NEW MAX PLANCK CENTER IN SOUTH KOREA

The Max Planck – Yonsei IBS Center for Deep Tissue Nanoscale Control began work in August 2025. In this second Max Planck Center with a South Korean partner, researchers from the Max Planck Institute for Medical Research together with its new Departments located in Heilbronn, the Max Planck Institute for Neurobiology of Behavior – caesar in Bonn, and the Institute for Basic Science at Yonsei University in Seoul are engaged in collaboration. Their goal is to visualize cellular processes deep within human tissue and to control them precisely, without damaging the tissue. Because light penetrates only a few millimeters into tissue, the researchers rely on alternative imaging techniques such as magnetic fields or ultrasound. They are also searching for evidence that the immune and nervous systems can be controlled precisely from outside the body, opening new therapeutic possibilities.

www.mpg.de/25113200

OUTSTANDING ✶

EDELGARD BULMAHN

PHOTO: DAVID AUSSERHOFER/MPG

The SPD politician and former Federal Minister of Education and Research was awarded the Harnack Medal by the Max Planck Society (MPG) for her services to science and research in Germany. During her term as minister from 1998 to 2005, she initiated several reforms that continue to have an impact today. Among other things, she created the Excellence Initiative, which has made German universities more competitive internationally, and the Joint Initiative for Research and Innovation, which guarantees non-university research organizations steady budget increases.

WOLFGANG BAUMEISTER

PHOTO: MAX PLANCK INSTITUTE OF BIOCHEMISTRY

The Director at the Max Planck Institute of Biochemistry receives the 2025 Shaw Prize for his development of cryo-electron tomography. The technique allows researchers to examine cellular structures at atomic resolution – in their native environment and in 3D. The prize is worth USD 1.2 million.

PHOTO: FABIAN VOGL / MPG

Proxima Fusion is developing a fusion power plant based on the stellarator concept. In this design, a magnetic field shaped like a twisted rope of dough confines the plasma (pink), where nuclear fusion occurs.

RECORD FUNDING FOR PROXIMA FUSION

The Munich-based startup Proxima Fusion, a spin-off from the Max Planck Institute for Plasma Physics (IPP), has raised EUR 130 million in capital. With this funding, the company aims to finance development of the world's first stellarator-based fusion power plant, planned for the 2030s. The investment represents the largest private financing round to date in fusion energy in Europe. In total, Proxima Fusion now has more than EUR 185 million in public and private funding. Together with the tokamak, the stellarator is one of two magnetic-confinement approaches to nuclear fusion, both of which confine the plasma fuel with magnetic fields. A stellarator is harder to build than a tokamak (such as the international research reactor ITER currently under construction) but has operational advantages. Proxima Fusion builds on the results of the Wendelstein 7-X stellarator experiment at the Max Planck Institute for Plasma Physics and, in developing a fusion reactor, relies on sophisticated simulations and innovative superconducting technology.

www.mpg.de/24881966

IN BRIEF

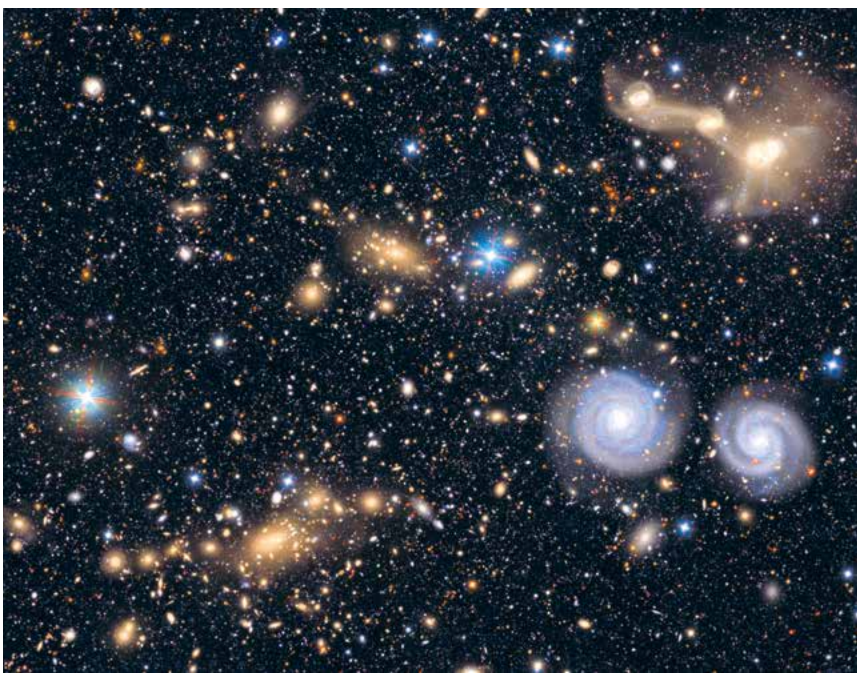


IMAGE: NSF–DOE VERA C. RUBIN OBSERVATORY

Section of a much larger image captured by the Vera C. Rubin Observatory of the Virgo Cluster of galaxies in the direction of the constellation Virgo. It shows, among other things, merging galaxies (upper right) and spiral galaxies reminiscent of the Milky Way (lower right).

THE LARGEST CAMERA FOR SPACE

The Vera C. Rubin Observatory in Chile has released its first telescope images. The images show a vast diversity of objects, including numerous galaxies of many shapes and colors. In the image shown here, assembled from more than 1,100 overlapping frames, ten million galaxies lie hidden. Thanks to its wide field of view, which is 40 times the size of the full moon, the Vera C. Rubin telescope can image the entire observable southern sky in ten years. The 8.4-meter telescope is aided by the world's largest digital camera. At 3,200 megapixels, a single image is so large that it would take 400 Ultra HD screens (an area the size of a basketball court) to display all the details at once. Researchers at the Max Planck Society will use the data to map billions of galaxies beyond the Milky Way and examine how dark matter and dark energy influence their distribution. The telescope will also capture rapidly evolving events, for example when a star is torn apart by a supermassive black hole at the center of a distant galaxy.

www.mpg.de/24900555

TWO ERC ADVANCED GRANTS FOR MAX PLANCK

Eva Schinnerer, Group Leader at the Max Planck Institute for Astronomy (MPIA) in Heidelberg, and Miltos Tsiantis, Director at the Max Planck Institute for Plant Breeding Research (MPIPZ) in Cologne, have both secured an ERC Advanced Grant. Eva Schinnerer will receive the grant, which amounts to approximately EUR 2.5 million, for the project Galaxy Centers: Understanding Star Formation in Extreme Environments. The project investigates how stars form in the dense, gas-rich centers of spiral galaxies, regions long considered atypical environments for star formation. Miltos Tsiantis's research project Clonal aims to elucidate the basis of clonal reproduction through the formation of root suckers, a little-studied mechanism of plant reproduction.

www.mpg.de/250301en
www.mpg.de/250302en

PHOTO: BRENDAN BARRETT / MAX PLANCK INSTITUTE OF ANIMAL BEHAVIOR

Capuchin on Jicarón Island with an abducted howler monkey infant. The males on the island have learned to crack hard foods with stones and are considered particularly innovative.

ABDUCTED OUT OF BOREDOM

Since 2017, researchers at the Max Planck Institute of Animal Behavior have been using motion-activated cameras to document the behavior of white-faced capuchins on an island off the coast of Panama. In 2022, a doctoral researcher reviewing the footage spotted a capuchin carrying a young howler monkey infant on his back. She then combed through tens of thousands of images and videos from that period and discovered that a young male had been carrying around four different howler monkey infants. Within five months, four additional males had adopted this behavior. Over more than a year, the animals carried eleven howler monkey infants on their backs, each for up to nine days. The footage suggests that the males had abducted the howler infants from their parents: it shows parents calling to their young from nearby trees. When the infants run away, the abductors bring them back. The infants likely starved in the end because they received no milk. The capuchins do not appear to derive any benefit from the abductions. Because capuchins on the island have few predators or competitors, the behavior may instead have arisen out of boredom and then spread through the group.

www.mpg.de/24686977

EMPATHY EMERGES IN THE CEREBELLUM

We cannot see what other people think. Yet living together depends on imagining what others know and intend. This is why we need the capacity to adopt others' perspectives. This perspective-taking ability typically emerges between ages three and five and is often tested with experiments in which participants who know the location of a particular object are observed to see whether or not they recognize that another person searching for that same object is looking in the wrong place. Researchers at the Max Planck Institute for Human Cognitive and Brain Sciences showed children film clips of such situations and recorded brain activity with magnetic resonance imaging (MRI). The scans revealed especially strong activity in regions of the cerebellum, a structure best known for movement control and increasingly recognized for its roles in language and other cognitive functions. The researchers also found that, in children, the cerebellum transmits more information to the cerebral cortex, whereas in adults, the flow of information runs in the opposite direction. This suggests that during childhood, the cerebellum may enable the cortex to decode another person's mental state. The results are consistent with the finding that injuries to the cerebellum in early childhood can lead to lasting changes in social behavior, resembling those seen in disorders like autism and schizophrenia.

www.mpg.de/24902613

BLINKS, RATHER THAN BALLADS

In a noisy setting, you have to shout to hold a conversation. Many birds do the same: they adjust the volume of their song to the ambient noise level. But according to researchers at the Max Planck Institute for Biological Intelligence, the common dipper that lives along fast-flowing streams uses another strategy. Instead of singing over the roar of the water to defend territory or attract mates, the bird sometimes switches to visual signals: it blinks. Its bright white eyelids stand out sharply against the brown plumage and are easy to see. The researchers observed that dippers blink more often when other dippers are nearby. Birds that blink generally also sing more quietly. Dippers that are alone do the opposite. Blinking, then, serves as a way to communicate with others of the same species. Just what they are signaling remains unclear, however. ***www.mpg.de/250303en***

PHOTO: KEVIN DUCLOS

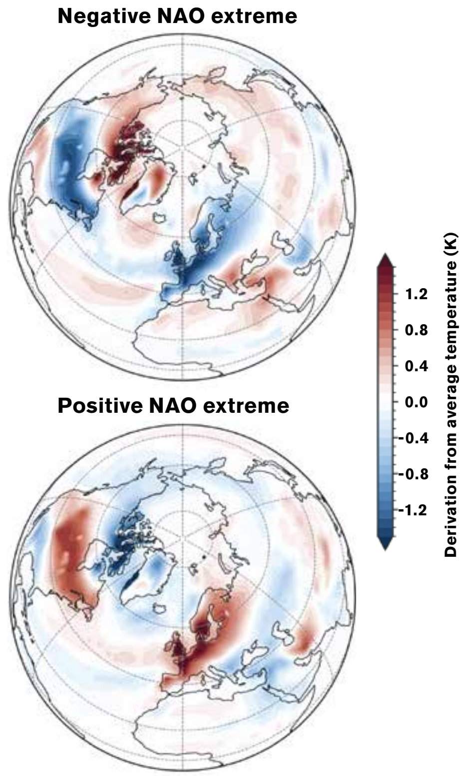
Common dippers often live along rushing waters.

DON'T BREXIT MY HEART

Couples in the United Kingdom who support different political parties are more likely to separate than those who share the same political beliefs. An analysis of more than 30 years of longitudinal data by researchers at the University of Padua and the Max Planck Institute for Demographic Research shows that the risk of separation is 38 percent higher when partners hold divergent political views and back different parties. The effect was particularly pronounced for disagreements over Brexit: couples who disagreed on Brexit separated more often than couples who agreed on it. The study underscores that political polarization not only divides society but also strains relationships – and that shared core values can foster relationship stability.

www.mpg.de/24863744

GRAPHIC: GCO BASED ON THE WORK OF QUAN LIU, MPI FOR METEOROLOGY



A divided Europe: a negative North Atlantic Oscillation (NAO) extreme – a weak pressure gradient over the North Atlantic – yields heavy rainfall in northwestern Europe and heat in southern Europe. At a positive NAO extreme (i.e., with a strong pressure difference), the weather pattern is reversed.

DROUGHT AND FLOOD IN EUROPE

Extreme heat and drought in one part of Europe, and heavy rainfall in another – a pattern that occurred in 2023 and will likely become more common in summer. As human-induced climate change advances, extremes in the North Atlantic Oscillation (NAO) are expected to grow more frequent and more pronounced. Meteorologists use this term for fluctuations in the pressure gradient over the North Atlantic between the Azores and Iceland. When that gradient is very weak in summer, as in 2023, cool and moist air moves into northwestern Europe, while warm air flows into the Mediterranean. When the gradient is extremely strong, the pattern flips: heat in northwestern Europe and lower temperatures in southern Europe.

www.mpg.de/24911578

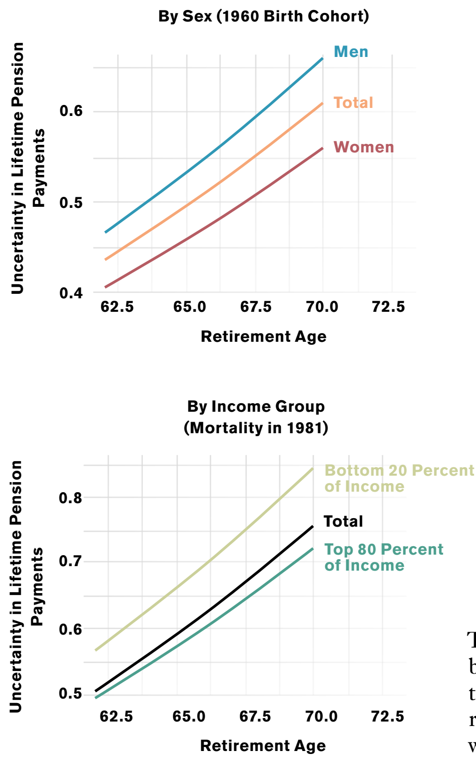
92,000

The number of years a child would need to learn a language if it learned in the same way ChatGPT does.

BRAIN BEATS AI

Toddlers acquire language far faster than AI systems. While machines process vast amounts of data in seconds, children draw on their social, cognitive, and motor skills to master language quickly through active use. In language acquisition, they are far ahead of AI. If a child were to learn language the way ChatGPT does, the process would take 92,000 years. A team at the Max Planck Institute for Psycholinguistics and the ESRC LuCiD Centre in the United Kingdom has now introduced a model that explains this advantage. What matters is not the quantity of information, but how children learn from it: they engage all senses, combining sight, hearing, touch, smell, and taste, and by exploring their surroundings, they constantly create new learning opportunities. Beyond deepening our understanding of early language development, these insights might also be able to spur AI research and development.

www.mpg.de/250203en



GRAPHIC: GCO BASED ON WORK BY THE MPI FOR DEMOGRAPHIC RESEARCH

IS IT WORTH WORKING LONGER?

In many countries, monthly pension payments increase when people retire later. Using data from the United States, a research team from the Max Planck Institute for Demographic Research, Stanford University, and Huazhong University of Science and Technology examined whether this pays off. The researchers calculated how uncertainty about life expectancy affects the optimal retirement age, measured by the total amount a person receives in pension payments over their lifetime. According to their analysis, retiring at the United States' minimum age of 62 is economically rational, because delaying retirement increases the uncertainty of ending up with a higher lifetime total. The effect is strongest for men and for people with low incomes: for them, retiring at 62 is especially advantageous, because it is particularly uncertain whether they will live long enough to benefit from a longer working life. With an early retirement, they can at least claim the entitlements accrued up to that point. The researchers recommend giving greater weight to lifespan uncertainty in pension policy to avoid exacerbating existing inequalities. ***www.mpg.de/24945137***

The later people retire, the less certain it becomes that they will receive a higher lifetime total in pension payments than if they had retired earlier, especially for men and people with low incomes. Later retirement pays off only if you live a long life.

Hydrogen embrittlement causes cracks not only in steel, as shown here, but also in aluminum alloys.

IMAGE: CEPHOTO, UWE ARANAS

RESISTANT TO HYDROGEN

A new material might make it easier to build a hydrogen economy. Hydrogen is expected to replace fossil resources in many sectors. However, due to its tendency to make many alloys turn brittle, it is difficult to transport and store. Theoretically, aluminum alloys are well suited for hydrogen applications thanks to their low weight. However, variants that are resistant to the gas have so far been too soft for many uses. An international research team – including scientists at the Max Planck Institute for Sustainable Materials – added a small amount of the metal scandium to an aluminum-magnesium alloy and then heat-treated it. This produced two types of nanoparticles in the material. One consists entirely of aluminum and scandium, which strengthens the alloy. The other has an additional shell that contains magnesium; these particles trap hydrogen and reduce the risk of embrittlement. With this alloy design, the researchers also improved the properties of other aluminum alloys. They also successfully tested the manufacturing process under conditions similar to those in industry.

www.mpg.de/24623335

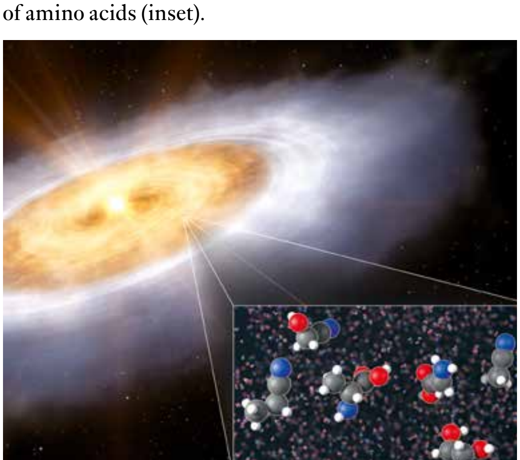
BALANCE OF POWER

In many cultures, men hold dominant positions. This is sometimes seen as a legacy of our primate past. Researchers at the Max Planck Institute for Evolutionary Anthropology in Leipzig now refute this view, having shown that gender relations in monkeys and apes depend primarily on living conditions. They analyzed interactions between males and females in more than 120 species and found that clear dominance of one sex over the other is rare. Male dominance prevailed in 25 of 151 populations, female dominance in 16. In 70 percent of the populations studied, the sexes were more or less equal in status. The researchers observed female power mainly in species where females are monogamous, grow to the same size as males, or forage primarily in trees. Under these conditions, females apparently have greater freedom to decide whether or not to mate with a given male. Solitary or pair-living species also often show female dominance. By contrast, male dominance is common in species that live mainly on the ground, where males are physically stronger and mate with several females. Humans fit neither the female-dominance nor the male-dominance group. They are much closer to species in which both sexes can gain power. **www.mpg.de/24986976**

PHOTO: CHRISTINA FICHTEL

Male (left) and female red-fronted lemur. In this species, females rank above males in the group hierarchy.

The planet-forming disk around the star V883 Orionis (artist's impression) very likely contains complex organic molecules such as the precursors of amino acids (inset).



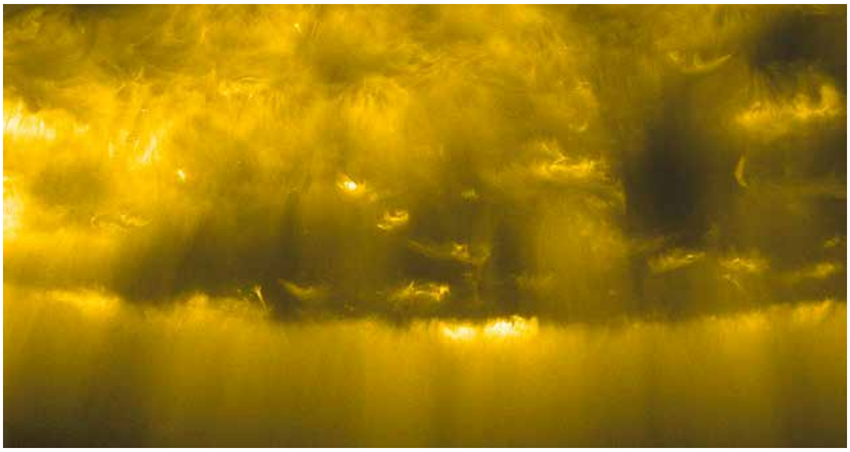
EVOLUTION BEGINS IN SPACE

Researchers at the Max Planck Institute for Astronomy have discovered complex organic molecules in the young star system V883 Orionis. It is highly probable that this is the first detection of ethylene glycol and glycolnitrile in a planet-forming disk. These compounds are considered the precursors of sugars and amino acids and may represent the key building blocks of life. Observations with the Alma radio telescope array suggest that such prebiotic molecules don't just form within the dust and gas disks around young stars: they can also survive both the death and birth phases of stars. The building blocks of life that initiate evolution should therefore already be widespread in the universe. Life in space may thus be more universal than previously thought. Whether it then emerges on planets depends primarily on the conditions on those planets. **www.mpg.de/24451940**

MAGNETIC TURMOIL ON THE SUN

In March 2025, the European–American spacecraft Solar Orbiter for the first time captured detailed images of the Sun's poles. The Sun's poles are of particular interest to researchers as they could provide crucial clues about the Sun's activity cycle. Solar Orbiter observed the poles during a maximum of the 11-year solar activity cycle, which marks a time period in which the Sun's magnetic field is in a state of flip. Over five to six years, it transforms from a dipole into a wound-up and chaotic field until it shifts back to a bipolar field of reversed polarity. During the transitional phase, the turbulent field increases the probability of intense bursts of radiation and charged particles. Instruments on board, developed under the lead of the Max Planck Institute for Solar System Research, reveal a chaotic and complex structure of the magnetic field at the south pole – small regions of opposite polarity lying close together, a clear sign of the ongoing magnetic reversal. By the end of 2026, Solar Orbiter will be able to observe the north and south poles of the Sun three more times and thus help to understand the underlying origin of the 11-year solar cycle.

www.mpg.de/24862748



The south pole of the Sun, photographed by the Extreme Ultraviolet Imager instrument aboard Solar Orbiter on March 30, 2022.

PHOTO: ESA & NASA/SOLAR ORBITER/EUI TEAM

Cissy, a Sumatran orangutan mother is taking a nap in her day nest.

PHOTO: XXX

ORANGUTANS TAKE NAPS

Orangutans, like many humans, compensate for too little sleep at night by taking naps during the day. This was observed by a team from the Max Planck Institute for Behavioral Biology and the University of Konstanz in collaboration with researchers from Universitas Nasional in Indonesia. Over a period of 14 years, the scientists collected data from 53 adult orangutans at the Suaq Balimbing Monitoring Station in Sumatra and recorded a total of 455 days and nights of orangutan behavior. Adult apes usually spend the night alone in a nest, which they rebuild every evening in about ten minutes. The researchers have now discovered that various factors can shorten the nighttime rest of orangutans, which lasts on average almost 13 hours. The presence of other orangutans during nest building is enough to cause this, but the animals also sleep less in colder temperatures or when they have traveled longer distances on the day before. However, the study also shows that for every hour of sleep they lose at night, they take five to ten minute naps during the day – for which they also build special nests, albeit simpler ones that take only two minutes to complete.

www.mpg.de/24896387

FORWARD.
VISION.
FUTURE.

€ 25,000

Apply until
15th February 2026

Hermann Neuhaus

Hermann Neuhaus Prize

The Hermann Neuhaus Prize recognizes excellent postdocs and group leaders in the Biology & Medicine Section **(BMS)** and the Chemistry, Physics & Technology Section **(CPTS)**. The prize will enable the successful applicant to further develop the application potential of his or her research.

For more information visit
www.mpg.de/hermann-neuhaus-prize