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Annual Assembly 2023 puts the spotlight on law(s)

Rules of Reality – Rules for Reality

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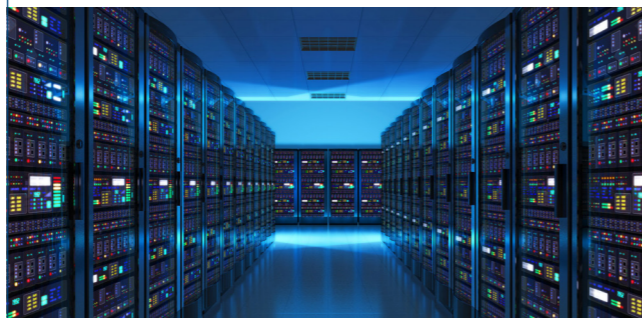
Two Nobel Prizes for Leopoldina Members:
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Editorial

Dear Members, Dear Friends of Leopoldina,

Since the beginning of Russia's war of aggression against Ukraine, the conditions for Ukrainian researchers have become very precarious. As a consequence, it is important to offer Ukrainian scientists the opportunity to continue their studies abroad. Leopoldina is providing funding through the Ukraine Distinguished Fellowship. The fellowship has been set up to support researchers working on independent research projects in Germany while remaining affiliated to a Ukrainian institution. I am delighted to be able to introduce two recipients of the fellowship in this newsletter (p. 11).



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

Image: David Ausserhofer | Leopoldina

Scholarships were also awarded at the Leopoldina Annual Assembly at the end of September. For the first time postdoctoral fellows could apply for funding for their participation. I would like to offer my heartfelt thanks to the Friends of the Leopoldina Academy and the Alfried Krupp von Bohlen and Halbach Foundation for their financial support. My thanks also to the Wilhelm and Else Heraeus Foundation, which for many years, together with the Friends of the Leopoldina Academy, has made it possible for gifted pupils to attend the Annual Assembly (p. 6 f.).

We hope you enjoy this issue!

The Nobel Prize in Physics goes to Leopoldina Member Ferenc Krausz

Physicist is receiving the award together with Pierre Agostini and Anne L’Huillier

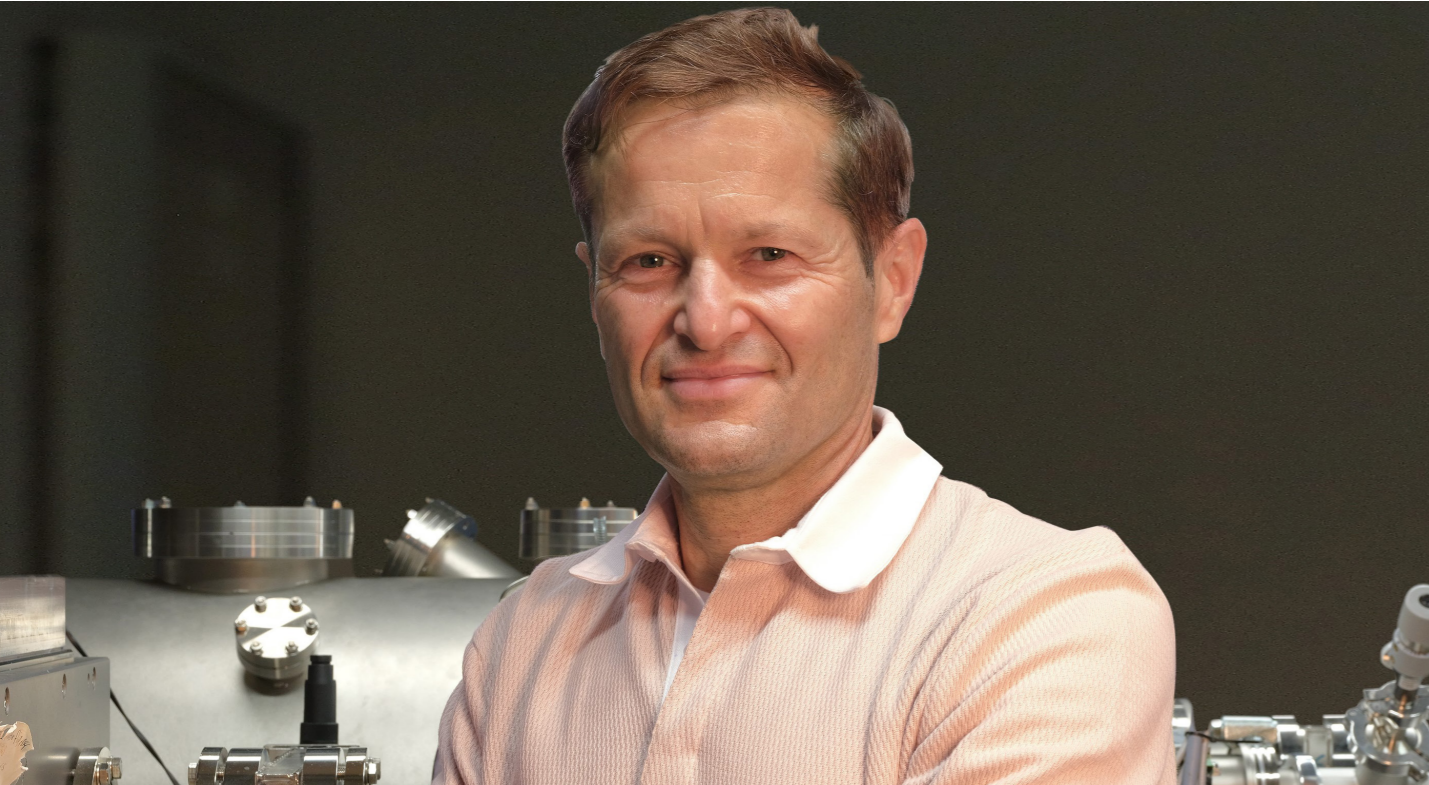


Image: Peter Seidel

The Hungarian-Austrian Physicist Ferenc Krausz, Member of Leopoldina since 2016, has been awarded the Nobel Prize in Physics. Krausz is receiving the award together with Pierre Agostini and Anne L’Huillier for their research on the behaviour of electrons in ultra-short light flashes.

Ferenc Krausz is considered to be the founder of attosecond physics, which observes and researches ultrafast movements of electrons in real time. New fields of work have emerged on the basis of his research, such as high-resolution microscopy of living organisms. He has also developed lasers which can be used in the diagnosis of eye diseases and cancer.

For the first time, Ferenc Krausz and his team have managed to generate and

measure an attosecond light pulse. An attosecond is a billionth of a billionth of a second (0.000,000,000,000,001 seconds). He has developed laser systems

“Based on these findings serious diseases can be studied in a completely new way.”

Gerald Haug ML
President of the Leopoldina

and components that make such observations possible. Electrons move at the speed of about a thousand kilometres per second. In these laser systems the attosecond flash acts like an extremely

short photo flash and freezes movement at a certain point in time. Researchers working with Ferenc Krausz were thus able to measure that an electron needs between seven and 20 attoseconds to cross the atomic shell. The exact speed depends on how the electrons interact with one another and with the atomic nucleus.

Leopoldina President, Gerald Haug, congratulates Ferenc Krausz, who has been Director at the Max Planck Institute for Quantum Optics in Garching since 2004: “This award recognises groundbreaking findings in the field of attosecond measurement technology, which can be used to study serious diseases in a completely new way.” ■ JK

► Ferenc Krausz

The Nobel Prize in Medicine goes to Leopoldina Member Katalin Karikó

Neuroscientist and biochemist honoured together with Drew Weissman



Image: Markus Scholz | Leopoldina

The Hungarian-US-American neuroscientist and biochemist Katalin Karikó, Member of Leopoldina since 2022, is awarded the Nobel Prize in Physiology or Medicine. She is receiving the award together with US-American immunologist Drew Weissman for their joint scientific research which has been used as the basis for today’s mRNA technology.

Katalin Karikó and Drew Weissman searched for ways to prevent the inflammatory processes triggered by synthetic mRNA, which for a long time has stood in the way of a medical application of mRNA technology. This enabled them to develop vaccines against COVID-19.

Katalin Karikó has observed in her research on inflammatory processes

triggered by synthetic mRNA that the inflammatory reaction can be avoided if spatially differently arranged pseudou-

“This prize recognises groundbreaking findings in the field of synthetically produced mRNA.”

Gerald Haug ML
President of the Leopoldina

ridine is incorporated into the mRNA instead of the nucleoside building block uridine. Embedded in nanolipid particles, an mRNA modified in this way forms the basis for the mRNA vaccines that have been used around the world

since the end of 2020 and have immunised millions of people against the SARS-CoV-2 virus. With this research, Katalin Karikó, who has been a Professor at the University of Szeged in Hungary since 2021 and works as Associate Professor of Neurosurgery at the University of Pennsylvania/USA, has laid the foundations of a new technology.

The President of Leopoldina, Gerald Haug, congratulates Katalin Karikó on this high honour: “This prize recognises groundbreaking findings in the field of synthetically produced mRNA for vaccine development.” ■ JK

► Katalin Karikó

► Interview in Leopoldina-Newsletter 1/2023

“... that, in all humility, we only understand a part of reality”

Leopoldina Annual Assembly puts the spotlight on “Law(s)” from different perspectives



The Annual Assembly in Halle (Saale)/Germany was attended by Leopoldina Members, pupils and young scientists. Around 270 guests focused on the topic of “Law(s)” in lectures and discussions. Images: Anna Kolata and Markus Scholz | Leopoldina

The academic organisation of the Annual Assembly on 28 and 29 September was in the hands of three Leopoldina Members: the Romanist Andreas Kablitz, Director of the Petrarca Institute at the University of Cologne/Germany, the lawyer Andreas Voßkuhle, Director of the Institute of Political Science and the Philosophy of Law at the University of Freiburg/Germany, and the physicist Konrad Samwer from the University of Göttingen/Germany. They discuss the topic “Law(s): Rules of Reality – Rules for Reality”.

How did you come up with this topic?

Andreas Kablitz: The idea was to find a topic that would be of interest to those from every field represented by Leopoldina, which would bring different scientific cultures together under one umbrella and at the same time highlight different cultures and perspectives. The concept

of law, encompassing the laws of nature and the laws of the legal system, seemed a suitable subject.

In common parlance laws are “set” legally by humans. How does the term fit with the “discovered” pre-existing laws of nature?

Konrad Samwer: First of all, it needs to be said that the “laws” of nature do not actually exist in the classic sense. Nature itself has no laws, we describe our observations as humans and formulate them mathematically. Thus, they are human-made, mostly mathematical formulations of re-



Konrad Samwer. Image: private

gularities that we observe in nature. An example: The famous Kepler’s laws describe the Earth’s orbit around the sun. Strictly speaking, however, there is an interaction between all the planets and the sun and even the moon affects the orbit. The art of physics is to look for approximations and to name them mathematically, without getting it wrong, but at the same time also without making it too complicated. The laws that we have developed can then often be used to make predictions which can be tested. The predictions that Carl Gauß made about the return of the asteroid Ceres, for example, were correct to the day. However, we are also happy to refute or add to laws once they have been formulated.

Andreas Voßkuhle: This all shows that there is a common feature between legal laws and the laws of nature, in that they can be changed but for a time they pro-



Patrick Joseph Siegle (Freiburg im Breisgau/Germany), Maryana Yaremko (Hamburg/Germany) and Vivian Oktay Yurdakul (Wuppertal/Germany) (from left to right) received a travel grant to attend the Annual Assembly. The grants were awarded for the first time to young scientists and have allowed the lawyer, Germanist and historian to network in person in Halle (Saale). This was funded by the Friends of the Leopoldina Academy and the Alfried Krupp von Bohlen and Halbach Foundation.

Image: Markus Scholz | Leopoldina

vide orientation about how to explain the world and guidance on how to deal with it. For us lawyers, the term “law” is of course key. We have chosen it for the Annual Assembly because it is a good way to build a bridge: a term that can be used to link different perspectives and also show that they are sometimes more similar than different.

Legal laws, however, are created in a completely different way to those of the natural sciences.

Voßkuhle: Yes, democratic law is the end product of a parliamentary process. Lawyers spend a lot of time thinking about why laws are actually valid, what makes them normative, why do we obey them. When we think of law in a modern constitutional state we have reinforcement bodies such as the police and courts. However, it is interesting that there are decisions which are respected even without bodies such as constitutional courts. We are thus dealing with a vibrant subject which immediately loses its apparent clarity when we give it more thought.

Can the idea of a given “natural law” act as a bridge between legal and scientific laws?

Voßkuhle: That is what we believed for a long time: The idea of something divine that one can recognise and translate into a law has a long tradition. However,

at the very latest with the emergence of analytical philosophy at the beginning of the 20th century, the idea of such a law of nature became problematic. In Germany, it experienced a renaissance after the atrocities of the Nazi regime, and the question



Andreas Voßkuhle.

was whether there may not also be positive laws that are unjust because they violate the idea of justice.

In the famous formula of Gustav Radbruch, that which is evidently unjust cannot be right. After German reunification, this line of argument was used again with regard to sentencing guards posted along the Berlin Wall, whose actions were legally permitted in the GDR. Although we live in a secular society, we believe that we can recognise injustice. In this respect, there is still a remnant of natural law within our legal system. Here, too, we recognise that the concept of law is a term that opens up basic questions of philosophy and theology.

How important to your topic are the laws of religion, ethics and morality?

Kablitz: Very important. We have seen that the meaning of the term of “setting”

laws also fits the modern concept of natural laws. Here, development has caught up with the old meaning of the word. In Greek mythology, it is the consilium of the gods in Olympus that “sets” the laws of nature.

Samwer: In the past, scientists also attributed things they could not explain to higher powers.

Voßkuhle: Historically, many things are connected to the term “law” that could seem unscientific and unconsidered today. From this perspective also, it is a good topic for a scientific academy.

Despite all the differences between research subjects, research methods and scientific cultures, is there something that unites all the sciences?

Samwer: We are united by the realisation that we only understand part of reality. For this reason alone, science needs lively, open, and fearless debate across all disciplines.

Voßkuhle: I also believe that dealing with a lack of knowledge is a common challenge; despite all our differences, it is part of our scientific approach. The fact that we can never explain everything fully and have to deal with uncertainties is a basic consideration that should lead to a certain amount of humility.

Kablitz: I completely agree. Unfortunately, there are two hurdles that stand in the way of the required humility. Psychologically, researchers are more motivated by the prospect of ground-breaking insights, and our language seduces us into assuming facts. We should be aware of both these things.



Andreas Kablitz.

■ THE INTERVIEW WAS CONDUCTED BY ADELHEID MÜLLER-LISSNER

▶ Annual Assembly “Law(s): Rules of Reality – Rules for Reality”

New heads: Charlotte Klönk and Andreas Barner

Art historian appointed new Secretary for Class IV / Medical doctor and mathematician appointed Honorary Senator

Two persons were added to the Leopoldina committees at the Annual Assembly: Art historian Charlotte Klönk ML was appointed Member of the Presidium and the former President of the Donor Association, Andreas Barner, was appointed Honorary Senator.

Charlotte Klönk was admitted to the Leopoldina Presidium and was elected as the new Secretary for Class IV – Humanities, Social and Behavioural Sciences during the regular Senate meeting on 28 September. The Berlin-based art historian succeeds historian Ute Frevert ML. Klönk has been a Member of Leopoldina since 2019.

Leopoldina has appointed the medical doctor and mathematician, Andreas



Charlotte Klönk and Andreas Barner.

Images: Markus Scholz | Leopoldina, Peter Himsel | Stifterverband

Barner, as Honorary Senator in recognition of his wide-ranging and far-sighted support of Leopoldina, especially in developing a dialogue between science, economics, and politics. Barner was ap-

pointed ad personam Senator for Leopoldina from 2007 to 2016.

At their meeting the Senate also discharged the Board of Directors for the financial year 2022. The committee also approved a new version of the election rules presented by the Presidium. This had become necessary due to newly adopted regulations for dealing with conflicts of interest in the election procedure. In the process the previous election regulations of 2015 were fully updated.

The subject of “Artificial Intelligence” was proposed for the Annual Assembly in 2025 by Thomas Lengauer ML (Saarbrücken/Germany) and Klaus-Robert Müller ML (Berlin/Germany). ■ JB

JÜRGEN TROE AWARDED THE COTHENIUS MEDAL



At the Annual Assembly in Halle (Saale)/Germany Jürgen Troe ML (centre) received the Cothenius Medal from Leopoldina Vice President Thomas Krieg ML (left) and President Gerald Haug ML (right) for his outstanding life's work in science. Jürgen Troe, Member of Leopoldina since 1979, is an expert in the field of physical chemistry and is researching chemical reaction kinetics. In this field, he focuses on describing extensive reaction systems such as the combustion of substances, reactions in the atmosphere, and processes in interstellar molecular clouds. From his research, Troe has made a significant contribution to understanding the molecular basis of chemical reactions. He has been able to clearly describe the movement of multi-atom molecules and ions in decay reactions that are important in atmospheric chemistry, photochemistry and plasma chemistry and in astrophysical reactions, combustion processes and catalysis. Troe has received many awards for his work, including the Max Planck Research Prize of the Max Planck Society in 1993 and the Carus Medal of Leopoldina in 1995.

■ OK | Image: Anna Kolata | Leopoldina

Carus Medal for Nicola Fuchs-Schündeln

Leopoldina has awarded the Carus Medal 2023 to macroeconomist Nicola Fuchs-Schündeln ML. Fuchs-Schündeln conducts research into the work and consumer decisions of private households. She focuses in particular on the influence of policies and norms. She also analyses the causes of inequality and the formation of economic and political preferences. Nicola Fuchs-Schündeln has been a Member of Leopoldina National Academy of Sciences since 2021. In 2018, she received the Gottfried Wilhelm Leibniz Prize from the German Research Foundation. The Carus Medal is named after Carl Gustav Carus, 13th President of Leopoldina, and has been awarded to younger scientists in a field represented by the Leopoldina since 1896. Medal winners have included the later Nobel laureates Jacques Monod (1965), Christiane Nüsslein-Volhard (1989) and Stefan W. Hell (2013). ■ OK

▶ Carus Medal

STATEMENT OF THE ALLIANCE OF SCIENCE ORGANISATIONS IN GERMANY REGARDING THE CURRENT SITUATION IN ISRAEL (12 OCTOBER 2023)

The Alliance of Science Organisations in Germany expresses its deepest condolences for the victims of the terrorist attacks on Israel.

In particular, our sympathy is with our friends and colleagues in the Israeli scientific community. Israel has been and will always be a prime partner for the German research and innovation community.

Our thoughts are with all victims and all those taken hostage, their families and friends. We are shocked and appalled by the atrocious violence that has been perpetrated by the terrorists and strongly condemn these barbaric acts. They cause unspeakable suffering for all civilians.

We stand in solidarity with Israel.

www.allianz-der-wissenschaftsorganisationen.de/en/

S20 statements for government summit

Under the leadership of the Indian National Science Academy (INSA) the academies of G20 countries have prepared three statements for the Science20 Process. Recommendations to the G20 summit concern clean energy, holistic health, and how to connect science, society and culture. The final vote took place at the Science20 Summit in Coimbatore/India on 21 and 22 July.

In order to slow down global warming, the G20 academies recommend intensifying efforts to promote renewable energies and increase access to clean energy. In addition, the academies stress the need for greater support for research and innovation.

For the health sector, the academies recommend a holistic approach that includes physical and mental health and also well-being. The “One Health” concept, which stresses the close connection between the health of humans, animals, plants, and ecosystems, is as central as the early detection of infectious diseases and the fight against antibiotic resistance. The role of science in society and culture was also discussed. The rapid development of digital technologies offers a unique opportunity to preserve our cul-

tural heritage and make it accessible to future generations. Transformative technologies such as artificial intelligence or genome editing need to be handled responsibly.

For its G7 and G20 policy advice, Leopoldina, together with its partner academies, is developing evidence-based recommendations for the summits of heads of state and government. The Science20 Process was established in 2017 under the leadership of Leopoldina and is an annual event. ■ CHW



SCIENCE 2023 INDIA

On behalf of the German government, Leopoldina President, Gerald Haug ML, attended the meeting of the Chief Science Advisers of the G20 countries on 27/28 August 2023 in Gandhinagar/India. The agenda included health challenges in the context of One Health, improving access to scientific knowledge, and issues of diversity and equal opportunities in science.

▶ S20 Statements

4TH GERMAN-BRAZILIAN WORKSHOP ON "WATER AND REGIONAL DEVELOPMENT"



Climate change is exacerbating the unequal distribution of water and putting pressure on the global food system. Faced with a growing world population, aquaculture is seen as a promising solution for ensuring food security. But aquaculture needs to be sustainable for this. Young scientists from South America and Europe discussed how this can be achieved at a workshop at the Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB) from 16 to 19 October, organised by the Academia Brasileira de Ciências (ABC) and Leopoldina. The highlight was the panel discussion at the Brazilian Embassy with representatives of the German Ministry of Food and Agriculture, the Food and Agriculture Organisation FAO, Iglo Deutschland, the Aquaculture Stewardship Council, and the Directorate General for Maritime Affairs and Fisheries of the European Commission. The fourth event in the German-Brazilian series "Water and Regional Development" was coordinated by Klement Tockner ML and Werner Kloas for Leopoldina, and Adalberto Val and Maria Célia Portella for the ABC.

■ TP / Image: Markus Scholz | Leopoldina

Scientific diplomacy with and for Southeastern Europe

Accelerating the integration of Western Balkan countries

The scientific systems of the Western Balkan countries are in a period of transition. They now need support to accelerate their integration into the European Research Area and the European Education Area. The answer is a partnership for excellence and also a partnership for Europe.

What kinds of transformation and advances are taking place in the higher education, research and innovation communities of the Balkan countries and Southeastern Europe? How can excellence be achieved in the Balkans through meaningful instruments and European alliances? How can we foster a culture of excellence? Which concepts for international mobility and cooperation are suitable for Southeastern Europe? How can the academic diaspora help to shape the development of their countries of origin?

These were the key issues discussed at the 7th Conference of National Stakeholders of the Education and Science Systems as part of the Berlin Process for the Western Balkans. About 60

leaders of academies, universities and research institutes met at the Academy of Sciences of Albania in Tirana on 19 and 20 September. Their decisions and recommendations were channelled into the 9th Western Balkans Summit of Heads of State and Government on 16 October in Tirana/Albania.

During the conference Federica Mogherini, Rector of the College of Europe Bruges/Belgium and Vice President of the European Commission from 2014 to 2019, stressed: "We are seeing a reinterpretation of basic concepts: EU enlargement, integration, mobility, cohesion, resilience. We need to educate Europe's future generations."

This year, Albania is chairing the Berlin Process for the Western Balkans, which was set up as an intergovernmental initiative in 2014. Since 2015 the Process has included a platform for science, education and innovation, which is coordinated by Leopoldina.

■ LB

▶ Berlin Process

7th Bilateral Symposium with Korean Academy

Focus on brain research

The Symposium "Advances in Brain Research" was organised together with the Korean Academy of Science and Technology (KAST) at Leopoldina head office in Halle (Saale)/Germany on 28/29 June.

23 scientists from South Korea and Germany discussed current trends and the latest results of brain research. In addition to basic research, modern neuroscientific technology and new research approaches such as brain organoids were discussed. These will allow progress in decoding the human brain and open up new ways of understanding and treating strokes, brain tumours, neurodegenerative disorders and other diseases.

Hans R. Schöler ML, Max Planck Institute for Molecular Biomedicine, Münster, and Bong-Kiun Kaang, Seoul National University, were responsible for the academic coordination of the 7th Bilateral Symposium of Leopoldina and KAST

KAST is one of Leopoldina's strategic partner academies in Asia. A bilateral agreement has been in place since 2012 and has been extended and expanded several times. In future, the cooperation will focus on the challenges of the energy transition.

■ CHW

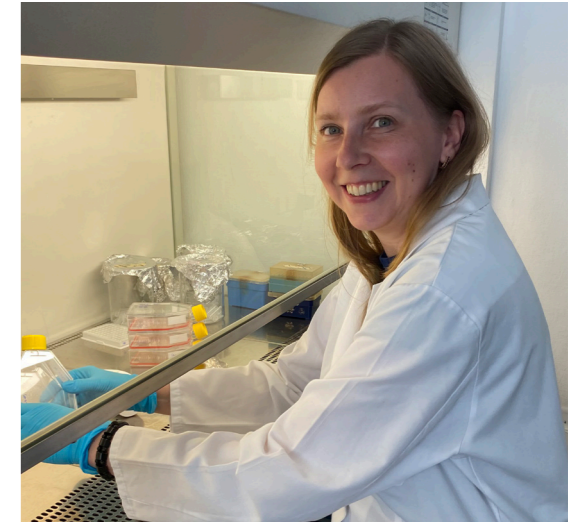
Personal support for researchers

Leopoldina is supporting scientists with the Ukraine Distinguished Fellowship



Anton Stepanenko and Yuliya Khrunyk are two of the ten postdocs that Leopoldina is supporting with the Ukraine Distinguished Fellowship. The fellowship allows them to continue their research for one year while maintaining their Ukrainian affiliation. They are being supervised by two Leopoldina Members: Stepanenko at IPK Gatersleben/Germany by Ingo Schubert and Khrunyk by Annette Beck-Sickinger at the University of Leipzig/Germany.

Images: private, Kristin Löbner



Leopoldina is supporting ten Ukrainian postdocs with the Ukraine Distinguished Fellowship. The funding will support outstanding postdoctoral researchers from Ukraine, whose careers have been endangered or interrupted by the war, for one year.

It is a return to familiar territory: since 1 January, Yuliya Khrunyk has been undertaking research at the Institute of Biochemistry at the University of Leipzig. This has been made possible by the Leopoldina funding programme. Yuliya Khrunyk is well known to the Institute as she worked here for three months in 2017 with Annette Beck-Sickinger, Leopoldina Member and Professor of Biochemistry.

Yuliya Khrunyk is researching sponges. "Sponges are an exciting group of organisms," says the 43-year-old, who previously worked as a postdoctoral researcher at the Max Planck Institute for Terrestrial Microbiology in Marburg and most recently at the Ural Federal University in Yekaterinburg/Russia. "They are among the oldest marine organisms and have an interesting molecular biological structure."

The biomedical scientist is analysing these in more detail by using in vitro ex-

periments. She wishes to find out whether they can be used as inspiration for biomaterials – such as implants in bone cells. Yuliya Khrunyk is already fully integrated into the routines of the laboratory. At the beginning of September she presented her findings at the Conference of the European Society for Biomaterials in Davos/Switzerland and is now working on a publication together with Annette Beck-Sickinger. She feels very much at home in Leipzig. "I know the team and the town well, which makes research easier for me."

About 100 kilometres away as the crow flies, in Gatersleben, Saxony-Anhalt, Anton Stepanenko has been working on

duckweed since November. The 35-year-old molecular biologist is conducting research with Leopoldina Member Ingo Schubert at the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK). Stepanenko sees that "duckweed can be used in different ways: as food, as animal feed, as an aquatic model plant for developmental biology, as a bioindicator or for bioenergy production and waste water treatment."

He already studied the genus during a five-year post-doctoral period in China. However, there are still many taxonomic mysteries surrounding the plant. "Without a clear systemic classification, it is difficult to advance applied research and thus the later use of duckweed" says Stepanenko.

Conditions are ideal for him at the IPK. Using molecular biological and cytogenetic methods, he is attempting to shed more light on the characteristics of native and tropical species. His interest in duckweed brought the Ukrainian scientist together with Ingo Schubert, Honorary Professor at the University of Kassel/Germany. When the war broke out in Ukraine, Anton Stepanenko was visiting IPK as a guest researcher and from there he successfully applied for the Leopoldina fellowship.

■ BJH

FUNDING FOR POSTDOCS

The Ukraine Distinguished Fellowship will allow ten postdocs to work, initially for one year, on an independent project at a university or research institute in Germany, while maintaining their affiliation with a Ukrainian Institution. The funding is provided by private donors and the Friends of the Leopoldina Academy, with Leopoldina providing the main share.

▶ Ukraine Fellowship

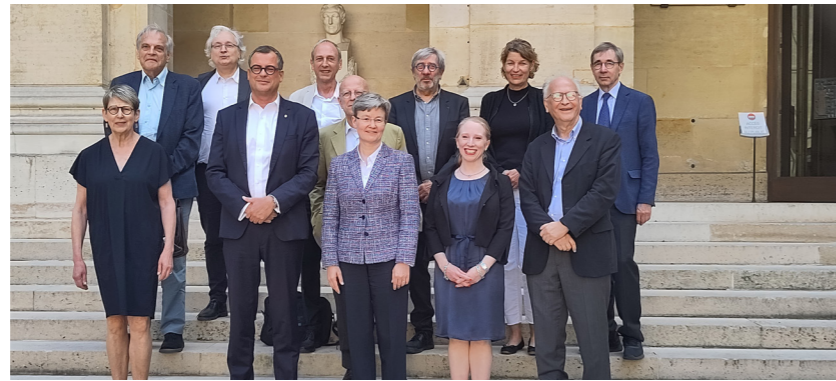
Personal exchange resumed

Visits to partner academies in France, China and Japan

Now that the pandemic restrictions have been lifted, it is possible to set up in-person events in Germany and abroad between Leopoldina and its international partners.

Thus, President Gerald Haug ML and Vice Presidents Ulla Bonas ML, Thomas Krieg ML and Regina Riphahn ML were able to visit the Académie des sciences on 5 June. In Paris, the delegation met the President, Alain Fischer, and Vice President of International Affairs of the French Academy, Francis-André Wollman. In a strategy meeting, the current priorities of the Academy and future options for possible cooperation were discussed.

A delegation, led by President Gerald Haug, travelled to the Chinese Academy of Sciences (CAS) from 3 to 7 July. The delegation was received by CAS Vice President Zhang Tao, a co-founder of the



Delegation of the Leopoldina to the Académie des sciences in Paris.

Image: private

Science for Future initiative launched in 2018. Both academies agreed to continue the joint programme with a second conference planned for Berlin in autumn 2024. In addition, the delegation visited two CAS institutes, the Institute of Atmospheric Physics in Beijing and the Dalian Institute of Chemical Physics. In a return visit, Gerald Haug received his Chinese counterpart Hou Jianguo in

Berlin on 18 October.

A delegation, led by Gerald Haug, had met the Science Council of Japan at the beginning of October. At the same time a trip was made to the STS forum in Kyoto/Japan. Here, Gerald Haug chaired the session on “Basic Science, Innovation and Policy” on current challenges of basic research in the context of political agenda. ■ KK

For science-based regulation of plants bred in the EU

Leopoldina and German Research Foundation publish ad hoc statement on science-based regulation

For years, the Leopoldina has been campaigning for the product-based assessment of genetically modified organisms (GMOs) and amendment to the genetic engineering law, which is essentially more than 30 years old.

Recently, the European Commission has presented a draft regulation which specified that plants modified by new genomic methods of type 1 (NGT-1) will be treated according to scientific principles as equivalent to the products of classical breeding methods such as cross-breeding and undirected mutagenesis. The member states must now adopt a position on this in the coming months. In doing so, the Commission is meeting a core demand that has been voiced by the life sciences for years: it is not the method of genetic modifica-

tion, but objective risks of the modification at hand that should justify precautionary measures.

On the occasion of Germany’s upcoming position on the Commission’s draft, the Leopoldina and the DFG have issued a joint ad hoc statement on three issues that require clarification. (1) The precautionary principle is not applicable to NGT-1 plants according to European standards due to the lack of cause for concern, because they have the same risk profile as conventionally bred plants. (2) Genetic engineering law and patent law should not be mixed up for argumentative purposes. It was not yet possible to predict whether the patents on sequences in NGT-1 varieties expected by some parties would be a serious economic problem. This aspect would have

to be monitored very closely in the coming years, as envisaged by the Commission and improvements would have to be made in patent law if necessary. (3) It would be consistent if non-regulated NGT-1 plants were also approved for organic farming purposes in the future. Organic farming could benefit greatly from NGT-1 plants because it mostly foregoes chemical pesticides. According to European case law, classical mutagenesis plants that have long been used in organic farming are also non-regulated GMOs within the meaning of genetic engineering law. ■ JF

▶ Ad hoc statement on plant breeding (German only)

Reflecting different roles in science communication

Series “Policy advice in the field of tension between science, politics and the media” (Part 5)

In an increasingly complex world, there is a growing need for scientific expertise on all issues of society and politics. This includes issues such as pandemics and their consequences, climate change, and, most recently the energy transition.

BY CAROLINE WICHMANN*

Research findings and scientific advice to society have become important elements of mainstream media and chat shows and are also discussed more intensively on social media. And rightly so, as in this way scientific findings can play a role in public debates and political decisions, particularly in crisis situations. Science provides insights which can be used to develop options for policy decisions. However, it is only one voice among many in society.

Expertise

Scientists are now speaking out more often in the media to meet the demand for advice. They are expected to provide well-argued facts and insights, but also to give their advice and opinions. Their expertise is needed to ensure an informed discussion about important issues in our society. However, when experts speak out, they risk being criticised and even attacked, whether this is justified or not. This shows that expertise in specialist issues alone is often not enough for science communication to be successful.

In order to make a transparent contribution to public debates, it is helpful to prepare in advance not only for the possible questions and interpretations of the other party but also for the different roles that researchers can play in the discussion.

Specialist Field

The genuine task of scientists is to generate and publish research in their



Researchers are also in demand in public debates – as here with Leopoldina Member Antje Boetius at the Journalist Collegium on the topic of “Climate Research”. Image: Hannes von der Fecht | AWI

own specialist field (level 1). These facts and findings can be interpreted in the next stage (level 2). This is performed through exchanges with colleagues in the field, but also by communicating with the public. If scientists are also involved in science-based policy advice, they can provide various possible options based on their research (level 3). In this case, experts from different disciplines generally work together to combine their findings in order to respond to societal issues.

Recommendations

If scientists also give recommendations or preferences for a particular course of action (level 4), the conversation moves away from the factual to an expression of opinion (level 5). This applies particularly if statements no longer relate to a scientist’s own field of expertise (level 6). Here statements are no longer different from those of other actors in society who publicly contribute their opinions on a subject.

Progress from one level to the next can be fluid, and the further statements move away from substantiated facts and

develop into opinions the more vulnerable the statements become in social exchange.

Role Model

The role model shows, on the one hand, that researchers themselves need to be aware of this and should make it transparent to others what role they are taking on. On the other hand, journalists or presenters should also take these different roles into account and communicate them to their audience. This will prevent misunderstandings, enable more differentiated criticism and allow a more transparent and comprehensible social dialogue.

* Caroline Wichmann has headed the Leopoldina Press and Public Relations Department since 2009. In 2020, 2015 and 2011 she was elected Research Spokesperson of the year. The article was published in DIE ZEIT on 13 July 2023.

▶ Vienna theses (2023)

“Don’t chase after the Americans”

Leopoldina Member Bernhard Schölkopf will give the traditional Christmas Lecture on 7 December

The mathematician, physicist, and computer scientist Bernhard Schölkopf is one of the world’s leading experts in the field of machine learning. In the run-up to the Christmas Lecture, he will give this year on the development and success of machine learning methods, he talks about neural networks and AI superpowers in an interview.

About ten years ago, machine learning technology ushered in a new era in Artificial Intelligence (AI). The neural networks that these algorithms use are often compared to the human brain. But a human child learns what a cat is from three examples; a neural network needs millions of cats.

Bernhard Schölkopf: These methods are very good if you have huge amounts of data and powerful computers at your disposal. But while they start from scratch for every problem, a few cat examples are enough for us humans because we may have already learned how to recognize dogs and how a dog’s appearance changes under different perspectives and lighting conditions. We haven’t really figured out how to make that work for computers.

Computer algorithms learn by discovering statistical correlations. But a correlation between two quantities does not establish causality. You are interested in how to detect cause-and-effect relationships in data.

Schölkopf: It’s impossible with data alone. But it is possible if you can intervene in a system – then you can wiggle one variable, so to speak, and see how the other one changes. If this is not possible, it may be sufficient that objects or conditions change by themselves. My team has applied this to the problem of finding exoplanets and we have actually discovered a number of those planets in the Kepler telescope data. Coincidentally, the first exoplanet we found was in the



Bernhard Schölkopf ML...

... develops algorithms that allow computer programs to react flexibly to situations, thus helping to establish Machine Learning as a method to detect patterns in observational data in a range of scientific disciplines. The mathematician, physicist, and computer scientist is founding director at the Max Planck Institute for Intelligent Systems in Tübingen/Germany. Schölkopf has been a member of the Leopoldina since 2016.

Image: Markus Scholz | Leopoldina

habitable zone around a star, and water vapor was found spectroscopically in its atmosphere.

For the past year, ChatGPT has been making headlines. You can almost talk to the system like to a real human. Is this technology the future of AI?

Schölkopf: On the one hand, it’s absolutely fascinating how well these systems work. These large language models have absorbed the cultural achievements of humanity that have been written down as training data and are a kind of distillation of this knowledge. Because it’s almost like chatting with a human, we are tempted to attribute properties to those systems that they do not have. There is a danger of thinking that the problem of

intelligence is solved and we understand how it works.

Training these systems costs billions, and only a few large companies, all in the USA, can afford it. Does Europe stand any chance at all against these AI superpowers?

Schölkopf: I see three possibilities. One option is to start from scratch – but a university or even a Max Planck Institute doesn’t have the computing power required for that. You could also try to improve an existing model by fine-tuning it for certain problems. Or you simply use the interface to OpenAI or Google. But we should not just chase after the Americans, we should make sure that innovation happens in Europe as well.

That was probably one idea behind Cyber Valley which you co-founded in Tübingen.

Schölkopf: In the past, the best graduates of our universities usually aimed for a career in science. Today, many want to go to one of the top industrial labs. If you really want to be attractive as a region, you need a mix of academic research, industrial labs, and startups. That’s what Cyber Valley is supposed to provide.

But there is also the European level – and that is where the ELLIS Institute in Tübingen comes in which was launched this summer under your leadership.

Schölkopf: There are other great research locations in Europe, for example around Cambridge and at ETH Zurich. We want to connect those locations in a meaningful way, for example by supporting PhD students with supervisors in two different countries. Such an ecosystem would be a bonus which you would not get in the same way in America. And our students are certainly just as smart as American students.

■ THE INTERVIEW WAS CONDUCTED BY CHRISTOPH DROESSER

NEW CLASS III MEMBERS – MEDICINE



In July, the newly elected Members of Class III – Medicine 2022 received their certificates. The image shows Leopoldina President Gerald Haug ML (centre) and the new Members (from left to right): Hans-Ulrich Kauczor ML, Angela Hübner ML, Knut Brockmann ML, Katerina Harvati-Patheodorou ML, Marius Ueffing ML, Gerd Kempermann ML, Denise Manahan-Vaughan ML, Arndt Hartmann ML, Jörg Kalff ML and Peter A. Fasching ML.

Image: Markus Scholz | Leopoldina

Personalia | Publications

Awards and Honours

■ **Andrea Ablasser** ML, Member of the Microbiology and Immunology Section, was awarded the Paul Martini Prize of the Paul Martini Foundation (Berlin/Germany).

■ **Katrin Böhning-Gaese** ML, Member of the Organismic and Evolutionary Biology Section, was awarded the Science Communication Medal of the Göttinger Max Planck Institute/Germany.

■ **Frank Bradke** ML, Member of the Neurosciences Section, was awarded the Remedios Caro Almela Prize of the Instituto de Neurociencias (IN) of the Miguel Hernández de Elche University (UMH) (Elche/Spain) and the Spanish National Research Council (CSIC) (Spain).

■ **Erick M. Carreira** ML, Member of Chemistry Section, was awarded the Akira Suzuki Award of the Institute for Chemical Reaction Design and Discovery (ICReDD) of Hokkaido University (Sapporo/Japan).

■ **Patrick Cramer** ML, Member of the Biochemistry and Biophysics Section, was awarded the Shaw Prize of the Shaw Foundation (Hong Kong/China) in the category “Life Science and Medicine”. He was also awarded the Bavarian Maximilian Order for Science and Art.

■ **Stefanie Dehnen** ML, Member of the Chemistry Section, was awarded the RSC/GDCh Alexander Todd-Hans Krebs Lectureship in Chemical Sciences by the Royal Society of Chemistry (RSC) (London/UK).

■ **Donald Bruce Dingwell** ML, Member of the Earth Sciences Section, was awarded the Gustav Steinmann Medal of the German Geological Society – Geological Association (DGGV) (Berlin/Germany).

■ **Ottmar Edenhofer** ML, Member of the Economics and Empirical Social Sciences Section, was admitted to the Berlin-Brandenburg Academy of Sciences (BBAW).

■ **Karl Max Einhäupl** ML, Member of the Neurosciences Section, was awarded the Goethe Plaque of the Hessian Ministry for Science and the Arts.

■ **Lars P. Feld** ML, Member of the Economics and Empirical Social Sciences Section, was awarded the Univer-

sity Medal of the Albert Ludwig University of Freiburg/Germany. He was also awarded the Gold Friedrich List Medal of the Federal Association of German Economists and Business Economists (bdvb) (Düsseldorf/Germany).

■ **Anja Feldmann** ML, Member of the Informatics Section, was awarded the Konrad Zuse Medal by the German Computer Science Society (Bonn/Germany).

■ **Claudia Felser** ML, Member of Chemistry Section, was admitted to the Hall of Fame of German Research of Manager Magazin (Hamburg/Germany).

■ **Ivo Feußner** ML, Member of the Organismic and Evolutionary Biology Section, was awarded the “Euro Fed Lipid Award” of the European Federation for the Science and Technology of Lipids (Euro Fed Lipid).

■ **Alexandra M. Freund** ML, Member of the Psychology and Cognitive Sciences Section, was admitted to the Berlin-Brandenburg Academy of Sciences (BBAW).

■ **Nicola Fuchs-Schündeln** ML, Member of the Economics and Empirical Social Sciences Section, was awarded an Honorary Doctorate by the Otto von Guericke University of Magdeburg (Magdeburg/Germany).

■ **Thomas Gasser** ML, Member of the Neurosciences Section, was awarded the Breakthrough Prize in the category of Life Sciences.

■ **Reinhard Hickel** ML, Member of the Ophthalmology, Oto-Rhino-Laryngology, Stomatology Section, was awarded the Cross of Merit on Ribbon of the Order of Merit of the Federal Republic of Germany.

■ **Katalin Karikó** ML, Member of the Human Genetics and Molecular Medicine Section, was awarded the Nobel Prize in Physiology or Medicine by the Nobel Assembly at Karolinska Institutet (Stockholm/Sweden). She was also awarded an Honorary Doctorate by Princeton University (Princeton/USA). She was also awarded an Honorary Doctorate by Harvard University (Cambridge/USA). She has also been admitted to the European Molecular Biology Organization (EMBO).

■ **Thomas Kirchner** ML, Member of the Pathology and Forensic Medicine Section, was awarded the Rudolf

Virchow Medal 2023 of the German Society for Pathology (DGP) (Berlin/Germany).

■ **Horst-Werner Korf** ML, Member of the Anatomy and Anthropology Section, was appointed Honorary Member of the European Society for Comparative Endocrinology (ESCE).

■ **Ferenc Krausz** ML, Member of the Physics Section, was awarded the Nobel Prize in Physics by the Royal Swedish Academy of Sciences (Stockholm/Sweden).

■ **Carola Lentz** ML, Member of the Cultural Sciences Section, was elected Honorary Member of the German Society for Social and Cultural Anthropology (DGSKA).

■ **Thomas C. Mettenleiter** ML, Member of the Veterinary Medicine Section, was awarded the Gold Medal of the World Organisation for Animal Health (WOAH) (Paris/France). He was also awarded the Professor Niklas Medal of the German Federal Ministry of Food and Agriculture.

■ **Erika von Mutius** ML, Member of the Microbiology and Immunology Section, was awarded the Bavarian Maximilian Order for Science and Art.

■ **Frank Neese** ML, Member of the Chemistry Section, was awarded the ICReDD Award of the Institute for Chemical Reaction Design and Discovery (ICReDD) of Hokkaido University (Sapporo/Japan).

■ **Jürgen Osterhammel** ML, Member of the Cultural Sciences Section, was awarded the Bavarian Maximilian Order for Science and Art.

■ **Annette Oxenius** ML, Member of the Microbiology and Immunology Section, was admitted to the European Molecular Biology Organization (EMBO).

■ **Jörn Piel** ML, Member of the Microbiology and Immunology Section, was awarded the Inhoffen Medal of the Helmholtz Centre for Infection Research (HZI) (Braunschweig/Germany).

■ **Hans-Georg Rammensee** ML, Member of the Microbiology and Immunology Section, was awarded the Lifetime Achievement Award of the Association for Cancer Immunotherapy CIMT (Mainz/Germany).

■ **Ángel Rubio** ML, Member of the Physics Section, was awarded the Spanish National Research Prize Premio Nacional de Investigación Blas Cabrera.

■ **Uğur Şahin** ML, Member of the Human Genetics and Molecular Medicine Section, was admitted to the Order Pour le Mérite for Sciences and Arts.

■ **Cordelia Schmid** ML, Member of the Informatics Section, was awarded the Körber Prize for European Science of the Körber Foundation (Hamburg/Germany).

■ **Rotem Sorek** ML, Member of the Genetics/Molecular Biology and Cell Biology Section, was awarded the Max Planck Humboldt Research Prize 2023 of the Max Planck Society for the Advancement of Science (Munich/Germany) and the Alexander von Humboldt Foundation (Bonn/Germany).

■ **Matthias Tschöp** ML, Member of the Agricultural and Nutritional Sciences Section, was awarded the Ernst Schering Prize 2023 of the Schering Foundation (Berlin/Germany). He was also awarded the Heinrich Wieland Prize 2023 of the Boehringer Ingelheim Foundation (Mainz/Germany).

■ **Özlem Türeci** ML, Member of the Human Genetics and Molecular Medicine Section, was awarded the Jung Prize for Medicine 2023 by the Jung Foundation for Science and Research (Hamburg/Germany). She was also admitted to the Order Pour le Mérite for Sciences and Arts.

■ **Wolfgang Wahlster** ML, Member of the Informatics Section, was admitted to the Hall of Fame of German Research of Manager Magazin (Hamburg/Germany).

■ **Herbert Waldmann** ML, Member of the Chemistry Section, was awarded the Otto Hahn Prize 2023 of the City of Frankfurt am Main, the German Physical Society (DPG) and the German Chemical Society (GDCh).

■ **Helmut Werner** ML, Member of the Chemistry Section, was awarded the Fischer Wilkinson Prize of the European Chemical Society (Brussels/Belgium).

Deceased members

■ **Theodor Diener** ML | 28 February 1921 to 28 March 2023 | Beltsville/USA | Agricultural and Nutritional Sciences Section

■ **Jeanette Erdmann** ML | 21 November 1965 to 09 July 2023 | Lübeck/Germany | Human Genetics and Molecular Medicine Section

■ **Albert Eschenmoser** ML | 15 August 1925 to 14 July 2023 | Küsnacht/Switzerland | Chemistry Section

■ **Jan Helms** ML | 09 March 1937 to 05 September 2023 | Würzburg/Germany | Ophthalmology, Oto-Rhino-Laryngology and Stomatology Section

■ **Yoshiki Hiki** ML | 28 July 1933 to 14 October 2022 | Tokyo/Japan | Surgery, Orthopaedics, Anaesthesiology Section

■ **Maria-Elisabeth Krautwald-Junghanns** ML | 24 August 1953 to 26 August 2023 | Leipzig/Germany | Veterinary Medicine Section

■ **Dieter Lohmann** ML | 09 December 1927 to 16 June 2023 | Leipzig/Germany | Internal Medicine and Dermatology Section

■ **Michael Speicher** ML | 25 October 1960 to 24 September 2023 | Graz/Austria | Human Genetics and Molecular Medicine Section

■ **Ian Wilmut** ML | 07 July 1944 to 10 September 2023 | Edinburgh/UK | Veterinary Medicine Section

New class I members

■ **Guy Bertrand** ML, La Jolla/USA, University of California San Diego, Chemistry Section

■ **Rainer Blatt** ML, Innsbruck/Austria, University Innsbruck, Physics Section

■ **Persis S. Drell** ML, Stanford/USA, Stanford University, Physics Section

■ **Jan Esper** ML, Mainz/Germany, Johannes Gutenberg University Mainz, Earth Sciences Section

■ **Gernot Heiser** ML, Sydney/Australia, University of New South Wales, Informatics Section

■ **Catherine Heymans** ML, Edinburgh/UK, University of Edinburgh, Physics Section

■ **Ángel Rubio** ML, Hamburg/Germany, Max Planck Institute for the Structure and Dynamics of Matter, Physics Section

■ **Daniel Rückert** ML, Munich/Germany, Technical

University of Munich, Informatics Section

■ **Martina Angela Sasse** ML, Bochum/Germany, Ruhr-University Bochum, Informatics Section

■ **Thomas Schmitz-Rode** ML, Aachen/Germany, RWTH Aachen University/Germany, Engineering Sciences Section

■ **Roberta Sessoli** ML, Florence/Italy, Università degli Studi di Firenze, Chemistry Section

■ **Alain-Sol Sznitman** ML, Zurich/Switzerland, University of Zurich (Eidgenössische Technische Hochschule ETH), Mathematics Section

■ **Anke Weidenkaff** ML, Darmstadt/Germany, Technical University of Darmstadt, Engineering Sciences Section

■ **Anna Wienhard** ML, Leipzig/Germany, Max Planck Institute for Mathematics in the Sciences, Mathematics Section

■ **Annette Zippelius** ML, Göttingen/Germany, Georg August University of Göttingen, Physics Section

New class III members

■ **Marlene Bartos** ML, Freiburg im Breisgau/Germany, Albert Ludwig University of Freiburg, Neurosciences Section

■ **Triantafyllos Chavakis** ML, Dresden/Germany, University Hospital Carl Gustav Carus Dresden, Internal Medicine and Dermatology Section

■ **Peter Dayan** ML, Tübingen/Germany, Max Planck Institute for Biological Cybernetics, Neurosciences Section

■ **Michel Gilliet** ML, Lausanne/Switzerland, Lausanne University Hospital, Internal Medicine and Dermatology Section

■ **Wolfgang Henrich** ML, Berlin/Germany, Charité University Hospital Berlin, Gynaecology and Paediatrics Section

■ **Jan-Henning Klusmann** ML, Frankfurt am Main/Germany, University Hospital Frankfurt, Gynaecology and Paediatrics Section

■ **Jens Peter Klußmann** ML, Cologne/Germany, University Hospital Cologne, Ophthalmology, Oto-Rhino-Laryngology and Stomatology Section

■ **Karin Michels** ML, Freiburg im Breisgau/Germany, University Hospital Freiburg, Global Health Section

■ **Soni Pullamsetti** ML, Gießen/Germany, Max Planck Institute for Heart and Lung Research, Internal Medicine and Dermatology Section

■ **Leticia Quintanilla-Martínez de Fend** ML, Tübingen/Germany, University Hospital Tübingen, Pathology and Forensic Medicine Section

■ **Roger Stephan** ML, Zurich/Switzerland, University of Zurich, Veterinary Medicine Section

■ **Wolfgang Weber** ML, Munich/Germany, Technical University of Munich, Radiology Section

■ **Pauline Wimberger** ML, Dresden/Germany, University Hospital Carl Gustav Carus Dresden, Gynaecology and Paediatrics Section

Publications

■ NAL-live Vol. 2020.1, v2.0

Diethard Tautz, R. Guy Reeves and Luisa F. Pallares, The New (Old) Genetics, Version 2.0., doi:10.34714/leopoldina_NAL-live_0001_02000. [This article can be discussed online.]

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Abbreviations:

ML = Member of the Leopoldina