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Xi Calls for Openness, Cooperation in Sci-Tech

Chinese President Xi Jinping called on all countries to strengthen openness and cooperation in science and technology.

Xi made the remarks while delivering a speech via video at the opening ceremony of the 2021 Zhongguancun Forum (ZGC Forum), which was held from Sept. 24 to 28 in Beijing.

Xi noted that nowadays profound changes unseen in a century are evolving rapidly in the world and the impact of the COVID-19 epidemic is far-reaching, presenting severe challenges for the recovery of the global economy.

All countries in the world need to strengthen openness and cooperation in science and technology, explore ways and means of jointly solving important global issues through sci-tech innovation, address the challenges of the times together, and promote the noble cause of peace and development for all, said Xi.

He emphasized that the development of science and technology must have a global vision, grasp the pulse of the times, and closely follow the new requirements by the production and life of mankind.

Xi said that China attaches great importance to sci-tech innovation and is committed to promoting global cooperation in sci-tech innovation.

China will strengthen international sci-tech exchanges with a more open attitude, and actively participate in global innovation networks to jointly promote basic research and push forward the application of sci-tech achievements, so as to foster new growth momentum for economic development, he said.

China will strengthen intellectual property rights protection, and create a first-class innovation ecosystem. China will also shape the concept of developing science and technology for good purposes, improve global sci-tech governance, and enhance the well-being of mankind, he added.

He noted that Zhongguancun is China's first national independent innovation demonstration zone, and the ZGC Forum is a state-level platform for global sci-tech innovation exchanges and cooperation.

China supports Zhongguancun in carrying out a new round of pilot reforms, speeding up the construction of a world-leading sci-tech park, and making new contributions to promoting global sci-tech innovation exchanges and cooperation, he said.

With a theme of "intelligence, health and carbon neutrality," the forum this year is jointly organized by the Ministry of Science and Technology, the Chinese Academy of Sciences, the China Association for Science and Technology, and the Beijing municipal government.

Source: XINHUA

Staff members of China Mobile tested the signals of the 5G base station built at an altitude of 6,500 meters at the advanced base camp of Mount Qomolangma on May 21, 2021. (PHOTO: XINHUA)

Editor's Pick

IPR Protection in China: A Step Forward

By LU Zijian

Chinese President Xi Jinping launched a six-pronged Global Development Initiative, including staying committed to innovation-driven development, on September 21, via video at the general debate of the 76th session of the United Nations General Assembly.

"We need to seize the historic opportunities created by the latest round of technological revolution and industrial transformation, redouble efforts to harness technological achievements to boost productivity, and foster an open, fair, equitable and non-discriminatory environment for the development of science and technology. We should foster new growth drivers in the post-COVID era and jointly achieve leapfrog development," said Xi.

Meanwhile China has been increasing its efforts in innovation and protection of intellectual property rights (IPR). From zero to a global innovation leader, China has come a long way.

IPR drives economy

Recently, China released a 15-year plan (2021-2035) on the development of IPR. The plan proposes more rigorous IPR protection, achieving and maintaining a high level of public satisfaction, and greater market value of IPR by 2025. By 2025, the added value of patent-intensive industries is expected to equal 13 percent of China's GDP, and the added value of the copyright industry for 7.5 percent.

This is not the first time for China to issue a long-term plan for IPR development. Thirteen years ago, the *Outline of the National Intellectual Property Strategy* was launched.

Great achievements have been made since then.

Ranking as the 12th most innovative economy this year, China has been moving up the list for nine consecutive years, according to the *Global Innovation Index 2021* report, released by the World Intellectual Property Organization (WIPO) on September 20.

The report says that the performance of China is at the frontier of achievement, notably in innovation output. For example, China's levels of patents by origin, scaled by GDP, rank first, as do its levels of trademarks and industrial designs by origin as a percentage of GDP. ***See page 2***

Chinese Scientists Synthesize Starch from CO_2

Edited by WANG Xiaoxia

Chinese scientists have developed an artificial method of synthesizing starch from carbon dioxide (CO2) — a world first which marks a revolutionary leap forward in the field of basic research.

The study, conducted by the Tianjin Institute of Industrial Biotechnology (TIB) under the Chinese Academy of Sciences, was published in the journal *Science* on September 24. The research team reported a chemical-biochemical hybrid pathway for starch synthesis from carbon dioxide and hydrogen in a cell-free system.

This study makes it possible to transform starch production from traditional agricultural planting to industrial manufacturing, and paves the way for complex molecules synthesis from carbon dioxide, according to the research team.

Chinese scientist Cai Tao showed a sample of synthesized starch at a lab on Sept. 16, 2021. (PHOTO: XINHUA)

Starches, a storage form of carbohydrates, are a major source of calories in the human diet and a primary feedstock for the bioindustry.

According to the TIB, starch synthesis in nature needs about 60 metabolic reactions and complex physiological regulations.

The artificial starch anabolic pathway (ASAP), developed by the research team, consists of only 11 core reactions. It was drafted by computational pathway design, established through modular assembly and substitution, and optimized by protein engineering of three bottleneck-associated enzymes.

In a chemoenzymatic system with spatial and temporal segregation, ASAP, driven by hydrogen, converts carbon dioxide to starch at a rate 8.5 times faster than starch synthesis in maize, said Cai Tao, the lead author of the paper and an associate professor at the TIB.

With sufficient energy supply, the annual starch production of a bioreactor with the size of one cubic meter is theoretically as much as that of about 0.3 hectares of cornfields in China.

Ma Yanhe, Director General of the TIB, said that in the future, if the cost of the ASAP process can be reduced to a more economically feasible level, compared with agriculture, it will save more than 90 percent of the arable land and freshwater resources, and avoid the negative effect on the environment from pesticides and chemical fertilizer.

"The work could provide a pathway to our future industrial biomanufacturing of this important global substance," said Meagan Phelan, Science Press Package Executive Director.

BDS Provides More Precise Time Service

By WANG Xiaoxia

A high-precision time-frequency system was released at the First International Summit on BeiDou Navigation Satellite System (BDS) Applications held in Changsha, Hunan Province, September 16.

The BeiDou research team at the National University of Defense Technology (NUDT) said the system has improved the precision of time service. The high-precision all-optical transmission architectural time-frequency system was developed based on the team's own intellectual properties.

As the core of a navigation satellite system, the time-frequency system directly determines the accuracy of satellite navigation timing.

With the new system, the time reference of BDS-3 can be controlled to within one second for every 3 million years, 10 times more accurate than the previous system, which has reached the advanced level in the field of satellite navigation around the world.

The BeiDou research team at NUDT has made breakthroughs in key techniques, including high-precision optical fiber time-frequency transmission and high-stability synthetic atomic clock, and applied them to the BDS. Thus the key components to support high-precision time frequency are all developed domestically.

High-performance time service is very important, because the stable operation of communication, electricity, finance and other systems depends on reliable time synchronization.

The research team has carried out in-depth research on time-frequency including its high stability generation, high security transmission, high precision measurement, and high performance monitoring, so as to solve the bottleneck problems of high-precision traceability and remote transmission under the new architecture of the BDS-3 ground system.

An innovative approach was devised to realize high-precision time-frequency transmission based on optical fiber, and a distributed time-frequency system with high reliability and low complexity was developed after years of efforts.

The BeiDou team's achievements, represented by long-distance, high-precision and high-security time-frequency transmission technology, are being applied to satellite navigation and time-frequency systems.

There will also be broader application of these advanced technologies, for example, in measurement and testing, intelligent systems, mobile communications and scientific research.

Xi Congratulates 2021 World Internet Conference Wuzhen Summit

By TANG Zhexiao

The 2021 World Internet Conference Wuzhen Summit was held from September 26 to 28 both online and offline. Chinese President Xi Jinping sent a congratulatory letter to the 2021 World Internet Conference Wuzhen Summit, noting that digital technology is being fully integrated into the economy, politics, culture, society and building an ecological civilization with new ideas, new forms and new models, having an extensive and profound impact on humankind. ***See page 3***

WEEKLY REVIEW

Gravitational Wave Research Center Launched in Guangdong

The Gravitational Wave Research Center of China National Space Administration (CNSA) was unveiled in Zhuhai city, Guangdong Province on September 26. According to CNSA, the research center will develop a series of experimental satellite platforms and payloads to promote China's detection of space gravitational waves.

Beijing Tops Nature Index Science Cities' Rankings

For the fourth year, Beijing has held the top spot on the listings of Nature Index Science Cities which released on September 25. The index is regarded as one of the crucial methods and indicators to evaluate the performance of institutions and cities in scientific research. Four other Chinese cities — Nanjing, Guangzhou, Wuhan and Hefei — also entered the list, all ranking within top 20.

***The Lancet*: COVID-19 origin should be investigated worldwide**

Jointly written by several Chinese scientists, an article recently published on *The Lancet* noted that the origin tracing of the novel coronavirus should be conducted worldwide for pandemic prevention in the future. The article said, any hypothesis that lacks scientific evidence may lead to separation within the scientific community and among different population groups.

Chinese COVID-19 Vaccine Candidate Shows 79% Efficacy Against Delta

On September 22, Clover Biopharmaceuticals, a clinical-stage biotechnology company in China, announced that the company's protein-based COVID-19 vaccine candidate showed 79 percent efficacy against the dominant Delta variant and overall 67 percent efficacy against any variants in a large trial.

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