CHINA

All fun and games

Children under a special child care program enjoy fun games with a volunteer in Hohhot, Inner Mongolia autonomous region, on Monday. The winter holiday care camp aims to support children of gig workers, like couriers, food deliverymen and domestic helpers, through academic guidance, psychological companionship, and interest cultivation.
DING GENHOU / FOR CHINA DAILY

Scientists find clues to hiking chip storage

By LI MENGHAN
limenghan@chinadaily.com.cn

Chinese scientists have discovered ultratiny, "linear" boundaries inside three-dimensional crystals that could eventually allow a postage stamp-sized chip to store 10,000 high-definition movies.

The study, published in the journal Science on Friday, suggests that these structures — measuring one hundred-thousandth of the diameter of a human hair — could lead to artificial intelligence chips hundreds of times more powerful and energy-efficient than those available today.

To understand the discovery, imagine the interior of a ferroelectric crystal — a common material used in electronics — as a 3D grid, similar to a Rubik's Cube. In these materials, data is stored in different sections, or "blocks".

For years, scientists believed the boundaries separating these blocks were flat, two-dimensional interfaces, like sheets of paper. However, researchers at the Chinese Academy of Sciences' Institute of Physics found that in certain layered crystals, these "sheets" actually shrink into single, one-dimensional lines. These lines are roughly the width of a single atom.

The discovery challenges previous physics theories. Normally, these charged lines would be unstable and vanish quickly due to electrical forces.

The team found that tiny imperfections in the crystal — specifically missing or extra oxygen atoms — act like a form of atomic "glue". These defects hold the charged lines in place, making them stable enough to record and hold information.

Current storage technology, like the solid-state drives in laptops, records data in areas measured in tens of nanometers. These newly discovered "linear" walls are hundreds of times smaller.

"In theory, replacing today's storage units with these atomic-scale features could dramatically increase how much information fits into a tiny space," said Zhong Hai, the study's first author and an associate professor at Ludong University in Shandong province.

The researchers estimate this technology could pack 20 terabytes of data into a single square centimeter. This represents a storage density roughly 600 times greater than current capabilities.

While the researchers were able to create, move, and erase these lines using advanced electron microscopes and local electric fields, the technology is not yet ready for the electronics store.

Zhong emphasized that the work is fundamental research. Significant hurdles remain, such as designing microscopic electrodes capable of controlling these fields in everyday devices.

"This research opens a new path in materials science by redefining how small and flexible information-carrying structures within solids can be," Zhong said.

Chinese tourists avoid Japan amid concerns

Safety and travel advisories, and other factors drive decline in visitor numbers

By ZHAO YIMENG
zhaoyimeng@chinadaily.com.cn

Chinese tourist numbers to Japan have plummeted amid diplomatic frictions, security warnings, large-scale flight cancellations, and growing concerns over natural disasters and disease outbreaks, experts said on Tuesday.

Chinese carriers have canceled nearly half of all flights from the Chinese mainland to Japan this month. The downturn began in November, when remarks by Japanese Prime Minister Sanae Takaichi involving Taiwan triggered public backlash, according to Yang Jinsong, a researcher at the China Tourism Academy.

Yang said the drop in traveler demand is the result of multiple overlapping factors. "In addition to fluctuations in bilateral relations that have fueled public sentiment, travelers are increasingly wary of Japan's public security situation, recent earthquake activity, as well as disease outbreaks," Yang said.

On Monday, three major carriers — Air China, China Southern Airlines and China Eastern Airlines — announced that passengers who purchased tickets before noon that day for Japan-bound flights scheduled between March 29 and Oct 24, 2026, would be eligible for free refunds or changes.

Since Nov 15, 2025, Chinese carriers have canceled a large number of flights to Japan. Data from aviation platform Flight Manager shows that in January 2026, the cancellation rate for flights from the Chinese mainland to Japan reached 47.2 percent, up 7.8 percentage points from the previous month. As of Monday, flights on 49 routes scheduled for February had been canceled.

According to immigration statistics released by the Japanese government on Jan 15, about 348,700 Chinese nationals, excluding those from Hong Kong, Macao and Taiwan, traveled to Japan in December 2025, down about 40 percent from the previous year and about 35 percent from November 2025.

China's Ministry of Foreign Affairs on Monday issued a travel advisory warning that public security in Japan has deteriorated in recent months, highlighting a rise in criminal cases targeting Chinese citizens. Earthquakes in several regions have caused injuries, and the Japanese government has warned of possible follow-up seismic activity, it said.

"Chinese citizens in Japan are facing serious safety threats," the ministry said in the statement, advising travelers to avoid visiting Japan and those already there to closely monitor security conditions as well as earthquake and disaster alerts.

Meanwhile, Japan's Ministry of Agriculture, Forestry and Fisheries said on Tuesday that a highly pathogenic avian influenza outbreak, the country's 18th outbreak this season, was confirmed at a poultry farm in Chiba prefecture, near Tokyo. More than 100,000 quail were being raised at the farm.

On social media platform Xiaohongshu, also known as RedNote, users have been debating whether Japan remains a viable holiday destination. One user, nicknamed Xiaoyu, posted on Tuesday asking for advice on whether to proceed with a planned Spring Festival hiking trip along the Kumano Kodo trail.

"I am preparing a 'Plan B' amid fears of flight cancellations and other uncontrollable risks," the user said.

While some commenters said they were increasingly worried, others said their trips in December were largely unaffected.

Yang said Chinese travelers may consider alternative destinations for the holiday period, as uncertainty surrounding flights and safety conditions continues to influence travel decisions.

Study says AI narrows research focus

By ZOU SHUO
zoushuo@chinadaily.com.cn

A new study from Tsinghua University has identified a paradox in AI-assisted scientific research: while artificial intelligence boosts individual scientists' productivity, it also leads to a collective narrowing of research focus across the scientific community.

The research, led by Li Yong, a professor in Tsinghua University's department of electronic engineering, was recently published in Nature and reported by Science.

The team launched the study to address a puzzling contrast: the rapid rise of high-profile AI-powered breakthroughs alongside a documented decline in disruptive scientific discoveries across disciplines.

"We observed an intuitive contradiction between micro-level efficiency gains and macro-level feelings of convergence," Li said in an interview with China Daily.

To move beyond anecdotal evidence, the researchers constructed a large-scale panoramic knowledge map, analyzing 41.3 million academic papers published over a period of nearly 50 years.

They utilized a novel approach combining expert annotation with large language model reasoning to identify AI-infused research, achieving an identification accuracy of 0.875, with 1 representing a perfect score.

The findings showed that at an individual level, scientists who use AI publish 3.02 times more papers, receive 4.84 times more citations, and become project leaders 1.37 years earlier than peers who do not use the technology.

However, this "individual acceleration" comes at a collective cost. Research incorporating AI shows a 4.63 percent decline in knowledge breadth and a 22 percent drop in cross-disciplinary collaboration. Citation patterns in AI-driven studies form a "star-shaped structure", heavily concentrated around a small number of foundational AI papers, pointing to a trend toward homogenization.

Li explained the phenomenon using the metaphor of "collective mountain-climbing".

"Most researchers, influenced by tools and trends, converge on a few popular, data-rich 'known peaks' while largely ignoring the 'unknown peaks,'" he said.

Current AI models, which rely heavily on vast datasets, act as powerful "climbing accelerators" on established research paths. This creates a form of "scientific gravity" that steers the research community toward areas where AI performs best, systematically marginalizing data-scarce but potentially transformative frontiers, Li said.

The study identifies the root problem as a fundamental "lack of generality" in existing AI-for-science models — a systemic issue involving data availability, algorithms and entrenched research incentives.

AI's strengths in learning and prediction are most pronounced in data-rich fields, while its effectiveness drops sharply in frontier areas where data is limited or nonexistent, Li said.

The strong personal incentive to use AI for rapid publication further amplifies the trend, prioritizing problems that AI can solve over those that are more original or scientifically critical, Li added.

In response, the team has developed OmniScientist, an AI system designed as a collaborative "AI scientist". Its core philosophy is to evolve AI from a stand-alone efficiency tool into an integrated participant in the human scientific ecosystem.

The system can autonomously navigate knowledge networks, propose novel hypotheses and design experiments, particularly in cross-disciplinary and data-sparse fields, Li said, emphasizing its potential to expand scientific exploration rather than merely accelerate existing research trajectories.

For practicing scientists, Li recommends a mindset of "conscious, active steering of AI". Researchers should allow fundamental scientific questions — rather than AI's current capabilities — to guide their work, deliberately allocate resources to explore areas where AI performs poorly, and use AI to strengthen, not weaken, interdisciplinary collaboration.

Li also said educational institutions should teach critical thinking about AI's limitations alongside technical training. Journals and academic institutions should reform evaluation systems to better reward research diversity, originality and long-term exploratory projects.

For frontier research, Li said longer evaluation periods and greater tolerance of failure are needed to provide institutional support for scientists willing to explore the "unknown mountains".

Blood test helps early lung cancer detection

By LI MENGHAN
limenghan@chinadaily.com.cn

A Chinese research team has developed the world's first blood-based diagnostic kit that can tell whether lung nodules are benign or cancerous, including very small nodules that are often difficult to assess using existing methods. Researchers say the breakthrough could significantly improve early detection of lung cancer.

Lung cancer is the deadliest cancer in China, largely because many cases are discovered at an advanced stage. Early symptoms are often mild or absent, delaying diagnosis and treatment.

Low-dose CT scans are widely used to screen people at high risk, such as smokers or those with a family history of lung cancer. However, CT scans can only detect nodules and cannot determine whether they are malignant. Patients must undergo repeated follow-up scans, and studies show that fewer than 30 percent are able to comply with long-term monitoring.

"Distinguishing benign from malignant nodules is the key to achieving earlier lung cancer diagnosis and lowering mortality," said Hu Hai, a professor at the Chinese Academy of Sciences' Hangzhou Institute of Medicine and vice-president of Zhejiang Cancer Hospital, who leads the research team.

To solve this problem, the team spent about 10 years studying tumor autoantibodies — immune system signals that can appear in the blood at a very early stage of cancer, even when the number of cancer cells is still small.

Using techniques from synthetic biology and artificial intelligence, researchers analyzed complex blood samples and screened more than 400 proteins linked to early stage lung cancer. From these, they identified 13 biomarkers that are most useful for diagnosis. Eight of the biomarker combinations are newly discovered and perform significantly better than existing clinical standards in China and overseas, according to the team.

The researchers also tackled manufacturing challenges that have restricted similar tests, such as inconsistent results between production batches and short shelf life. By using customized protein tags and freeze-drying technology, they extended the kit's shelf life to 12 months under refrigeration. All core raw materials are produced domestically, ensuring a stable supply and consistent quality.

The kit was tested in clinical trials at leading hospitals, including Tongji Hospital of Huazhong University of Science and Technology's Tongji Medical College and Beijing Chest Hospital. The trials enrolled 1,463 patients with lung nodules, including 794 lung cancer cases, of which 462 were early-stage cancers.

Results showed the kit detected more than 65 percent of early-stage lung cancer cases, with accuracy significantly higher than traditional diagnostic methods. For small nodules that are often difficult to assess using low-dose CT scans alone, the test increased diagnostic accuracy to more than 85 percent.

The blood test costs about 1,000 yuan ($144) and requires only 2 milliliters of blood. Researchers say this avoids the risks associated with invasive biopsies and makes testing easier for elderly or physically frail patients, while also reducing follow-up costs.

"This marks a major step forward in early lung cancer diagnosis in China, shifting screening from relying on imaging alone to detecting molecular signals in the blood," Hu said. He added that the team hopes to expand use of the test to community clinics and health screening centers, greatly increasing early detection rates countrywide.

Sci-tech museum gets ready

Visitors explore the Shanghai Science and Technology Museum on Tuesday. After more than two years of systematic upgrades, the museum underwent its first operational stress test, inviting a specialized audience including media representatives. It is set to open to the public during Spring Festival. TAO LEI / FOR CHINA DAILY

Chengdu firm sets up large computing model in space

GUANGZHOU — A Chinese commercial aerospace firm has successfully deployed a general-purpose artificial intelligence model aboard its orbiting satellites, marking a major milestone for space-based computing.

GuoXing Aerospace Technology announced at a seminar on Monday that it has uplinked Alibaba's Qwen3 large language model onto its inaugural space-based computing center, enabling end-to-end reasoning tasks entirely in orbit.

"This marks the world's first deployment of a general-purpose large-scale AI model from ground control to an operational satellite constellation in orbit," said Wang Yabo, executive vice-president of the startup based in Chengdu, Sichuan province.

In May 2025, China launched a new constellation of 12 space computing satellites into orbit, the first cluster of GuoXing Aerospace's space computing project.

In the trial, the Qwen3 model completed multiple experiments, with questions transmitted from Earth to the satellite, processed on board, and results returned to ground stations — all within two minutes.

As AI fuels an insatiable appetite for computing power, a new field is emerging in the technological race as intelligent computing capabilities are pushed into space. In November, a SpaceX rocket orbited the Starcloud-1 satellite mounted with Nvidia GPUs.

Wang outlined the firm's ambitions to build a sprawling network of 2,800 specialized computing satellites by 2035.

The planned constellation includes 2,400 inference satellites and 400 training satellites, deployed across sun-synchronous, dawn-dusk and low-inclination orbits at altitudes of 500 to 1,000 kilometers.

The constellation is designed to employ laser inter-satellite links to facilitate high-speed data transfer, aiming to deliver 100,000 petaflops of inference compute and 1 million petaflops of training compute worldwide.

Its second and third satellite clusters are expected to be deployed this year, with a 1,000-satellite network completed by 2030, according to Wang.

XINHUA