



# Science and Technology Daily

VOL.4-NO.127

JANUARY 20-21, 2024

## Blueprint to Fast Track 'Beautiful China'

By ZHONG Jianli

The goal of building a "Beautiful China" will be basically achieved by 2035, when green ways of production and life will be broadly adopted and the country's ecological environment will improve fundamentally.

This is the tenor of a guideline recently issued by the Communist Party of China (CPC) Central Committee and the State Council to comprehensively promote the development of a "Beautiful China."

The document says that by 2027, China will see a continuous decrease in the total discharge of major pollutants and improvement in its ecological environment. A "Beautiful China" in all respects will be built by the middle of the century.

The concept of building a "Beautiful China" was first put forward at the 18th National Congress of the CPC in 2012. Since then, the local governments of provinces have begun work on building a beautiful land with blue sky, green land and clear water.

As some structural and long-term pressures on ecological and environmental protection have yet to be resolved, the guideline stresses the need for maintaining determination to enhance ecological civilization while pursuing a path of balanced and sustainable development.

It provides an extensive roadmap and specific policy measures to comprehensively advance building a "Beautiful China" and expedite modernization that harmonizes humans with nature.

Key to the proposed plan is accelerating the transition to environment-friendly development practices. The guideline advocates deep integration of digitalization, and intelligent and low-carbon strategies within industries, noting that by 2027, the proportion of new energy vehicles among all new automobiles should reach 45 percent.

The document outlines a comprehensive plan to implement a step-by-step carbon peaking action. By 2035, non-fossil energy is expected to constitute an increased proportion of total energy consumption, and the creation of a more effective, dynamic and globally influential carbon trading market is on the agenda.

In the sustained and intensive efforts to combat pollution, by 2027, the national average concentration of fine particulate matter should decrease to below 28 micrograms per cubic meter, and the target for 2035 is below 25 micrograms per cubic meter.

The document also proposes establishing demonstration areas for building a "Beautiful China," such as the Xiong'an New Area, Yangtze River Economic Belt and Guangdong-Hong Kong-Macao Greater Bay Area.

See page 2

## New Graphic

### Goals of Comprehensively Promoting the Building of a Beautiful China



By 2027

• A continuous decrease in the total discharge of major pollutants.

By 2035

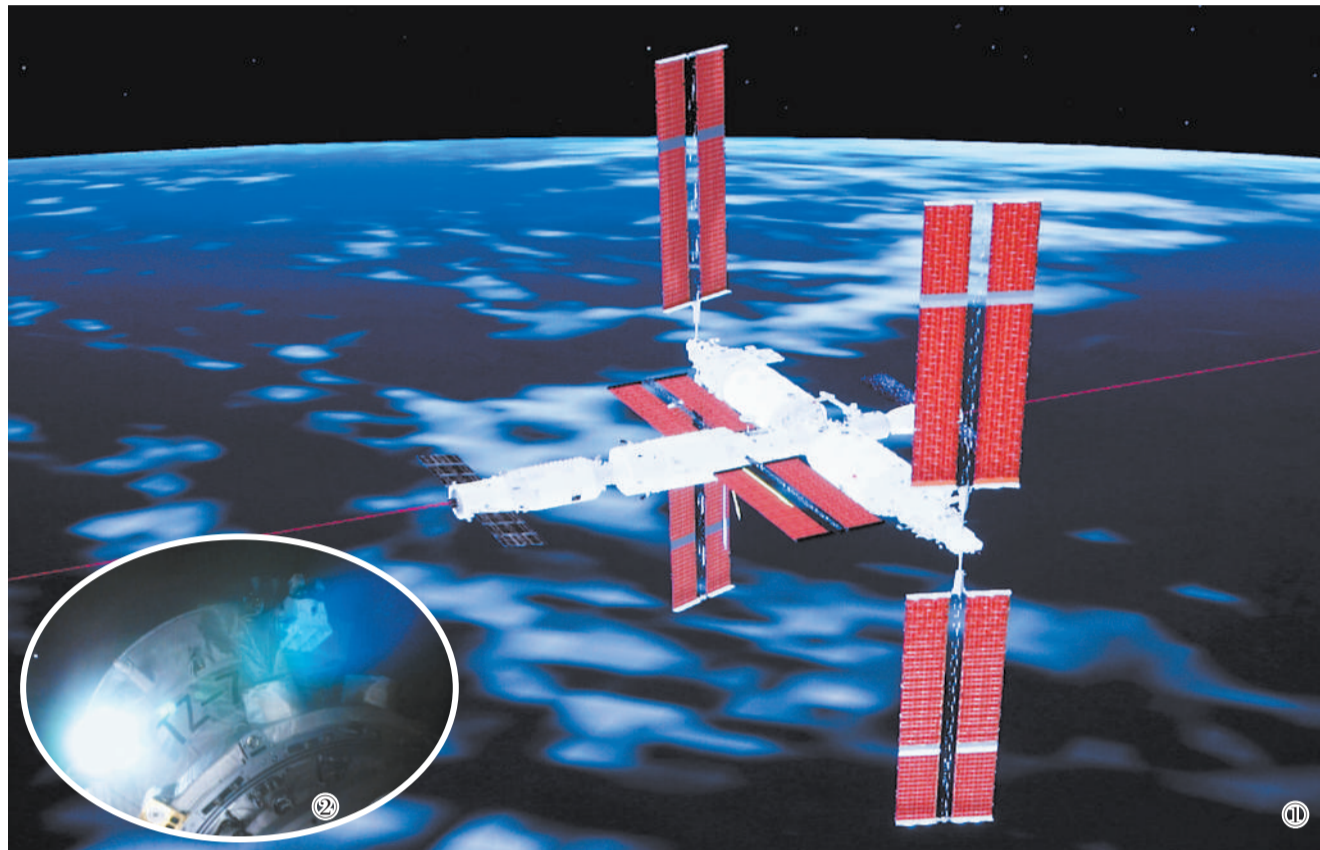
• Carbon emissions will have peaked and be in steady decline.



By 2050

• Green development and lifestyles will have taken full shape, and the deep decarbonization of some key areas will have been realized.

Source: XINHUA Designed by LIN Yuchen / S&T Daily



①This simulated image captured at Beijing Aerospace Control Center on January 18 shows China's cargo spacecraft Tianzhou-7 having conducted a rendezvous and docking with the combination of the space station Tiangong. ②This screen image shows China's cargo spacecraft Tianzhou-7 approaching the combination of the space station Tiangong before docking. (PHOTO: XINHUA)

## Editor's Pick

## Ecological Monitoring Helps Scientific Protection

By Staff Reporters

Ecological monitoring is a basis for objectively and accurately understanding regional ecological conditions, as well as scientifically implementing ecological protection and restoration.

According to a work plan jointly issued by the Ministry of Ecology and Environment (MEE) and the Chinese Academy of Sciences (CAS), China will establish an ecological quality monitoring network, and has identified the first batch of 55 National Ecological Quality Comprehensive Monitoring Stations, including Xishuangbanna station (forest) in Yunnan province and Changzhou plain water network station (wetland) in Jiangsu province.

### Covering major types of ecosystem

At the crack of dawn, Shen Wei and his colleagues at the Changzhou plain water network station go out to collect samples from waters, before returning to the laboratory to analyze them.

"We have observed *Novaculina chinensis*, a national second-class protected animal, and it has been found several times in succession, which shows that the ecological condition of the lake is

gradually improving," said Shen, deputy head of ecology department of Changzhou environmental monitoring center.

"Listed as the first batch of the national monitoring station, our work has also ushered in an upgrade: from focusing on the plain water network to the comprehensive management of mountains, rivers, forests, fields, lakes and grasslands," said Pan Chen, director of Changzhou environmental monitoring center.

The first batch of 55 National Ecological Quality Comprehensive Monitoring Stations covers major ecosystem types, including key protection regions and urban agglomerations with intensive human activity. According to the MEE, ecological monitoring network takes biodiversity and habitats as monitoring objects, including the species composition, structure and function of the biological community, and aims to realize all-round monitoring of various ecosystems within 100 kilometers of the station.

### Integrated system

"Millions of pieces of monitoring data are collected every year, in terms of biology, meteorology, hydrology and soil," said Yuan Shengdong, a researcher at

CAS Xishuangbanna tropical rainforest ecosystem research station. Yuan added that it is hard to have new findings over a short period, and long-term data is necessary to figure out the dynamic changes in tropical rainforests.

After being selected as the national ecological quality comprehensive monitoring station, the work efficiency of the station is expected to improve. Advanced tools such as satellites, planes and unmanned aerial vehicles (UAV) will be used to coordinate with ground monitoring, thus constructing an integrated ecological monitoring technological system, according to the MEE.

The satellite remote sensing, as the main means of ecological supervision, covers a large scope all day, which can find surface changes and problems in a timely manner. The UAVs are more flexible and respond rapidly. Equipped with visible infrared, hyperspectral, lidar and other payloads, they can help verify the problems found by satellites. Ground monitoring, mainly through cameras and patrols, can also detect and prevent human interference activities in a timely manner.

See page 2

## 'Lobster Eyes' Telescope to Observe Universe

By TANG Zhexiao

Adopting cutting-edge space science technology, including "lobster eyes" telescope and CMOS sensors, China launched its new X-ray astronomical satellite Einstein Probe (EP) on January 10.

The EP, shaped like a double-petaled lotus flower blooming in space with 12 petals, was designed to detect outbursts in the universe at X-ray wavelengths, and capture traces of fleeting phenomena. The "petal" is a special X-ray telescope carrying 36 microporous imagers, each containing nearly a million

square holes narrower than a strand of human hair.

The EP was developed by scientists inspired by the functioning of lobster's eyes. Made up of numerous tiny square tubes, lobster eyes allow light from all directions to reflect in the tubes and point to the same spherical center on the retina, which gives the lobster a large field of view.

Scientists mimicked the lobster eye to develop the large-field X-ray imaging telescope, aiming to efficiently observe and detect mysterious outbursts in the universe.

The previous X-ray telescopes only had a field of view roughly the size of the Moon as seen from Earth, while "lobster eyes" telescope is capable of covering a celestial region about the size of 10,000 Moons, said Ling Zhixing, a scientist of the National Astronomical Observatories of the Chinese Academy of Sciences.

According to the research team, the European Space Agency and the Max Planck Institute for Extraterrestrial Physics in Germany jointly participated in the EP project, and the French Space Agency provided very high frequency antennas for the EP.

## International Cooperation

## Container Terminal Deepens Sino-Egyptian Ties

By LIN Yuchen

The bustling Abu Qir Marine Port Container Terminal in the Egyptian coastal city of Alexandria witnessed a historic moment when the Chinese cargo vessel Zhonggu Jilin docked at the terminal on January 10. It marked the official inauguration of the terminal, constructed by China Harbour Engineering Company (CHEC).

Located on the Mediterranean coast, Alexandria is the second largest city in Egypt. Its geographical position makes it a part of international shipping routes, as well as a key hub for maritime trade. The ambitious container terminal initiative undertaken by CHEC is poised to redefine the region's maritime landscape and foster international cooperation.

Duan Kun, head of CHEC Egypt, highlighted the achievements of the project management team. He said the team overcame numerous challenges to maintain an impressive construction pace, ensuring the project's completion without any safety, quality or environmental incidents.

The first phase of construction encompassing the 600-meter quay and supporting facilities was completed in October 2023, making the terminal ready to operate. In the second phase, additional infrastructure is being built, such as embankments, fence, electrical systems, communication networks and other facilities.

The Abu Qir Container Terminal is contributing significantly to the local community. Since construction started, the project has generated over 2,000 direct employment opportunities for the local workforce. When it becomes fully operational, the terminal is anticipated to have an annual throughput capacity of two million standard containers. It is expected to catalyze the growth of Egypt's maritime trade industry with sustained development of the industrial chain.

This landmark cooperation between China and Egypt not only showcases the success of international cooperation, but also underscores the positive impact on Egypt's economy and the broader maritime trade landscape.

## WEEKLY REVIEW

### Origin Wukong a Hit with Global Users

As of Jan. 15, Origin Wukong, the China-developed third-generation superconducting quantum computer, had completed over 33,800 quantum computing tasks for global users since it became operational on Jan. 6.

### New Strategy to Improve Solar Cell Performance

Researchers from Kunming University of Science and Technology have proposed a new strategy to significantly improve the photoelectric conversion efficiency and lifetime of the battery, the university said on Jan. 14.

### Formation Process of Primitive Star Clusters Revealed

An international team led by Peking University has unveiled their findings on the formation process of high-mass protostellar clusters, by using large radio telescopes to undertake high-definition observations. The results were recently published in concerned academic journals.

### Ultra-low Temperature Achieved in Supersolid Candidate

Chinese scientists have achieved ultra-low temperature refrigeration — below minus 273°C — in a recently synthesized supersolid candidate, without the use of liquid helium, a conventional material that has long been used in ultra-low temperature refrigeration, according to a paper recently published in *Nature*.

WECHAT ACCOUNT



E-PAPER



# Report Stresses Need for Global Forest Restoration

By LIU Yin & ZHONG Jianli

Polar ice caps are melting rapidly and making the global sea level rise faster while the rate of global forest restoration is still lower than that of destruction. That is the warning conveyed by the *Remote Sensing Monitoring of the Global Ecological Environment Report 2023* recently released by China's Ministry of Science and Technology.

The 12th edition of the annual report includes three special reports: on the impact of global land cover change on carbon loss and absorption; the production of major grain and oil crops globally and food security; and the changes and impact of ice and snow in the polar regions and the Qinghai-Xizang Plateau, according to Zhao Jing, director of the National Remote Sensing Center and chair of the editorial board for the reports.

The report found an accelerating trend in carbon loss due to global forest changes and the expansion of impervious surface areas from 1985 to 2020, resulting in an accumulated net carbon loss of approximately 250.3 billion tons.

During the same period, annual global forest destruction increased from 121,700 square kilometers to 284,000 square kilometers, while the annual recovered forest area increased from 68,400 square kilometers to 198,900 square kilometers, remaining below the destruction rate.

Liu Liangyun, a researcher at the Aerospace Information Research Insti-



Icebergs in Greenland are melting. (PHOTO: VCG)

tute of the Chinese Academy of Sciences, said there was some progress in curbing the accelerated reduction of forested areas globally. However, he emphasized that the current efforts have not entirely met the goal of "protecting, restoring and promoting the sustainable use of terrestrial ecosystems."

Over the surveyed 35 years, global forest recovery absorbed around 9.84 billion tons of carbon, with significant contributions from South America, Africa and Asia, which accounted for about 80 percent of the total.

Nevertheless, the carbon absorbed through forest recovery could offset only around 30 percent of the carbon loss

from forest destruction.

This underscores the importance of enhancing forest vegetation restoration and improving the carbon sequestration capacity of terrestrial ecosystems by the international community to address global climate change and achieve the carbon neutrality goals.

The report also highlighted a significant shrinkage in the overall scale of sea ice in the Arctic and Antarctic and the snow cover on the Qinghai-Xizang Plateau, with the ice caps in these regions and glaciers on the Qinghai-Xizang Plateau shrinking. The deterioration of glaciers in these regions is correlated with global warming.

Despite frequent extreme events in 2023, their impact on the production of major grain and oil crops globally was relatively mild. The total production of these crops is estimated to be 2.874 billion tons, an increase of 14.14 million tons compared to the previous year, representing a growth of 0.5 percent.

Over the last 40 years, the drought resilience of major grain and oil crop-producing regions worldwide has notably improved. This can be attributed to various measures adopted in the regions, including safeguarding irrigation, using plastic mulching, conserving arable land, adjusting planting structures, and selecting drought-resistant plant varieties.

## Case Study

# Low-altitude Economy Booming in Shenzhen

By LI Linxu

As a well-known city of drones, Shenzhen is leading the way in development of the world's low-altitude economy.

By the end of 2023, Shenzhen had more than 1,700 drone companies, with an annual output value of 96 billion RMB, up 28 percent year-on-year, ranking first in the country, according to the latest statistics.

The city's drones are continuously gaining traction overseas. In the sector of consumer-grade drones, Shenzhen takes up 70 percent of the global market, while in the field of industrial-grade drones, it owns half of the global market share.

Besides drones, the city's low-altitude economy is also booming in low-altitude manufacturing, low-altitude flying, and integrated services, with various application scenarios such as tourism, logistics, tour-inspection, surveying and mapping.

By the end of 2023, Shenzhen had launched 126 low-altitude routes, and constructed 89 drone takeoff and landing points.

In recent years, Shenzhen has rolled out a series of policies to unlock the potential of low-altitude economy and formed a vibrant low-altitude ecosystem of industries.

In 2022, the city released a three-year implementation plan to promote the innovation and development of low-altitude economy.

The following year, developing low-altitude economy was written into the city's government work report for the first time.

Last December, the city rolled out 20 measures to support the high-quality development of low-altitude economy,

including cultivating an industrial chain, promoting sci-tech innovation, and expanding application scenarios.

This month, Shenzhen unveiled a regulation, the first of its kind in the country, to promote the industries of low-altitude economy.

The regulation covers areas including infrastructure, flying services, industrial applications, and technological innovation.

It vows to deepen international cooperation in the field of low-altitude economy, and encourages local enterprises, research institutes, and industrial associations to participate in the formulation of local, national and international standards.

Thanks to such a favorable environment, the annual output of Shenzhen's low-altitude economy is on the way to surpass 100 billion RMB soon.

The low-altitude economy has become a new driving engine of economic growth, said an official from Shenzhen Municipal Bureau of Transport, adding that the city will speed up the fostering and opening-up of low-altitude application scenarios and strive to cultivate the most diverse application scenarios in the world.



A drone works in Shenzhen, Guangdong province. (PHOTO: XINHUA)

## Policy

# Plan to Harness Potential of Data Elements

By LI Linxu

Aiming to unlock the potential of data elements to spur high-quality development, China recently unveiled a three-year action plan on leveraging the multiplier effect of data elements.

The action plan was jointly released by 17 government bodies, including the National Data Administration (NDA) and the Ministry of Science and Technology.

As a new type of production factor, data has been quickly integrated into the processes of production, consumption, circulation, distribution and social

service management, said Shen Zhulin, deputy head of the NDA.

Through advancing the use of data in various scenarios, the action plan seeks to improve the allocation efficiency of data resources, foster new industries and patterns, and cultivate new growth drivers, added Shen.

It envisions that by the end of 2026, the application range and depth of data elements will be significantly expanded, playing a more significant role in driving economic and social development.

The projected average annual growth rate of the data industry is ex-

pected to reach 20 percent, according to the action plan.

To achieve these goals, the action plan has selected 12 sectors to promote the use of data, including industrial manufacturing, modern agriculture, commercial circulation, transport and financial services.

Sci-tech innovation, cultural tourism, healthcare, meteorological service, city governance, and green and low-carbon development are also among the selected sectors.

The action plan calls for advancing high-level opening up in the field of digital economy, strengthening internation-

al exchanges, and promoting orderly cross-border flow of data.

Efforts will be made to improve the quality of data supply, optimize the environment of data circulation and strengthen data security.

The action plan is a follow-up to a guideline on building basic systems for data, jointly released by the Communist Party of China Central Committee and the State Council in 2022.

In recent years, China has made great strides in developing its digital economy, upgrading digital infrastructure, and advancing digital technologies, laying a solid foundation to further leverage the role of data elements.

The International Data Corporation estimated China's annual data generation would reach 48.6 ZB by 2025, nearly 28 percent of the global total.

## Blueprint to Fast Track 'Beautiful China'

From page 1

To achieve the goals, it stresses the need for strengthened sci-tech support, calling for the development of green and low-carbon technologies. It proposes to build a market-oriented green technology innovation system. In addition, key national basic research plans should include R&D on pollution reduction, multi-pollutant collaborative emission reduction, climate change adaptation, biodiversity conservation, new pollutant treatment and nuclear safety.

At the same time, the guideline emphasizes expediting digital empowerment for building a "Beautiful China." This involves deepening the application

of digital technologies, constructing a digital governance system, and establishing a modern eco-environment monitoring system and a smart law enforcement system.

Significantly, the policy calls for joint efforts in building a global ecological civilization.

It proposes to adhere to the principle of common but differentiated responsibilities and promote a global environmental and climate governance system featuring fairness, rationality and win-win cooperation, while underscoring the need to deepen international cooperation on climate change, biodiversity protection, marine pollution control and nuclear safety.

## Ecological Monitoring Helps Scientific Protection

From page 1

Improving protection

Ecological monitoring should not only present the status quo and changes in regional ecological environment, but also improve the ability to detect ecological damage.

"Every routine monitoring of the Gehu Lake is helpful for the optimization and adjustment of pollution prevention and control measures," said Pan, adding that the Changzhou plain water network station will adopt the integrated system to carry out regular monitoring of the region.

"For example, cyanobacteria bloom is a prominent problem plaguing the management of Taihu Lake. The monitoring station uses the monitoring data collected over the years to study the competitive growth mechanism of aquatic grasses and cyanobacteria, providing

technical support for scientific and accurate restoration of the ecological environment," said Pan.

At present, the results of ecological monitoring have played an important role in supporting the work of national ecological environmental protection supervision projects, said Jiang Huohua, director of ecological and environmental monitoring department of the MEE.

According to Jiang, the monitoring procedure will be further standardized, and data will be collected, processed and shared on a unified platform. In the next step, the MEE will set up more stations in the ecological monitoring network, to achieve broader coverage of the key and fragile areas, and provide technical support for the construction of a modern and beautiful China with harmonious coexistence between man and nature.

# Emergency Response Robot Application High on Agenda

By CHEN Chunyou

To accelerate the development and practical application of emergency response robots (ERRs) and advance the modernization of the emergency management system, China plans to develop a series of advanced ERRs by 2025, and enhance their precision and intelligence levels, according to a guideline issued by the Ministry of Emergency Management and the Ministry of Industry and Infor-

mation Technology.

ERRs can operate semi-autonomously or fully autonomously, and can partially or completely replace humans in safety production, disaster prevention and reduction, and relief work. They can enhance the efficiency and safety of rescue operations in complex and hazardous scenarios.

Li Ying, dean of the School of Emergency Management Science and Engineering at the University of Chinese

Academy of Sciences, told *Science and Technology Daily* that the application of ERRs is a crucial indicator of China's efforts to make emergency management more scientific, professional, precise and intelligent.

In recent years, with the continuous development of technologies represented by AI, 5G and the BeiDou Navigation Satellite System, China has developed various ERRs, such as firefighting robots, earthquake rescue robots and underwater robots, all of which have been applied in real life.

"However, the application of ERRs is still in its infancy and mostly concentrated in the firefighting field. Their application in other fields is still in the stage of testing," Li said.

She said that for rapid and widespread application of ERRs, four key issues need to be addressed: core technological issues, the integration of intelligent equipment with emergency characteristics, practical applications, and the construction of an ERR ecosystem.

According to the guideline, action will be taken to establish key scenario ERR practical testing and demonstration application bases, improve the development ecosystem, and enhance the over-

all level of practical application and support for ERRs.

To achieve technological breakthroughs, measures will focus on key areas such as enhancing robots' ability to withstand harsh environments, improving their load-bearing functions and modular levels, and enhancing their control and intelligence levels, the guideline said.

To enhance emergency capabilities, various types of robots will be developed. These include reconnaissance robots for risky situations, and robots for life search, material support, firefighting and high-risk scene operations. Other areas are complex scene rescue and emergency response, construction of life passages and communication support.

"This will achieve independent and controllable high-end equipment, enhance the safety of high-risk operations, strengthen unmanned and intelligent emergency rescue capabilities for major and super major disaster incidents, and promote the transformation from direct human confrontation of disasters to a mode of reducing human involvement through relying on robots," Li said.



A robot carries out inspection near the leakage site of hazardous chemicals at Deqing county, Huzhou city of Zhejiang province. (PHOTO: VCG)

## INSIGHTS

## 'Ice City' Harbin Lifts Optimism in China's Economy

## Voice of the World

Edited by TANG Zhexiao

After "southern little potatoes" — "Ice City" Harbin's affectionate nickname for visitors from the warm southern cities — went viral on domestic social media, the capital of Heilongjiang province in China's cold northeast became an Internet celebrity city at the beginning of 2024.

When the annual International Ice and Snow Festival kicked off in Harbin on January 5, it added steam to the city's burgeoning ice and snow tourism.

## Frozen in real life

Dubbed "Ice City", "Oriental Moscow" and "Oriental Paris", Harbin has built its landmark theme park, the Harbin Ice and Snow World, this year with 250,000 cubic meters of ice.

The park's ice sculptures such as bridges, fairy-tale castles and towers are built from ice blocks from the frozen Songhua River nearby. When it gets warmer, they melt and flow back into the river without any pollution.

The park also uses an advanced inflatable membrane construction technology, which is green and environmentally friendly, and has good fire resistance and strong thermal insulation.

This incredible ice city in China is "raising the brrrrr for a tourist attraction," the *Daily Mail* wrote.

## Harbin tourism in vogue

Pakistan's Samaa TV reported that Harbin's ice and snow festival has bro-



Visitors have fun at the Ice and Snow World in Harbin, northeast China's Heilongjiang province, January 5, 2024. (PHOTO: XINHUA)

ken records and the ice city experienced a tourism boom over the New Year.

The festival has become a winter wonderland illuminated by vibrant lights at night, said Geo TV, another Pakistan-based TV station, adding: "The festival's success marks a crucial revival for Harbin's 'ice and snow' economy, with this year's winter proving to be a pivotal season for the city's tourism industry."

The Harbin Ice and Snow World has also successfully made it to the Guinness World Records as the largest ice and snow-themed amusement park.

According to their official statement, "The largest ice and snow theme park (temporary) measures 816,682.50 square meters and was achieved by Harbin Ice and Snow World (China) in Harbin, Hei-

longjiang, China, on December 31, 2023."

India's private TV station NDTV said this icy wonderland "features more than 2,000 carefully made ice and snow sculptures that capture the imagination of those who visit. The park's greatness is highlighted by the fact that it took a huge team of over 10,000 builders working hard for over a month to create this icy spectacle."

Besides infrastructure, Harbin's authorities have improved the city's accommodation and are holding a variety of activities including live performances, fireworks displays, and parades by ethnic minorities in their colorful traditional clothes to enhance the tourist experience.

**Ice and snow economy surges**  
Heilongjiang's Culture and Tourism

Department called Harbin's tourist boom an "ice and snow miracle." Official data shows that in the three-day New Year holiday, Harbin attracted a record number of more than three million tourists, and achieved a total tourism income of 5.9 billion RMB (824.5 million USD), another record high.

"The tourism boom occurred as China's services activity expanded at the fastest pace in five months in December, lifting optimism in the sector to a three-month high," Reuters reported.

Over the years, Harbin has been discovering new economic growth in cold resources and developing the industrial chain of its ice and snow economy.

The winter season is always a peak tourist period in northeastern China. Especially after the 2022 Beijing Winter Olympics, according to *South China Morning Post*, "domestic ice and snow tourism has experienced an incredible surge."

Harbin has a unique geographical location that enables it to have a five-month ice and snow carnival. Here, ice and snow are a natural resource, cultural symbol, economic power and innovation engine, PR Newswire commented. According to data from the culture and tourism department, the scale of Harbin's ice and snow economy exceeded 70 billion RMB (9.8 billion USD) from 2022 to 2023.

As the ice and snow economy achieves a breakthrough and sustains it, Harbin's success in turning natural resources into economic gain provides a good lesson to promote the revitalization of not only northeast China in the new era, but other places in East Asia as well.

## Comment

## Roll Booster for Global IP Progress

By Staff Reporters

This year marks the 30th anniversary of China's entry into the Patent Cooperation Treaty (PCT). China has been top-ranked in international patent applications through the PCT for four consecutive years, confirming its place as one of the world's leading countries in the area of IP and innovation.

Meanwhile, according to the Global Innovation Index 2023, a report issued by the World Intellectual Property Organization (WIPO), China overtook the U.S. for the first time to top the list of countries with the highest number of science and technology clusters among the top 100.

China has 24 such clusters, while the U.S. follows with 21 and Germany ranks third with nine, according to the WIPO report. It also showed that the highest climbers in the ranking last year were three clusters in China. Shen Changyu, commissioner of China National Intellectual Property Administration, said, "Over the past year, China's international cooperation in intellectual property deepened and expanded, and its role in serving high-level opening-up became increasingly prominent."

In the past three decades since China became a member of the PCT, China has actively participated in the revision and improvement of the PCT and concerned international rules, improved its own legal system on IP, and engaged in productive cooperation with WIPO.

IP protection serves as a major pillar for innovative development. Building on its rich reservoir of patent technologies, China has enhanced the quality and efficiency of its work on IP to unleash creativity at a faster pace. Currently, China has filed 126,400 global patent applications for solar panels, ranking first in the world. Top 10 NEV makers in China by sales have over 100,000 global patents in force, leading the green and low-carbon sector and providing a strong impetus for global sustainable development.

China's Foreign Ministry spokesperson, Wang Wenbin, said at the regular press conference on January 3, "China attaches high importance to international patent cooperation and intellectual property protection." China has expanded opening up in IP protection and fostered a world-class business environment that is market-oriented, law-based, and internationalized. This has resulted in more and more foreign applicants are looking to do business and plan their patent layout in China.

Over the past decade or so, applicants from 115 Belt and Road partner countries filed applications for 253,000 patents in China, an annual increase of 5.4 percent. As of the end of 2022, a total of 861,000 invention patents were in force for overseas applicants in China, a year-on-year increase of 4.5 percent. This speaks to the foreign-funded companies' recognition towards China's effort in IP protection.

Shen said China has taken an active part in international IP cooperation last year, and its IP progress has been recognized by the WIPO. The commercialization of IP achievements were also accelerated, with optimization of IP-related public services, which provided stronger support for industrial development and rewarded innovators.

"Specific rules for better implementation of the Trademark Law are expected to be amended, and the review standards for new fields and emerging businesses, including big data, artificial intelligence and gene technology, will be improved," he added.

Looking forward, China will continue to uphold the principle of openness, inclusiveness, balance and benefits for all, strengthen exchanges and cooperation on IP with all countries, and advance a fairer and more just global governance on IP to deliver more benefits of innovation to people around the world, and build a community with a shared future for mankind.

## Efforts to Suppress Chinese Students Damage U.S. Image

## Opinion

By GONG Qian

Florida's public universities are prohibited from hiring Chinese graduate students and postdocs to work in their labs due to a new state law, Science website reported.

Several Chinese students holding valid visa have recently claimed that they suffered lengthy interrogation upon entering the U.S. border. Some of them saw their visa revoked and were even slapped with a five-year ban from entering the U.S. None of them were told why their visa applications were rejected.

Such bullying goes against the two presidents' agreement in San Francisco on education cooperation, encouraging the expansion of student and youth exchanges. The U.S. should act on its commitment and stop its selective, discriminatory and politically motivated law enforcement in the name of national security.

al security.

The unjust act of blocking Chinese students from U.S. universities can be described as the "afterquakes" of the unjust Executive Order 10,043 by former President Trump in 2020, which prohibits the entry of or issuance of visas to Chinese students enrolled in graduate-level programs in the U.S. if Washington deems that they have ties with China's "military-civil" universities. But the list of such universities has not been made public yet, which makes the presidential executive order seem all the more arbitrary.

Since then, the proclamation has been casting a shadow over China-U.S. academic exchange. Some American politicians have suggested widening bans on Chinese students, and the *New York Times*, quoting a Pew Research Center survey, reported that many Americans back limiting the number of Chinese students in the U.S.

The unfavorable policy and unwelcoming environment have led to a decrease in the number of Chinese students studying in the U.S. However, the

U.S. does not seem to realize that it is risking losing a valuable talent pool which has made financial and scientific contributions to U.S. universities and indeed, the whole country.

"My colleagues in STEM disciplines have felt the drastic decline of the applications from top Chinese universities, hindering their research productivity. Moreover, this has also influenced undergraduate education as these students often take on teaching and research assistant roles," Professor Ma Yingyi at Syracuse University wrote in an article published on the website of U.S. think tank Brookings Institution.

Jack Corrigan, a research analyst at Georgetown University's Center for Security and Emerging Technology, pointed out that U.S. science and technology education and innovation heavily depend on foreign STEM talents staying in the U.S. after earning their degrees.

In a report published in 2022, Corrigan and his colleagues found that over three-quarters of the roughly 180,000 foreign nationals who earned STEM Ph.D.

between 2000 and 2015 were still living in the U.S. in early 2017. Among them, 31 percent of those were from China.

Between 2010 and 2021, the number of Chinese scientists leaving the United States increased steadily, according to a research article published by PNAS, a peer reviewed journal of the U.S. National Academy of Sciences.

"It's absolutely devastating," said David Bier, associate director of immigration studies at the Cato Institute, a think tank based in Washington, D.C. So many of the researchers that the United States depends on in the field of advanced technology are from China, or are foreign students, and this phenomenon will certainly have a negative impact on U.S. companies and research in the future, said Bier.

Since the U.S. portrays itself as open, inclusive and a heaven for academic freedom, it should take concrete steps to support and facilitate people-to-people exchanges and cross-border travel as it has promised, in order to live up to that image.



Bing Dwen Dwen, the mascot of the Beijing Winter Olympics, unveiled a special version of the Year of the Dragon called "Long Dwen Dwen", which was officially on sale on December 7, 2023. (PHOTO: XINHUA)

## British Businesses Positive About Their Investment in China

## Research Box

*The British Business in China: Sentiment Survey 2023-24* captures the perspective and needs of British businesses operating on the ground across the Chinese mainland.

For almost two-thirds of companies, projected revenues for this year have either increased (45%, up 12%) or remained on par with last year.

In keeping with last year, the majority of British businesses expect to either maintain (42%) or increase (35%) their investment in their Chinese mainland operations next year.

Government-industry dialogue: British businesses are positive about

China's push to attract foreign investment, which has seen increased communication with businesses and trade bodies alongside the 24 Point Guidelines for Attracting Foreign Investment which covers many regulatory challenges raised in previous editions of the Sentiment Survey.

R&D opportunities for British business in China: Interest has been identified in R&D in areas such as sustainability, AI and technological advancement, with many companies encouraged by China's growth objectives in such sectors.

— *The British Business in China: Sentiment Survey 2023-24, British Chamber of Commerce in China, 12-12-2023.*

## Smart Tool Processes Ancient Book Language

## Hi! Tech

By TANG Zhexiao

A smart language tool for processing and research of ancient books was launched recently, making it easier to read and understand difficult ancient Chinese language.

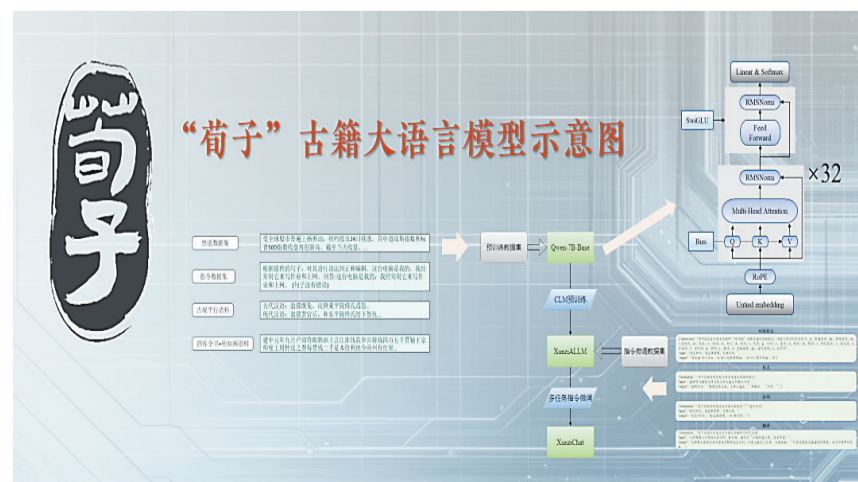
The tool named after Xunzi, a renowned Chinese philosopher, is a language model which has collected a corpus of more than two billion words, including the "Siku Quanshu," also known as "Complete Library in the Four Branches of Literature." It can perform func-

tions such as natural language understanding, automatic translation, poetry generation, and automatic indexing.

Thanks to its high-quality data and super computability, users can understand ancient texts without punctuation and translate the ancient expressions into modern Chinese language.

Currently, the tool is available as an open source and public welfare research result on GitHub, ModelScope and other websites.

Besides providing convenience for readers of ancient books and researchers, the "Xunzi" language model will be applied to AI writing and teaching, digital entertainment and other fields in the future, according to researchers.



Schematic diagram of the ancient language processing model "Xunzi". (PHOTO: College of Information Management of Nanjing Agricultural University)

# Fascination of Electrical Engineering

## Dialogue

By LONG Yun & BI Weizi

Vladimir Terzija, a distinguished visiting professor at Shandong University (SDU) is an important figure in the field of electrical engineering and electrical power systems. On an afternoon just after New Year's Day, he shared some of his thoughts on exploring the secrets and complexity of electricity with *Science and Technology Daily*.

### Inspired by predecessors

"Electricity has always been fascinating to me," Terzija said, adding that he was inspired by the legendary Serbian inventor Nikola Tesla.

The Wide-Area Monitoring, Protection and Control (WAMPAC) is one of his research focus areas. Terzija regards it as a complex but inspiring technical system. "It involves satellites, communication channels, and specialized sensors like time-synchronized phasor measurement units," he explained. This system plays a crucial role in monitoring, controlling, and protecting modern electrical power systems.

Terzija said music serves as a muse for his research. He intertwined his passion for music with the complexities of power system frequency measurement. His scientific contributions lie in creating new, efficient digital algorithms for power system frequency measurement, which are now integrated into modern digital devices and WAMPAC systems worldwide.

However, his journey doesn't stop there. Terzija connects his fascination with music to the world of electrical arcs, revealing the complexities of this natural phenomenon. On his journey of discovery, he developed mathematical models for electrical arcs and applied this knowledge to designing digital algorithms for the protection of transmission networks.



Professor Vladimir Terzija speaks at PowerCon 2023 held in China. (COURTESY PHOTO)

### Reliable, secure, green

"The Chinese electrical power system is huge and strong, covering a huge geographical area," he said. With more than 1.4 billion people relying on a robust, secure, and reliable power supply, preventing faults and blackouts becomes crucial. The WAMPAC system, designed to address faults and prevent blackouts, greatly supports China's defense against power system outages.

By understanding the system's dynamics through monitoring based on satellite technology, China has designed an effective defense mechanism. This defense system, built on the results of Terzija's research, contributes to the efficiency, security and reliability of the Chinese electrical grid.

Beyond blackout prevention, Terzija's research has also focused on addressing real-world challenges related to Smart Grid applications and multi-energy systems. The increasing complexity of modern power systems, which integrates renewable energy sources and storage units into power grids, demands advanced technology. His work in Smart

Grid applications supports the secure and reliable operation of these complex systems.

Moreover, Terzija emphasizes the integration of various energy systems as a solution to maximize renewable and green energy utilization. He highlighted the potential solution lies in the integration of various energy systems, such as combining electricity and heat systems or electricity and gas systems, or even all these together.

Through this integration, a flexible operation of the overall system can be achieved, leading to the optimization of renewable energy resource usage. From his perspective, flexibility and diversity play crucial roles in reducing CO<sub>2</sub> emissions in order to achieve clean energy generation and ultimately meet net-zero targets.

As the editor-in-chief of the International Journal, *Electrical Power and Energy Systems* (Elsevier), Terzija envisions a future where power systems seamlessly meet the demands of modern society. He is ready to embrace cutting-edge technologies, saying, "I am in-

sisting on those solutions involving the most modern technology, smart grid solutions based on new sensors, advanced technology communication infrastructure, and complex and robust algorithms based on artificial intelligence. These will make our power system resilient and economical."

### Fruitful collaboration

Terzija's collaboration with SDU since 2012 has been evolving constantly. The cooperation began with Professor Ding Lei, Dean of the School of Electrical Engineering at SDU, and their joint efforts in developing algorithms for the prevention of power system blackouts, which laid the foundation for new groundbreaking solutions.

"Today, algorithms are recognized as very efficient solutions, which are applied worldwide," said Terzija. The collaboration has expanded with strong support from many well-known Chinese scholars at SDU, opening doors to numerous collaborative projects. Meanwhile, he stressed the students' role in contributing to the quality and quantity of scientific results that they have achieved by now.

Commenting on his Chinese co-workers, Terzija said, "They are inspiring me. Their ambitions are motivating me to be even more involved in this activity." According to his former student Jin Zhaoyang, now an associate professor at SDU, Terzija consistently motivates students, propelling them forward to face challenges in both research and life.

In terms of research endeavors, his focus lies on addressing Big Data challenges in secure and reliable power system operations, as well as exploring topics related to the digitalization of the grid.

"One of my key duties is to make sure that a new generation of successful and capable professors take over the research activities which I'm running now," he said.

This article is also contributed by Wu Ke from SDU.

## Letter to the Editor

# Building a Lifelong Friendship Bridge

By Dubkova Olga

Bridge construction begins with design. My family, members of the Communist Party of the USSR, instilled in me love for the motherland, dedication to my work, and respect for all people. They were selfless in their devotion to making the world better. My grandfather fought against the Nazis, and my maternal grandparents worked in China from 1939 to 1946. Their collective experience and dedication inspire me to this day.

I have the fortune of teaching Russian as a foreign language to Chinese students. It wasn't easy for me at first because everything was new: new culture, new traditions, new customs. But I'll never forget the joy of communicating with those first students, which is a feeling all teachers will understand.

From the very beginning, I wanted to understand China and feel the Chinese spirit in a meaningful way. In the mid-90s, I came to China for the first time, to see this great country with my own eyes. Almost 30 years later, this feeling of admiration and respect for Chinese culture and language has never wavered. The more I learn, the more I want to share these feelings with friends and colleagues in Russia.

Through "Chinese stories," scientific articles, textbooks and monographs, I convey how incredible the Chinese civilization is, and how important it is to strengthen good relationships between our peoples.

The bridge of friendship cannot be built by one person, it requires all of us. My colleagues share their knowledge with me and, together, we have translated and published a large collection of scientific, socio-political and educational literature.

When we work together, we try different approaches. This creates common knowledge that connects our consciousness, a strong foundation for the bridge of friendship and mutual understanding. The strength and future of our friendship bridge depend on that foundation.

Translating books is difficult, but when you receive that completed published book, all the difficulties are forgotten and we feel only pride for our success and joint work. I work hard



Professor Dubkova Olga. (PHOTO: Xi'an International Studies University)

because it is my duty. I'd like to stand on the front line, nurturing youth who selflessly love their homeland, understand the past well, and understand different peoples and civilizations.

I've been lucky enough to communicate with three generations of students. All of them have stories that will add to my understanding. For example, one student's father brought apples to the university and wanted to give them to me. I still remember the taste of those apples. Respect for teachers is an age-old Chinese value.

Another time, I learned that a student did not eat the candy I gave, instead, she gave it to her grandparents. Respect for elders is a Chinese tradition dating back to the Spring and Autumn period. These ancient traditions define China and, in communicating these stories to me, my students strengthen their understanding of their own customs and traditions. I learn together with my students, and together we are building a bridge of friendship that will withstand any test.

My friends are also part of that bridge. We share our experiences, difficulties and aspirations, and have common dreams. Since I, as a teacher, believe spiritual development is most important, I am constantly trying to improve myself and my students. With knowledge and hope, we can build a strong bridge that will stand for centuries.

The author is a Russian teacher from Xi'an International Studies University.

## Service Info

# China Takes Measures to Facilitate Foreigners' Entry and Stay

A set of measures had been put into effective to facilitate the entry of foreigners to China for business, education and tourism, according to the National Immigration Administration (NIA).

The new measures, effective from January 11, 2024, include a relaxation of port visa application requirements

and access to visa extension, replacement, and issuance services at local immigration departments for foreign nationals coming to or staying in China for non-diplomatic and non-official purposes such as commercial cooperation, exchanges, investment, entrepreneurship, visiting relatives and personal matters.

Foreigners enjoy 24-hour direct transit without undergoing border check procedures at nine major airports in cities, including Beijing, Shanghai, Hangzhou, Xiamen, and Guangzhou.

Additionally, multiple-entry visas are available for foreigners in need, and the application requirement for visa documents has been streamlined for

foreigners staying in China, said NIA.

The NIA vows to continuously advance reforms and innovation in immigration management services and policies, improve the business environment, and contribute to the creation of a new development pattern.

Source: XINHUA

# How to Deal with Lingering Cough

## Science Outreach

By Staff Reporters

"We've seen an unusually large number of patients who have had typical viral upper respiratory infections, and had a persistent cough for weeks or months," said Dr. Sun Xiangjuan at Sichuan Traditional Chinese Medicine (TCM) Hospital, adding that many of her patients have recently come to her office with a nasty cough that has lasted for about two weeks.

According to the information provided by WHO, it is confirmed that the main reason for this wave of respiratory

disease epidemics is a common winter infection, not a new pathogen, nor caused by the novel coronavirus mutant strain.

Wang Huaqing, chief expert at the Chinese Center for Disease Control and Prevention, said the pathogens currently being monitored are mainly influenza viruses.

These viruses cause flu and cold-like symptoms that can last for some time. When a virus enters our respiratory tract, it infects our cells and replicates. This can cause a lot of inflammation and irritation in the throat, nose and chest that lasts for a long time.

In fact, Sun says the persistent cough is most likely due to prolonged inflammation in the airways — even after the virus is gone, the body continues to produce mucus and have bron-

chospasms, which is the reason for coughs. For some people, this inflammation can last anywhere from two weeks to two months, she explained.

While most causes of a persistent cough are mild and easily treated, a persistent cough is bothersome and can affect your quality of life. Getting prompt and effective treatment is advisable.

TCM experts recommend non-pharmaceutical methods to alleviate persistent coughing. One effective approach is point massage, specifically at the Tiantu and Hegu acupoints.

The Tiantu acupoint is located in the suprasternal fossa, just above the jugular notch. By gently pressing this acupoint with fingers, one can feel a refreshing sensation in the throat area, which helps to open the respiratory tract.

The Hegu acupoint massage, on the dorsum of the hand, between the 1st and 2nd metacarpal bones, can relieve asthma, eliminate heat toxicity, and alleviate symptoms of numbness, pain and fever.

For individuals who are prone to catching a cold and having a cough, moxibustion can be a helpful alternative. Moxa sticks, made from mugwort leaves, stimulate the acupoints to promote the activity of meridians, regulating the disrupted physiological functions of the body.

In addition, herbal fumigation is widely used in the treatment of symptoms such as fever, runny nose, and coughing. At home, one can use herbs like *Artemisia annua*, *Schizonepeta*, and *Artemisia argyi* to make infusions for bathing, which can help relieve symptoms like fever.

# Warring States Period Bronze Lamp

## Traditional Eastern Wisdom

By BI Weizi

A Warring States Period Qin tripod-shaped bronze lamp was unearthed in 1974 in Pingliang, Gansu province, an important part of the Silk Road. The lamp is now on display in the Gansu Provincial Museum because of its unique scientific and historic value.



A Warring States Period Qin tripod-shaped bronze lamp on display at Gansu Provincial Museum. (PHOTO: Gansu Provincial Museum)

The lamp has a diameter of 11.3 cm and a height of 16.7 cm when closed. It is in the shape of a tripod with three legs at the bottom, two duck-head-like ears facing each other on either side of the cap, keys on the tops of the ears, and an iron pillar in the middle.

To open the lamp, first turn the cap so that the two duck heads on the top cover face away from the double keys, then close the tops of the double keys, and use a "herringbone" shaped bracket to support the round tripod cover. The lamp panel will become a copper fuel lamp with a height of 30.2 cm.

When not in use, press down the double keys, rotate the double duck heads between the lids to lock them tightly, and close the tripod lid. Due to the exquisite design and craftsmanship, once closed, the seal is tight and the lamp oil stored in the tripod body will not leak out. It is rare that there is still muddy lamp oil in the tripod of a bronze lamp that is more than 2,000 years old.

This seemingly simple lamp not only has practical value, but also provides clues for historians to study the Silk Road. With digitalization empowering museums, visitors can now interact with this treasure through an electronic touch screen.