

An Alternative View of Art

Explaining climate research with the help of Kirchner and Calder

The Max Planck Society and the Städel Museum in Frankfurt am Main have joined forces for the first time as part of the “Guest Commentary” event series. The series was kicked off by Hamburg-based climate researcher Dirk Notz, Research Group Leader at the MPI for Meteorology.

Frankfurt’s Städel Museum has run the event format for several years now. For the 2018 series, however, exclusively Max Planck scientists have been invited to speak and give a thematic tour based on their field of expertise, taking in the works of the Städel Museum’s collection. In preparation for his guest commentary, Dirk Notz already visited the Städel Museum last year in order to gain an overview of the works he might use for his guest tour. The museum’s digital collection also helped him find relevant paintings and sculptures.

At four stations, Dirk Notz spoke about natural and man-made climate change, as well as the “set screws” that influence climatic developments in general. Beginning with “The Rain Shower,” a painting by 19th-century French artist Antoine Chintreuil, visitors were familiarized with the role of solar radiation, clouds and the composition of the atmosphere.

The second stop was a classic for all climate researchers: a winter landscape by Flemish painter Lucas van Valckenborch dating back to the 16th century. This painting pro-

vides valuable insight into the so-called Little Ice Age, which lasted from the 15th to the 19th century and is an example of natural climate change, a recurrent process in the Earth’s history.

That process is quite different from man-made climate change, which is caused by human lifestyle and is a considerably more rapid process. To illustrate his talk and inspire his audience, Dirk Notz also selected Ernst Ludwig Kirchner’s “Western Port in Frankfurt am Main,” a painting that depicts industrialization with smoking chimneys, locomotives and the new image of humanity in which man has dominion over nature. Finally, two sculptures – a mobile by Alexander Calder and “Composition” by Otto Freundlich – illustrated the fragile balance while simultaneously conveying the interdependencies between individual climatic factors.

The 30 audience members weren’t the only ones who considered the format a success – Notz did, too. “I enjoyed giving the tour and preparing for it, as it afforded me the opportunity to examine my research from a completely new perspective,” the climate researcher concluded.

Three further Max Planck scientists will appear as part of the 2018 guest commentary series: May 6: Thomas Duve, MPI for European Legal History; October 21: Ute Frevert, MPI for Human Development; November 18: Martin Stratmann, President of the MPG and Director of the MPI für Eisenforschung. Those interested can register their attendance directly with the Städel Museum. Participation in the guest commentary is free of charge, but attendees must purchase an admission ticket for the museum.

For more information, visit:

 www.staedelmuseum.de

The correlation between industrialization and climate change: Dirk Notz in front of Kirchner’s 1916 work “Western Port in Frankfurt am Main” (below) and Otto Freundlich’s sculpture “Composition”.



To Kuwait and Back

Max Planck Institute for Chemistry collects data on the chemical composition of the atmosphere on the shipping route between Europe and the Persian Gulf

Starting in the Mediterranean Sea, the “Kommandor Iona” research ship sailed along the Suez Canal and around the southern tip of the Arabian Peninsula to reach Kuwait – and then returned to the south of France. The aim of the scientific voyage, part of the AQABA (“Air quality and climate change in the Arabian Basin”) project, was to investigate the impact of air pollution on public health, the climate and the environment.

On their voyage, the researchers encountered a unique spectrum of diverse environmental conditions: They sailed through clean, undisturbed air across the Arabian Sea, while the air over the Red Sea was polluted and dusty, having blown over from Africa. In the Middle East, dry air currents from urban settlements dominated, along with ship exhaust gases.

Max Planck Director and expedition leader Jos Lelieveld described the initial measurement results: “Air pollutants alter the chemistry of naturally occurring dust in the atmosphere. This in turn impacts the water cycle, as the dust particles act as condensation nuclei for cloud droplets, which can alter rainfall and the climate as a whole.”

Lelieveld, who is also a professor at the Cyprus Institute, went on to describe how such changes can also affect flora and fauna. In addition to the Cyprus Institute, the AQABA project also includes researchers from the Kuwait Institute for Scientific Research and other institutions from Saudi Arabia, France and the US. The measurements were initially taken using drones launched from the ship, while scientific instruments were housed in five temperature-controlled laboratory containers on deck. The data sets will be used in studies on the interactions of gases and aerosols.



MPI staff in front of the “Kommandor Iona”.

Research Summit in Mexico

More than 15 Directors and Group Leaders from 14 Max Planck Institutes spoke at the first Frontiers in Science symposium in Mexico City. The conference, attended by high-ranking participants, was held at the auditorium of the National Museum of Anthropology.

The aim of the three-day event was to intensify scientific exchange and personal contact between leading Mexican scientists and to enable closer and more sustainable cooperation on research topics of mutual interest. Almost 40 scientists from Mexico and Germany gave presentations including social scientists, such as Axel Börsch-Supan (Max Planck

Institute for Social Law and Social Policy) and Ute Frevert (Max Planck Institute for Human Development), neuroscientists, like Jason Kerr (Center of Advanced European Studies and Research (Caesar)), and materials researchers, such as Beatriz Roldán (Fritz Haber Institute of the MPG). Other research fields that were covered at the first Frontiers in Science symposium in Mexico included astrophysics, biomedicine, archaeogenetics and chemical ecology. The symposium was organized by the Max Planck Society's liaison office for Latin America in collaboration with the Mexican Research Council CONACYT.

The History of the Theory of Everything

New cross-sectional research group investigates efforts to achieve a unifying framework for physics



Alexander Blum at the MPI for the History of Science in Berlin. His Max Planck Research Group officially started work in February.

By way of example, Blum names renowned physicist Werner Heisenberg, who was a Director at both the Kaiser Wilhelm and the Max Planck Institute for Physics. On April 25, 1958, he gave a speech on the 100th birthday of Max Planck in which he introduced his “theory of everything.” Using a single equation, this theory was supposed to explain all observed microscopic particles and their interactions, plus – at least in principle – the entire macroscopic universe. “However, Heisenberg’s formula provided no precise solutions, so the implications of his theory of reality were contested,” explains Blum. “Worse yet, not even the math was considered consistent.”

Despite all his efforts, Heisenberg never managed to persuade the doubters – but he also never retracted his ideas. On the contrary, he continued to pursue them with a handful of colleagues. The Research Group now aims to investigate, for instance, how one of the 20th century’s foremost scientists could be misled by his belief in a theory, basing its research on more than simply biographical interpretations such as hubris or naivety.

This is where the Group’s cross-sectionality comes into play. Initially, three Max Planck Research Groups are set to be established – two have issued calls for applications to start work in 2019, and Blum is now leading the way with the first. For Blum, whose MPI belongs to the Human Science Section (HSS), the connection with the MPI for Gravitational Physics, part of the Chemistry, Physics and Technology Section (CPTS), is very important as it facilitates collaboration with their colleagues there. “It may sound trivial, but it’s essential that we talk to people who deal with formal aspects of mathematics in their daily work,” the researcher explains. Dialogue with physicists who themselves work on quantum gravity is a valuable source for the historical perspective. “The attraction of this particular piece of history lies in the fact the topic is still being researched to this day.”

A joint Research Group between the Max Planck Institutes for the History of Science and for Gravitational Physics is currently addressing one of the major problems in physics: the century-long search for a “theory of everything.” The Group, led by Alexander Blum, is the first in the MPG to bring together disciplines from two Sections.

The modern view of the universe rests on two pillars: quantum theory and the general theory of relativity. The former describes the universe on a very small scale, the latter on a very large one. However, this intellectual edifice has one significant flaw – the two theories aren’t compatible. In fact, they diverge as far back as the very beginning of time, in their description of the Big Bang. Back in 1916, Albert Einstein speculated that his theory of general relativity would have to be merged with quantum theory, which in those days was still in its infancy. To this day, however, scientists are still struggling with this so-called quantum gravity.

It is this work that Alexander Blum’s Group on the “Historical Epistemology

of the Final Theory Program” is examining: “We want to reflect on and evaluate the search for the theory of everything using methods of historical epistemology,” says the 36-year-old, who studied physics at the University of Heidelberg and has worked at the MPI for the History of Science in Berlin since 2010. After considering the two main theories of physics in the 20th century more or less in isolation, it seemed appropriate to direct his attention to the long history of reconciling the theories, as Einstein had called for.

“In doing so, we came across an unusual situation – a research issue that existed 90 years ago and is still current today,” said Blum. “We’re interested, for example, in how knowledge has progressed to date. How has the relationship between theory and experimentation developed?” The Research Group comprises half a dozen members – including two postdocs and a doctoral student – and addresses the obstacles to the concept of such an all-encompassing theory.

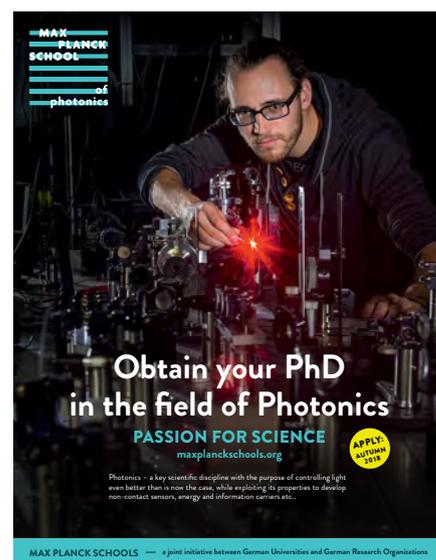
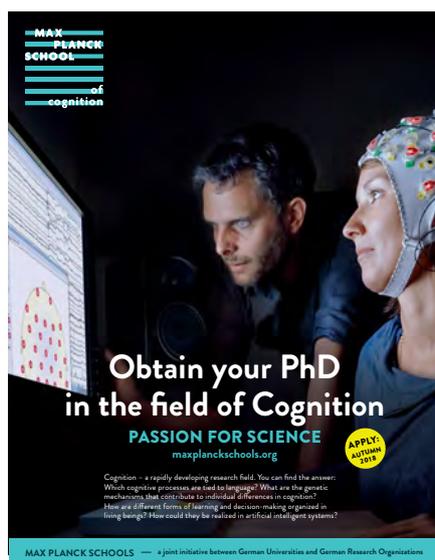
Max Planck Schools Develop International Presence

Uniform brand appearance created for the new doctoral training format

Preparations for the opening of the first three Max Planck Schools, innovative national networks for exceptional graduate education, are in full swing. At a meeting with the selection committee held late last year, the speakers introduced their now finely detailed concepts for the schools' implementation. These concepts currently form the basis for developing financial plans and curricula and for negotiating contracts with partners. In the fall of 2018, the Max Planck Schools will issue calls for appli-

cations in the new, uniform format. This date is planned to coincide with the application cycles of leading international universities, with which the schools aim to compete for the best doctoral candidates. The first students will begin their programs in 2019, and this offer is also open to bachelor's degree graduates in a fast-track procedure (two years for a master's degree, three years for a PhD). The joint website will go online at www.maxplanckschools.org in April this year.

Of the eight draft proposals, the committee led by Max Planck President Martin Stratmann and Horst Hippler, President of the German Rectors' Conference, selected three schools for a pilot phase: the Max Planck School of Cognition, the Max Planck School of Photonics and the Max Planck School Matter to Life. These schools bring together members from 21 universities and 31 institutes of non-university research organizations, underscoring the initiative's inter-institutional nature.



The three Schools and their logos: The design was selected to ensure that each Max Planck School is visible as an individual entity while still accentuating the common idea.

Call for Meitner Group Applications

Starting in 2018, up to ten additional research groups will be advertised each year in order to recruit exceptional female scientists as part of the Lise Meitner Excellence Program. The MPG hopes that the program will offer women transparent and clear career prospects. The program and the procedure were developed by a structural commission headed by Vice President Angela Friederici, with the participation of all three Section Chairs, and discussed within the Sections. Lise Meitner Groups will receive at least the same support as Max Planck Research Groups

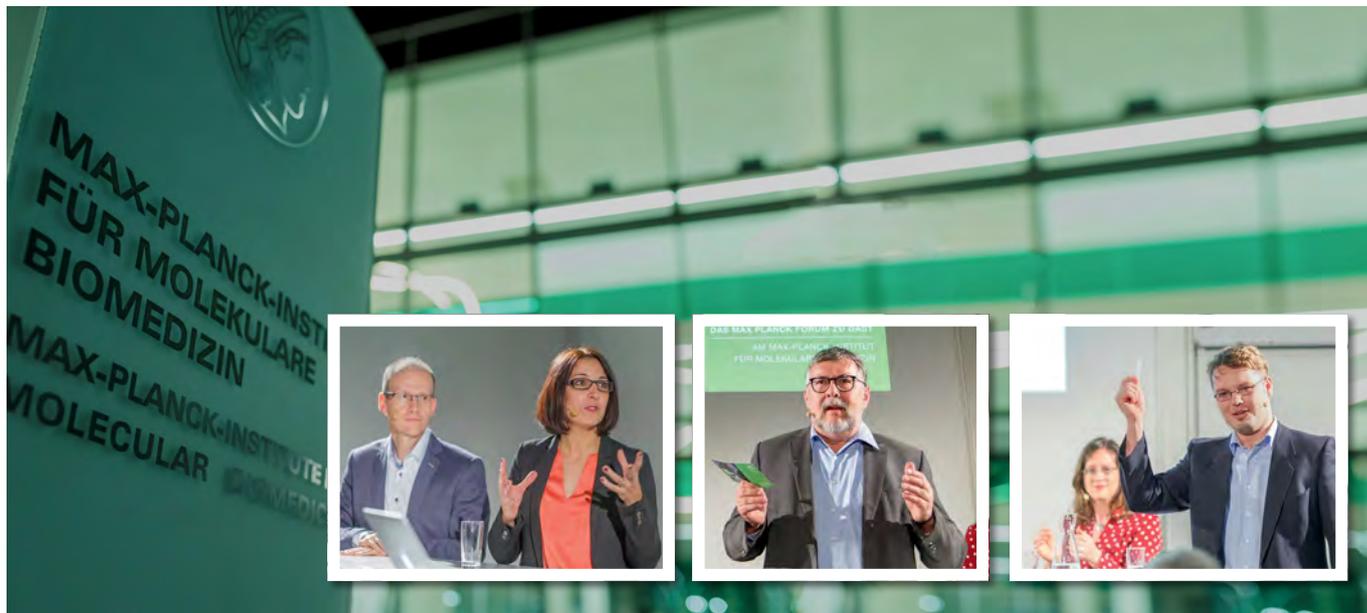
and will be centrally financed for a period of five years with the prospect of further extensions. The Lise Meitner Group Leaders will also be offered the opportunity to take part in the W2 tenure track procedure. The call for applications opened on March 1 and ends on April 18, 2018. Directors can also directly encourage candidates to apply.

The call for applications:

 <https://www.mpg.de/lise-meitner-excellence-program>

Successful Communication Event

Max Planck Forum on animal research wins over researchers and the audience



Ralf Adams and Kerstin Bartscherer (left) as well as Wiebke Herzog and Jan Bruder (right) outlined their research work in short presentations. Hans Schöler (center) took part in the panel discussion.

Animal research is a controversial topic, which is why few researchers – too few in fact – discuss it in the public domain. By withdrawing from the arena, scientists leave the field open for opponents of animal research. If you enter the term “*Tierversuche*” (animal research) into Google, on the very first page of search results you’ll find five hits with information on organizations campaigning against animal research. The link to the *tierversuche-verstehen.de* alliance website and the MPG’s main website on the issue (www.mpg.de/themenportal/tierversuche) don’t appear until the second page.

Animal welfare groups aren’t just present online, they also take their campaign to the streets with information stands in pedestrian areas and the “mouse mobile,” which tours throughout Germany. Their messages constantly seep into public perception without contradiction.

Such messages include, for example, the notion that basic research is done solely to satisfy the scientists’ curiosity and is of no benefit to humans. Those

who see human benefits only in drug development fail to recognize that basic research is primarily about understanding the body’s fundamental processes. A Max Planck Forum that attracted 100 attendees to the MPI for Molecular Biomedicine in Münster in late November was therefore given the title “The development and healing of tissue – what we learn from animal research.”

Kerstin Bartscherer, Wiebke Herzog, Ralf Adams and Jan Bruder first outlined their research work in easily understandable, 10-minute presentations. What could be achieved with a particular animal or cell culture model? And can the findings also be transferred to humans?

The range of topics included flatworms, with their incredible regeneration capacity, zebra fish, mice and human organoids. The researchers explained that key genes can be found in the development of the lymph vessels, not just in zebra fish and mice, but also in humans, and that mutations to such genes can cause serious diseases. As Jan Bruder explained, human organoids are

a valuable addition to biomedical research. Tiny organs can be grown from human cells in petri dishes, enabling particular aspects of disease and active substances to be examined.

During the subsequent panel discussion with Berlin-based science journalist Volkart Wildermuth, in which Hans Schöler also took part, criticisms of animal research were once again discussed, the limits of research on mini-organs were explored, and other key aspects were considered, such as the time-consuming authorization procedure in Germany.

The audience was full of praise for the four speakers, who won them over with “both the substance of their arguments and their personal charisma.” One audience member hoped that “at least some of those in the crowd who were skeptical of or opposed to animal research would now reconsider their views.” Overall it was an extremely successful event, a view that was also shared by the speakers themselves, including Hans Schöler. More of the same is now in order.