

New President Takes Office

Martin Stratmann takes over the leadership of the Max Planck Society from Peter Gruss



Now wearing the chain of office: Martin Stratmann delivers his inaugural speech.

The first speakers at the Plenary Assembly in Munich's Prinzregententheater were Bavaria's Minister President Horst Seehofer and Federal Chancellery Minister Peter Altmaier. Before an audience of around 800 guests including leading representatives of the political, business and scientific communities, Professor Martin Stratmann thanked his predecessor who had guided the fortunes of the Max Planck Society over a period of 12 years. Among the most visible changes were the 9 new institutes founded during this time, along with the reorientation of 15 existing institutes and the 14 Max Planck Centers established jointly with leading international research institutions: "I set myself the goal of developing the Max Planck Society in such a way as to enhance its international profile," said the departing President.

His successor, Martin Stratmann, was previously Section Chairperson and Vice President of the Chemistry, Physics and Technology Section of the Max Planck Society. "Never before has this office been held by a scientist so experienced in the dealings of the Max Planck Society," emphasized Peter Gruss, as he handed over the chain of office. Describing the aspects that he intends to focus on in the future, the new Max Planck President called on the Society to be ready "to dare more Harnack."

An abbreviated version of his inaugural address is included under the "Viewpoint" column in this issue of MAXPLANCKRESEARCH.

Photos: Denise Vermillo (top), Patrick Wack (bottom)

40 Years of Close Relations with China

The Max Planck Society and the Chinese Academy of Sciences celebrate their cooperation

The Max Planck Society is a pioneer in scientific cooperation with China. As far back as the 1970s, the Society began to develop relationships and networks, and established a program of mutual collaboration in which the Chinese Academy of Sciences (CAS), China's leading research organization, played a central role. Today, the Max Planck Society is one of the most important partners of CAS worldwide. Internationally, their cooperation serves as a model of dynamic and successful partnership based on mutual interest, and extends far beyond the exchange of scientists and cooperation on individual projects.

Highlights of the anniversary celebrations in Beijing included a scientific forum of brief presentations and the opening of the Science Tunnel at the China Science and Technology Museum. These events were followed in Shanghai by a conference jointly organized by the Max Planck Society and CAS on the subject of "Personalized Medicine."

The exhibition scouts at the opening of the Science Tunnel at the China Science and Technology Museum in Beijing.



“The pressure on patients could increase”

Individualized medicine poses challenges for health policy and the law/
Interview with Max Planck Director Ulrich Becker

The concept of improving our understanding and treatment of diseases by taking the patient's genetic disposition into account is becoming steadily more important in medical research. Particularly in the field of cancer therapy, individualized medicine is already part of day to day clinical practice. New methods allow patients to receive more specifically targeted treatments and avoid those that are ineffective. Ulrich Becker, Director at the Max Planck Institute for Social Law and Social Policy, is working with scientists at Ludwig-Maximilians-Universität Munich and the Helmholtz Center Munich to study the legal, ethical and economic consequences of this development for the German healthcare system.

People often speak about individualized medicine as if it were a matter of customized pills. Just what form does such treatment take?

Ulrich Becker: Individualized medicine doesn't mean that it is customized for each individual person. It refers to certain biological features that may be displayed by various persons. As for the medical products already on the market, typically a genetic test will be performed when a certain type of cancer is first diagnosed. The object is to investigate the patient's genetic make-up and discover how cells have already been altered by the cancer in order to select a treatment that is as specific as possible. But it must be understood that the term individualized medicine doesn't refer to a tightly enclosed concept. There is a very broad spectrum of tests and medical applications.

What legal challenges does this entail?

Apart from the issue of approving new treatments and diagnostics, there is the question of how individualized medicine fits into the catalog of services covered by statutory health insurance, and above all there is the matter of data protection. If individualized medicine is to be practiced on a large scale, a great deal of personal data must be collected. Scientists must know which biological features permit which interpretations. However, the laws as they apply make only limited provision for the use of such data. These bio-databases need

a basis of their own in law so that researchers can use the data safely and securely. And there must also be adequate legal protection for patients.

The thought of going to the doctor and first having to undergo a genetic test is something a lot of people aren't comfortable with. Will my doctor then tell me which diseases I am likely to suffer from in the years ahead?

This can indeed lead to difficulties. Assuming that the tests were to reveal information pointing to some other health problem – a so-called chance discovery: Should, or must the doctor inform you? Is the doctor even allowed to do so? Up to now, you have had a right to not knowing. In fact, the protection afforded by the existing laws is relatively strong. You, as the patient, give your consent for the doctor to investigate your genetic data for one specific purpose only, and in doing so, you are able to restrict the scope of the investigation. The doctor may inform the patient of nothing more than the test results within that envelope. However, the situation becomes particularly problematic when the genetic information that is discovered is hereditary and poses a health risk for close relatives. Without the consent of the patient, it isn't permissible for his or her relatives to be informed.

Patients covered by the state health insurance scheme can already enjoy certain individualized medical benefits. These could increase significantly in the future. How might this change the state health insurance scheme?

New drugs and methods of treatment first have to be included in the list of those eligible for funding under the state scheme. As a matter of principle, new treatments have to meet high standards of effectiveness. These standards are satisfied particularly when there is statistical evidence available based on as high a number of cases as possible. However, it is difficult to provide statistical evidence of the effectiveness of individualized medicine given that, up to now, any uniform disease patterns have, as it were, been fragmented by focusing on different genetic manifestations. As a result, one disease pattern can become two,



Ulrich Becker

.....
or five, or more. The question must be asked whether the requirements for evidence of the effectiveness of any given method need to be modified.

Will health insurers soon be able to order a patient to take a genetic test?

The state insurance scheme must abide by the existing regulations, and these currently protect patients quite comprehensively. But it's conceivable that our attitude toward genetic data may change in the future. If, as a result of individualized medicine, we start collecting this data far more often, it may occur to us to take a different view of the need to protect such data. On the other hand, if the health insurance funds could, in the future, save on costs as a result of individualized medicine, the pressure could increase on patients to allow access to their data.

And will health insurers be able to save money as a result of individualized medicine?

As part of our project, the economists considered the application of individualized medicine in certain cases. We're fairly certain that individualized medicine per se won't lead to a reduction in costs. It isn't possible to generalize with any serious intent. It's a matter of taking a close look at each individual case.

Interview: Michael Schlegelmilch

Spotlight on Genes and Signal Molecules

Bayer CropScience backs fresh ideas from Max Planck start-up targenomix



Lothar Willmitzer and his team at the Max Planck Institute of Molecular Plant Physiology in Golm are world leaders in the study of signal paths and metabolic processes in plant cells. These investigations are essential not just in the interests of basic research and in understanding biological systems. They are also of great economic importance, in that they have the potential to contribute to the development of new, higher-yielding and more resistant plant varieties. It was for this reason that Willmitzer founded the company targenomix in fall 2013. And targenomix has now found a powerful partner in Bayer CropScience. Through the partnership, Bayer CropScience has access to the research results achieved by targenomix. The company is thus also following a trend toward outsourcing research in the pharmaceutical and agrichemicals industry. “Smaller companies are generally more dynamic and more innovative than large conglomerates. And it also allows the big groups to minimize their own risk,” says Lothar Willmitzer. For targenomix this is likely to be a profitable cooperation in all respects.

Arabidopsis variants help decipher the functions of a variety of plant genes.

Cellular Light Switches

Axxam is developing new technology to accelerate drug screening

In recent years, a dream has come true for neurobiologists: With the aid of optogenetics, they are now able to integrate light-sensitive ion channels – known as channelrhodopsins – derived from the alga *Chlamydomonas reinhardtii* into nerve cells and switch these on and off using light. This in turn allows them to study cell communication within a neuronal network. The light-gated channel opens and the influx of ions depolarizes the cell, which means that the voltage across the membrane changes and an action potential is triggered. The company Axxam has now employed this principle for the first time in a screening platform that can test a large number of different voltage-dependent ion channels in parallel.

Such channels are interesting targets in the search for new medical agents. The process involves altering the cells genetically in such a way that they form different variants of channelrhodopsin and of the ion channel under investigation. The voltage in the cells is altered via the light-activated channelrhodopsin, enabling scientists to investigate whether a candidate agent modifies the behavior of the target channel at different voltages as desired. The new platform replaces expensive and time-consuming methods that rely on electrodes or unnaturally high concentrations of potassium.

The small freshwater alga *Chlamydomonas reinhardtii* has revolutionized neurobiology with its light-gated channelrhodopsin.

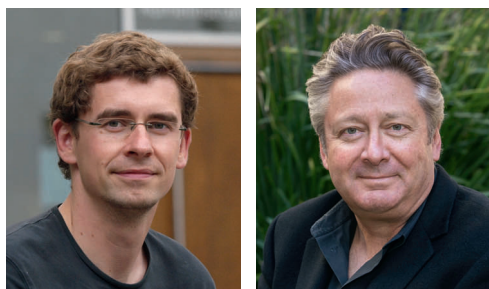


Bridging the Gap between History and the Sciences

Max Planck Institute in Jena now reoriented

The Max Planck Institute of Economics has been reoriented and renamed the Max Planck Institute for History and the Sciences. Geneticist Johannes Krause (Tübingen) and evolution research specialist Russell Gray (Auckland, New Zealand) have been appointed as Founding Directors. The new institute bridges the gap between history and the sciences. Biologists, linguists and social scientists will jointly make use of innovative scientific methods from, say, the field of genetic sequencing in order to exploit a new spectrum of information derived, for instance, from existing anthropological and archaeological collections.

“We have succeeded in appointing two internationally outstanding researchers to the new institute, Russell Gray and Johannes Krause, whose previous work impressively demonstrates the potential of this thoroughly interdisciplinary approach,” says Max Planck President Martin Stratmann. With the reorientation of the institute, two decades of



economic research at the former Max Planck Institute of Economics will come to an end at the close of 2014.

The two new Directors Johannes Krause (left) and Russell Gray.

National Awards Presented in the “Jugend forscht” Competition

Imagine the pendulum of an old grandfather clock. When another is hung on the end of the pendulum, it becomes a double pendulum. Once in motion, this arrangement can perform some crazy movements: initially, the pendulum swings smoothly back and forth; but then suddenly it begins to dance around chaotically and unpredictably. Vincent Stimper decided to take a closer look at this phenomenon. He created a computer simulation that takes Earth’s gravity into account, enabling him to precisely imitate the pendulum’s swing. His results show that, even in cases in which the movement of the double pendulum appears regular, on closer examination, it may already be in chaos. The jury praised the young researcher for the astonishing depth to which he had familiarized himself with these highly sophisticated methods of theoretical physics and declared him the national winner of the competition.

The Max Planck Society not only donates the 1,500 euro award for the national winner of “Jugend forscht,” but also funds all of the other awards in the physics category – at the regional, state and national level.

On the Net



Max Planck Has over 50,000 Fans

In early July, the number of fans of the Max Planck Society’s English-language Facebook page broke the 50,000 mark. With daily posts focusing on careers, research and scientific events, we are reaching a very young audience aged between 18 and 24. And the community is international, with the bulk of users coming from India (9,000), Germany (5,500), the US (4,900), Brazil (2,700) and Mexico (2,600). A month or so ago, the English- and German-language sites were joined by a Spanish version managed by the Latin America office in Buenos Aires.

www.facebook.com/maxplansociety
www.facebook.com/maxplanckgesellschaft
www.facebook.com/sociedadmaxplanck

Monitoring System for the Planet

Researchers at the Max Planck Institute for Ornithology in Radolfzell are working on a highly innovative project: ICARUS. Using the latest satellite technology, they not only intend to track a wide variety of species on their migrations, but they also hope to develop an entirely new type of monitoring system for our planet. It is possible that the migration routes may provide clues to predict epidemics or other natural disasters:

www.orn.mpg.de/animal_tracker

A Trio of Science Videos

Don’t miss the three educational science videos by Jon Parnell from the Max Planck Institute for Solid State Research: “Graphene: Sketches of our Future” is an insightful investigation of an everyday object: pencils. “The Other Infinity” explores the challenges of the nanoscale world and how they are tackled. The third video in the series, “A Universal Language,” explains the phenomenon of fundamental constants and the quantum Hall effect, and also features a compelling interview with Max Planck scientist and Nobel Prize laureate Klaus von Klitzing.

<https://www.youtube.com/maxplanck-stuttgart>