to be written in a language which is also comprehensible to non-experts.

Ad hoc statements from the Leopoldina therefore cannot take the form of highly complex scientific publications of the type found in specialist journals. Instead, they must be written in a way which is accessible for both political decision-makers and the wider public. They set out possible courses of action and recommendations which are underpinned by the research-based evidence available at the time and the way in which this has been unanimously interpreted by the authors. In essence, they are consensus papers.

Conflicting goals

Given the increased media attention that science-based policy advice is currently receiving as a result of the COVID-19 pandemic, the conflict between time pressure and the need to consult in-depth sources is more apparent than ever before. Equally, the scientific discussion between the various disciplines involved and between the consensus and individual voices has moved much further into the limelight. Every scientist is, of course, free to express their own personal opinion. By bringing together the expertise of outstanding scientists from a wide range of scientific disciplines, it is possible to gain a more comprehensive view of our present challenges. ■ RED



Ad hoc statements on the COVID-19 pandemic

Increasing knowledge transfer between science, politics and administration

Leopoldina Vice President Regina T. Riphahn on the “Initiative for Evidence-Based Policymaking”

Since 2018, the Leopoldina’s Evidence Initiative has provided a platform for dialogue and networking in cooperation with and for those involved and interested in politics and science. The initiative was introduced to support evidence-based politics and focuses on the use of empirical data in political decisions.

BY REGINA T. RIPHAHN ML*

The Evidence Initiative of the German National Academy of Sciences Leopoldina has been promoting discussions between science and politics in various ways for several years. Our objective is to increase the use of evidence in the work of the executive and legislature. The initiative organizes a variety of activities in pursuit of this goal.

A recent example was the “International Perspectives on Evidence-Based Policy Making” online workshop held on 18 February. During this session, Maria Kaisa Aula, State Secretary in the Finnish Ministry of Finance, and Stéphane Jacobzone, Senior Advisor at the OECD Directorate for Public Governance, discussed best practice examples from evidence-based government activities alongside other international guests and representatives from German federal authorities. The discussion focused primarily on factors that could be used to encourage the use of “more evidence” in political decision-making processes as well as obstacles to this evidence-based approach.

The initiative concentrates on the “demand side” of scientific policy advice by examining the needs of members of parliament and public administrators. To support its work, a survey of members of the German parliament is being conducted in the first quarter of this year to gather systematic information

“Our objective is to increase the use of evidence in the work of the executive and legislature.”

Regina T. Riphahn
Vice President of the Leopoldina



Image: Markus Scholz | Leopoldina

on how they use scientific evidence in their work.

The use of evidence is successful if it leads to improved political measures. This means that in addition to being generated, scientific evidence must subsequently be distributed and used effectively in policy advice. Often, however, knowledge is not transferred efficiently enough from researchers to policymakers and public administrators, which would ensure that scientific findings could be used in decision-making processes in an appropriate form and at the right time. If, on top of this, the impact of political measures is not adequately reviewed, political objectives may not be met, resources may be used inaccurately or other unintended side effects may arise.

In politics and administration, there are several promising strategies in place for improving the use of scientific findings. Important steps have already been taken to ensure that existing and planned political measures are reviewed for efficiency and adapted where necessary. The Evidence Initiative supports these developments and organizes events and discussions with public administrators to encourage the inclusion

of methodologically sound evaluations as an inherent part of the political decision-making process.

* Regina T. Riphahn is a representative of the Evidence Initiative. The economist holds the Chair of Empirical Economics at Friedrich-Alexander-University of Erlangen-Nuremberg/Germany

▶ Evidence-based policymaking (in German)

SURVEY OF THE GERMAN PARLIAMENT

As part of its initiative for evidence-based policymaking, the German National Academy of Sciences Leopoldina is conducting a survey of members of the Bundestag, the German federal parliament. The survey will obtain systematic information on the use of scientific evidence in debates within the German parliament. The aim is for the results to close a gap in research into how scientific findings are understood and handled in parliamentary work. The project is being undertaken by the Cologne/Germany-based ISG Institute for Social Research.

Can the German innovation system emerge even stronger from the COVID-19 pandemic?

The Research Summit has been bringing business, science, civil society and politics together since 2015

Finding a potential way to contain the spread of the coronavirus in the midst of the pandemic has only been possible thanks to the unexpectedly rapid development of vaccines. Fundamental research with long-term funding, corporate initiatives and risky investments – this combination of factors is giving us cause to hope for a return to normal everyday life in the not too distant future.

Can these factors and other less effective measures implemented to curb the spread of the virus teach us anything about what form the German and European innovation system should take in the future? This was the topic discussed at the 2020 Research Summit on 17 November under the title “Beyond stimulus packages – what decisions need to be made after COVID-19 to create a sustainable, resilient and agile innovation system?”

Since 2015, the annual Research Summit has been bringing together leading figures from business, research institutions, professional associations and politics to discuss pressing questions surrounding research and innovation policy. Organized by Stifterverband (Donors’ Association for the Promotion of Humanities and Sciences in Germany), the German National Academy of Sciences Leopoldina, the Commission of Experts for Research and Innovation (EFI) and the Volkswagen Foundation, the Research Summit is usually held in Berlin/Germany as a full-day in-person event with almost 400 participants. Owing to the COVID-19 pandemic, it could not take place in its usual format last year. Instead, the 2020 Research Summit was held as a virtual round table with 32 experts.

At first glance, it would seem that the German innovation system adapted itself quickly and flexibly to the pandemic



The Research Summit brings together leading figures from business, science, civil society and politics – as seen here at the 2019 event on artificial intelligence. As in 2020, the 2021 roundtable discussion will take place virtually.

Image: David Ausserhofer | Leopoldina

overall. According to surveys conducted by Stifterverband, research and development expenditure did not significantly decrease in 2020. Nevertheless, the pandemic has brought weaknesses more clearly to light. These must be resolved in the coming years to prevent Germany and the rest of Europe from falling behind globally.

2021 RESEARCH SUMMIT

Due to take place just a few months before the German parliamentary elections, the 2021 Research Summit will examine possible courses of action for improving innovation policy during the upcoming legislature period. One of the key questions will examine how business, science and politics should work together to achieve the transformations required to meet the objectives of the European Union’s Green Deal. High-profile experts will discuss this topic at a hybrid event on 19 May 2021.

In their results report, the initiators of the Research Summit summarized the discussions into five important general objectives for current innovation policy:

- Strengthen Europe’s technological sovereignty
- Intensify global cooperation in the area of sustainable innovation
- Increase the impact of science on society through research freedom, the use of science in the public interest and independent advice
- Ensure optimal performance as a product of the transfer of scientific knowledge to business and society
- Collect and use more data for research, the protection of health and crisis management

These areas of action have opened up more questions, which will be discussed at the 2021 Research Summit. ■ ART

Results of the 2020 Research Summit (in German)

Access to digital sequence information

Ad hoc statement of the Leopoldina on the importance of open science



Among other uses, DSI databases are a key tool for biodiversity conservation because changes in ecosystems can be tracked with their assistance.

Image: ymgerman | AdobeStock

Digital sequence information (DSI) forms the backbone of many areas within the life sciences. The genetic information (DNA sequence) of many organisms can be quickly deciphered using modern high-throughput methods. The data obtained during this process is then made available to researchers worldwide in DSI databases. Scientific progress has come to depend on free access to this information. However, these databases have now become the focus of international discussions, and access to them could be restricted in the future.

The background is that the use of DSI is contributing more and more to the global economy. However, the economic benefits generated are often distributed inequitably around the world. Countries with a particularly high level of biological diversity are less likely to benefit from this form of value creation, which mostly occurs in places other than the of the genetic resources' countries of origin. With this in mind, one of the main objectives of the 1993 Convention on Biological Diversity is to establish a means of benefit sharing. A framework was laid down for this in the Nagoya Protocol (2010). Little progress has been made since then, which is why raising money through the

scientific use of DSI is now up for discussion.

In an ad hoc statement, the Leopoldina describes the importance of open science to global sustainable development and the conservation of biological diversity. The statement also outlines how restricting access to digital sequence information could impact active substance research like antibiotics development. To enable free research worldwide, DSI databases must continue to be openly accessible, states the Leopoldina. The coronavirus pandemic has shown that the exchange of sequence information, in this case of novel pathogens, contributes significantly to scientific progress. „The value of DSI arises mainly from the ability to compare various data with each other. Restricting access is contrary to species conservation goals and the principle of Open Science,“ says ad hoc statement co-author Rudolf Amann ML of the Max Planck Institute for Marine Microbiology in Bremen/Germany. ■ HST

Ad hoc statement
“Maintaining open access
to Digital Sequence
Information”

Friends of the Academy

Election of new chair of the Executive Board

Jutta Schnitzer-Ungefug has been elected as the new chair of the Executive Board of the Friends of the Leopoldina Academy. The former Secretary-General of the Leopoldina has succeeded Horst Dietz, who will continue to serve as a member of the Executive Board. Dietz and Schnitzer-Ungefug are both founding members of the association.

At the election in January, the two vice chairs, Dietrich Kloevekorn-Norgall (also treasurer) and Santer zur Horst-Meyer (also secretary), were re-elected for another term. The Executive Board has also welcomed two new members: Franziska Hornig, Secretary-General of the Leopoldina since September 2020, and biotechnologist Reinhard Renneberg. ■ JK



[Friends of the Leopoldina Academy \(in German\)](#)

Wissenschaft im Dialog

Günter M. Ziegler succeeds Antje Boetius

Günter M. Ziegler ML took over as chair of the steering committee of Wissenschaft im Dialog (Science in Dialogue, WiD) at the start of 2021. The mathematician and president of Freie Universität Berlin assumed the office from Antje Boetius ML. Deep-sea researcher and Director of the Alfred Wegener Institute in Bremerhaven/Germany, Boetius had been at the helm of the organisation for science communication since 2015. On taking up the position, Ziegler highlighted that “communicating findings and answers in a clear and transparent manner” is important for science. ■ RED



[Wissenschaft im Dialog](#)

Increasing research into life course and ageing

Authors present new Report on Tomorrow's Science

The Report on Tomorrow's Science "Research for longer lives: the future of ageing and life course research in Germany" was presented at an online event at the end of 2020. During the presentation, the authors of the report emphasized the need for more funding to support research into ageing and life course. Ursula Staudinger ML (TU Dresden/Germany) reminded attendees that while average life expectancy had increased by 40 years over the last 150 years, fertility had decreased over the same period. She said that this demographic shift was one of the key challenges of the 21st century.

Gerd Kempermann (German Center for Neurodegenerative Diseases, Dresden/Germany) stressed the need for ageing and life course research to play a much stronger role in biomedical science. He explained that although geriatric medicine was still a specialist field, demographic change was causing it to become part of general medicine. Alexia Fürnkranz-Prskawetz ML (TU Vienna/Austria) spoke of the importance of researching the biological and psychological processes of ageing in combination with socio-economic structures and cultural values from the perspective of social and life sciences. Josef Ehmer (University of Vienna/Austria) said that we needed to change our perceptions of ageing, adding that little humanities and cultural research was being conducted in this field. Finally, Johannes Siegrist (Heine University Düsseldorf/Germany) described how research into ageing and life course requires many disciplines to work together, but that this is currently far from being the case in Germany. ■ CBR

▶ Report on Tomorrow's Science: "Research for longer lives"

New rules for reproductive medicine in Germany

The Embryo Protection Act is turning 30 years old



Reproductive medicine has come a long way since the Embryo Protection Act entered into force on 1 January 1991. *Image: Dmytro Sukharevsky | Fotolia*

The Embryo Protection Act entered into force in Germany on 1 January 1991. To mark its 30th anniversary, the Leopoldina and the Konrad-Adenauer-Stiftung are organizing a virtual discussion on 22 April titled 30 Years of the Embryo Protection Act. The topics discussed will include medical progress and social change since the act was introduced as well as the need for new political measures.

A good 30 years ago, lawmakers were faced with a complex situation. In vitro fertilization had opened up new treatment options to many childless couples. At the same time, it had become possible to gain access to human embryos outside of the womb. Regulations needed to be written for this new field, which had, of course, opened up a series of scientific and medical questions and was highly controversial from an ethical point of view. This resulted in the adoption of the Embryo Protection Act (ESchG) in 1990, which allowed reproductive medicine to be practiced to a limited extent in Germany, but completely prohibited research on embryos.

This all happened a long time ago,

but is just as topical today because the act still serves as the regulatory framework for reproductive medicine. Egg cell donation is still banned under the act, for example, but discussions as to whether this should now be permitted in Germany as it is in many other European countries have been ongoing for years.

"After more than 30 years of scientific, medical and social developments, it is high time that lawmakers reformed reproductive medicine in Germany. In fact, you could even say that such a change is overdue," said Jochen Taupitz ML, speaker of the Leopoldina and the Union of German Academies joint working group, which published a statement on reproductive medicine in 2019. Claudia Wiesemann, another member of the working group, added: "Far from being a niche topic, reproductive medicine is a social issue of fundamental importance and needs to be discussed widely across both a societal and political spectrum." ■ SW

▶ Virtual discussion (in German) "30 Jahre Embryonenschutzgesetz"

The Leopoldina supports scientific and technological cooperation with China

Bilateral scientific cooperation between Germany and other countries is based on agreements on scientific and technological cooperation (STC). Regular meetings are held to evaluate the implementation of these agreements.

The Leopoldina joined the German Federal Ministry of Education and Research (BMBF) and the Chinese Ministry of Science and Technology (MOST) at the STC meeting held with China on 27 January. As clearly reflected in China's five-year plan for 2021 to 2025, China – like Germany – places great value on science and technology. Both countries share the view that global challenges can only be overcome together. Their joint work focuses on climate and marine research, climate protection technology and green cities. With regard to the ongoing pandemic, their belief in cooperation in the



Green cities are one of the areas of scientific cooperation between Germany and China.

Image: tostopphoto | Adobe Stock

life sciences is more relevant than ever before.

Both sides agree that appropriate conditions – such as the open exchange of information or a common viewpoint on ethical questions – are needed for

successful scientific collaboration. Additionally, repeated reference was made to the Beijing Declaration on Basic Science, which the Leopoldina and the Chinese Academy of Sciences (CAS) adopted as part of their Science for Future initiative in 2019 and presented together during the STC meeting.

The Leopoldina and CAS use their Science for Future public conference series to emphasize the importance of fundamental research and early-career researchers. They also work together to provide advice for the summit meetings between the heads of state and government of the G20 nations as part of Science20. ■ RN



Scientific and technological cooperation with China

Resilience strategy for a stable future power supply

The digitalization of the energy system is a necessary step in driving forward the energy transition and ensuring that Germany has a secure future power supply. Despite the huge potential it holds, upgrading the existing system could also increase the risk of power outages, for instance as a result of technical defects or cyber attacks. This is why experts recommend developing a resilience strategy so that unexpected disruptions to the power supply can be responded to quickly and the energy system remains up and running.

In the science academies' joint statement "Resilienz digitalisierter Energiesysteme. Wie können Blackout-Risiken begrenzt werden?", the experts outline 15 measures which could be used to create a reliable and secure energy sup-

ply. The possible courses of action were drawn up as part of the Energy Systems of the Future (ESYS) project initiated by acatech – German National Academy of Science and Engineering, the German National Academy of Sciences Leopoldina and the Union of the German Academies of Sciences and Humanities. They include technical, regulatory and security-related measures. The statement also presents suggestions for education campaigns, economic incentives and monitoring activities involving all the relevant key players.

The publication of the English translation of the statement ("Resilience of digitalized energy systems – how can the risks of power outages be limited?") is scheduled for March 2021. ■ VB

SAPEA

Report on biodegradable plastics

SAPEA, the consortium of European Academy Networks, has published a report on the biodegradability of plastics in the open environment. The report concludes that biodegradable plastics could play a role in reducing the accumulation of plastics in the environment – but only in specific applications. For other applications, including most single-use packaging and plastic bags, it would be better to reduce the amount of plastic we use, to recycle it or to use compostable plastics. In cases of the latter, biodegradability depends on both the material a plastic is made of as well as the conditions of the environment where it is disposed. ■ NH



Biodegradability of plastics

Remembering Nobel Prize winner and Leopoldina honorary member Paul J. Crutzen

Crutzen became a member of the Leopoldina in 1992 and was an honorary member since 2014



Paul J. Crutzen, Nobel Laureate in chemistry and honorary member of the Leopoldina, passed away in January.

Images: Max Planck Institute for Chemistry | Carsten Costard and Rolf Hofmann, Archives of the Max Planck Society Berlin-Dahlem/Germany | Wolfgang Filser

The German National Academy of Sciences Leopoldina mourns the loss of honorary member Paul J. Crutzen. Crutzen died on 28 January 2021 at the age of 87. Considered one of the pioneers of ozone depletion research, the Dutch meteorologist was awarded the Nobel Prize in Chemistry in 1995 for his work. Crutzen is also known for his proposal to refer to the current geological epoch as “the Anthropocene”. Crutzen was elected as a member of the Leopoldina in 1992, and was subsequently named an honorary member of the Academy in 2014.

Meteorologist Paul J. Crutzen dedicated his research to the natural and human-effected decomposition of the ozone’s photochemistry, for which he, Mario Molina

and Sherwood Rowland all received the Nobel Prize in Chemistry in 1995. The committee thus also acknowledged their warning of a global environmental concern. The findings of Crutzen and his team contributed significantly to the development of policies for combatting the accelerating growth of the ozone hole, which, for instance, were integrated in the 1987 Montreal Protocol – an international treaty for the protection of the ozone layer. In 2000, Crutzen proposed the term “Anthropocene” to refer to the current geological epoch. He stated that since the beginning of industrialization, humans have had the greatest impact on biological, geological and atmospheric processes.

Paul J. Crutzen earned his doctorate in meteorology from Stockholm Univer-

sity/Sweden in 1968 and completed his postdoctoral qualification (habilitation) there in the same subject five years later. Following research periods in the USA, he was appointed Director of the Atmospheric Chemistry Division of the Max Planck Institute for Chemistry in Mainz/Germany in 1980. He held professorships at the University of Chicago/USA, the University of California, San Diego/USA and Utrecht University/Netherlands.

Paul J. Crutzen has been honored with numerous prizes for science and honorary academic titles. He was also awarded the Order of Merit of the Federal Republic of Germany. An asteroid was named after him in 2000. Paul J. Crutzen was an honorary member of the German National Academy of Sciences Leopoldina since 2014.

■ RED

People

Awards and Honors

■ **Jutta Allmendinger** ML, member of the Economics and Empirical Social Sciences Section, was appointed member of the Pontifical Academy of Social Sciences/Vatican City.

■ **Ralf Bartenschlager** ML, member of the Microbiology and Immunology Section, was honored with the Beijerinck Virology Prize by the Royal Netherlands Academy of Arts and Sciences (Amsterdam/Netherlands).

■ **Patrick Cramer** ML, member of the Biochemistry and Biophysics Section, was honored with the Louis-Jeantet Prize for Medicine by the Louis-Jeantet Foundation (Geneva/Switzerland) and the Science Prize by the Hector Stiftung (Weinheim/Germany).

■ **Ottmar Edenhofer** ML, member of the Economics and Empirical Social Sciences Section, was appointed as a counsellor to the Vatican's Dicastery for Promoting Integral Human Development.

■ **Bernd Fitzenberger** ML, member of the Economics and Empirical Social Sciences Section, was honored with the German Prize for Economics by the Joachim Herz Foundation (Hamburg/Germany).

■ **Katharina Kohse-Höinghaus** ML, member of the Chemistry Section, was honored with the 2020 Walther Nernst Denkmünze medal by the Deutsche Bunsen-Gesellschaft für physikalische Chemie (German Bunsen Society for Physical Chemistry, DBG) (Frankfurt am Main/Germany) and the 2020 Heilbronner-Hückel Lecture Series presented by the Swiss Chemical Society (SCS, Bern/Switzerland). She was also named a Distinguished Scientist by the Chinese Academy of Sciences (CAS, Beijing/China).

■ **Heyo K. Kroemer** ML, member of the Physiology and Pharmacology/Toxicology Section, was elected member of acatech – National Academy of Science and Engineering (Munich/Germany).

■ **Stuart S. P. Parkin** ML, member of the Physics Section, was honored with the King Faisal Prize by the King Faisal Foundation (Riyadh/Saudi Arabia).

■ **Dagmar Schäfer** ML, member of the History of Science

and Medicine Section, was elected member of acatech – National Academy of Science and Engineering (Munich/Germany).

■ **Chris-Carolin Schön** ML, member of the Agricultural and Nutritional Sciences Section, was elected member of acatech – National Academy of Science and Engineering (Munich/Germany).

■ **Dirk Trauner** ML, member of the Chemistry Section, was honored with the Arthur C. Cope Scholar Award by the American Chemical Society (ACS, Washington, D.C./USA).

■ **Wolfgang Wick** ML, member of the Neurosciences Section, was appointed to the German Science Council by the Federal President.

Deceased members

■ **Friedrich Bonhoeffer** ML | 10 August 1932 to 29 January 2021 | Tübingen/Germany | Genetics/Molecular Biology and Cell Biology Section

■ **Martyn M. Caldwell** ML | 28 June 1941 to 24 January 2021 | Washington, D.C./USA | Organismic and Evolutionary Biology Section

■ **Paul J. Crutzen** ML | 3 December 1933 to 28 January 2021 | Mainz/Germany | Earth Sciences Section

■ **Gernot I.W. Duncker** ML | 10 December 1953 to 5 February 2021 | Halle (Saale)/Germany | Ophthalmology, Oto-Rhino-Laryngology and Stomatology Section

■ **Wolfgang Gerok** ML | 27 March 1926 to 16 January 2021 | Freiburg im Breisgau/Germany | Internal Medicine and Dermatology Section

■ **Klaus Hafner** ML | 10 December 1927 to 25 January 2021 | Darmstadt/Germany | Chemistry Section

■ **Lothar Jäger** ML | 13 February 1934 to 4 July 2020 | Jena/Germany | Internal Medicine and Dermatology Section

■ **Olli Lehto** ML | 30 May 1925 to 31 December 2020 | Helsinki/Finland | Mathematics Section

■ **François Mathey** ML | 4 November 1941 to 8 December 2020 | Paris/France | Chemistry Section

■ **Manfred Regitz** ML | 20 August 1935 to 19 January 2021 | Kaiserslautern/Germany | Chemistry Section

■ **Eduard Seidler** ML | 20 April 1929 to 7 December 2020 | Freiburg im Breisgau/Germany | History of Science and Medicine Section

■ **Niels Sönnichsen** ML | 22 December 1930 to 27 January 2021 | Berlin/Germany | Internal Medicine and Dermatology Section

■ **Aleksandr S. Spirin** ML | 4 September 1931 to 30 December 2020 | Pushchino/Russia | Biochemistry and Biophysics Section

■ **Wolfram Sterry** ML | 5 March 1949 to 19 September 2020 | Munich/Germany | Internal Medicine and Dermatology Section

■ **Jens Taubenheim** ML | 19 June 1929 to 22 January 2021 | Berlin/Germany | Earth Sciences Section

■ **Ekkehart Tillmanns** ML | 29 January 1941 bis 30 December 2020 | Vienna/Austria | Earth Sciences Section

New class IV members

■ **Cristina Bicchieri** ML, Philadelphia/USA, University of Pennsylvania, Center for Social Norms and Behavioral Dynamics (Epistemology Section)

■ **Christina Brandt** ML, Jena/Germany, Friedrich Schiller University Jena, Ernst Haeckel House (History of Science and Medicine Section)

■ **Alena Buyx** ML, Munich/Germany, Technical University of Munich, Institute of History and Ethics in Medicine (Epistemology Section)

■ **Usha Goswami** ML, Cambridge/UK, University of Cambridge, Department of Psychology (Psychology and Cognitive Sciences Section)

■ **Carola Lentz** ML, Mainz/Germany, Johannes Gutenberg University Mainz, Anthropology and African Studies (Cultural Sciences Section)

■ **Thomas Müller** ML, Konstanz/Germany, University of Konstanz, Department of Philosophy (Epistemology Section)

■ **Armin Nassehi** ML, Munich/Germany, LMU Munich, Department of Sociology (Cultural Sciences Section)

■ **Christoph M. Schmidt** ML, Essen/Germany, RWI – Leibniz Institute for Economic Research (Economics and Empirical Social Sciences Section)

Leopoldina Fellowship Programme – New fellows

■ **Dr. Jonathan Daume**, Department of Neurophysiology and Pathophysiology at the University Medical Hospital Hamburg-Eppendorf (UKE), will join Prof. Dr. Ueli Rutishauser's working group at the Center for Neural Science and Medicine at the Cedars-Sinai Medical Center in Los Angeles/USA to work on his research project.

■ **Dr. Jürgen Eser**, Institute for Theoretical Physics at Goethe University Frankfurt/Germany, will work at the Institute for Theoretical Physics at Paris-Saclay University in Saint-Aubin/France for 24 months under the leadership of Prof. Dr. Jean-Paul Blaizot.

■ **Dr. Annalena Genreith-Schriever**, Institute of Physical Chemistry at RWTH Aachen University, will join Prof. Dr. Clare Grey at the Department of Chemistry, University of Cambridge/UK, for 24 months.

■ **Dr. Cornelius Gropp**, most recently employed at the Laboratory of Organic Chemistry (LOC) at the Swiss Federal Institute of Technology Zurich/Switzerland, will spend 18 months conducting research under Prof. Dr. Omar M. Yaghi at the Department of Chemistry at the University of California, Berkeley/USA.

■ **Dr. Theresa Groß-Thebing**, Institute of Anatomy and Molecular Neurobiology at the University of Münster/Germany, will carry out her project for 24 months under Prof. Dr. Azim Surani at the Gurdon Institute at the University of Cambridge/UK.

■ **Dr. Nicholas Günsken**, Nano-Institute at the LMU Munich/Germany, will join Prof. Dr. Mark Bongersma's working group in the Department of Materials Science and Engineering at Stanford University in Stanford/USA for 24 months.

■ **Dr. Richard Höfer**, Institute for Applied Mathematics at the University of Bonn/Germany, will carry out his project for 24 months at the Institute of Mathematics of Jussieu at the Université de Paris/France with the support of Prof. Dr. Laurent Desvillettes and Prof. Dr. David Gérard-Varet.

■ **Dr. Darshan Joshi**, Max Planck Institute for Solid State Research in Stuttgart/Germany, will spend 24 months in Prof. Dr. Subir Sachdev's group in the Department of Physics at Harvard University in Cambridge/USA.

■ **Dr. Sebastian Markert**, Biocenter of the University of Würzburg/Germany, will work with Prof. Dr. Shigeki Watanabe for 24 months in the Department of Cell Biology of the School of Medicine at Johns Hopkins University in Baltimore/USA.

■ **Dr. Philipp Schienbein**, Center for Theoretical Chemistry at the Ruhr-Universität Bochum/Germany, received approval to carry out his project for 24 months under Prof. Dr. Jochen Blumenberger in the Department of Physics and Astronomy at the University College London/UK.

■ **Dr. Marcel Schlegel**, Institute of Organic Chemistry at Leipzig University, will conduct research with the support of Prof. Dr. David Nicewicz in the Department of Chemistry at the University of North Carolina in Chapel Hill/USA for 24 months.

■ **Dr. Michael Teders**, Organic Chemistry Institute at the University of Münster/Germany, will work under Prof. Dr. Wilhelm Huck for 24 months in the Department of Physical-Organic Chemistry within the Institute for Molecules and Materials at Raboud University in Nijmegen/Netherlands.

Leopoldina Fellowship Programme – Former fellows

■ **Prof. Dr. Giesa Gerold**, 2009 fellow, has been appointed as a professor of biochemistry with a concentration in molecular and clinical infection research at the University of Veterinary Medicine Hannover, Foundation.

■ **Prof. Dr. Silke Hofmann**, fellow from 2010 to 2012, has been appointed as a professor for dermatology at the Helios Universitätsklinikum Wuppertal within the Faculty of Health at Witten/Herdecke University in Witten/Germany.

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Abbreviations:

ML = Member of the Leopoldina