



● As the clock ticks closer to 2025, let's bid farewell to the old and embrace the new. Here's to health, happiness and success for all in 2025. Happy New Year!

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Editor's Note:

Looking back at 2024, we have seen numerous significant breakthroughs and accomplishments in science and technology. From Chang'e 6 and allogeneic CAR-T therapy, to the first human brain-chip and SpaceX, technological innovation is bringing us more confidence and hope for the future.

Top 10 Sci-Tech News of 2024 in China

1. China Convenes Landmark National Science Conferences

On June 24, China held the National Science and Technology Conference, the National Science and Technology Award Conference, and the general assemblies of the members of the Chinese Academy of Sciences and the Chinese Academy of Engineering. These meetings emphasized accelerating China's high-level sci-tech self-reliance and charted a path to achieving its goal of becoming a science and technology powerhouse by 2035.

2. LHAASO Identifies First Super Cosmic Ray Source

Chinese scientists used data from the Large High Altitude Air Shower Observatory (LHAASO) to identify the first confirmed super cosmic ray source in the Cygnus star-forming region. A giant ultra-high-energy gamma-ray bubble structure over 5,000 light-years away was discovered, housing photons with energies up to 20 peta-electron volts, a significant milestone in astrophysics.

3. Breakthrough in High-Yield Rice Genetics

Chinese scientists decoded the genetic mechanism behind "clustered-spikelet rice," a unique variety producing multiple grains from a single position. They identified the BRD3 gene mutation and its role in regulating panicle branching and grain number, providing new angles for high-yield rice

cultivation.

4. First Observation of Fractional Quantum Anomalous Hall State of Photons

A team led by Professor Pan Jianwei from the University of Science and Technology of China successfully realized the fractional quantum anomalous Hall state of photons, a major breakthrough in quantum physics. Using superconducting optical resonators, the team created an artificial gauge field, enabling efficient exploration of novel quantum states.

5. World's First Brain-Inspired Complementary Vision Chip

Tsinghua University unveiled "Tianmuc," the first brain-inspired complementary vision chip. Mimicking human visual systems, it can adapt to extreme scenarios like sudden light changes or night flashes. Published in *Nature* in May, this breakthrough overcomes the limitations of traditional vision chips.

6. Chang'e 6 Returns with Moon's Far Side Samples

On June 25, the Chang'e 6 mission achieved the world's first lunar far-side sampling and return, collecting 1,935 grams of material. The samples revealed volcanic activity 2.8 billion years ago, and provided the first-ever ancient magnetic field data on the moon's far side, advancing lunar research.

7. Shenzhen-Zhongshan Link Opens After Seven-Year Construction

On June 30, the Shenzhen-Zhong-

shan Link, one of the world's most complex sea-crossing projects, opened to traffic. Spanning 24 km, it includes bridges, tunnels and islands, reducing travel time between Shenzhen and Zhongshan from two hours to 30 minutes.

8. Breakthrough in Allogeneic CAR-T Therapy for Autoimmune Diseases

Chinese researchers improved the situation of three patients with refractory autoimmune diseases using allogeneic CAR-T therapy. This groundbreaking approach marks the first reported successful use of such an approach for autoimmune diseases, offering new hope for patients.

9. Launch of Huawei's Native HarmonyOS

In October, Huawei introduced HarmonyOS NEXT, China's first fully self-developed mobile operating system. With zero reliance on Android's open-source code, this "pure" HarmonyOS represents a leap in domestic software innovation, setting new benchmarks in security and efficiency.

10. China's First Deep-Ocean Drilling Ship Commissioned

In November, the Meng Xiang (meaning "Dream" in Chinese) deep-ocean drilling vessel officially entered service. With a drilling capacity of 11,000 meters, the ship integrates scientific drilling, oil and gas exploration, and gas hydrate investigation. It represents a major achievement in deep-sea exploration and marine technology.



SpaceX "caught" the first-stage booster of its Starship megarocket as it returned to the launch pad after a test flight. (PHOTO: VCG)



An image generated by text-to-video model Sora. (PHOTO: OpenAI)

Top 10 International Sci-Tech News of 2024

1. Largest Ancient Human Gene Bank Created

An international research team analyzed the bones and teeth of almost 5,000 humans who lived across western Europe and Asia up to 34,000 years ago, and created the world's largest ancient human gene bank. By comparing ancient human DNA to modern-day samples, the team mapped the historical spread of genes and diseases over time as populations migrated.

2. First Human Brain Chip Implanted

American entrepreneur Elon Musk announced on January 29 that his brain-chip startup Neuralink had implanted the first brain computer interface device in a person the previous day and the recipient was recovering well. "Preliminary results show promising neuron spike detection," Musk posted on social media platform X.

3. OpenAI's Text-to-Video Tool Sora Stuns the World

Introduced in February 2024, OpenAI's generative AI model Sora can create realistic videos from text. It teaches AI to understand and simulate reality, which is of great importance for developing models that can interact with the physical world. However, if misused it can exacerbate misinformation and false content.

4. World's Biggest Neuromorphic Computer Developed

Intel has developed the world's largest neuromorphic computer system, Hala

Point. It has 1.15 billion neurons and is powered by more than 1,000 Loihi 2 processors, which can perform AI workloads using 100 times less energy at speeds as much as 50 times faster than conventional computing systems.

5. First Bose-Einstein Condensate Created from Molecules

A team of physicists has successfully created a unique quantum state of matter called a Bose-Einstein condensate (BEC) out of molecules. This first molecular BEC's greater period of stability will facilitate testing longstanding theories in quantum phenomena, including superconductivity, superfluidity and more. Molecular BECs also hold the potential to help the development of new types of quantum computers.

6. Chang'e 6 Returns with Moon's Far Side Samples

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7. CAR-T Cell Therapy for Autoimmune Diseases

A turning point in the long history of humanity's struggle against autoimmune disease came with Chinese and German researchers using chimeric antigen receptor (CAR) T cell therapy to treat deadly autoimmune diseases with positive effects.

The success brings hope for the mass production of cutting-edge CAR-T therapies.

8. SpaceX Starship Pulls Off 'Chopstick' Rocket Catch

SpaceX pulled off a bold test flight of its enormous Starship rocket. Its super heavy booster passed through the atmosphere and returned to its launchpad, where the launch tower caught it using mechanical arms that SpaceX nicknamed the "chopsticks." It was a revolutionary breakthrough in aerospace engineering.

9. Third Type of Magnetism's Existence Confirmed

Scientists have proved the existence of a new type of magnet dubbed "altermagnetism," after previously believing it impossible. The international team discovering the magnet says it could be used to develop more efficient electronic devices. The discovery of altermagnetism provides researchers with the opportunity to explore superconductivity and spintronics, key aspects of rapidly developing supercomputers and magnetic memory technology.

10. Breakthrough in Quantum Chip's Error Correction Capability

Google's latest generation quantum chip Willow managed to keep errors below a critical threshold, a breakthrough in error correction capability. This quantum error correction function is considered a necessary condition for real applications of quantum computing in the future, according to a paper published in *Nature*.



This photo taken by a mini rover released from the lander-ascender combination of Chang'e 6 probe shows a view of the combination itself on the lunar surface. (PHOTO: CNSA)



China's manned deep-sea submersible Jiaolong conducts the 300th dive in the Western Pacific Ocean. (PHOTO: XINHUA)

Chinese PV Project Empowers Suriname Villages

International Cooperation

By WANG Xiaoxia

Remote villages in the Suriname forest, most of which previously only had electricity for a few hours a day, now enjoy a continuous power supply thanks to a microgrid photovoltaic project, undertaken by Power Construction Corporation of China (PowerChina) in the small coastal South American country.

PowerChina signed a contract with Suriname's Ministry of Natural Resources in September 2019 for the first phase of a microgrid photovoltaic project in its

villages, and the first rural photovoltaic (PV) microgrid was officially put into operation in May 2020.

The microgrid is a compact power generation and distribution network comprising distributed energy sources, energy storage, conversion devices and monitoring systems. This internal grid can operate independently, purchasing power from the main grid when needed and selling excess power back when available.

The good performance of the project's first phase prompted the signing of the second phase project in July 2021. PowerChina will construct five more microgrids to benefit around 40 forest villages along the Suriname River. The first site in phase two has been completed

and features a hybrid energy setup with solar, diesel generation and energy storage, to deliver continuous power.

Providing a more stable and reliable power supply, the project is significantly enhancing the villagers' quality of life and promoting local economic development, said Chandrikapersad Santokhi, president of the Republic of Suriname.

With a stable power supply, the wild rainforest has attracted more and more tourists, and the lives of villagers have also improved. Through technical training and experience sharing, local employees have gradually mastered the operation and maintenance techniques, which brings in more income for their families.

White Paper on China-Led π -HuB Project Published

By Staff Reporters

Recently, *Nature* published online a white paper titled " π -HuB: the Proteomic Navigator of the Human Body," initiated by Chinese scientists and co-signed by scientists from 18 countries. This marks the first time *Nature* has published a white paper on a global big science project led by Chinese researchers.

On December 17, the symposium of the π -HuB project was held in Guangzhou. "More than 20 years after the completion of the Human Genome Project, while it has catalyzed the global bioeconomy's growth and prosperity, its impact on human health and the understanding of life and death has not met initial expectations. The human body consists of 37 trillion cells, and it is the

dynamic changes in proteins that hold the key to understanding life, aging, disease and death," He Fuchu, the project's chief scientist, said.

The publication of the π -HuB white paper in *Nature* highlights China's growing status, academic influence and organizational leadership in global life sciences. It also showcases the significant contributions of China's proteomics research in advancing global scientific collaboration and building a global community of health and shared future for all, according to the experts at the symposium.

The π -HuB project aims to decode the human body on a higher level than the Human Genome Project by focusing on a "real-time panoramic map" of the proteome. It is anticipated to deepen our understanding of human biology,

facilitate disease risk assessment, early diagnosis, optimal treatment strategies and the development of precision medicine. It will significantly advance proteomics technologies, leading to new diagnostic methods, therapeutic targets and revolutionary approaches to health management.

This initiative aims to usher in a transformative era of healthcare, shifting the focus toward proactive health management. According to He, the project will fully integrate artificial intelligence and big data analytics to transform data and information into knowledge and wisdom.

As of now, the π -HuB project has garnered support from over 114 top scientific teams from more than 20 countries and regions, forming a global collaborative network.