

MAX-PLANCK IN ISRAEL

The Max Planck Society has opened an office in Israel. Overseen by scientific manager Hila Elroy, its purpose is to maintain and expand the relationships between the Max Planck Society and Israeli researchers, especially in light of the difficult situation in Israel. In addition to Max Planck President Patrick Cramer, the Israeli president Isaac Herzog, numerous representatives of Israeli universities and research facilities, and a small Max Planck delegation took part in the opening ceremony. Scientific excellence, innovation, and a democratic, pluralistic orientation unite the Max Planck Society and the Van Leer Jerusalem Institute, which is where the office is located.

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PHOTO: YONIKELBERMANN / MPG

CAS President Jianguo Hou presents Max Planck Secretary General Simone Schwanitz and President Patrick Cramer with a model of the space telescope Einstein Probe, which the Max Planck Institute for Extraterrestrial Physics also uses to conduct research.

50 YEARS OF COLLABORA- TION WITH CHINA

The Max Planck Society has been working together with the Chinese Academy of Science (CAS) since 1974. Representatives of both organizations celebrated this collaboration at the end of October with a ceremony in Berlin. Max Planck researchers benefit from the cooperation, which has evolved over time; for example, they enjoy preferential access to the infrastructure of the CAS, some of which is unparalleled throughout the globe. This infrastructure includes the Five-hundred-meter Aperture Spherical Telescope in southwest China, for instance, which is the largest radio telescope in the world. This is one of the reasons why Max Planck maintains this collaboration with the Chinese science organization – under guarantee of academic freedom and free exchange of data – despite increasing skepticism regarding China. “In these challenging times, we as scientists must stand united, maintain bridges, and continue to collaborate while avoiding risks,” Max Planck President Patrick Cramer said during the anniversary event. “After all, many of the global challenges we face, we can only address by working together.”

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OUTSTANDING! ★

BETTINA VALESKA
LOTSCH



PHOTO: WOLFRAM SCHEIBLE / MPG

The Director at the Max Planck Institute for Solid State Research is receiving one of the 2025 Gottfried Wilhelm Leibniz Prizes, which are each awarded in addition to EUR 2.5 million in prize money. The German Research Foundation is acknowledging the chemist for her research on nanomaterials that could be used in the process of harnessing regenerative energy. For instance, she has developed photocatalysts that make it possible to use sunlight to generate hydrogen from water, even with time delays. Since the material can store energy from sunlight, it may be possible to use the material as a solar battery that can be charged directly by light.

AI FOR HEALTH

The goal of the research program BioAI Dresden is to advance biomedical research using artificial intelligence. Representatives of the Max Planck Society, Boehringer Ingelheim Foundation, and TU Dresden signed a contract to this effect in the presence of Minister-President Michael Kretschmer and Minister of Science Sebastian Gemkow in the State Chancellery of Saxony. Under the contract, the project partners and the Free State of Saxony agree to joint financing of EUR 40 million. The goal of the program is to improve the scientific understanding of health by combining AI with biochemical and physical knowledge.

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IMAGE: NATROT / ADOBESTOCK

Revealing gene sequences: artificial intelligence can help analyze sequences like these and more.

TOP IN EUROPE

Researchers at the Max Planck Society have secured 12 Synergy Grants in the latest call for applications sponsored by the European Research Council (ERC). These grants support projects for up to six years with a maximum of EUR 14 million. That means Max Planck is ahead of the French Centre National de la Recherche Scientifique (CNRS), which received ten grants,

and the University of Cambridge, which has five successful projects. In all, the ERC decided to fund 57 of the 548 projects submitted. The Max Planck Society had nine successful applications for the Consolidator Grants, for which the ERC awards a maximum of EUR 2 million for periods of up to five years, and came in second after the CNRS. A total of 328 scholars re-

ceived funding. Max Planck also ranked second behind the CNRS for the Starting Grants, which are awarded for a term of five years with an average funding amount of EUR 1.5 million: Max Planck researchers were awarded 16 of the 98 grants in this category.

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HISTORY OUT OF THE ASHES

One of the most violent known eruptions of Vesuvius took place in the year 79 AD, burying the Roman city Pompeii and its inhabitants under a thick layer of small stones and ash. A research team has now extracted and analyzed DNA from the remains of skeletons belonging to 14 people. Doing so allowed the researchers to determine the family relationships,

gender, and origin of the buried people. An especially interesting discovery they made concerns the remains of an adult with a child in their arms. In contrast to what had previously been assumed, this person was not a mother with her child, but was instead a man and a child unrelated to him. Additionally, at least one of two individuals who had previously

been considered sisters or a mother and daughter was a man. It turned out that the inhabitants of Pompeii primarily consisted of immigrants from the eastern Mediterranean area. As was the case across the entire Roman Empire, this city was thus very cosmopolitan.

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PHOTO: COURTESY OF ARCHAEOLOGICAL PARK OF POMPEII

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Plaster casts of a supposed family buried by Vesuvius in the “House of the Golden Bracelet” in Pompeii. Genetic analyses now show that all four people were male and not related to each other. The two adults and child on one of their laps were probably fleeing to the harbor, but were forced to seek protection in the stairwell of the house, where they were then killed by the collapsing stairs. The child lying foremost in the picture, a four-year-old boy, was found several meters from the group during the excavations.

Artistic representation of the disc of gas and dust around a young star, from which winds consisting of gas and dust blow out into space in a conical form.



IMAGE: NATIONAL ASTRONOMICAL OBSERVATORY OF JAPAN (NAOJ)

GONE WITH THE WIND: THE BIRTH OF A PLANET

Statistically speaking, at least one planet forms near every newborn star in the Milky Way and does so in the gas and dust disc rotating around the young star. The gas and dust also flow out of the disc, taking the form of winds. Experts suspect that the winds play an important role in the birth of stars, since they are what makes it possible for fresh building material for stars and planets to flow inwards. A research team, in which the

Heidelberg was involved, has now proven the existence of a complicated wind system in a planet-forming system for the first time using the James Webb Space Telescope. The astronomers now plan to use the telescope to research additional young systems whose planet development has progressed to different stages. By doing so, they want to find out exactly how gas currents influence the growth of stars and planets.

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ORGAN DONATIONS ARE NOT INCREASING

More than 8000 people in Germany are waiting for a donor organ, but there is little willingness to donate. That is why a reform initiated by the Bundesrat (Federal Council) in the summer intends for all people to be considered donors, unless they have actively objected to the removal of their organs (opt-out model). Until now, people needed to actively consent to organ donations. However, a study led by the Max Planck Institute for Human Development in Berlin shows that the number of organ donations has not increased in Argentina, Chile, Sweden, Uruguay, and

Wales, where the opt-out model was introduced. Researchers believe that if the transition to an objection-based solution is not accompanied by investments in the health system, information campaigns, and efforts to address the concerns of the relatives of a deceased person, the number of organ donations is unlikely to increase. As an alternative, ushering in a binding decision in favor of or against organ donation, such as during an application for proof of identity, could increase the number of donations.

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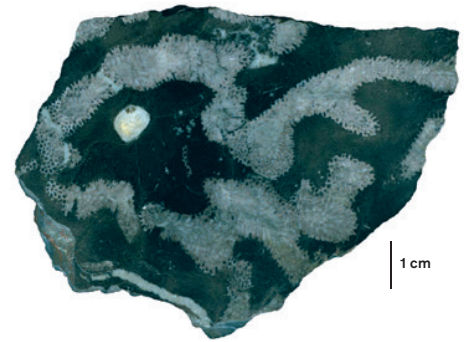


PHOTO: SIMON FELIX ZOPPE, 2021

SYMBIOSIS IN ANCIENT CORALS

Corals were already living in symbiosis with algae 400 million years ago. In this symbiosis, the algae produce carbohydrates using the energy from sunlight and provide them to the corals. Researchers under the direction of the Max Planck Institute for Chemistry in Mainz determined this when analyzing nitrogen isotopes in fossils of corals from the Devonian period in the Eifel and Sauerland regions. Their method is so sensitive that the minuscule amount of organic material contained in a few milligrams of fossilized coral was sufficient. They found the same ratio of heavy to light nitrogen that is typical of corals living in symbiosis in these fossils. The researchers thereby proved the existence of the oldest symbiosis in corals to date. This symbiotic relationship with algae could be the reason prehistoric coral reefs reached enormous proportions, even in areas that were poor in nutrients.

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SOLAR FIRE WITH LIGHT AND SHADOWS

On May 11, 2024, a solar storm of the strongest class struck the Earth head on, followed by Northern Lights that were also visible in Germany. The Earth's magnetic field was thoroughly shaken in October as well, when another strong solar flare struck the planet. As fascinating as the spectacles in the sky were, solar storms like these can cause considerable damage on Earth. The charged particles that reach us from the Sun are bundled into packages by its magnetic field. When the particles hit the Earth's magnetic field, they can disrupt electronics or communication with satellites – and thus GPS signals – or cause power networks to collapse, such

as when the lights went out in parts of Sweden in 2003. That is why the Max Planck Institute for Solar System Research is carefully researching the activity of the Sun, which makes it possible to make better predictions. One of its research questions is why the Sun is particularly active every 11 years. Among other things, the Institute is using data from the solar observatory Solar Orbiter, which was launched in 2020 and depicts the entire disc of the Sun in detail, for its analyses. The instruments also observe the solar magnetic field and its behavior with great precision.

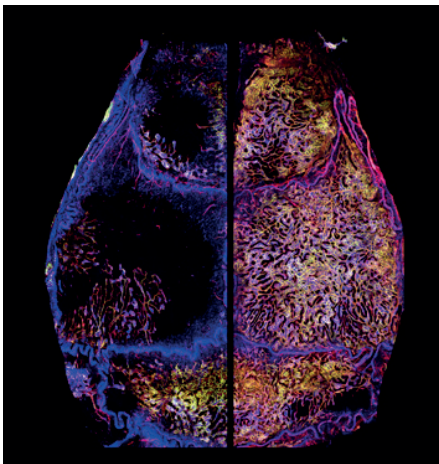
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PHOTO: SAMI SOLANKI (MPS)

An unusual phenomenon: These Northern Lights were photographed on May 11, 2024, near Göttingen.

IMAGE: MPI F. MOL. BIOMEDICINE/BONG-HHN KOH



Blood vessels in the cranial bone marrow (red) of a young (left) and an old (right) mouse.

THICK-SKULLED

Bone marrow contains the stem cells used to make all of the blood cells in our bodies. The number of blood vessels and cells decreases as organisms age. New findings suggest that the bone marrow in skulls is an exception: a research team at the Max Planck Institute for Molecular Biomedicine has discovered that the formation of blood cells increases there over the course of a lifetime. The skulls of young mice contain only a small amount of bone marrow. However, it continues growing throughout their lives, along with the number of blood

vessels. In mice, this special property appears to be unique to the bone marrow in their skulls. As a result of this continual growth, the bone marrow expands considerably and takes up more space in the cranial vault. Computer tomography images show that human cranial bone marrow also grows as we age. Researchers now hope that the knowledge they have gained can be used to help make the marrow in other bones similarly resistant to the aging process in the future.

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FLOWER 12 POWER

Lavender oil could increase the power and service life of sodium-sulfur batteries. These batteries are better suited than lithium batteries as stationary energy reservoirs for wind and solar energy, among other things, because sodium is lighter and can be obtained in a more environmentally friendly manner than lithium. In terms of their weight, however, sodium-sulfur batteries store less energy than lithium batteries and do not last as long. However, a team at the Max Planck Institute of Colloids and Interfaces has shown that their storage capacity and operational lifespan can be increased if one pole of the battery consists of a nanomaterial made of carbon and sulfur. The researchers derived the nanomaterial from linalool, the main component of lavender oil, and sulfur. Not only does it prevent polysulfide ions – which form at the positive pole when sodium-sulfur batteries discharge – from migrating to the negative pole and ultimately making the battery unusable, the nanomaterial also increases the amount of sulfur that is available for the electrochemical reaction and thus increases the battery's storage capacity.

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LOTS OF PROTEIN, LESS SUGAR

Rice is a staple food for more than 4 billion people. It is naturally rich in many carbohydrates but contains little protein. A research team at the International Rice Research Institute in the Philippines and the Max Planck Institute of Molecular Plant Physiology in Potsdam has now identified the gene that determines the carbohydrate composition and protein content in rice. The team has used both classic breeding and genome editing to produce rice types with a low sugar and high protein content. This HAHP rice (high amylose, high protein) contains about 16 percent protein. In contrast, the protein content of traditional rice varieties

is between only 2 and 8 percent. At the same time, the rice has a low glycemic index owing to its high amylose and protein content. The sugar values in blood increase less as a result. It also contains many essential amino acids not produced by the body. HAHP rice can also produce yields that are comparable to those of the high-yield varieties that are currently available on the market. The new rice is already available in countries outside the EU. Since varieties that were created using classic breeding are not classified as genetically modified, HAHP rice could also be cultivated and sold in the EU.

www.mpg.de/23544458



Rice fields at the International Rice Research Institute, where different types are cultivated

PHOTO: IRRI

ROOSTERS DO NOT CROW WITHOUT TESTOSTERONE

Although testosterone also appears in females, it is typically designated as a “male hormone”: it plays a crucial role in the sexual development, appearance, and aggressive behavior of males. Without testosterone, for example, roosters do not crow. Researchers at the Max Planck Institute for Biological Intelligence have bred and researched genetically modified chickens who

lack what is called an androgen receptor. As a result, the sexual hormone can no longer have an effect. As expected, the roosters were infertile. They also lacked a crest, wattle, and ear lobes, among other things. In contrast, their tail feathers and spurs developed much as they would in normal roosters. Evidently, the outer appearance of roosters is not solely deter-

mined by the androgen signal path. The lack of an androgen receptor had a similar effect on the hens: they were also infertile, and the typical flaps of skin on their heads were smaller than normal. The research results demonstrate that testosterone is not merely a male hormone; instead, it plays important roles in both sexes.

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PHOTO: SABINE GLOAGUEN

The H.E.S.S. telescope network in the Khomas highlands of Namibia.

RECORD ELECTRONS FROM THE UNIVERSE

The Earth is constantly bombarded by extremely small, highly energized particles like atomic nuclei and electrons. Researchers, including some from the Max Planck Institute for Nuclear Physics, have now measured the electrons with the most energy in the universe ever detected by measuring devices. They used the H.E.S.S. observatory in the highlands of Namibia to do so. Instead of directly detecting the particles, it uses light signals that they trigger when entering the thick atmosphere of the Earth. Above all, the researchers are interested in finding out which astronomical objects accelerated the electrons to such high energies. Since particles can easily be

deflected by the magnetic field of the Milky Way owing to their charge and low mass and quickly lose energy once they go astray, it is suspected that the source is relatively close to the Earth – within thousands of light years from our planet. To put this in perspective, the Milky Way has a radius of 100,000 light years. The energy distribution of the measured electrons also indicates that a few pulsar stars – possibly only one – may be their source. Pulsars are stellar remnants that accelerate electrons in their strong magnetic fields. However, it was not possible to establish the precise positions of the sources.

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HELP AGAINST VIOLENCE

A study conducted by the EU Fundamental Rights Agency in 2014 indicated that more than one third of all women in Germany become victims of physical and/or sexual violence at least once in their lives. The *Gewalthilfegesetz* [Violence Assistance Act], a law that intends to legally safeguard access to protection and consulting for people affected by violence, was debated at the beginning of December in the Bundestag but not adopted. A study by the Max Planck Institute for the Study of Crime, Security and Law in Freiburg shows how important it is. According to this study, domestic violence increased significantly during the lockdowns of the coronavirus pandemic, especially against women and girls. The researchers also questioned employees at aid organizations as part of the study. They stated that the number of inquiries received by the organizations suddenly decreased at the beginning of the first lockdown. Those questioned said that during this time, the people concerned had fewer opportunities to contact counseling centers, for instance, because they had to spend considerably more time with their violent partners.

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