



# Science and Technology Daily

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WEEKLY EDITION

## 2023 World 5G Convention Seeks Deepening Industrial Applications

By ZONG Shihan

The opening ceremony of the 2023 World 5G Convention, themed "5G+ By All For All," was held in Zhengzhou, central China's Henan province, on December 6.

"China has built the world's largest and technologically advanced 5G network, and 6G technology will also gradually develop on the basis of 5G technology," vice minister of Science and Technology Chen Jiachang said at the opening ceremony. Calling 2023 the fifth year of 5G commercialization and an important stage of continuity and transition, he added that it is urgent to deepen application and expand international cooperation.

According to Lou Yangsheng, secretary of the Henan Provincial Committee of the Communist Party of China, Henan has built 187,000 5G base stations, taking the lead in achieving full 5G network coverage in all its urban areas above township level in China. The showcasing of technological progress and application of 5G technology at the convention will not only strengthen the development of the digital industry in Henan, but also promote its development globally, Lou added.

China is one of the global leaders in 5G development, and has made positive contributions to application services, including finance, healthcare and education, said John Hoffman, chief executive officer of Global System for Mobile Communications Association, adding that 5G technology is also helping people around the world better cope with natural disasters and climate change, and improving the quality of life.

Wu Hequan, an academician of the Chinese Academy of Engineering, pointed out that there are still issues in 5G market applications, which cannot meet the large bandwidth, high reliability and precise positioning needed for industrial application. To address these issues, it is necessary to introduce 5G+ before the commercialization of 6G. Wu added that 5G-Advanced can be seen as an upgraded version of 5G.

Martin Hirzel, president of the Swiss association of mechanical and electrical engineering industries, said traditional mechanical and electrical engineering industries must embrace intelligent manufacturing to remain competitive in the global market. Also, for data exchange and security, both technical support and open relationships are necessary.

Co-hosted by the Chinese Ministry of Science and Technology and the People's Government of Henan, the three-day event features forums, exhibitions and a 5G-based application design competition. The objectives are to create a world-class industrial exchange platform, help tap Henan's core advantages in 5G, link global 5G innovation resources, and empower the establishment of a national innovation hub in central China.



The 2023 World 5G Convention is held in Zhengzhou, Henan province from December 6 to 8. (PHOTO: ZHOU Weihai / S&T Daily)

## Editor's Pick

## Agricultural Data Revolution Empowers Food Security in Developing Countries

By LIANG Yilian

The CropWatch system, a China's revolutionary cutting-edge remote sensing based crop monitoring system, was developed by the Aerospace Information Research Institute, Chinese Academy of Sciences. Though it was initially developed in 1998 for domestic use, CropWatch has now broken down the challenges of global agricultural conditions and come up with a set of timely comprehensive solutions.

### Applications from home to abroad

In 2013, CropWatch expanded its reach by introducing a participatory cloud platform for remote sensing monitoring, enabling users worldwide to engage in agricultural conditions analysis.

Quarterly and annual reports in both Chinese and English have been regularly released, garnering significant global attention. According to Wu Bingfang, the team leader, the system's impact is evident, with over 170 countries downloading and utilizing the reports for analysis.

From domestic to global use, the R&D team has been put through its paces. The development journey involved dividing the world into 105 agroecological regions, each tailored to specific agricultural characteristics. Over 15 years of international cooperation, Wu's team has continually improved models to enhance the system's adaptability to diverse regional conditions.

### Facilitating int'l collaboration

Mongolia is one of the countries

that benefit from CropWatch. "One of the biggest problems facing Mongolian agriculture is drought, and how to monitor drought is a big challenge for the country. With the support of the United Nations Economic and Social Commission for Asia and the Pacific, we have successfully customized a drought monitoring system for Mongolian conditions. Now, along with carrying out independent drought monitoring, they can also help other countries," said Wu.

While food price fluctuations sometimes are due to "market speculation," in some developing countries, the lack of accurate national and global agricultural information increases the risk of making wrong food decisions.

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## Sci-tech Evaluation Flourishing in China

By YONG Li & LIANG Yilian

According to a newly released report, sci-tech evaluation institutions in China have achieved rapid growth since 2016. The number of institutions carrying out science and technology evaluation related business had exceeded 120,000 by 2021. Thirty-one provincial regions have established sci-tech evaluation institutions, of which enterprise institutions account for 93 percent of the total, with an average registered capital of 5.4 million RMB.

Regionally, the provinces with the largest number of assessment agencies are Guangdong, Shanghai and Hunan. The report showcases the diverse business landscape of sci-tech evaluation institutions, with primary activities revolving around science and technology information consultation, project evaluation, and achievement appraisal.

The report, compiled by more than ten units led by the National Cen-

ter for Science & Technology Evaluation (NCSTE) and China Society of Technology Evaluation and Result Management (CSTERM), was released at the 7th National Collaborative Development Seminar of Science and Technology Evaluation Institutions in Chongqing on November 30.

"As a modern governance tool and method, sci-tech evaluation is playing an increasingly important role in promoting science and technology innovation in the whole society, improving the level of science and technology management, optimizing resource allocation, supervision and accountability," said Guo Xiangyuan, chairman of the CSTERM.

He pointed out that after years of development, various activities of sci-tech evaluation in China are making continuous progress in the direction of specialization and standardization, while evaluation ability and quality are constantly improving.

Nie Biao, director of the NCSTE, pro-

posed several suggestions to promote sci-tech evaluation, including strengthening the evaluation of major national scientific and technological tasks to promote the guiding and exemplary role of the evaluation, enhancing the assessment of cutting-edge technologies to correctly judge the opportunities and challenges that emerging technologies may bring; and making full use of modern information technology to provide efficient support for science and technology evaluation.

The report, themed "China Science and Technology Evaluation Development Report 2022," summarized the development process of science and technology evaluation in China, and analyzed the development of establishing structures such as science and technology evaluation systems, theoretical methods, standardization, information, organization and team building, along with deep diving into the development trend of science and technology evaluation.

## International Cooperation

## Water Technology Helps Build Sustainable Future

Edited by TANG Zhexiao

Transferring over 60 billion cubic meters of water since November 2013 from major rivers in the south to the drought-prone north including metros like Beijing and Tianjing, the first phase of the East Route of China's South-to-North Water Diversion (SNWD) project officially celebrated its tenth anniversary on November 15.

From the world's longest artificial river Jinghang Grand Canal, to the Three Gorges Dam and the SNWD project, China's mega water conservancy projects are famous worldwide.

Besides domestic projects, China is stepping up efforts in assisting global water infrastructure projects, developing the water resource and improving people's lives.

The Karot Hydropower Project is one of the China-aided power projects being built in Pakistan under the framework of the China-Pakistan Economic Corridor.

Besides alleviating energy shortage and optimizing Pakistan's energy structure, the project has benefited Pakistan people in both economic and social ways since it broke ground in April 2015.

Official data shows that it can generate 3.2 billion kilowatt-hours of clean electricity annually, reducing 3.5 million tons of carbon dioxide emissions per year.

As the largest stadium in Qatar and the Middle East in terms of capacity, the Lusail Stadium hosted ten matches of the FIFA World Cup Qatar 2022 including the final.

When Lionel Messi and his team won the tournament for Argentina, few fans would have known that the turf was planted by CRCC using the underground infiltration irrigation technology. See page 3

## WEEKLY REVIEW

### Oilfield with 100-mln-tonne Reserves Discovered

The Changqing Oilfield branch of PetroChina has discovered an oilfield with geological reserves of over 100 million tonnes in Huanxian County in Gansu province, northwest China, according to Niu Xiaobing, deputy general manager of the branch.

### "Plain Scan CT + AI" Makes Early Pancreatic Cancer Screening Possible

Researchers from Alibaba's Damo Academy and a number of top medical institutions in three countries successfully used medical AI technology and CT scans to detect pathological changes in a large number of screenings. This is a breakthrough in early screening of pancreatic cancer on a large scale. The study was published in *Nature Medicine*.

### Logistics Sector Sees Faster Expansion

China's logistics sector registered rapid expansion in November. The index tracking the country's logistics market performance stood at 53.3 percent last month, up 0.4 percentage point from October, according to the China Federation of Logistics and Purchasing.

### Fresh Findings on Nanometal

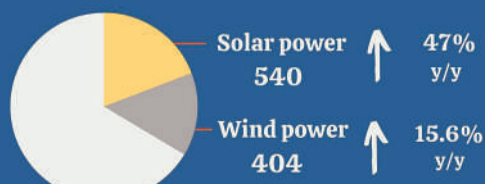
Scientists from Chongqing University and collaborators created the world's first 3D microscopy technique system and tracked the rotations of individual grains in a nanograin nickel before and after in situ nanomechanical testing. The new study, published on December 1 in *Science*, is expected to help improve material design and engineering applications.

## New Graphic

### RAPID DEVELOPMENT OF CHINA'S RENEWABLE ENERGY



The country's installed power generation capacity (million kilowatts)



Source: National Energy Administration  
Designed by SONG Ziyani/S&T Daily

WECHAT ACCOUNT



E-PAPER



Tech for Better Life in China

# Human Rights Protection in Digital Age

By ZHONG Jianli

"Commemorating the 75th Anniversary of the Universal Declaration of Human Rights," a seminar in remembrance of the world's first comprehensive international statement on human rights, was held in Beijing on December 4.

The declaration, adopted by the United Nations General Assembly on December 10, 1948, contributed significantly to the progress and development of global human rights.

Over 70 experts and scholars discussed the spirit and significance of the declaration, China's concept of human rights and safeguarding them, as well as the new human rights protection issues in the digital age.

Padma Choling, president of the China Society for Human Rights Studies, said the Universal Declaration of Human Rights established the basic consensus on respecting and protecting human rights. China has always been a contributor, advocator and practitioner of the spirit of the declaration.

Zhang Wenxian, director of the Academic Committee of China Law Society, said the Global Development Initiative,



A seminar on "Commemorating the 75th Anniversary of the Universal Declaration of Human Rights" is held in Beijing on December 4. (PHOTO: ZHONG Jianli/S&T Daily)

Global Security Initiative and Global Civilization Initiative are based on common human values. They not only reflect China's human rights concepts, but also express the common aspirations of people around the world and are of great significance for building a

fair, reasonable and inclusive international human rights governance system.

In today's world, with the rapid development of digital technology, the protection of digital human rights has become a global issue.

Han Xiutao, director of the Center

for Sci & Tech and Human Rights Studies at the Beijing Institute of Technology, said the new technologies represented by generative AI, while facilitating people's life, were also leading to ethical risks such as privacy leakage, fake information and digital divide.

As a major country with a rapidly developing digital economy, China has always adhered to the principle of attaching equal importance to security and development in the ethical governance of digital technologies such as AI.

In 2019, China issued its new-generation AI governance principles with eight points, including respect for privacy. In July 2023, the Interim Measures for the Management of Generative AI Services was released, the world's first regulation for generative AI.

Han said China has always followed the humanistic concept of "science and technology for good" and developed AI technologies responsibly to enable a better life for people. Its solutions for human rights protection have contributed substantially to global human rights governance in today's smart digital era.

IUSTC International Union for Science & Technology Communication

The International Union for Science & Technology Communication (IUSTC), initiated by Science and Technology Daily, is a unified platform for the global publications to exchange the latest sci-tech news, aiming to promote global sci-tech innovation and cooperation, and improve the efficiency of sci-tech information dissemination. Therefore, this column is specifically for publishing news from members of IUSTC.

## Science and Technology Daily Signs MOU with IOL

By Robin-Lee Francke

Independent Online (IOL) and Science and Technology Daily (S&T Daily) are set to break the boundaries and expand audiences after signing a memorandum of understanding (MOU).

During a sit-down in Cape Town, the delegation who flew in from China and IOL, along with representatives from Independent Newspapers discussed the prospects of a fruitful relationship between the publications and countries.

Zhang Biyong, president of S&T Daily, said the publication is a Chinese mainstream media and sees South Africa as important for collaboration, adding that the prospects of sharing content on both ends from the publications as well as learning from each other is key as technology advancements are made daily.

Wang Junming, assistant editor-in-chief of S&T Daily said this newly formed relationship could lead to dialogues, forums, and innovations which would be beneficial for both countries.

S&T Daily, founded in 1986, serves

as its nation's primary platform for the dissemination of information within the field of science and technology.

Editor-in-chief for IOL, Lance Witten said he was pleased with the MOU with one of the most respected media titles and groups in the Chinese publishing landscape.

"This paves the way for greater collaboration in the future on both the content and skills-sharing fronts. It allows our South African-based storytelling to reach a broader international and Chinese audience and exposes our audience to their storytelling," Witten said.

"There is much we as a country can learn from China, especially in terms of the plethora of technological advancements in all fields, such as engineering, medtech, fintech and manufacturing, and the fact that over just four decades they have managed to lift their population out of poverty," he added.

"This partnership is a huge step forward for IOL and our audiences, and I can't wait to continue along this journey with our new partners," Witten said.

Source: IOL



IOL signs an MOU with S&T Daily. From left to right: Aziz Hartley, Lance Witten, Zhang Biyong and Wang Junming. (PHOTO: IOL)

# Pooling Financial Resources to Spur Sci-tech Innovation

Policy

By LI Linxu

In its latest move to spur sci-tech innovation, China is stepping up efforts to pool more financial resources to support the innovation-oriented sectors.

A specialized campaign focusing on boosting the capabilities of sci-tech financial services will be launched, according to a meeting jointly held by four government bodies, including the People's Bank of China (PBC) and the Ministry of Science and Technology (MOST).

Priorities will be given to the key ar-

reas such as national major sci-tech tasks and sci-tech SMEs, so as to bolster the quality and efficiency of finance serving the real economy.

The meeting called for improving and perfecting of an all-round and multi-level sci-tech financial service system, including credit and loans, bonds, equity, insurance, venture capital, and financing guarantees.

In recent years, China has rolled out a series of policies to strengthen the sci-tech financial service system, with significant achievements made in supporting sci-tech innovation.

Loans to high-tech manufacturing enterprises, SRDI enterprises, and sci-tech SMEs, have maintained a relatively rapid pace.

Meanwhile, the issuance scale of sci-tech innovation bonds and sci-tech innovation corporate bonds continues to expand.

Of particular note is that the construction of Science and Technology Innovation Board (STAR), Beijing Stock Exchange (BSE) and ChiNext is gaining momentum, while the reform of registration-based IPO system is going deeper.

ChiNext and STAR will continue to rank top by number of deals and proceeds in 2023, according to a report recently released by Ernst & Young, forecasting that listing on the BSE is expected to become a new trend for high-growth SDRI companies, thanks to supportive policies.

Besides the meeting, PBC, together

with seven government bodies, have recently unveiled 25 measures to strengthen financial services for private companies, particularly for SMEs, as well as those in high-tech, innovation-driven, green and low-carbon sectors.

The measures focus on the facilitation of the private companies' access to diverse financing channels such as credits, bonds and stock options.

The policies encourage eligible companies to fully leverage both the domestic and overseas capital market, Jane Yang, managing partner of Ernst & Young Beijing Office, told *S&T Daily*. She advises eligible companies to choose their listing spots in light of their own conditions, as well as the capital markets' preferences.

# Safeguarding Blue Sky Gains Momentum

By LI Linxu

The State Council executive meeting reviewed and approved an action plan to continuously improve air quality on November 24.

Efforts will be made to coordinate the high-level environment protection and high-quality development, according to the meeting, calling for people from all walks of life to take an active part in curbing air pollution.

It emphasized developing a green and low-carbon circular economy system, and accelerating the green and low-carbon transformation of industries, energy and transport.

In recent years, China has rolled out a series of policies to combat air pollution, which has significantly improved the air quality.

Ten years ago, an action plan for prevention and control of air pollution was implemented, setting specific

goals of lowering the particulate matter (PM) level.

In 2018, a three-year action plan to win the battle for a blue sky was released.

Thanks to these efforts, China has seen the fastest improvement in air quality across the world.

From 2013 to 2022, China's average PM2.5 concentration decreased by 57 percent, and the number of heavy pollution days reduced by 93 percent, accord-

ing to the Ministry of Ecology and Environment (MEE).

The country will stringently control the increase in emissions, reduce existing emissions, and strengthen supervision and support efforts, said Huang Runqiu, minister of MEE, in an earlier press briefing, vowing to make relentless efforts to control air pollution and protect the blue sky for the people.

The low-carbon transformation of energy will be speeded up, and new and clean energy sources will be vigorously developed, while the development of a green transportation system will be advanced, according to Huang.

clinics in Beijing. International cooperation in stem cell and gene R&D will also be supported.

In addition, Beijing will be assisted to strengthen cooperation and exchanges with members of the Digital Economy Partnership Agreement in digital identity, digital inclusiveness, cybersecurity, fintech and logistics.

Trade and investment institutional arrangements will be optimized with rules that are in line with the innovative development of trade in services. Trade costs and barriers will be reduced and cross-border trade supervision improved. Cross-border capital flows will be facilitated and enterprises going global will be supported.

Beijing will get help to build a professional organization for the construction of the Green Silk Road. It will be encouraged to import and export environmental products and services, and carry out bilateral and multilateral cooperation projects in this sector.

# New Plan to Open Up Service Sector Further

By CHEN Chunyou

The State Council announced a new plan on November 23 to open up the service sector wider. Plan 2.0 is a follow-up on a policy released in 2020, when Beijing became China's first integrated national demonstration zone for opening up the service sector.

Ling Ji, vice minister of commerce, said at a recent news briefing that the service industry, characterized by a wide range of categories, is an important area for building a higher-level, open economic system. The launch of a new round of pilot initiatives in the demonstration zone will help it align with international economic and trade rules, and promote a high-standard system for opening up the service industry.

Since 2015, China has selected 11 provinces and cities for comprehensive pilot programs to open up the service industry. Zhu Bing, director of the department of foreign investment administration at the Ministry of Commerce, said in the first three quarters of 2023, the added value of the service industry in these 11 provinces and cities reached 13.2 trillion RMB, accounting for 69.7 percent of the regional GDP.

Plan 2.0 will launch 170 pilot initiatives, notably more than before, and with greater openness and innovation, Ling said.

The objective is to construct a modern industrial system and optimize the overall ecosystem of industrial development. It will also deepen reform and opening up of the whole industrial chain

in key areas such as telecommunications, healthcare, finance, culture and education, and professional services.

Specifically, Beijing will be supported to build an international information industry and digital trade port. It is expected to strengthen international cooperation in the digital field, promote the formulation of relevant international rules, and seek mutual benefits and win-win cooperation in cross-border transmission of data, security testing and certification of digital products.

In healthcare and medical services, Beijing will further the Belt and Road international cooperation project on health and WHO Collaborating Centre brand projects. Doctors from foreign countries, as well as Hong Kong, Macao and Taiwan will be supported to set up

## Agricultural Data Revolution Empowers Food Security in Developing Countries

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The "soybean crisis" in 2004 made us realize that relying on foreign information alone is actually very risky, so we have to have our own sources of information," Wu told *S&T Daily*. CropWatch has offered a new data option for many user countries to obtain agricultural information in the Western-dominated food world.

Wu said it is similar to a consumer shopping around when buying things, comparing the pros and cons and then making an informed decision.

"One should not impose on others what he himself does not desire" is Confucian wisdom that Wu holds close to his heart. "In the process of cooperating with different countries, I found that the country, no matter big or small, rich or poor, has a very strong sense of data sovereignty," said Wu, adding that this was the reason CropWatch was moved to the cloud, in order to enhance the ownership of crop monitoring and improving information transparency for countries.

"The CropWatch program is a model of South-South cooperation," Shamika Sirimanne, director of technology and logistics for the United Nations Conference on Trade and Development, said during her opening remarks at a workshop in August. "Its focus on long-term sustainable implementation by participating countries and the fact that it represents a true transfer of knowledge and technology make it stand out," she said, adding that "This will enable [countries] to make data-driven policy decisions."

The increase of international im-

past of CropWatch is attributed to the long-term support of the National Remote Sensing Center of China. "Data transparency and long-term monitoring are key for users to receive and use the system. Our 25 years of continuous monitoring and 11 years of foreign service for the agricultural economy have led us to this point," said Wu. The project has been sustained by the long-term support of different departments in the country, such as the National Remote Sensing Center of China, according to Wu.

### Securing food futures

Another move for the CropWatch team is to make more thematic analysis to show the successful cases of our agricultural practice. With less than seven percent of the world's arable land, China feeds about 20 percent of the world's population. What's the secret behind it?

For example, irrigation accounts for over 50 percent of China's arable land and more than 70 percent of our total food production. Despite this significant contribution of irrigation, only about 24 percent of the world's arable land is irrigated, which is one of the major reasons for the volatility of global food production, according to Wu.

"Why do China and India prioritize irrigation while many other countries invest significantly less in this crucial practice? It's a query often overlooked, yet its impact on global food security is paramount. We must articulate the critical factors steering global food security and generously impart China's insights to our global counterparts," said Wu.

## INSIGHTS

## Global Stocktake: Climate Action Cannot Wait

## Opinion

Edited by TANG Zhexiong

With a resounding call to accelerate collective climate action, the 28th meeting of the Conference of the Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC) kicked off on November 30 in Dubai.

COP28 marks the conclusion of the "Global Stocktake," the first assessment of global progress in implementing the 2015 Paris Agreement.

Countries already know what the global stocktake will say: they are not on track, BBC reported in September. The world is not on track to limit a temperature rise to 1.5°C by the end of this century.

The stocktake does recognize that countries are developing plans for a net-zero future, and the shift to clean energy is gathering speed, but it makes clear that the transition is nowhere near fast enough yet to limit warming, said UNFCCC.

Actions to address climate change cannot wait. "We don't have any time to waste," said COP28 president Dr. Sultan Al Jaber, adding that we need to take urgent action now to reduce emissions. At COP28, every country and every company will be held to account, guided by keeping 1.5°C within reach.



Delegates arrive at the venue of the COP28 United Nations climate summit in Dubai on November 30, 2023. (PHOTO: VCG)

United Arab Emirates (UAE) has the presidency for COP28. On the eve of COP28, construction of the China-built Al Dhafra PV2 Solar Power Plant in the UAE was fully complete. As the world's largest single-site solar power plant and an important project of Belt and Road cooperation in green energy, it covers an area of 20 square kilometers of desert area with more than four million photovoltaic (PV) modules. At its full designed capacity, the plant can supply power for 200,000 households, and reduce 2.4 million tonnes of carbon emissions per year, according to officials.

China is a doer in advancing global climate governance, said Foreign Ministry Spokesperson Wang Wenbin. "We have not only built the world's largest clean power generation network, but also provided support and assistance in this regard to other developing countries to the best of our capability."

Aside from the UAE's Al Dhafra PV2 Solar Power Plant, China has undertaken other clean energy projects, such as the Sachal wind power project in Pakistan, the Noor III solar-thermal power plant in Morocco, the Al Kharsaah PV power station in Qatar and the Garissa

PV power plant in Kenya.

All these are vivid examples of China acting on the vision of green development, supporting the green and low-carbon construction and operation of infrastructure and enhancing international cooperation in climate response, said Wang.

China declared it would develop green and low-carbon energy and halt financing and construction of new coal-fired power plants overseas at the 2021 United Nations General Assembly. Two years later, research at the Green BRI Center in the International Institute of Green Finance showed that the proportion of renewables in China's Belt and Road energy sector projects surpassed fossil fuels, and the country made no overseas coal power investments in 2021 and the first half of 2022.

Apart from clean energy transitions, China also achieved results in soil erosion, ecological restoration, as well as farmland construction. In the last two decades, China has moved from the back seat to the front seat on everything related to green development, according to Erik Solheim, former executive director of the United Nations Environment Programme.

As Al Jaber said, all parties should prepare to deliver a high-ambition decision in response to the global stocktake that reduces emissions while protecting people, lives, and livelihoods.

## Voice of the World

## Smooth Sailing for China's Shipbuilding Prowess

Edited by QI Liming

Industry data shows that while the market share of China's shipbuilding industry continues to expand, a large number of high-tech shipbuilders are emphasizing the quality development of China's shipbuilding industry through optimizing types of ship. It is therefore entirely possible that the shipbuilding industry will become an ace up the sleeve of China's exports.

**Taking the lead spot in new global orders**

According to the data from global market researcher Clarksons Research Service on November 29, South Korean shipbuilders are expected to lag far behind their Chinese counterparts in new global orders, to place second worldwide in the industry this year amid a demand decline.

Clarksons data showed that South Korean shipyards won a combined 9.55 million compensated gross tonnages (CGTs) in new orders in the first 11 months of this year, down 39 percent from a year earlier.

Chinese shipyards outperformed their South Korean counterparts, clinching 21.89 million CGTs in new orders. South Korean shipbuilders obtained orders to construct 201 vessels, compared to China's 995 ships.

According to the *Korea JoongAng Daily*, given their track record, Chinese shipyards are expected to take the top spot in new global orders for the third straight year in 2023, with South Korea likely to place second.

According to data from the maritime industry professional services firm Lloyd's Register, in 2022, China accounted for 48 percent of global shipyard output, with South Korea at 25 percent and Japan at 15 percent.

Decades after China began its concerted efforts to build competitiveness in the global shipping industry, 2022 was the first time that Chinese shipbuilders exceeded the combined market share of Japanese and South Korean shipyards. Ships delivered to new owners by Chinese shipyards in 2022 totaled 14.6 million CGT, or nearly half of the

30.8 million CGT delivered globally, said *The Maritime Executive*.

China's market share has been growing consistently over the past 20 years. In 2000, Clarksons calculated they held less than 10 percent of the market, but in 2009 emerged as the market leaders.

As *South China Morning Post* reported, China has become the world's go-to country for shipbuilding after a boom of overseas orders. "China becoming a major world shipbuilding center may cause other countries to consider it to fill immediate needs for orders where other yards are already at full capacity," said Tom Ramage, economic policy analyst with the Washington-based Korea Economic Institute of America.

**Seeking diverse ship building capacity**

"Chinese shipyards' success has been achieved by maintaining a leading position within dry bulk ships and, more recently, establishing themselves as the premier location for building container ships," said Niels Rasmussen, chief shipping analyst at the Baltic and International Maritime Council (BIMCO).

"They also hold a large share of orders for most other ship types, but have yet to establish themselves as key players within the gas carrier sector," noted Rasmussen. However, BIMCO expects that it is possible that China could make inroads also into this sector, just like they gradually attracted orders for ultra large container ships.

In 2022, Chinese shipyards won 45 LNG tanker orders worth an estimated 9.8 billion USD, about five times their 2021 order values. Three Chinese shipyards won nearly 30 percent of 2022's record orders for 163 new gas carriers, according to Clarksons.

Meanwhile, S&P Global Commodity Insights said Chinese shipyards have accumulated their largest number of LNG new-build orders till this September, positioning them in coming years as an alternative to South Korean yards. In the first half of 2023, Chinese yards received 14 large LNG carrier orders, accounting for 35 percent of global orders for the period, as Xinhua News Agency reported this August.



China's first large cruise ship is delivered on November 4, 2023. (PHOTO: VCG)

## China Becomes the Global Renewables Leader

## Research Box

Over the last decade, China has become the world's renewables leader. Currently on target to reach a record-breaking 230 gigawatts (GW) of wind and solar installations this year, China leads the global renewables market. This is more than double the number of US and Europe installations combined.

While some other markets are moderating renewables targets, China has pushed up its 2025 wind and solar outlook by 43%, or 380 GW, since it first announced its 2060 carbon neutrality target in September 2020.

China has become a leader in grid-

connected energy storage, with capacity doubling from 2020 to hit 67 GW in 2023 and an outlook to expand to 300 GW by 2030. The share of coal in power generation has been continuously falling, down 10 percentage points in the last five years to about 55% today. About 80% of the reduction was replaced by renewables and the rest mostly by nuclear power.

The share of coal in power generation has been continuously falling, down 10 percentage points in the last five years to about 55% today. About 80% of the reduction was replaced by renewables and the rest mostly by nuclear power.

*How China became the global renewables leader, Wood Mackenzie, 11-20-2023*

## Science Museums Should Play Vital Role in Shaping Sustainable World

By GONG Qian

*Editor's note: The opening ceremony of the 2023 International Symposium on the Development of Natural Science Museums Under the Belt and Road Initiative (BRISMIS) was held in Beijing on November 29. Two keynote speakers, Wang Xiaoming and Shahbaz Khan, were on hand to share their insights on the role of science museums in conducting science education, promoting public engagement, and bringing about action and change.*

It is universally accepted that understanding science and technology begins with curiosity and imagination. Science and technology museums, also referred to as natural science museums, are therefore important spaces to nurture human curiosity, especially among the younger generation, and to shape public awareness and action, thus build-

ing an inclusive and sustainable world.

**Equal education and science communication**

In his speech at the ceremony, Wang Xiaoming, tenured professor of East China Normal University and vice president of Chinese Association of Natural Science Museums, said natural science museums promote equal and inclusive informal education by building an open, flexible and non-systematic education system, so that everyone has equal educational opportunities. They also help to establish a lifelong learning society and promote all-round development of people.

Natural science museums should be a venue for science popularization exhibitions of historical and current scientific and technological achievements, a place where the global deficit of science and technology can be reduced and a shared place with no thresholds, no discrimination, no boundaries, for all ages,

according to Wang.

Science museums should also serve as a science education and science culture communication platform that integrates science and art, filled with imagination, attraction and affinity, said Wang.

Furthermore, Wang said science museums could bridge domestic and international communication, enabling different groups to share their innovative ideas and achievements in the field of science and technology.

**Addressing global challenges**

In his keynote speech, Shahbaz Khan, director of the UNESCO Office in Beijing, said that in an era marked by profound climate and ecological challenges, the role of science museums and centers in fostering global sustainability has never been more crucial.

He said that science museums, traditionally repositories of knowledge and culture, are now pivotal in addressing

the complex nexus of climate change, ecological balance, and sustainable living. They are uniquely positioned to educate and inspire the public, especially the younger generation, about the intricacies of our environment and the critical need for its preservation.

Khan highlighted the fact that some science museums around the world such as the Science Museum Group in the UK and the California Academy of Sciences in the U.S. are making strides in reducing carbon emissions, and engaging communities in biodiversity and climate change initiatives.

Similarly, professor Wang stressed that natural science museums could promote the preparation of citizens to participate in joint responses to global issues, and achieve objective expression of new technologies, policies and emergencies such as the COVID-19 pandemic through vigorous debates and doubts.

## 3D Printing System Efficiently Aids Trauma Treatment

By TANG Zhexiong

An orthopaedic device that can be used to stabilize long bone fractures after emergency trauma, produced by an intelligent 3D medical high-speed printing (3D-HSP) system, was recently launched by the West China Pitech.

The external fixation brace printed by this 3D-HSP could be used for emergency trauma and postoperative external fixation covering the bones and

joints of the limbs, such as wrist and knee joints, as well as the spine.

The system has achieved a number of core technological breakthroughs, with its efficiency being 20 times higher than that of traditional 3D printing technology, according to the inventor.

Combined with a control system driven by AI to direct the printing trajectory, this 3D-HSP can replace traditional plaster fixation to provide a printed external fixation. After real-time

scanning of an injured body, the 3D-HSP can accurately print a fixed brace in about 30 minutes, whereas it originally took five to seven hours to print a similar brace.

The system has been put into clinical application in China and is continuing to be upgraded, in order to be able to print more complex curved surfaces such as shoulder joints, helping doctors treat patients' affected areas quickly and efficiently.

## Hi! Tech



## Water Technology Helps Build Sustainable Future

From Page 1

The turf is a crucial part of a football pitch and can affect a match's outcome. The technology, developed by College of Resources and Environment of Ningxia University, can irrigate with sea water or recycled water directly onto the grass, stabilizing water control and making it appropriate for tropical and sub-

tropical zones like Qatar.

This technology is what northwest China's Ningxia Hui autonomous region, which is surrounded by sand on three sides and has an arid climate, contributes to Arab countries with similar natural environments while improving water resource utilization.

Developed by Changjiang Design

Group (CDG) and applied in more than 30 water infrastructure projects, the video and sonar integrated leakage detection technology is called a "magic tool."

With the help of this technology, the location of abnormal leakage areas can be determined quickly. Moreover, the penetration point can be accurately located through the underwater robot

high-definition tracking. The flow rate and detection accuracy are 100 times higher than the previous technology version, with the detection water depth exceeding 150 meters, according to CDG.

Fu Ni, deputy director of the international department of CDG, said these technical achievements of international cooperation in water conservancy are expected to promote exchanges and cooperation in water-related fields and the company will continue to promote Chinese technology globally.

# Shaping a Decade of Collaborative Success

## Dialogue

By LONG Yun & BI Weizi

The opening ceremony of the XJTU-POLIMI Joint School of Design and Innovation in Xi'an on September 7, 2019, marked a significant milestone in the long-standing partnership between Politecnico di Milano (POLIMI), Italy and Xi'an Jiaotong University (XJTU). This joint school was and still is the first overseas campus of POLIMI.

At the forefront of this partnership stands Professor Sergio Amedeo Pignari, the executive associate dean of the XJTU-POLIMI Joint School of Design and Innovation, whose pivotal role has been instrumental in bringing this collaborative vision to reality.

**The beginning of collaboration**  
"This is a long-dated collaboration," Pignari told *Science and Technology Daily*, emphasizing the depth and breadth of the partnership between these two universities. Since its official inception in 2012, the collaboration has evolved significantly, notably with the launch of a Double Degree (DD) Program at the Master's level in Electrical Engineering. Over the years, this program has cultivated over 100 graduates who have seamlessly transitioned into high-level positions in the global job market.

However, the strides of collaboration extend far beyond this point. Pignari has been actively involved in the early discussions on the feasibility of the Joint School, including the formal application procedure and proposal submission to the Ministry of Education (MoE) of China, since 2015.

The academic exchanges have expanded further, including virtually all the other branches of Engineering, Architecture, and Design, and encompassing a DD Program at the Master's level



Professor Sergio Amedeo Pignari in the class. (PHOTO: XJTU)

in architecture oriented towards Heritage, approved by the MoE of China. Also, the collaboration has not been confined to Master's programs. Two innovative Learning Programs at the Bachelor's level have been started in the Joint School, further enhancing the educational landscape.

In the current phase, Pignari is dedicated to managing teaching activities and fostering research collaborations among POLIMI, XJTU, and the industrial world. His efforts have gained positive feedback from national and international companies.

According to Pignari, the Joint School transcends the conventional university school model. It represents a collaborative effort between Italy and China, leveraging their complementary strengths to drive "a new paradigm for innovation development."

Looking ahead, Pignari hopes the Joint School runs a diverse range of innovative Learning Plans covering creative and technological areas, focusing on key technological domains, such as the green and intelligent technologies for carbon neutrality, sustainable cities, and smart manufacturing.

### The man behind the expertise

Pignari's academic journey began as an electronic engineer specializing in EMC (electromagnetic compatibility). His expertise lies in researching interference phenomena, which centers around the aerospace, automotive, energy and other related sectors, showing his dedication to addressing real-world challenges.

Pignari highlighted the unique balance inherent in his research field, "I like [my research field] very much because it's a very balanced subject. It is made of 50 percent of theory and 50 percent of practice." For him, this equilibrium is a crucial aspect of his work, where electromagnetic and circuit theory are seamlessly integrated with experimental tests.

His commitment to international sci-tech cooperation is evident in his active involvement with prestigious organizations such as the Chinese Society for Electrical Engineering and the Institute of Electrical and Electronics Engineers. As a fellow member of these organizations, he considered it a great honor and acknowledged the positive impact on his work.

His involvement in these organizations has facilitated personal connections with renowned scientists and research groups globally. Speaking about the importance of international collaboration, Pignari said, "For scientific research, there are no borders. It is very important to be able to interact, discuss, and brainstorm with all the people around the world, because that's the only way to maximize the possibility of providing a concrete contribution to sci-tech advancement."

### The nuances and commonalities between two countries

Pignari's connection with China, especially Xi'an, is not merely academic. "I visited China for the first time in 2008, and on that occasion, I stayed in China for a couple of months to deliver a course at Tongji University in Shanghai," Pignari recalled. The experience left a deep impression on him, and he was captivated by the nuances and commonalities between China and Italy. "I immediately realized that travel would have had a big impact on my future professional and private life," he said.

One aspect that stood out during his time in China was the "cultural connection through food." Pignari said, "Italian and Chinese cuisines share this 'cultural aspect' completely. We don't consider food just energy to live, and the implication of [food] is much more for us."

When asked about interesting stories while working with Chinese counterparts, Pignari shifted the focus to Xi'an, highlighting the city's unique blend of history and modernity. He emphasized Xi'an's role as a city that allows visitors to witness "the roots and the wings" of China, where the past merges with the future in a distinctive blend.

This article is also contributed by XJTU.

## Letter to the Editor

# Mix of Unique Experiences in China

By Alex Tani

In the summer of 2019, I went to China for the first time to attend a summer school program in Beijing. The city's mix of ancient traditions and modern life amazed me. The program covered Chinese culture, history and language, and I loved exploring places like the Forbidden City and Wangfujing markets.

After the program ended, I decided to pursue a master's degree in international politics at a university in London, to help me better understand the history of China. Learning about this country from a classroom filled with great academics was beneficial, but I was more eager to return to China. In my opinion, if you want to study and understand a country, nothing can compare to having real experience living there.

Unfortunately, the pandemic delayed my arrival in China. However, I was determined to make the most of my time waiting to return. I spent my days studying Chinese, reading books about Chinese history and even starting looking for apartments to live in Beijing.

In 2023, I was lucky to win a scholarship to attend another master's program in Beijing. This current course has given me the time needed to explore more hidden spots in the city, finding peaceful parks and calm places amid the urban chaos.

Living in the city full-time wasn't always easy. I had to get used to the fast pace, understand social norms, and pick up the language. But Beijing welcomed me, and I found both challenges and re-

wards in my daily life.

Now, my master's program at Peking University focused on both economics and international relations, helping me further understand China's role in the world. The diverse group of students in my classes made every discussion interesting. Beyond the classrooms, exploring Beijing became a big part of my education.

Food was a major part of my experience too. From street food to fancy restaurants, I loved trying new dishes. Sharing meals with classmates and locals became a way to connect across cultures.

Sometimes, I felt a bit homesick for my hometown and missed the familiar things. But new friendships and exciting discoveries in China quickly replaced those feelings.

Besides my studies, I got involved in community projects, trying to connect international students with the local community. These experiences, whether in class or working on community initiatives, helped me form connections that went beyond cultural differences.

Looking back, my time in China has been a mix of unique experiences. What started as a curiosity in 2019 has turned into a deep connection, making China feel like a second home. The city's energy, the friendliness of its people, and the endless possibilities for exploration have made this part of my life an unforgettable adventure.

Alex Tani is a postgraduate student from UK at Peking University.



Alex Tani (the first one from the left) and his friends. (COURTESY PHOTO)

## Traditional Eastern Wisdom

# King of Bronze Statues

By ZONG Shihan

The grand statue of a human figure in bronze, on display at the new Sanxingdui Museum in Sichuan province, southwest China, is the tallest and most complete standing bronze figure in existence. It is nearly 261 centimeters tall and weighs 180 kilograms.

Known as the king of bronze statues in the world, it has a history of more than 3,000 years and was unearthed at a sacrificial pit at the Sanxingdui archaeological site in 1986.

The statue consists of a figure and a square base. The figure wears a high crown and three layers of tight-sleeved clothes, with an exquisite dragon and bird pattern. The hands are held in front of the chest in an embrace-like posture. The figure also wears anklets and stands barefoot.

The awe-inspiring statue demonstrates the maturity of ancient China's bronze casting technology. Lead and tin added to bronze made the alloy more ductile and easier to cast into ornate vessels in that era. Other civilizations during the same period still used red copper, which could not be cast into complex patterns or hollow objects.

There are two theories about the

identity of the mysterious statue. Some regard it as the statue of a high priest who commanded sacrificial activities while some think it is the statue of a king, the supreme ruler. It is certain that the statue was a sacrificial artifact used for blessing.

It is difficult to determine what the figure held in his hands. It could have been a scepter, or an item of ivory, or even a jade cong, a tube-like object. Experts have not yet reached a conclusion and it could remain a mystery forever.



The grand bronze statue of a human figure at the new Sanxingdui Museum. (PHOTO: VCG)

# China Taking Measures to Address Winter Acute Respiratory Infection

## Service Info

By Staff Reporters

On November 26, the National Health Commission held a press conference to discuss the current situation and preventive measures for winter respiratory diseases in China.

Mi Feng, spokesperson for the National Health Commission, said that respiratory diseases are on the rise with the onset of winter across the country. According to Mi, recent monitoring indicates that the current respiratory infectious diseases are mainly due to the influenza virus, with additional cases

caused by rhinoviruses, mycoplasma pneumonia, respiratory syncytial virus and adenoviruses.

Mi emphasized the importance of coordinated medical resource management, implementing a tiered diagnosis and treatment system, and enhancing general infection diagnosis and treatment capabilities. He also noted the need for timely and continuous updates on medical institutions providing services such as pediatric and fever clinics.

Efforts should be made to increase the opening of relevant consulting rooms and treatment areas and make full use of traditional Chinese medicine, said Mi, highlighting the necessity of effective epidemic prevention and

control in places with high population density, including schools, childcare institutions, and nursing homes. Measures involve minimizing personnel movement and visits.

China has promoted online diagnosis and treatment to meet the needs of patients, leveraging online hospital platforms to set up channels for fever clinics and pediatric treatments.

Wang Huaqing, chief expert of Immunization Planning at the Chinese Center for Disease Control and Prevention, said that different age groups are affected by distinct pathogens. For instance, influenza and nasal viruses are prevalent among the 1-4 age group, while the 15-59 age group sees dominance in influenza, nasal viruses, and

the novel coronavirus.

In response to widespread concerns about difficulties in registration and slow medical consultations, Ying Xumin, deputy director of the Hangzhou Municipal Health Commission, emphasized the need to enhance the supply of medical services.

Ying urged all levels of medical institutions to normalize the opening of respiratory and fever clinics. He stressed the importance of extending service hours based on demand and creating conditions for establishing nighttime clinics. In addition, he called for a streamlined service process to ensure a more efficient and patient-friendly experience in accessing medical services.

# What to Know About Cerebral Haemorrhage

## Science Outreach

By Staff Reporters

Recently, with strong cold air impacting many regions throughout China, the number of patients with brain haemorrhages has increased significantly. Many people think that a brain haemorrhage is something that only happens to older people, but this is not the case. Wang Mingyu, an attending physician at the Neurosurgery Department of the First Hospital of Shanxi Medical University, recently pro-

vided information about brain haemorrhage for the general public, to help them seek medical help as soon as possible if any symptoms occur.

### Brain haemorrhage

Brain haemorrhage, also known as an intracranial haemorrhage, is a symptom of bleeding in the brain. It requires immediate treatment. The skull surrounds the brain, and any leaking blood can cause compression and damage to the brain tissues.

A brain haemorrhage can cause a number of different symptoms, including sudden tingling, weakness, numbness or paralysis in the face, arm or leg. Other symptoms include a sudden, severe headache, difficulty in swallowing, problems with vision, loss of balance

or coordination, difficulty in understanding, slurred speech and seizures.

It is important to recognize these symptoms quickly so that treatment can be given as soon as possible.

### Risk factors

There are several risk factors and causes of brain haemorrhage. Irrespective of age, high blood pressure is one of the most important risk factors for brain haemorrhage. Long-term high blood pressure can cause damage to blood vessels and atherosclerosis, which can lead to blood vessel rupture and brain haemorrhage. For young people without a history of hypertension, sudden cerebral haemorrhage is most commonly caused by cerebrovascular disease.

Smoking and alcohol abuse can also affect the health of blood vessels, increasing the risk of atherosclerosis, which can lead to brain haemorrhage. In addition, excessive pressure from studies, work and life can put the body in a state of tension and easily lead to cerebrovascular accidents.

### Preventive measures

Brain haemorrhages are life-threatening, and require urgent treatment and extensive rehabilitation. Maintaining a healthy lifestyle is an effective way of preventing a brain haemorrhage. A sensible diet, moderate exercise, emotional regulation, quitting smoking and limiting alcohol, and avoiding overexertion can all help to keep blood vessels healthy.