



# Science and Technology Daily

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WEEKLY EDITION

## Tech for Better Life in China

### The Miraculous Ecological Tale of Henan

By LIN Yuchen & WANG Xiaolong

Visit the Zhengzhou Longhu Park in Henan's capital city Zhengzhou and you will be greeted by majestic swans and other wildlife. It is difficult to believe that this place used to be a wasteland once.

Henan's commitment to a greener urban environment can be seen from its multiple initiatives that combine environmental protection with economical benefits.

The ecological protection drives in this inland central province in the Yellow River valley are tackling alleviating extreme climate conditions and poverty in its suburban cities while building up foundations for their economic growth.

The Zhengzhou Longhu Park at the heart of Zhengzhou is a striking example. The size of nearly two dozen soccer fields, it is the largest artificial wetland in Zhengzhou with natural water ecosystem protection and restoration functions. Once a barren wasteland, it was transformed in merely 10 years into a haven for nearly 150 species of wildlife such as mute swans, egrets, ducks and mandarin ducks.

There are 55 mute swans in the park. Lu Bing, a volunteer with an association for bird protection in Zhengzhou, says the species is very choosy about its habitat but the Longhu Park has been meticulously protected and greened to meet its needs.

The conservation model in the wetland park involves both the government and volunteers. The Zhengzhou municipal government, working with local animal protection experts, has planted vegetation suitable for the consumption of the mute swans in the park. "This not only creates a scenic attraction for visitors, beautifying the natural environment but also ensures ample food for these swans to thrive on," Lu said.

Besides, the park's water and air quality is monitored regularly in real-time while portable noise monitoring devices are used to periodically assess the noise levels.

Another highlight of Henan's environmental protection drive is the national-level wetland park in Yuzhou, a county in Xuchang City, which showcases an innovative model of treating polluted water.

A management personnel of the wetland said wetlands constructed adjacent to a sewage plant could naturally purify wastewater. *See page 2*



Visitors pose for photos in front of China's pavilion at the Green Zone of the 28th session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP28), in Dubai, the United Arab Emirates, December 3, 2023. (PHOTO: XINHUA)

## Editor's Pick

### Yangtze River Delta Leads Innovative Development

By Staff Reporters

The Yangtze River Delta, encompassing Shanghai and the provinces of Jiangsu, Zhejiang and Anhui, covering around 358,000 square kilometers, generates nearly a quarter of China's GDP and contributes to over one-third of the country's total foreign trade.

On a crucial inspection tour, Chinese President Xi Jinping stressed efforts to make new major breakthroughs in the integrated development of the Yangtze River Delta and enhance the region's leading and exemplary role in pursuing Chinese modernization.

Xi particularly stressed the need for Shanghai to accelerate the construction of the "five centers" - the international center of economy, finance, trade, shipping, and science and technology innovation.

#### Rich sci-tech innovation resources

Shanghai has consistently showcased unique advantages in sci-tech innovation, boasting the largest talent pool in China over the past three years, as re-

vealed in the Shanghai Talent Supply and Demand Data Report. Despite challenges posed by the COVID-19 pandemic, Shanghai maintained its leading position, with a talent proportion of 10.2 percent in 2022 — surpassing other Chinese big cities like Beijing (9.18 percent) and Shenzhen (6.43 percent).

Beijing and Shanghai rank as the top two with the highest number of high-level scientists among 20 major cities known for their sci-tech innovation worldwide, according to a report released at the 15th Pujiang Innovation Forum in 2022.

In addition, Shanghai consistently rates as one of the top cities when it comes to attracting foreign experts. Throughout the decade, more top scientists moved to Shanghai from key cities in developed countries than left it, according to Yicai Global.

#### Striving to build global sci-tech innovation center

Shanghai, the largest city in China known for its vibrancy, openness and in-

novation, has taken center stage since China implemented the policy of reform and opening up. Shanghai's exemplary role as a major economic powerhouse leading China towards high-quality development is underscored again in the new era.

Based on the resources, Shanghai is dedicated to becoming a sci-tech innovation hub, contributing to breakthroughs in science and technology development in the Yangtze River Delta.

According to the World Intellectual Property Organization's latest Global Innovation Index released in September, the Shanghai-Suzhou sci-tech cluster moved up one place to enter the top 5 on the list of top 100 sci-tech clusters, and two other Chinese sci-tech clusters, Shenzhen-Hong Kong-Guangzhou and Beijing, also made the top five.

Chinese cities are rapidly growing in high-quality scientific research while American and European cities are dropping, according to a global ranking of top science cities by scientific database Nature Index released this November. *See page 2*

### World's Deepest, Largest Underground Lab Begins Operation

By WANG Xiaoxia

Some 2.4 km below the earth's surface, the world's deepest and largest physics facility was completed and put into use on December 7.

The Deep Underground and Ultra-low Radiation Background Facility for Frontier Physics Experiments (DURF) is the second phase of the China Jinping Underground Laboratory, which is tucked inside the Jinping Mountain in Sichuan province, southwest China.

The site is ideal for its low cosmic-ray muon flux — only one-hundred-millionth of that on the earth's surface, which means the facility has far less noise from background radiation than

many other underground facilities.

The DURF is mainly designed for major basic research in physics, and carries out experiments in frontier fields, such as direct detection of dark matter, neutrinoless double beta decay, as well as key nuclide synthesis processes and stellar evolution in the field of nuclear astrophysics. Therefore, it will provide a platform for interdisciplinary research integrating particle physics, nuclear astrophysics and life sciences.

The China Jinping Underground Laboratory consists of two phases. Its first phase was completed and began operation at the end of 2010. With a total volume of about 4000 cubic meters, it housed two experiments to directly de-

tect dark matter: the China Dark Matter Experiment (CDEX) and PandaX.

The completion of the second phase, namely the DURF, has enlarged the lab's total room capacity by nearly 80 times to 330,000 cubic meters. Ten research teams from Chinese universities and research institutions, such as Tsinghua University, China Institute of Atomic Energy and Shanghai Jiao Tong University, have been stationed in the DURF to carry out scientific experiments.

The DURF was jointly built by Tsinghua University and Yalong River Hydropower Development Company. It is the first time that a large state-owned enterprise supported national basic scientific research.

## International Cooperation

### Green Technology Brings Freshwater to UAE

By Staff Reporters

Through cooperation with the Belt and Road Initiative (BRI), China has shared its technology and experience in seawater desalination with partners in arid regions around the world, providing abundant freshwater to local households.

One flagship project is the Taweelah Independent Water Plant (IWP) in Abu Dhabi, UAE. Contracted by Power China in 2019 and connected to the grid at the end of 2021, it is the world's largest operational membrane-driven desalination plant.

Applying the world's advanced reverse osmosis (RO) technology, the plant has an unprecedented capacity of 909,000 m<sup>3</sup> per day, and can meet the water demand of nearly one million local households under full load, according to Power China.

The UAE faces high water stress due to its hot weather and large demand, with an average daily water consumption per capita of over seven cubic meters. The UAE's fresh water supply mainly relies on groundwater and desalination. However, long-term large-scale exploitation of groundwater will seriously degrade the water quality and cause salinization, posing a threat to the local agricultural and ecological environment. Thus, the seawater desalination plant is an important facility for social welfare.

Apart from providing freshwater, the seawater RO plant features a 50MW on-site solar PV power generation facility to complement the energy supply from the grid. The PV power plant is expected to meet 30 percent of the plant's electricity demand in the first eight years, with a target of increasing solar energy's share to 55 percent by the end of the first quarter-life of the project.

At the 2023 Global Water Summit, the Taweelah IWP won the Global Water Awards—Desalination Plant of the Year 2023, for its contribution to people's livelihoods and local economic and social development in the UAE.

## New Graphic

### THE NUMBER OF CHINA'S SCI-TECH JOURNALS CONTINUES TO GROW

- The total number of sci-tech journals
- English-language sci-tech journals



Source: Blue Book on China's Scientific Journal Development (2023)  
Designed by SONG Ziyun / S&T Daily

WECHAT ACCOUNT



E-PAPER



# China Advances Global 6G Standardization

## Policy

By ZHONG Jianli

The Ministry of Industry and Information Technology (MIIT) of China recently announced its commitment to fostering a unified global standard for 6G technology, heralding a new era of international industrial innovation collaboration.

Zhang Yunming, vice minister of MIIT, underlined the necessity of nurturing a consensus and promoting close collaboration among global industry, academia, research and application sectors, in order to advance the innovation and cooperation for 6G, the next-generation comprehensive digital infrastructure.

MIIT has been actively driving various initiatives encompassing the research of 6G development requirements, technological R&D, as well as international cooperation.

Earlier this year, China's proposal of five categories of 6G typical scenarios and 14 key performance indicators was



The 6G communication technology is exhibited at the 2023 Zhongguancun Forum held on May 28, 2023 in Beijing. (PHOTO: VCG)

wholly adopted by the International Telecommunication Union in its 6G vision and requirements recommendation document.

The IMT-2030 (6G) Promotion Group of China has actively bolstered in-

ternational exchanges and cooperation, signing memorandums with the European 6G Smart Networks and Services Industry Association (6G-IA), Korean 6G Forum, and the Telecommunications Standards Development Society of India.

Zhang stressed the need to cement original innovation, particularly in advancing key technologies such as new wireless network technologies, propelling the convergence of mobile communication with other sectors such as intelligence, sensing, and computation. He also said it's necessary to accelerate the development of integrated 5G applications to strengthen the foundation for 6G applications.

In addition, Zhang called for efforts to enhance international communication and deepen cooperation to steer the formation of unified global standards for 6G.

Wang Zhiqin, head of the IMT-2030 (6G) Promotion Group and deputy director of the China Academy of Information and Communications Technology, highlighted three novel scenarios of 6G application: the integration of communication and sensing, the convergence of communication and AI, and ubiquitous IoT.

She added that in the future, 6G will connect not only humans but also a myriad of intelligent entities such as robots and the metaverse.

# 5G Revolution Shapes the Future

By ZONG Shihan, CHEN Chunyou & SONG Ziyan

The 2023 World 5G Convention held in Zhengzhou, Henan province in central China, from December 6 to 8, saw experts discuss technological breakthroughs and propose industrial paths for 5G development, drawing a blueprint for a better future.

## Accelerating technology evolution

Wu Hequan, an academician of the Chinese Academy of Engineering (CAE), said at the convention that with the rapid development of information technology represented by 5G, cloud computing, big data and artificial intelligence, major countries and international organizations are strengthening research on 5G-Advanced and 6G, competing for first-mover advantage in the new round of science and technology revolution and industry reform.

Although 5G technology still faces various challenges, there are directions for its development. Among them, tera-

hertz technology and Reconfigurable Intelligent Surface (RIS) are attracting attention.

Terahertz is a unit of frequency, denoting one trillion cycles per second. Terahertz technology refers to the use of electromagnetic waves in the terahertz region of the electromagnetic spectrum. RIS is a programmable structure that can be used to control the propagation of electromagnetic waves.

Yao Jianquan, an academician of the Chinese Academy of Sciences (CAS), pointed out that for 5G's evolution to 5G-Advanced and 6G, the network bandwidth and transfer rate have to be improved and time delay reduced. Competition among major economies over terahertz technology has already begun.

According to Yao, although humans do not yet fully understand and apply terahertz technology, the technology has shown advantages in some industries. In addition to mobile communication based on fingerprints, invisibility,

safety and other factors, terahertz has vast application prospects in the field of biomedicine.

According to Cui Tiejun, another academician of CAS, RIS is one of the solutions to technological challenges of 6G. Its typical feature is that it can control the propagation of electromagnetic waves in real time and process digital information to connect the digital world and physical world. Since the RIS concept was proposed in 2014, his team has developed a complete information metamaterials system and promoted its application in multiple fields, Cui added.

## Enabling industry development

With its improvement and popularization, 5G technology has begun to play a key role in various industries.

It has enabled scientific drilling in unmanned areas tens of thousands of meters deep and hundreds of kilometers away, said Sun Longde, an academician of CAE, adding that in the Daqing Oilfield in Heilongjiang province,

5G is used for data acquisition, reducing inspection time from days to 20 minutes.

In manufacturing, 5G is helping with data acquisition and high-precision positioning. In the medical field, it plays a role in emergency treatment, remote diagnosis and hospital management. In agriculture, the integration of new digital technology and biotechnology has ushered in an intelligent breeding era.

The main application of 5G is in industrial Internet, which has achieved results in machine vision and remote-controlled robots, and will play a greater role in discrete manufacturing and process manufacturing as it improves, Wu said.

"From a drop of oil to a thread, from a piece of iron to a section of steel, from heavy equipment to shoes, hats, clothing, and snacks, 5G has evolved from single production to large-scale production, from peripheral auxiliary to core production," said Li Pizheng, executive director of China Mobile.

# First Phase of Commercial Subsea Data Center Completed

## Case Study

By WANG Zhuhua & ZHONG Jianli

In the azure waters off the coast of Lingshui in south China's Hainan province, a milestone of technological innovation has been achieved after a 1300-tonne data pod was lowered to its designated position under the sea.

As the core equipment of Hainan's demonstrative Underwater Data Center

(UDC) project, the pod successfully docked with its base and completed necessary tests, marking the completion of the first phase of the world's first commercial UDC project.

Pu Ding, general manager of the project said data centers are fundamental to the storing, computing and processing of information, and are the backbone of Internet services.

"The UDC represents a new, eco-friendly, and low-carbon data center system. By placing IT infrastructure such as servers within pressure vessels on the

seabed, the center utilizes gravity heat pipe technology, employing the flow of seawater for natural cooling of the data center equipment. This approach offers advantages such as green, low carbon, safe, reliable, and cost-efficient," said Pu.

In December 2022, the UDC project deployed its first two data pods, which will work in tandem with the newly deployed one to form the world's largest underwater data pod cluster.

According to Li Jiawen, vice president of Hailan Cloud, the technical provider of the project, these pods not only serve as data storage facilities, but also function as a supercomputer on the seabed. Packed with intelligent computing equipment, they can process over four million high-definition images in 30 seconds, equivalent to the workload of 60,000 traditional computers operating simultaneously.

The project is planned to be executed in three phases. The first phase includes the deployment of three sets of underwater data pods. Subsequent phases will witness the construction of 30 and 100 data pods respectively.

Comparing the undersea project with a land-based traditional data center of similar scale, Pu said, "Once the en-

tire project is completed, it is projected to save 122 million kWh of electricity, reduce the land area needed by 68,000 square meters, and conserve 105,000 tons of freshwater annually."

He added that through comprehensive design and development of marine infrastructure, the underwater data center, when combined with offshore renewable energy, marine monitoring and ocean farming, can promote the intensive utilization of marine resources, facilitating the synergistic development of the digital economy and marine economy.

The exploration of UDCs initially began with Microsoft in 2015. After three sea trials and retrievals, Microsoft's experiments confirmed that servers operating in a sealed and inert gas environment on the seabed exhibited eight times more reliability than those in land-based data centers.

"The Hainan project team, after innovating current international advanced technologies, not only fills the gap in China's development of marine engineering and data center infrastructure, but also positions its overall technology and industrial capabilities at the forefront internationally," said Li.

IUSTC International Union for Science & Technology Communication

# S&T Daily Partners with Nouvelles d'Europe

By LI Linxu

In its latest move to promote the dissemination of sci-tech innovation achievements, *Science and Technology Daily* (*S&T Daily*) has established a cooperative news service relationship with *Nouvelles d'Europe*.

Zhang Biyong, president of *S&T Daily*, and Zhong Cheng, president of *Nouvelles d'Europe*, signed an MOU in Paris on November 24.

The two sides will conduct full cooperation in the exchange of news resources, such as sci-tech news in the forms of images, texts and videos, and also co-host relevant events.

Zhang presented the English Week-

ly Edition of *S&T Daily* to Zhong, and extended an invitation to *Nouvelles d'Europe* to join the IUSTC that was initiated by *S&T Daily*, aiming to enhance the communication and cooperation in the field of science and technology among global news agencies, think tanks and organizations.

Zhong introduced the development history of *Nouvelles d'Europe*, and accompanied the visiting delegation on a tour of the culture center of *Nouvelles d'Europe*, as well as its Chinese school.

*Nouvelles d'Europe*, established in 1983, is one of the most influential Chinese news organizations in continental Europe.



Zhang Biyong, president of *S&T Daily*, holds talk with Zhong Cheng, president of *Nouvelles d'Europe*, in Paris on November 24. (PHOTO provided by *Nouvelles d'Europe*)

# Yangtze River Delta Leads Innovative Development

From page 1

Shanghai is ranked third for high-quality research output according to the annual Nature Index report.

## Leading the way in integrated development

The integrated development of the Yangtze River Delta is undergoing new major breakthroughs, which enhanced the region's leading and exemplary role in pursuing Chinese modernization.

The Yangtze River Delta is home to many industrial and supply chains for critical industries.

As a major automobile production

base in China, a new energy vehicle (NEV) rolls off the production lines in the Yangtze River Delta every 10 seconds, according to Xinhua.

With the chips and software sourced from Shanghai, batteries from Jiansu, and die-casting machines from Zhejiang, an NEV factory in the delta region can acquire all auto parts within a 4-hour drive.

This showcases the immense potential for synergy-driven development within the Yangtze River Delta, making it an example of collaborative success for the rest of the country.

# The Miraculous Ecological Tale of Henan

From page 1

The wetland microbial community helps remove pollutants from wastewater by catalyzing chemical reactions, biodegradation and biosorption. They also support vegetation growth. The water passes through the surface flow wetland and its quality is further improved. It is then discharged into the nearby river, meeting discharge standards.

The wetland system also serves as a green lung and a sight for sore eyes for the nearby residents. "The plants remain green throughout the year except in winter, and people enjoy bringing their families here to see the beautiful scenery," apasserby told *Science and Technology Daily*.

Both the Zhengzhou Longhu Park and the Yuzhou Wetland Park exemplify the vision of providing a healthy living environment for the local people. Besides, it focuses on creating an integrat-

ed model that utilizes a clean environment to boost the economy.

For example, Sunzhuang, a village in Zhengzhou close to the Yellow River, has been hosting seed technology expos for several years.

The latest exhibition in October this year showcased over 6,500 new vegetable varieties. The participants included top breeding teams from 31 provinces, municipalities and autonomous regions across the country. International and foreign-funded enterprises such as Syngenta, Nunhems, Rijk Zwaan, Enza and Hazera were also present.

"The seed expo provides a platform for displaying newly developed vegetable varieties. In the future, we will strengthen cooperation with research institutions and enterprises, promote new and superior varieties, and contribute to rural revitalization," Jiang Junping, director of the seed tech expo, said.



A set of data pods are lowered into the sea in Hainan. (COURTESY PHOTO)

## INSIGHTS

## Sharing New Opportunities for Global Supply Chain

## Voice of the World

Edited by TANG Zhexiao

China will take a clear-cut stand against protectionism and various forms of "decoupling and severing industrial and supply chains," integrate at a deeper level into the global system of industrial and supply chains, and actively participate in international cooperation in green development, Premier Li Qiang said at the first China International Supply Chain Expo (CISCE). This prompted Reuters to report that China had hit back at the West's de-risking strategy as evidenced by the expo.

As the world's first national exhibition on supply chains, the just-concluded CISCE yielded fruitful outcomes including more than 200 deals and intention agreements signed with a total value of more than 150 billion RMB (about 21 billion USD), according to official data from China Council for the Promotion of International Trade (CCPIT).

More than 500 domestic and foreign firms exhibited their latest products and technologies at the expo, focusing on smart cars, green agriculture, clean energy, digital technology, and the health and lifestyle sector.

Indonesian President Joko Widodo highlighted the need to strengthen global supply chains with new solutions and better collaborations, saying that Indonesia welcomes the first CISCE to fully support global efforts to build a stronger and more stable global supply



Foreign friends visit the first China International Supply Chain Expo in Beijing, on December 5, 2023. (PHOTO: VCG)

chain.

"The inaugural supply chain expo is the right event at the right time," said Ngozi Okonjo-Iweala, director-general of the World Trade Organization.

The remarks were being cognizant of the COVID-19 pandemic and supply disruptions that followed exposing general vulnerabilities in the way global production networks organized.

Meanwhile, Eddie Yue Wai-man, chief executive of the Hong Kong Monetary Authority, said China is to play a dominant role in the global supply chain as it transitions to complex, high-end products, and the country will become even more crucial going forward.

The CISCE also highlighted China's advancements in clean energy and new energy vehicles, said *the Helsinki Times*.

Data from the National Energy Administration showed that by the end of this September, the country's total installed renewable energy capacity reached 1.38 terawatts, which accounted for nearly half of the country's total installed power generation capacity and exceeded that of coal-fired power.

This is more than double the number of US and European installations combined, according to a report titled *How China Became the Global Renewables Leader* by Wood Mackenzie, a glob-

al research and consultancy company. Moreover, Mackenzie forecasted that China will hold more than 80 percent of the world's polysilicon, wafer, cell, and module manufacturing capacity from 2023 to 2026.

China has become an important force in stabilizing the global clean energy industry chain and supply chain, and has cooperated with more than 100 countries and regions on green energy projects, according to Zhang Shaogang, vice chairman of CCPIT.

Tomasz Szyplula, president of the Poland Federation of Small and Medium-Sized Enterprises, recognized China as a prime market when it comes to clean energy cooperation. He told Xinhua News Agency that there are many projects that they would like to cooperate with Chinese business.

Emphasizing the mutual benefits of supply chain cooperation and the importance of expanding Chinese technologies to broader markets globally, Chris Pereira, CEO of the North American Ecosystem Institute, told *the Helsinki Times* that new energy is China's "most internationalized and sustainable advantage."

The first CISCE is a big step toward fostering innovative exchanges among companies that have achieved technological breakthroughs, according to foreign affairs commentator Hannan R. Hussain. It also significantly reflects China's vision to share new opportunities for global supply chain resilience, particularly during a period of rapid global transformations in technology, science and resources, said Hussain.

## Opinion

## Human Rights Still Central in New Era



A woman picks tomatoes at a greenhouse in Huimin county, east China's Shandong province. The local specialized fruit and vegetable planting cooperatives have greatly help villagers increase their income. (PHOTO: XINHUA)

By Juan Jose Vazques &amp; Francisco Rojas Aravena

As we commemorate the 75th anniversary of the Universal Declaration of Human Rights, it is a time for profound reflection on the progress and ongoing challenges in the global pursuit of human rights. This milestone offers an opportunity to reassess our collective efforts, understand diverse perspectives, and renew our commitment to human rights in a diverse, increasingly interconnected and conflictive world.

The interpretation and application of human rights have evolved since the Universal Declaration was adopted in 1948. Across diverse cultural and political landscapes, nations have grappled with integrating these universal principles into their unique contexts.

For instance, China's approach to human rights, which often emphasizes collective well-being alongside individual freedoms, provides a contrasting yet instructive perspective. Such diversity in understanding and implementing human rights underscores the necessity of ongoing dialogue and adaptability in our global human rights discourse. A multilateral space is the area where this dialogue must be developed.

The intersection of environmental sustainability and human rights has become increasingly prominent. The global climate crisis poses a direct threat to fundamental human rights, including the right to live, to health, water, and a safe environment. China's environmental targets, like its commitment to carbon neutrality and significant investments in renewable energy, exemplify the scale and urgency of action required on a global level. These efforts highlight the critical link between environmental stewardship and the protection and fulfillment of human rights and effective compliance, serving as a call to global action.

The eradication of poverty is integral to the realization of human rights. China's recent strides in lifting a huge portion of its population out of poverty demonstrate the impactful role of targeted economic policies and development strategies in advancing human rights. This achievement provides a powerful example for global poverty reduction efforts, emphasizing the need to focus on economic rights as a fundamental com-

ponent of the human rights agenda. Also, this is a fundamental achievement of the UN 2030 Agenda and the Sustainable Development Goals.

Large-scale development initiatives like China's Belt and Road Initiative illustrate the complex relationship between global development and human rights. Such initiatives underscore the importance of balancing economic development with the principles of sustainable growth and equitable practices, ensuring that human rights remain at the forefront of global development agendas to achieve the goals of the 2030 Agenda.

The advent of digital technologies, particularly advancements in AI, introduces new challenges to the human rights landscape. Issues of privacy, data security, and the ethical use of technology are increasingly relevant in a digitalized world. The policies and practices adopted by nations at the forefront of these technological advancements will play a crucial role in shaping global norms and standards in technology, with significant implications for human rights. We need global standards in this area.

As we observe the 75th anniversary of the Universal Declaration of Human Rights, the journey towards achieving these rights globally remains a work in progress. Nations like China, with their unique approaches to human rights, environmental policies, poverty reduction, and technological advancements, offer valuable lessons and challenges.

In many places, violations of human rights and violence continue to prevail. How can we get out of this situation?

This can be achieved only through education and more education. It is a task that we must undertake every day, continuing day by day with perseverance. This opens the path to new dialogues, understanding others and seeking the basis for substantive agreements amid differences. This is what will allow us to work to "live together" as humanity in our common home, as a human family, protecting human rights.

Juan Jose Vazques is a legal advisor and professor at the UN-mandated University for Peace; Francisco Rojas Aravena is an expert on international relations and human security and serves as the rector of the university.

## Global Climate Governance Needs Action, not Criticism

## Comment

By TANG Zhexiao

The recently concluded 28th meeting of the Conference of the Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC), is seen as a global stocktake of progress in limiting the temperature rise since the *Paris Agreement* was signed. However, instead of strengthening joint efforts to address global climate governance, some critics missed the point, focusing on shirking responsibilities and discrediting others.

According to the UK's *The Guardian*, electricity generation in China and India, and oil and gas production in the U.S., have produced the biggest increases in global greenhouse gas emissions since 2015.

Lacking scientific basis, this comment is one-sided and inconsistent with the facts and failed to demonstrate the positive attitude needed for climate response, the Chinese Embassy in the UK said on December 6.

Global warming is the result of cu-

mulative emissions of greenhouse gases. Developed countries have been releasing greenhouse gases into the atmosphere for more than 200 years of industrialization. They have unshirkable historical responsibility for climate change, including the UK, said the Embassy spokesperson.

According to the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report, historical cumulative CO<sub>2</sub> emissions from 1850 to 2019 are estimated at 2,400 ± 240 Gt CO<sub>2</sub>, of which more than half (58 percent) occurred before 1990. Among them, North America and Europe ranked the highest in cumulative emissions, accounting for 23 percent and 16 percent respectively.

Data from the Emissions Database for Global Atmospheric Research showed that the 2022 greenhouse gas (GHG) emissions per capita of EU members are nearly 1.2 times more than global GHG emissions per capita.

The Party GHG Inventory Submissions to the UNFCCC secretariat suggested that among the 15 developed countries and the EU, only nine parties have achieved their GHG emission reduction targets in 2022.

Even worse, the 100 billion USD of climate finance that is promised by developed countries for developing countries has not been provided. Estimates by a British-founded confederation of charitable organizations Oxfam and the Organization for Economic Co-operation and Development suggested that the actual flow of climate finance from developed to developing countries in 2020 was between 21 billion USD and 83.3 billion USD.

Erik Solheim, former UN under-secretary-general and former executive director of the UN Environment Programme, said that developed countries that have caused the major part of global warming should take on their due responsibilities for climate change.

Wealthy investors have the capital to take risks, and indeed, should be taking more of them, said Bill Gates, the billionaire founder of Microsoft. "Very wealthy individuals should also be making changes to their lifestyles to bring their emissions close to zero," he told *the New York Times*.

It is an objective fact that developed and developing countries have different historical responsibilities, develop-

ment stages and capabilities to combat climate change.

China has stayed true to its promises and made significant contributions to global climate response. The country's emission intensity of carbon dioxide decreased by more than 51 percent from 2005. Compared to developed countries' general programme of 40 to 70 years to move from carbon peaking to carbon neutrality, China has given itself 30 years.

Fatih Birol, head of the International Energy Agency, told pan-European media network Euractiv that China did the world "a big favour" by bringing down the cost of clean technologies such as solar panels.

As the Chinese Embassy in the UK remarked, the principles of equity, common but differentiated responsibilities, and respective capabilities should be upheld in tackling climate change.

The key to achieve the goals of the *Paris Agreement* lies in fulfilling commitments and actions, as well as strengthening unity and cooperation. Shirking responsibilities and passing crisis on to others will only continue to hamper the global climate governance process.

## Hi! Tech

## 5G Technology Transforms Social Lives

Editor's note: As a core component of the new generation of information technology, 5G brings profound changes to the mode of social production and people's way of life. To demonstrate how 5G exerts influence on social development, some 5G applications were presented at the 2023 World 5G Convention held in Zhengzhou, Henan province.



5G intelligent robot dog.



5G remote inspection unmanned aircraft system.



5G + intelligent control platform for mine management.



AI simulation cockpit.

(All photos by ZHOU Weihai)

# Making Science Coherent to Wider Audiences

## Dialogue

By LONG Yun & BI Weizi

Recently, an Indonesian expert on scientific assessment and policy, Yoslan Nur, also an officer of the United Nations Educational, Scientific and Cultural Organization (UNESCO), visited Beijing for the 2023 International Symposium on the Development of Natural Science Museums under the Belt and Road Initiative (BRI).

During the symposium, he called for more initiatives to utilize the science museums and centers to "make science more engaging and accessible to a broader audience."

### Establishing platforms for knowledge communication

Nur embarked on his journey with UNESCO in 1999, laying a solid foundation for a remarkable career devoted to promoting a culture of innovation and science communication for sustainable development. He has played a pivotal role in advancing the development of science centers and museums around the world, especially in Africa.

According to Nur, science centers and museums serve as vital platforms for knowledge exchange, providing an enjoyable way for children to gain knowledge in the sci-tech field.

Moreover, these facilities are quite important in enhancing public awareness regarding sustainable development. To some extent, they can encourage individuals and groups to reflect on their actions, contributing to the collective effort in addressing global issues like climate change and the loss of biodiversity.

From Nur's perspective, the development of the natural science museums under the BRI holds immense value in



Dr. Yoslan Nur speaks at the symposium. (COURTESY PHOTO)

fostering cultural exchange and driving technological innovation through education and awareness initiatives.

However, the process has not been without its challenges. Nur acknowledged the limited presence of science centers in Africa in general. Currently, science centers in Africa are primarily concentrated in the southern or northern regions. He advised that initiatives, like promoting "scientific tourism," could make technology more present on the continent.

### Working together for science outreach

As the saying goes, "If you want to go fast, go alone; if you want to go far, go together." Nur said UNESCO does not improve public understanding in the sci-tech field alone, rather reaching out to form a cooperative network to make collective efforts. He applauded China's role in enhancing global science outreach activities at different levels.

In 2018, the Chinese Association of Natural Science Museums (CANSM) and UNESCO agreed to work together on new activities to unleash the potential

of science-oriented museums to promote the United Nations Sustainable Development Goals.

For instance, CANSM has actively supported UNESCO's work, fostering collaborative efforts to promote science popularization under the BRI framework, which includes capacity-building programs for science museums and contributions to science popularization policy-making.

At the same time, Nur mentioned the China-aided science museum in Addis Ababa, the Ethiopian capital, which is said to be Africa's first-ever museum solely dedicated to science.

He said it has become a crucial asset, fostering scientific awareness and education among the local people. These efforts by the Chinese government have had a profoundly positive impact on the region, creating a substantial influence.

Recognizing the success of the science museum in Ethiopia, there is hope for similar initiatives in Kenya or Rwanda. The establishment of science centers

in these regions could further improve public understanding of science and contribute to local development.

### Fueling sci-tech innovation

Nur is quite familiar with China's journey towards becoming a sci-tech powerhouse. He never hesitates to share his thoughts to help the public understand China's sci-tech policies.

In the dynamic landscape of global scientific advancement, China has emerged as a powerhouse, attracting attention for its efforts to foster international cooperation in the scientific field.

"He is an old friend to Chinese people and China," said Ou Jiancheng, his Chinese counterpart working at the CANSM. Nur said in a recent interview with *Science and Technology Daily* that China has transitioned from a manufacturing hub to a provider of cutting-edge technologies such as high-speed trains, and smartphones.

The catalyst for this evolution lies in the establishment of organizations like the Chinese Academy of Sciences and the Ministry of Science and Technology, with their cohesive functions in sci-tech policy making and implementation.

"Technological innovation is like an engine," said Nur. "A country needs to continually fuel the engine to keep it in motion. Once the engine of scientific innovation starts running, it propels economic development, social progress, and cultural advancement in various aspects."

China's role in global innovation culture is not confined to technological capacity alone. He lauded China's strategic deployment of high-tech zones, sci-tech incubators in universities, and support for small and medium enterprises (SMEs) in fostering a knowledge-driven economy.

"I think that China is doing well in developing the knowledge economy and knowledge society," said Nur.

## My China Story

# Lively Communication, Fruitful Harvests

By LONG Yun & BI Weizi

In 2015, Northwestern Polytechnical University (NPU) welcomed a German expert Michael Schmittbetz to its faculty. As a veteran journalist from Germany turned language educator at a Chinese university, Schmittbetz's journey reflects a commitment to fostering cultural exchange and international communication. He is dedicated to leveraging educators' crucial role in promoting a more connected and understanding world.

Schmittbetz began his journalism career and dedicated years to a German television station. With his increasing passion for history, philosophy and sociology, he started to teach these subjects to international students in Germany, which eventually led him to leave his homeland to explore the diversity of the world. In Xi'an, a famous cultural hub in western China, he found an opportunity to teach a range of compelling subjects, including history, German literature, linguistics and writing.

Reflecting on his teaching approach, Schmittbetz emphasized the importance of "lively communication." He criticized the fear of making mistakes prevalent among Chinese students, advocating for a more interactive and accepting learning environment. He said that overcoming unnecessary shyness is crucial to motivating students to speak and communicate effectively.

From his perspective, the most rewarding aspect of his career lies in his students' reactions. "I am not a teacher who stands behind the teacher's desk.

We find our forms of communication together in the classroom," said Schmittbetz in a recent interview with *Science and Technology Daily*, adding that the reward for him is "when students do not just translate words and sentences but understand thoughts and develop their thoughts."

In our interconnected world, international relations are becoming increasingly complex, he said, adding that despite the challenges, different countries complement each other, highlighting the role of lively communication in gaining the knowledge needed for global understanding.

Nowadays, China has become an increasingly popular destination for people around the world. For foreign experts considering teaching and living in a foreign country like China, Schmittbetz has some salient advice — "keep an open mind." He encouraged embracing cultural differences and remaining true to oneself and emphasized the significance of finding friends and fostering people-to-people connections for a fulfilling experience.

Beyond language training, Schmittbetz's German studies classes convey intercultural aspects. He provides his Chinese students with firsthand impressions of a foreign culture. His hope is more Chinese students will have opportunities to visit Germany, fostering mutual understanding and paving the way for a stronger relationship between Germany and China.

This article is also contributed by NPU.



Michael Schmittbetz. (PHOTO: ZHANG Wei / Beijing Review)

## Expats Activity

# Orientation Workshop for Foreign Experts Held in Shanghai

By Staff Reporters

To help foreign experts in Shanghai better understand the city and have a more enjoyable work and living experience,

the 2023 Orientation Workshop for Foreign Experts, sponsored by the Science and Technology Commission of Shanghai Municipality (Shanghai Administration of Foreign Experts Affairs), was

held recently and attended by nearly 30 foreign experts and their families from 17 countries.

The workshop included various engaging activities, such as lectures, a city tour, a Chinese learning seminar, and a cultural salon. It not only helped foreign experts further understand Shanghai's relevant policies but also brought them a rich and interesting learning experience, allowing them to feel the charm of Chinese culture.

The "Foreign Talents in Shanghai" Kunqu Opera and The Bund Salon, as the final part of the workshop, was held in the Bank of China Building on the Bund. Foreign experts visited the exhibi-

tion hall of the building and attended a lecture on foreign-related financial services.

During the salon, foreign experts dressed in opera costumes learned Kunqu Opera, and practiced calligraphy and painting on folding fans, fully experiencing the beauty of traditional Chinese art.

Foreign experts expressed their gratitude to the organizer for the well-planned workshop, which allowed them to further immerse themselves in Shanghai's culture, gain a deep understanding of policies and beneficiary measures closely related to their work and life, and help them better settle in the city.



Foreign experts dressed in opera costumes learn the Kunqu Opera. (PHOTO by the Science and Technology Commission of Shanghai Municipality)

## Traditional Eastern Wisdom

# Bronze Heavenly Tree: Mythical Thinking of Ancient Shu People

By ZONG Shihan

The huge bronze heavenly tree is a representation of the ancient Shu civilization, which dates back to at least 4,800 years in southwest China's Sichuan province. It can also be regarded as a masterpiece of bronze casting technology.

The debris of eight bronze heavenly trees was unearthed in a sacrificial pit at the Sanxingdui archaeological site in 1986. One of them, which is 396 centimeters high, has been repaired and is on display at the new Sanxingdui Museum in Sichuan. This tree was named as the No.1 Heavenly Tree, making it the

largest single bronze artifact discovered in the world. Due to the missing top part, experts estimate that the total height would be around 5 meters.

The No.1 Heavenly Tree is composed of a base and a main trunk. The base looks like three mountains connected together, decorated with sun and cloud patterns. The main trunk has three layers, with three branches extending from each layer. Each branch bends into a bow shape in a different direction.

There are small circles and flower buds with hollow patterns on the tree's branches, with one bird sitting on each flower bud, totaling nine birds. In addition,

the tree is full of fruits, and a dragon descends from the side of the main trunk, appearing to prepare for flight.

Regarding the specific connotation of the No.1 Heavenly Tree, the jury is still out in academic circles about its real meaning. However, there is consensus to define the tree as a heavenly tree, which is imagined as a ladder for the ancient Shu people to communicate with gods and traverse heaven and earth. Some people believe that the modeling and connotation of this bronze tree should be related to the divine tree recorded in the *Classic of Mountains and Seas*, a Chinese compilation of mythic geography and beasts.



The huge bronze heavenly tree at the new Sanxingdui Museum. (PHOTO: VCG)

## Service Info

# Insights into the Origin of Chinese Civilization: Shimao Site

By BI Weizi

Shimao site, located in Gaojiabao town, Shaanxi province on the northern edge of the Loess Plateau, is the biggest prehistoric walled site discovered in China, offering archaeologists insights into the origin of Chinese civilization.

The Shimao site is roughly 4,000 years old and covers an area of around 4.25 million square meters. In September 2019, by performing carbon-14 dating, archaeologists figured out the building time of the primary section of the Shimao site - the palace center - to be about 2200-1900 BC, towards the end of the Longshan period. In recent decades, a lot of valuable jewellery, carved stones, bone needles, shells, and even musical instruments and crocodile bone dishes have been found at the site.

Archaeological research has shown that the Shimao site consists of three practically complete and relatively independent stone cities: the palace center,

the inner city, and the outer city. The palace center was surrounded by inner and outer stone walls, which were 2.5 meters thick on average, with perimeters of approximately 4,200 meters and 5,700 meters respectively, and feature gates, turrets and watch towers.

The palace center was a huge stepped pyramid built on a hill made of loess. The pyramid was modified to form 11 platforms, and it stood 70 meters tall. The inner city consisted of a stone-walled platform, which experts believe was a palatial complex. Unusual features at the Shimao site include jade embedded in the walls for spiritual protection, relief sculptures of serpents and monsters, and paintings of geometrical patterns on the walls.

These discoveries have provided a lot of new research materials for understanding the origin and formation of the Chinese civilization, as well as the social and settlement development and the relationship between humans and the land.