



# Leopoldina

## news

Deutsche Akademie der Naturforscher Leopoldina –  
Nationale Akademie der Wissenschaften

Halle (Saale), 13 September 2012 **03 | 2012**

## Leopoldina issues statement on the opportunities and limits of bioenergy



cluded that bioenergy will not be able to make a quantitatively significant contribution to Germany's transition to renewable energy sources. The statement points out that bioenergy requires more surface area and is associated with higher greenhouse gas emissions than other renewable sources such as photovoltaic, solar thermal energy and wind energy. In addition, energy crops potentially compete with food crops, the statement says.

However, it also points out the areas where biogas, bioethanol and biodiesel can be a climate-friendly alternative. For example, the scientists recommend combining food production and bioenergy production to make more efficient use of biogenic waste. At the same time, they are also careful to note that the greenhouse gas emissions produced by agriculture need to be taken into consideration and integrated into the guidelines for sustainable bioenergy.

The Leopoldina has continued to engage in the social debate on bioenergy use. On 12 September, the authors of the statement discussed the Leopoldina's recommendations at a public event in Berlin attended by representatives of the government, parliament, trade associations and the scientific community. (ca)

► You can find an article by Prof. Bernhard Schink ML, who helped coordinate the statement, on page 2

The German federal government is planning to make wind, solar and biomass the country's main sources of energy in the future. To generate bioenergy, plant matter needs to be converted into a form that can be used for electricity, heat and fuel. A statement published by the Leopoldina in July 2012 entitled "Bioenergy - Chances and Limits" led to a lively public debate on bioenergy use.

More than 20 expert scientists contributed to the statement, which examined the question of whether bioenergy can really be a climate-friendly alternative to fossil fuels. After conducting research for one and a half years, the scientists con-

### Dear members and friends of the Leopoldina,

One of the biggest challenges facing society today is the energy supply of tomorrow. As such, the German government's work on ma-



king the transition to renewable, sustainable energy sources affects us all. If, by 2050, the majority of our energy is to come from renewable sources and our carbon emissions

are to fall by 80 percent, then we must see the transition as a truly collaborative project that each and every one of us must support. Research is a crucial part of this project. The German National Academy of Sciences Leopoldina recently brought the issue of energy into the public eye again when it published its statement „Bioenergy – Chances and Limits“. The document provides a nuanced exploration of the potential of using bioenergy as an alternative energy source. This issue of Leopoldina news reports on the findings of the paper and the response it has received. The Leopoldina will continue to focus on the transformation of Germany's energy system. For example, the topic will feature at this year's annual assembly (22-24 September, Berlin), which is entitled "Rolle der Wissenschaft im Globalen Wandel" (The Role of Science in Global Change). I would like to take this opportunity to invite you to join us at the conference.

Kind regards,

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# The limits of bioenergy

By Prof. Bernhard Schink ML, coordinator of the bioenergy statement

The picture on the box is not always the same as what you get inside. Consumers encounter this fact all the time. The German National Academy of Sciences Leopoldina conducted a study to determine what role bioenergy ought to play in Germany's future energy mix. It may initially seem like a good idea to cultivate biomass, especially corn and sugar beets, then ferment the sugar and use the resulting alcohol as fuel. The solution appears carbon-neutral, producing an equal amount or less carbon dioxide than the plants absorbed during their lifetime. In reality, though, the situation is much more complex. Fertiliser and lots of water is needed to grow healthy plants. And providing those two things requires energy. In addition, plants cultivated for bioenergy and plants cultivated for food compete for land, fertiliser (especially phosphate) and water, both locally and globally. Finally, fertilised soil releases nitrogen oxide and methane, very potent greenhouse gases that can put just as great a burden on the atmosphere as the carbon dioxide that was absorbed by the plants would have done. Producing energy crops therefore involves a number of problems that considerably reduce their potential benefits.

Over the last one and a half years, the German National Academy of Sciences Leopoldina has undertaken a study that sheds light on the different aspects of producing sources of biomass energy with regard to the climate balance, ecology and process economics. The findings are sobering. In Germany, bioenergy is only capable of making a very modest contribution – just a few percent – towards meeting total energy needs. Today's higher percentages are only possible as a result of large quantities of imported biomass, which are mainly used as animal feed and which make up about one-third of our total biomass conversion. Against this backdrop, it does not seem to make much sense to expand production of bioethanol and biogas in Germany. Current technology requires sugar

or starch to produce bioethanol on an industrial scale. This means bioenergy production is in direct competition with food production. The same is true for producing biodiesel from rapeseed, sunflower seeds and oil palms. The technology for fermenting other parts of plants like the stalks and leaves into ethanol does not exist (yet). This waste and the waste from livestock farming is much better suited for fermenting into biogas, a mix of methane and carbon dioxide. Biogas has the additional advantage over ethanol of not having to be distilled and separated. This step in ethanol production devours lots of energy. Decentralised use of bioenergy incorporating either biogas reactors by themselves or in combined power plants could be economically viable on a small scale. Biogas production especially ought to concentrate primarily on utilising waste.

As regards biomass production in general, one should know that plants make very inefficient use of the solar energy that is available to them. Only about one percent of the solar energy that they receive goes towards the creation of biomass. That energy can be harvested from fast-growing wood such as poplar and put to immediate use as an energy source through combustion. Converting biomass into ethanol leaves just one-fifth of the original one percent energy utilisation and only in a best-case scenario. This means bioethanol only yields 0.2 percent of the solar energy it was originally exposed to. Efficiency of this sort is negligibly low, for example when compared with photovoltaics, which already today can achieve more than ten percent conversion efficiency depending on the technology used. In light of these facts it is also unrealistic to pursue objectives like improving the efficiency of photosynthesis through process optimisation.

The Leopoldina's statement shows that bioenergy can only play a very modest role in meeting the energy needs of a country like Germany, which is densely populated and requires a large amount of

## The Statement

More than 20 expert scientists were involved in the Leopoldina's bioenergy working group, which produced the statement. The following members of the Leopoldina were responsible for coordinating the group's work: Prof. Rudolf K. Thauer ML, Max Planck Institute for Terrestrial Microbiology in Marburg; Prof. Bernhard Schink ML, Professor of Limnology and Microbial Ecology at the University of Konstanz; Prof. Bärbel Friedrich ML, Chair of the Department of Biology at Humboldt-Universität Berlin and Vice President of the Leopoldina. The statement was published in English. A bilingual German and English summary is also available, as is a paper containing the recommendations in German.

► You can download all three documents from the Leopoldina website: [www.leopoldina.org/en/publications/statements-and-recommendations/](http://www.leopoldina.org/en/publications/statements-and-recommendations/)

energy. It is a contribution that should be used by converting agricultural and municipal waste into biogas primarily through fermentation or into syngas through pyrolysis. Expanding bioethanol production in Germany can only make a very small contribution to the country's energy supply, and it entails great ecological risks in terms of greenhouse gas emissions and land and soil degradation. The Academy's statement makes a point of highlighting these aspects in the hope that they will become part of future talks on bioenergy use in Germany and central Europe.

► This article appeared in *Financial Times Germany* on 6 August 2012 in a slightly modified form.

## Conference Reports

### New findings from the life sciences

The Leopoldina's Class II discussed a wide range of research topics at its symposium

*Class II – Life Sciences held its annual symposium on 24 May 2012. During the event, which was entitled **New Advances in the Life Sciences**, members of sections within Class II presented their latest research findings. The event was chaired by the coordinator of the symposium, Prof. Claus Bartram ML, senator of the Section Human Genetics and Molecular Medicine, and Prof. Peter Propping ML, Secretary of Class II. The introductory speech was given by Prof. Irene Schulz-Hofer ML, Spokesperson of Class II.*

Prof. Erwin Grill ML, Center of Life and Food Sciences Weihenstephan at Technische Universität München, opened the symposium. His lecture, entitled “More crop per drop? – Responses of plants to water deficit”, explored the relationship between plant growth and water consumption. The UN’s Food and Agriculture Organization (FAO) says that plant production is key to solving water problems around the world. The amount of water a plant consumes depends on its biomass. The global water situation would therefore benefit if plants could use water more effectively and react better to the stress of events like water shortages. One approach involves gaining a better understanding of signaling of the plant hormone Abscisic acid (ABA) during deficit irrigation.

Prof. Ernst Bamberg ML of the Max Planck Institute of Biophysics in Frankfurt/Main is one of the founding fathers of optogenetics. In his lecture “Optogenetics in neurosciences and cell biology”, Prof. Bamberg reported on his work with Hegemann, Nagel and Deisseroth. They discovered that it is possible to control nerve cells using light and channelrhodopsins (light-gated ion channel proteins). Thanks to the team’s discovery, over 1,000 research groups around the world are now using channelrhodopsins to investigate cells.



*Ole H. Petersen from the Cardiff School of Biosciences spoke about his groundbreaking research findings on pancreatitis in the Leopoldina Lecture*

Photo: Markus Scholz

Just like manufacturing processes in the automotive industry, gene expression is subject to a kind of quality control. Given the immense complexity of the human genome and proteome, cells are constantly at risk of suffering errors. These might come about as a result of mutations, of processing errors within the cell, or of damage caused by external factors. Prof. Andreas Kulozik ML from the Center for Child and Adolescent Medicine at University Hospital Heidelberg spoke about “Quality control of gene expression”. The lecture looked at why some patients who possess a dominant genetic predisposition to beta thalassemia never actually develop the disease. The answer is that nonsense-mediated mRNA decay (NMD), a control mechanism which detects nonsense mutations in mRNA, prevents mRNA expression and thus protects against the negative effects of faulty proteins. However, the same mechanism can (in the case of Duchenne muscular dystrophy, for example) have negative consequences and lead

to the onset of the disease.

Prof. Sebastian Suerbaum ML of the Institute for Medical Microbiology and Hospital Epidemiology of Hannover Medical School gave a lecture entitled “The evolution of the carcinogenic pathogen *Helicobacter pylori* with and within its human host”. Around half the world’s population are infected with *Helicobacter pylori*. The bacteria can cause gastric cancer that kills half a million people each year – around 36,000 in the European Union alone. *Helicobacter pylori* is characterised by unusually high genetic and geographic variability. However, researchers have succeeded in identifying its origins, and its high variability has allowed them to use it to trace ancient human migrations. Thus an African strain of *H. pylori* was discovered on the American continent, for example, and researchers have found evidence indicating that large felines were infected with *H. pylori* after a “host jump” from humans. All in all, it can be said that *H. pylori* provides an excellent example of coevolution that



will help us deepen our understanding of how humans and pathogens coevolve.

Prof. Herrmann Wagner ML of the Institute for Biology II at RWTH Aachen then spoke about “The acoustic system of the barn owl”. As nocturnal birds of prey, barn owls rely on sound rather than visual cues to locate their prey and their brains are highly specialised in the processing of acoustic signals. The sophisticated system for horizontal sound localisation barn owls have developed over the course of their evolution is of great interest for both scientists doing basic research and those working on bionic applications. In particular, a deeper understanding of the auditory system on the molecular, cellular and neural levels could help researchers develop better cochlear implants and hearing aids.

The lecture given by Prof. Christian Haass ML of the Adolf Butenandt Institute at Ludwig-Maximilians-Universität in Munich focused on “The molecular clockwork of Alzheimer’s disease”. Sci-

entists have made significant progress in recent years in terms of understanding how this most common form of dementia develops. According to current scientific knowledge, amyloid plaques occur more frequently between the brain cells of sufferers of Alzheimer’s disease, while protein aggregates, known as tangles, build up inside the brain cells. The amyloid plaques contain a self-aggregating molecule, amyloid beta peptide, which destroys neural cells. According to Christian Haass, preventing the formation of amyloid plaques by using secretases – small molecular enzymes that “snip” the amyloid beta peptide out of the amyloid plaques – as blocks is a possible form of therapeutic intervention.

The scientific symposium ended with the Leopoldina Lecture, which was held in the evening by Prof. Ole H. Petersen ML from the Cardiff School of Biosciences to an audience of some 150 people. In his talk on “How the pancreas reacts to excessive alcohol and is destroyed”,

Petersen explained very clearly how pancreatic infections develop. The digestive enzymes produced by the pancreas are normally only activated after they reach the gastrointestinal tract. But under certain conditions they may already become active in the pancreas, and as a result, the pancreas destroys itself. This process of self-destruction is known as acute pancreatitis and can become chronic. In most cases, the condition is caused by excessive alcohol consumption. Chronic pancreatitis also increases the risk of contracting pancreatic cancer – a form of cancer with a very low survival rate. To date, no effective therapy exists for pancreatitis. However, new research findings provide grounds for hope, as they explain how alcohol activates the self-destruction mechanism in the pancreas. The UK’s Medical Research Council described this discovery as one of the most significant developments of 2011. (kh)

## Advances in clinical medicine

**The symposium held by the Leopoldina’s Class III focused on the latest findings in cancer research and ophthalmology**

*As part of a series of scientific symposia organised by the Leopoldina’s classes, Class III – Medicine held its congress, Advances in Clinical Medicine, on 10 July 2012. The event, which was chaired by the class spokesperson Prof. Hans Konrad Müller-Hermelink ML and the class secretary Prof. Philipp U. Heitz ML, provided an overview of the latest findings in cancer research and ophthalmology. Six Leopoldina members presented their most recent research findings at the event.*

Prof. Hans H. Kreipe ML from Hannover Medical School gave the first presentation. Kreipe conducts research on the development of mammary carcinoma (breast cancer). He presented the results achieved in recent years in the field of pathological research in terms of identifying and classifying tissues and tumour cells. More frequent sequencing of tumours in recent years has led to progress in the pathological diagnosis of tumours in general. The combination of morphological and molecular biological processes is increasingly improving the efficiency of therapies, which can be applied in a more

targeted way and with greater success. The aim of the advances in this research field is to develop predictive pathology, that is, to make it possible to detect the disease at an early stage.

After this presentation on integrated tumour pathology, Prof. Boris C. Bastian ML from the University of California in San Francisco lectured on the integrated taxonomy of skin tumours. The paradigm shift to precision medicine is also becoming evident in the field of melanomas, which have been primarily classified to date by their location on the body. Sequencing technology has also led to a reinterpretation of the taxonomy of melanocytic tumours. The mutations underlying tumorous changes in skin tissue now play a crucial role in the classification of such cases.

In the following talk, Prof. Günter Emons ML from Göttingen University asked whether oncological research has already solved the problem of endometrial carcinoma (uterine cancer). Here, too, progress in classifying tumours has led to major advances in treating the disease. Various studies have shown that some of the commonly used therapies are

only effective in certain cases or are not effective at all. In particular, the differentiation between two types of endometrial carcinoma has improved the quality of life of patients, who can now be treated in a more targeted way. It has also been shown that radiotherapy is ineffective in many cases or can even have an adverse impact. As a result of these findings, the treatment guidelines for endometrial carcinoma have now been fundamentally revised. But despite all of the advances, this type of cancer cannot be described as a problem that has been solved.

During the second half of the symposium Prof. Maria-Elisabeth Krautwald-Junghanns ML from the University of Leipzig gave the audience an interesting insight into basic research in veterinary medicine. In her lecture, she described the unusual features of the eyes of birds of prey, which count among the most highly developed optical organs in the animal world. As optical orientation is vital for birds of prey, information on the health of birds’ eyes can play a vital part in successfully treating injured animals and releasing them back into the wild. Krautwald-Junghanns has been able to

significantly improve diagnosis by using optical coherence tomography. The quality of the information on the health of birds' eyes provided by this diagnostic procedure could not previously be achieved with live birds.

This procedure has also proved very useful in other fields of veterinary medicine. For example, Krautwald-Junghanns has also developed a procedure for detecting the sex of chicken embryos. This method can be used shortly after an egg has been fertilised. The aim is to avoid killing huge numbers of male chicks shortly after they have hatched. This is still common practice in the breeding of laying hens today.

Following this short excursion into the field of veterinary medicine, Prof. Rudolf F. Guthoff ML from the University of Rostock gave a talk on developments in human ophthalmology in which he focused on the limitations of surgical treatment of presbyopia, or age-related long-sightedness. The main aim of these therapeutic procedures is to restore accommodation, that is, the ability of the lens to adapt to different distances. Guthoff described several accommodative implants and micro-technical solutions. However, a good solution is still a long way off. While some of the implants already available on the market do not achieve the desired effects due to their position in the eye, other technological solutions are currently still at the basic research stage. In particular, implants will have to be significantly reduced in size before they can be implanted in the

human eye.

Prof. Hans J. Schlitt ML from the University of Regensburg gave the final presentation in the symposium. His talk was on general advances in the field of liver transplants in Germany, but also on the problems involved. Various techniques are now being used to tackle negative developments. The donation of part of an organ by a living donor is possible, but is also viewed critically as it poses a risk to the healthy donor. However, other techniques are already being conducted successfully. For example, split liver transplants involve transplanting the organ of a deceased donor in two recipients. Auxiliary liver transplants are also used for recipients suffering from acute liver failure. In this method, a donor liver is transplanted to the patient to provide support to the native liver, which is not removed. When the native liver has recovered after some time, immunosuppressive drugs are progressively discontinued, thus leading the donor liver to reduce in size. In conclusion, Schlitt showed how extensive research is still needed on immunosuppression in particular. The drugs used here frequently have severe side effects that can subsequently reduce the success of the treatment.

In keeping with tradition, the scientific symposium was rounded off by the Leopoldina Lecture. In the lecture, Prof. Michael Hallek ML from Cologne University asked if "personalised medicine" represents genuine progress or if it is merely a marketing gimmick used by the pharmaceutical industry. The media has

become increasingly fond of the term in recent years. However, it certainly remains a controversial topic.

Hallek presented personalised medicine from the perspective of oncology. Particularly in cancer therapy, diagnostic advances have led to a high degree of individualisation in tumour treatment. This has become possible largely due to greater understanding of the genetic disorders that occur in cancer cells and make them divide at an unregulated pace. The personalised approach has come about through the development of a very wide range of drugs in recent years. However, these drugs are only effective for tumours caused by the genetic disorders for which they were developed. Using these drugs in an untargeted way often proves to be ineffective. Hallek was able to show by means of examples that a precise examination of the pathogenesis of the tumours, including molecular diagnosis, makes it possible to precisely define the most suitable therapy. This leads to a far better prognosis for individual patients than has been the case to date. At the same time, Hallek also pointed out that this fundamental change in cancer therapy would require wide-ranging changes in the organisation of the healthcare system. Although some success can already be expected, this process is still at the beginning. Nonetheless, Hallek was able to answer the question of whether or not personalised medicine marks genuine progress with an unambiguous "yes" in the case of research on and treatment of cancer. (hst)



**Leopoldina**  
Nationale Akademie  
der Wissenschaften

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#### Abbreviations

ML = Member of the Leopoldina

## New members of Class II and III received certificates



*New members of Class III - Medicine (from left to right): Reinhard Fässler (Martinsried), Heymut Omran (Münster), Jochen A. Werner (Marburg), Michael Hallek (Cologne), Hans Jürgen Schlitt (Regensburg), Konrad Reinhart (Jena), Sabine Werner (Zurich), Leopoldina-Generalsekretärin Jutta Schnitzer-Ungfug, Henning Schliephake (Göttingen), Hans Peter Rodemann (Tübingen), Manfred Dietel (Berlin), Annette Grüters-Kieslich (Berlin), Leopoldina-Präsident Jörg Hacker, Claudia Spies (Berlin), Maode Lai (Hangzhou/China), Andreas Bockisch (Essen), Angelika Schnieke (Munich), Boris C. Bastian (San Francisco/USA), Brigitte Vollmar (Rostock), Stephan Lang (Essen), Maria- Elisabeth Krautwald-Junghanns (Leipzig).*

Photos: Markus Scholz

Since the beginning of the year, Leopoldina President Prof. Jörg Hacker ML and Secretary General Prof. Jutta Schnitzer-Ungfug award certificates to the new members of the various classes at a ceremony held during the class symposia. Class II – Life Sciences met on 23 May, while Class III – Medicine held its symposium on 10 July.

At these events, the new members also receive information on the Leopoldina and its tasks, as well as on the Academy's organisational structure and administrative sections. The heads of the Department Science – Politics – Society, the Department International Relations and the Department Press and Public Relations present an overview of their work. There is also a presentation on the tasks and contact persons of the Academy's archive, library and administration.



*New members of Class II - Life Sciences (from left to right): Andreas Kulozik (Heidelberg), President Jörg Hacker, Christian Bogdan (Erlangen), Caroline Kisker (Würzburg), Stanislav N. Gorb (Kiel), Maciej Zyllicz (Warsaw/Poland), Alexander Borst (Martinsried), Ulf-Ingo Flügge (Cologne), Geoffrey L. Smith (Cambridge/UK), Sebastian Suerbaum (Hannover), Ernst Bamberg (Frankfurt/Main), Secretary General Jutta Schnitzer-Ungfug, Manfred Schartl (Würzburg), Erich Gulbins (Essen), Walter Rosenthal (Berlin).*



# Events

## September

**6 September to 19 October 2012**

**LEOPOLDINA PHOTO EXHIBITION:**  
"NEUE BILDER VOM ALTER(N)"

Leopoldina, Jägerberg 1, 06108 Halle (Saale)/Germany

**13 September**

**2.00 p.m.**

**LEOPOLDINA COLLOQUIUM:**

ON THE OCCASSION OF THE 80TH BIRTHDAY OF THE PAST PRESIDENT BENNO PARTHIER

Leopoldina, Jägerberg 1, 06108 Halle (Saale)/Germany

**13 to 14 September**

**3RD HUMAN RIGHTS COMMITTEE-SYMPOSIUM:**

"HUMAN RIGHTS AND SCIENCE"

Vertretung des Landes Sachsen-Anhalt beim Bund, Sachsen-Anhalt-Saal, Luisenstraße 18, 10117 Berlin/Germany

**17 to 19 September**

**11.00 a.m.**

**JOINT WORKSHOP:**

"STRENGTHENING THE DIALOGUE BETWEEN SCIENCE AND POLICY" COOPERATION OF EASAC AND NASAC

Leopoldina, Jägerberg 1, 06108 Halle (Saale)/Germany

**19 to 22 September**

**1.00 p.m.**

**INTERNATIONAL CONFERENCE:**

"INNATE IMMUNITY OF THE LUNG - IMPROVING PNEUMONIA OUTCOME" CONFERENCE OF THE TRANSREGIONAL COLLABORATIVE RESEARCH CENTER SFB-TR 84 AND THE LEOPOLDINA

Berlin-Brandenburg Academy of Sciences and Humanities, Markgrafestraße 38, 10117 Berlin/Germany

**22 to 24 September**

**9.00 a.m.**

**LEOPOLDINA ANNUAL ASSEMBLY:**

"DIE ROLLE DER WISSENSCHAFT IM GLOBALEN WANDEL"

PROGRAM: WWW.LEOPOLDINA.ORG/EN/EVENTS/EVENT/1674/

Langenbeck-Virchow-Haus, Luisenstraße 58/59, 10117 Berlin/Germany

Scientific organization:

Detlev Drenckhahn ML (Würzburg)

## October

**4 to 5 October**

**12.00 a.m.**

**JENA LIFE SCIENCE FORUM 2012:**

"DESIGNING LIVING MATTER – CAN WE DO BETTER THAN EVOLUTION?" COOPERATION OF THE FREGE CENTRE FOR STRUCTURAL SCIENCES OF THE JENA UNIVERSITY AND THE LEOPOLDINA

Jena University, Assembly Hall, Fürstengraben 1 und Rosensäule, Fürstengraben 27, 07743 Jena/Germany

Scientific organization: Bernd Olaf Küppers ML (Jena), Peter Schuster ML (Vienna)

**8 to 9 October**

**LEOPOLDINA SYMPOSIUM:**

"TECHNOLOGICAL INNOVATIONS FOR A LOW CARBON SOCIETY" COOPERATION OF THE ACADEMY OF SCIENCE OF SOUTH AFRICA AND THE LEOPOLDINA ON THE OCCASSION OF THE GERMAN-SOUTH AFRICAN YEAR OF SCIENCE 2012/2013

Nedbank Menlyn Maine, Auditorium, Pretoria/South Africa

Scientific organization: Sigmar Wittig ML (Karlsruhe)

**9 October**

**4.30 p.m.**

**SEMINAR ON THE HISTORY OF SCIENCE:**

PROF. DR. LOTHAR PELZ ML, ROSTOCK: "DIE KINDER VON LEWENBERG. VON DER GROSSHERZOGLICHEN BILDUNGS- UND PFLEGEANSTALT FÜR GEISTESSCHWACHE KINDER ZUR NS-KINDERFACHABTEILUNG SACHSENBERG"

Leopoldina, Auditorium, Jägerberg 1, 06108 Halle (Saale)/Germany

**9 October**

**1.30 p.m.**

**GERMAN-JAPANESE SYMPOSIUM:**

"POSITIVE AGING" COOPERATION OF THE GERMAN RESEARCH AND INNOVATION FORUM TOKYO, THE INSTITUTE OF GERONTOLOGY OF THE TOKYO UNIVERSITY AND THE LEOPOLDINA

Hotel New Otani, 4-1 Kioi-Cho, Chiyoda, Raum Suiho, Tokyo/Japan

**14 to 16 October**

**7. HEINRICH F. C. BEHR-SYMPOSIUM:**

"STAMMZELLEN UND KREBS"

German Cancer Research Center, Im Neuenheimer Feld 280, 69120 Heidelberg/Germany

Scientific organization:

Otmar Wiestler ML (Heidelberg)

**18 to 21. October**

**5.45 p.m.**

**IMB CONFERENCE:**

"DNA DEMETHYLATION, REPAIR AND BEYOND"

Institute of Molecular Biology, Auditorium, Ackermannweg 4, 55128 Mainz/Germany

Scientific organization:

Christof Niehrs ML (Mainz), George Reid (Mainz), Holger Richly (Mainz), Helle Ulrich (London)

**28 October to 14 December**

**EXHIBITION:**

"SALUTEM ET FELICITATEM! GRÜNDUNG UND INTERNATIONALE AUSSTRAHLUNG DER LEOPOLDINA", VERNISSAGE, 28 OCTOBER, 3.00 P.M., WITH PRESENTATION OF THE JOHANN LORENZ BAUSCH PROMOTION PRIZE AWARDED BY THE LEOPOLDINA FREUNDKREIS

Leopoldina, Cafeteria, Jägerberg 1, 06108 Halle (Saale)/Germany

## November

**1 to 3 November**

**LEOPOLDINA SYMPOSIUM:**

"CHANGING PATTERNS OF HEALTH PROBLEMS IN SUB-SAHARAN AFRICA: IMPACT OF COMMUNICABLE AND NON-COMMUNICABLE DISEASES", COOPERATION OF NASAC, THE GHANA ACADEMY OF ARTS AND SCIENCES AND THE LEOPOLDINA Bernhard-Nocht-Institut, Auditorium, Bernhard-Nocht-Straße 74, 20359 Hamburg/Germany

Scientific organization: Volker ter Meulen ML (Würzburg)

**6 November**

**4.00 p.m.**

**SEMINAR ON THE HISTORY OF SCIENCE:**

PROF. DR. DITTMAR DAHLMANN, BONN: "PETER SIMON PALLAS UND SEIN WISSEN"

SCHAFTLICHES WERK“

Leopoldina, Auditorium, Jägerberg 1,  
06108 Halle (Saale)/Germany

**11 to 16 November**

**LEOPOLDINA PHOTO EXHIBITION:**

“NEUE BILDER VOM ALTER(N)”

Kreishaus Landkreis Emsland, Orde-  
niederung 1, 49716 Meppen/Germany

**12 November**

**9.30 a.m.**

**LEOPOLDINA WORKSHOP:**

“NACHHALTIGKEIT IN DER WISSENSCHAFT”

Vertretung des Landes Sachsen-Anhalt  
beim Bund, Luisenstraße 18, 10117  
Berlin/Germany

**20 November to 21 December**

**LEOPOLDINA PHOTO EXHIBITION:**

“NEUE BILDER VOM ALTER(N)”

MEDIO RHEIN ERFT Bergheim,  
Konrad-Adenauer-Platz 1, 50126 Berg-  
heim/Germany

**21 November**

**6.00 p.m.**

**LEOPOLDINA DISCUSSION:**

“NEUE ANFORDERUNGEN AN DIE WISSEN-  
SCHAFTSKOMMUNIKATION”

Leopoldina, Auditorium, Jägerberg 1,  
06108 Halle (Saale)/Germany

**22 to 24 November**

**2.00 p.m.**

**LEOPOLDINA CONFERENCE:**

“WISSENSCHAFTSAKADEMIEN IM ZEIT-  
ALTER DER IDEOLOGIE. POLITISCHE  
UMBRÜCHE – WISSENSCHAFTLICHE  
HERAUSFORDERUNGEN – INSTITUTIONELLE  
ANPASSUNG” CONFERENCE OF THE PRO-  
JECT GROUP HISTORY OF THE LEOPOLDINA  
IN THE FIRST HALF OF THE 20TH CENTURY  
AND THE LEOPOLDINA

Leopoldina, Jägerberg 1, 06108 Halle  
(Saale)/Germany

**30 November**

**8.00 a.m.**

**LEOPOLDINA SYMPOSIUM:**

“AUTOPSIE UND RELIGION” COOPERATION  
OF THE CENTER FOR MEDICINE - ETHICS  
- LAW HELVETIAE, THE DEPARTEMENT  
PATHOLOGY OF THE ZURICH UNIVERSI-  
TY HOSPITAL, THE CHAIR OF CRIMINAL  
LAW, LAW OF CRIMINAL PROCEDURE AND  
MEDICAL LAW, THE GRADUATE PROGRAM

„BIOMEDICAL ETHICS AND LAW“ AND THE  
LEOPOLDINA

University Hospital, Frauenklinikstra-  
ße 10, 8091 Zurich/Switzerland

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## December

**4 December**

**4.30 p.m.**

**SEMINAR ON THE HISTORY OF SCIENCE:**

PROF. DR. MARIACARLA GADEBUSCH  
BONDIO, MUNICH: “GUTE MEDIZIN  
TROTZ FEHLBARKEIT. EIN VERMÄCHTNIS  
VON SANTORIUS, POPPER UND EINIGEN  
ANDEREN”

Leopoldina, Auditorium, Jägerberg 1,  
06108 Halle (Saale)/Germany

**18 December**

**4.30 p.m.**

**LEOPOLDINA CHRISTMAS LECTURE:**

WITH THE NOBEL LAUREATE IN MEDICINE  
2011 PROF. DR. JULES A. HOFFMANN ML,  
STRASBOURG/FRANCE

Leopoldina, Auditorium, Jägerberg 1,  
06108 Halle (Saale)/Germany

**19 December**

**7.00 p.m.**

**FISHBOWL DISCUSSION:**

ON THE TRANSITION TO RENEWABLE ENER-  
GY SOURCES

Palais am Fürstenwall, Staatskanzlei  
Sachsen-Anhalt, Hegelstraße 40-42,  
39104 Magdeburg/Germany

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## January 2013

**8 January**

**6.00 p.m.**

**SEMINAR ON THE HISTORY OF SCIENCE:**

PROF. DR. MICHAEL HAGNER ML, ZURICH:  
“GEGENWART UND ZUKUNFT DES WISSEN-  
SCHAFTLICHEN BUCHES”

Leopoldina, Auditorium, Jägerberg 1,  
06108 Halle (Saale)/Germany



# People

## Deceased members

### Andrew Fielding Huxley ML

22 November 1917 to 30 May 2012 Cambridge/UK

Section Physiology and Pharmacology/Toxicology

Sir Andrew F. Huxley explored the action potential of axons in neurons and, together with his colleague Alan Hodgkin, developed the Hodgkin-Huxley model, which describes how action potentials in neurons are initiated and propagated. In 1963 Huxley and Hodgkin were awarded the Nobel Prize in Medicine for their discoveries concerning the ionic mechanisms involved in excitation and inhibition in the peripheral and central portions of the nerve cell membrane. A year later Huxley was elected as a member of the Leopoldina.

### Erkki Koivisto ML

19 January 1927 to 27 February 2012 Tampere/Finland

Section Radiology

Erkki Koivisto was appointed a member of the Leopoldina in 1986 for his efforts to promote radiology around the world. His research activities focused primarily on diagnostic radiology and on technological advancements to improve diagnostic practice.

### Karl Lennert ML

4 June 1921 to 27 August 2012 Kiel/Germany

Section Pathology and Forensic Medicine

The Leopoldina made Karl Lennert a member in 1966 in recognition of his work on lymph-node tumours and their characteristics. He proposed a new system, called the “Kiel Classification”, which classified lymphomas according to their biological, morphological and immunological characteristics. He also collected tissue samples and created a register of lymph nodes, something that greatly benefited collaboration between medical specialists throughout Europe.

### Hubert E. Schroeder ML

17 February 1931 to 14 August 2012 Rheinfelden/Germany

Section Ophthalmology, Oto-Rhino-La-

ryngology and Stomatology

Hubert E. Schroeder is considered the father of oral structural biology. He was elected a member of the Leopoldina in 1996. His work focused on oral epithelia, in particular on gingiva and the junctional epithelia. He delivered new findings on bacterial infections in the mouth and was the first to explore the structure of the dental root.

### Werner Schroth ML

5 September 1928 to 16 June 2012 Leipzig/Germany

Section Chemistry

Werner Schroth's research mainly focused on the analysis of azulenes – exploring their physical makeup, testing out theories and preparing compounds from them. These aromatic hydrocarbons are particularly useful in chemistry and biology due to their dark-blue colour. Schroth also studied salts with heterocyclic compounds and their heterofunctional precursors. In honour of his achievements in this field, the Leopoldina made him a member in 1989.

### Heinz A. Staab ML

26 March 1926 to 29 June 2012 Berlin/Germany

Section Chemistry

The Leopoldina welcomed Heinz A. Staab into its ranks in 1974. He was elected for his pioneering work in physical and organic chemistry. For example, he found that kekulene, sometimes called “superbenzene” serves to probe the relative importance of benzenoid versus annulenoid aromaticity. He also investigated the dependency of excimer and charge-transfer interactions, work that enabled him to prepare cyclophane-bridged conjugates.

### Hans Thoenen ML

5 May 1928 to 23 June 2012 Munich/Germany

Section Neurosciences

Hans Thoenen's work focused on analysing the physiological function of the sympathetic nervous system. He was thus able to learn about the interactions between healthy and damaged cells and how the body repairs damage. Of particular significance was his discovery of the

two most important nerve growth factors – BDNF (brain-derived neurotrophic factor) and CNTF (ciliary neurotrophic factor). In 1979 the Leopoldina elected him as a member for his pioneering work.

## Newly elected members, March and May 2012

**Amparo Acker-Palmer**, Professor of Neural and Vascular Development at the Institute for Cell Biology and Neuroscience, Goethe Universität Frankfurt/Main/Germany (Section Human Genetics and Molecular Medicine)

**Annette Beck-Sickinger**, Professor of Bioorganic Chemistry & Biochemistry at the Institute of Biochemistry, Leipzig University/Germany (Section Chemistry)

**Bruce Beutler**, Regental Professor and Director at the Center for Genetics of Host Defense, University of Texas Southwestern Medical Center, Dallas/USA (Section Genetics/Molecular Biology and Cell Biology)

**Marc Burger**, Professor of Mathematics at the Department of Mathematics, Swiss Federal Institute of Technology Zurich/Switzerland (Section Mathematics)

**Webster K. Cavenee**, Professor of Medicine and Cell & Molecular Medicine at the Ludwig Institute for Cancer Research, University of California, La Jolla, San Diego/USA (Section Human Genetics and Molecular Medicine)

**Matthias Drieß**, Professor of Chemistry at the Department of Chemistry, Technische Universität Berlin/Germany (Section Chemistry)

**William B. Durham**, Senior Research Scientist at the Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, Cambridge/USA (Section Earth Sciences)

**Jochen Feldmann**, Professor of Experimental Physics at the Faculty of Physics, Ludwig-Maximilians-Universität Munich/Germany (Section Physics)

**Brett B. Finlay**, Professor at the Michael Smith Laboratories, University of British Columbia, Vancouver/Canada (Section Microbiology and Immunology)

**Raghavendra Gadagkar**, Professor of Ecological and Evolutionary Biology at the Centre for Ecological Sciences, Indian Institute of Science, Bangalore/India (Section Organismic and Evolutionary Biology)

**Sara Anna van de Geer**, Professor of Mathematics at the Department of Mathematics, Swiss Federal Institute of Technology Zurich/Switzerland (Section Mathematics)

**Ursula Hamenstädt**, Professor of Mathematics at the Mathematical Institute, University of Bonn/Germany (Section Mathematics)

**Hanns Hatt**, Professor of Cytophysiology at the Faculty of Biology and Biotechnology, Ruhr Universität Bochum/Germany (Section Physiology and Pharmacology/Toxicology)

**Gerald H. Haug**, Professor of Geology at the Geological Institute, Swiss Federal Institute of Technology Zurich/Switzerland (Section Earth Sciences)

**Peter Hegemann**, Professor of Experimental Biophysics at the Department of Biology, Humboldt Universität, Berlin/Germany (Section Biochemistry and Biophysics)

**Lutz Hein**, Professor of Pharmacology and Toxicology and Director of Section II at the Institute of Experimental and Clinical Pharmacology and Toxicology, University of Freiburg/Germany (Section Physiology and Pharmacology/Toxicology)

**Stipan Jonjić**, Professor at the Department for Histology and Embryology and Chair of the Center for Proteomics, University of Rijeka/Croatia (Section Microbiology and Immunology)

**Kurt Kremer**, Professor of Physics and Director of Polymer Theory at the Max Planck Institute for Polymer Research, Mainz/Germany (Section Physics)

**Ulrike Kutay**, Professor of Biochemistry at the Institute of Biochemistry, Swiss Federal Institute of Technology Zurich/Switzerland (Section Biochemistry and Biophysics)

**Thomas Langer**, Professor of Genetics at the Institute for Genetics, Cologne University/Germany (Section Biochemistry and Biophysics)

**Jiayang Li**, Professor at the Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, as well as Vice President of the Chinese Academy of Sciences/China (Section Organismic and Evolutionary Biology)

**Wolfgang Meyerhof**, Professor of Molecular Genetics at the University of Potsdam and Head of the Department of Molecular Genetics at the German Institute of Human Nutrition/Germany (Section Agricultural and Nutritional Sciences)

**Klaus-Robert Müller**, Professor of Machine Learning at the Department of Software Engineering and Theoretical Computer Science, Technische Universität Berlin/Germany (Section Informatics)

**Gerald Rimbach**, Professor of Human Nutrition and Food Science at the Institute of Human Nutrition and Food Science, University of Kiel/Germany (Section Agricultural and Nutritional Sciences)

**Brigitta Schütt**, Professor of Physical Geography at the Department of Earth Sciences, Freie Universität Berlin, and Vice President of the Freie Universität Berlin/Germany (Section Earth Sciences)

**Ali Mehmet Celâl Şengör**, Professor of Geology at the Department of Geological Engineering, Istanbul Technical University/Israel (Section Earth Sciences)

**Christine Silberhorn**, Professor of Applied Physics, University of Paderborn/Germany (Section Physics)

**Gabriele Stangl**, Professor of Human Nutrition at the Department of Agricultural and Nutrition Sciences, Martin Luther Universität Halle-Wittenberg/Germany (Section Agricultural and Nutritional Sciences)

**Martin Suhm**, Professor of Physical Chemistry and Director of the Institute for Physical Chemistry, Georg-August-Universität Göttingen (Chemistry Section)

**Julia Vorholt**, Professor of Microbiology at the Institute of Microbiology, Swiss Federal Institute of Technology Zurich/Switzerland (Section Microbiology and Immunology)

**Huanming Yang**, Professor of Genetics and President at the Beijing Genomics Institute, Chinese Academy of Sciences, Shenzhen/China (Section Human Genetics and Molecular Medicine)