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Scientists Discuss Future of Science and AI

By SUN Jin & ZHAO Hanbin

The Tengchong Scientists Forum 2025, held in Tengchong city, Yunnan province in southwest China, brought together the world's top scientific talent, including Nobel laureates, Turing Award winners, Fields medalists, and leading Chinese academicians to discuss AI changing the world.

The discussions from December 5 to 8 spanned critical fields like digital security, mathematics, materials science, quantum technology, agriculture, and robotics.

Bridging basic research and application

Turing Award recipient Andrew Chi-Chih Yao, acknowledging AI's potential for good, cautioned about new challenges in digital security. He used biosynthesis technology as an example to warn that large AI language models could be maliciously used to aid in the synthesis of harmful DNA sequences.

To counter this, Yao proposed cross-disciplinary solutions merging biology and cryptography to develop safe, privacy-preserving DNA screening systems.

Fields medalist Efim Zelmanov stressed mathematics as the foundation of AI, pointing out that the core of deep learning techniques is rooted in mathematical principles like polynomial approximation. The foundational logic behind modern applications such as cybersecurity and blockchain can be traced back to the finite fields established by



The opening ceremony of the Tengchong Scientists Forum 2025 is held on December 6. (PHOTO: XINHUA)

French mathematician Évariste Galois in the 19th century.

Nobel laureate Konstantin Novoselov spoke about AI's capacity to expand scientific boundaries. He cited the use of AI and robotics to achieve unprecedented atomic-level precision in developing advanced materials like graphene.

Promoting sci-tech from theory to reality

Pan Jianwei, an academician of the Chinese Academy of Sciences, described the forthcoming era of quantum networks, promising improvements

in Internet security and speed. He said in the future, when quantum computing and AI are combined, it will be possible to surpass human intelligence.

His team has reported significant progress in quantum communication and computing, and is developing practical applications like integrated space-ground quantum networks and quantum-enhanced telescopes.

Huang Sanwen, president of the Chinese Academy of Agricultural Sciences, presented a breakthrough in hybrid potato breeding. Using genomic design,

his team has developed the world's first hybrid potato capable of propagation from true seed, overcoming the inherent limitations of asexual reproduction.

Huang said the technology could revitalize some 200 million mu (about 13.3 million hectares) of farmland in southern China lying fallow in winter. It could also be extended to 45 vegetatively propagated crops globally, making a scalable contribution to world food security.

Wang Xingxing, founder and CEO of Unitree Robotics, underscored the importance of endowing robots with human-like mobility. "Movement is essential for robots to finish human tasks. We aim to enable robots to execute all human motions."

"The AI data for embodied intelligence is scarce, but this presents the best opportunity for innovation," Wang said. Although robots still face challenges in unfamiliar environments, he thinks that with 30,000 units collecting data globally and continuous AI model optimization, robots could perform 80 percent of tasks in 80 percent unfamiliar scenarios within two years.

Scientific progress is strongest when foundational research, cutting-edge technology and real-world needs converge. The exchanges in Tengchong underscored a common message: AI and related technologies can expand human capabilities and public benefit — if pursued with interdisciplinary collaboration and a focus on accessibility and safety.

China's AI Models Rise as Innovation Accelerates

AI Ripples

By LIANG Yilian & DU Peng

China's artificial intelligence ecosystem is gaining rapid global traction, with domestic large models rising in international rankings and expanding their influence across industries.

The latest assessment released by the prominent evaluation platform LMArena ranks several Chinese models among the world's best. Baidu's ERNIE model has been placed second globally — and first in China — for text capabilities, excelling in creative writing, long-form comprehension, and following instruction. It also ranks among the global leaders in visual understanding.

Zhipu's GLM-4.6 has a leading position in coding capabilities, matching the performance of other top international models.

Since the rise of DeepSeek earlier this year, global interest in China's AI development has intensified. Large models have quickly become a strategic battleground in international competition. Through advances in fundamental research, product deployment,

and ecosystem building, Chinese AI developers are entering the global first tier, helping to reshape productivity in sectors across the economy.

"Intelligence itself is the biggest application, and the speed of technological iteration is the only real moat," Baidu founder Li Yanhong said at the 2025 Baidu World Conference. Over the past year, he remarked, the capabilities of large models have expanded well beyond conversational tools, with notable progress in digital humans, coding agents, and systems capable of autonomously searching for "globally optimal solutions" in complex scenarios.

China currently leads the world in the pace of model development. By July, Chinese institutions had released 1,509 large models — 40 percent of the global total. According to Stanford University's 2025 AI Index Report, China's high-performance models have rapidly improved in both quantity and quality, with the performance gap between top Chinese and international systems narrowing significantly by the end of 2024.

At the heart of this progress is continuous technological innovation. Baidu's newly launched ERNIE 5.0, a next-generation natively multimodal model with 2.4 trillion parameters, has a unified architecture capable of processing

and generating text, images, audio, and video.

Unlike earlier approaches that combined separate modules for different types of data, Baidu's new design builds a single, integrated framework from the ground up, enabling the model to handle heterogeneous information with greater fluidity and synergy, according to Baidu.

Chinese AI models are also making a strong mark on the global open-source community. A joint report by MIT and Hugging Face, a U.S. company that uses machine learning to develop computation tools for building applications, says Chinese developers accounted for 17.1 percent of worldwide downloads of open-source AI models over the past year, surpassing the U.S.

Baidu's multimodal reasoning model recently topped both the global model trending chart and the global multimodal chart on Hugging Face. "Baidu has led more than 1,000 open-source projects, with over 21,000 community contributors," said Chen Shangyi, chair of Baidu's technology committee.

Competition among large models is increasingly shaped by the strength of foundational hardware and development platforms. Domestic AI chipmakers such as Kunlunxin, Ascend, and Cambricon

are rising rapidly, with Baidu's latest Kunlunxin products offering significant improvements in performance and cost.

At the software level, platforms including Baidu's PaddlePaddle, Huawei's MindSpore, and Megvii's MegEngine are helping developers deploy large-model applications more efficiently.

As technological capacity expands, real-world applications are emerging as the primary measure of value. With its vast population and diverse industry scenarios, China has become the world's largest and most dynamic testing ground for large-model deployment.

In the energy sector, for example, Baidu worked with State Grid to build a unified AI innovation platform and deploy an intelligent drone inspection system capable of five million tower inspections annually, reducing manual climbs by 40 percent.

Backed by an end-to-end AI stack — from chips to frameworks, models, and applications — Baidu is partnering with enterprises across education, healthcare, finance, and manufacturing. Its PaddlePaddle-ERNIE ecosystem now supports over 23 million developers and 760,000 companies.

"When AI becomes a native capability," Li said, "intelligence is no longer a cost — but a source of productivity."

Case Study

Hebei's Committed Efforts Toward Ecological Protection

By Staff Reporters

In the first eight months of 2025, the average concentration of PM2.5 (fine inhalable particles) in the province was 30 micrograms per cubic meter, a year-on-year decrease of 18.9 percent, according to He Litao, deputy director of the Department of Ecology and Environment of Hebei province.

This data reflects Hebei's committed effort toward ecological protection. The province has deeply integrated sci-tech innovation into green development, striving to transform the vision of "bluer sky, greener land and cleaner water" into practice, and ensuring the implementation of major national strategies.

Bluer sky

Steel is a pillar industry in Hebei and also the priority for green transformation.

Hebei's goal for the steel industry is to achieve A-level environmental performance, implement policies according to conditions of every single enterprise, and promote the green and low-carbon transformation of the entire process and industrial chain.

Since 2016, Hebei has cumulatively reduced its crude steel production capacity by over 82 million tonnes, and more than 80 steel enterprises have completed their relocation from urban areas.

Meanwhile, Hebei has established an automatic air monitoring network and automatic pollution source monitoring network. They can collect and analyze over 23 million pieces of data daily. Through large AI models and online diagnosis, they can achieve precise source tracing and targeted treatment.

The collaboration of technological measures has reduced the average concentration of PM2.5 by 63.8 percent during the period of 2013 to 2024.

Greener land

The Saihanba afforested area, which covers 94,000 hectares in Hebei, is an example of the province's ecological restoration efforts through technological innovation.

To protect forests, Hebei has set up over 6,000 monitoring stations and established an integrated smart management

and protection platform covering air, space and ground.

Xiongan New Area, designated as a relocation area for the non-capital functions of Beijing, uses big data to manage over 20 million seedlings, and enriches the diversity of plants to create a more natural forest.

Since the beginning of the 14th Five-Year Plan, Hebei has completed afforestation and reforestation of over 30 million mu. Meanwhile, the forest coverage rate in Xiongan New Area has increased from 11 percent when it was established to 35 percent to date.

Cleaner water

The ecological environment governance and protection of Baiyangdian, a major wetland in north China, represents Hebei's water management employing technological measures.

A monitoring network has been established, applying various technical means such as satellite remote sensing, unmanned aerial vehicles, and underwater sensors, to achieve real-time monitoring of the water quality of Baiyangdian.

A series of precise technological measures have been carried out, including silt removal and dredging, returning farmland to lakes and unblocking water systems. A total of over 27 million cubic meters of silt have been removed and 212 kilometers of channels have been dredged, achieving the connection of small lakes and ensuring water navigation.

In terms of biodiversity restoration, the local government has improved the wetland's functions, and established a buffer to purify the water flowing in. Dynamic monitoring of bird activities is also carried out, using video surveillance and voiceprint recognition. This has helped the number of wild bird species to increase from 90 to 296.

"Technological innovation is the core driving force for green development," Long Fenjie, director of the Department of Science and Technology of Hebei Province said, adding that Hebei will continue to focus on key areas such as air pollution prevention and control, ecosystem restoration, and green and low-carbon transformation.



A scenic view of Baiyangdian Lake, Hebei province. (PHOTO: XINHUA)

Data Element Education Guideline Released

Policy Express

By SUN Jin

In an effort to address the shortage of digital talent and support the ongoing reform of the market-oriented allocation of data elements, China has issued a guideline that sets out four key areas and 12 measures to build a comprehensive talent cultivation system covering discipline development, vocational education, academic research and industry-university-research-application.

The guideline, jointly released by

the National Development and Reform Commission, the Ministry of Education, and three other departments, encourages qualified universities to establish disciplines and majors related to data elements, such as data science and engineering, digital economy and management.

Universities with strong foundations and disciplinary resources are also encouraged to establish digital schools and relevant majors. To meet the urgent knowledge and skills needed in the growing data industry, universities are urged to offer micro programs in data element fields like data governance and data security.

For vocational education, the guideline also calls for adjusting training programs in line with digital industrial needs. New majors like data collection and cleaning, data annotation, and data operations will be supported. Enterprises and vocational schools will hopefully also jointly develop training bases and industry-aligned courses based on real digital industrial scenarios.

Application scenarios in the data field are regarded as a vehicle for industry-university-research-application. According to the guideline, enterprises are expected to lead the construction of such application scenarios, while universities and other research institutions

are being motivated to participate directly, accelerating the cultivation of versatile, innovative, and practice-oriented digital talent.

"The guideline marks a shift from fragmented exploration to a systematic, professional and high-quality development stage," said Yuan Jun, deputy director of the National Data Development Research Institute. "With its implementation, China will gradually bridge the gap between talent supply and industrial demand and foster a deeply integrated digital talent ecosystem," he added.



Steel Tech Collaboration Forges China-Serbia Friendship

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He reaffirmed Hebei's commitment that, "We will continue optimizing policies for international sci-tech collaboration, deepening integration within the Belt and Road Initiative, and fostering exchanges among young scientists."

The participants agreed that sci-tech innovation transcends borders and serves as a solid bridge for friendship and common development.

"Green, low-carbon steel development requires not only technological innovation but also international cooperation and shared wisdom," Lin Zhangguo, deputy general manager of the HBIS Group, stated. "We aspire to build long-term bridges with Serbian and global partners in green manufacturing, low-carbon R&D, and high-end talent cultivation to steer the global steel industry toward greater sustainability and efficiency."

Chinese Sci-tech Contributes to Solving Global Challenges

Voice of the World

By Staff Reporters

China's sci- tech innovation has topped a recent series of prestigious lists, injecting new vitality into the global quest for sustainable development.

Taking into account scientific research cities, disciplinary contributions, and international leadership, China's "meteoric rise" in research capabilities augers well for the international research ecosystem.

The advance of Chinese research cities

According to Nature Index 2025 Science Cities supplement, six Chinese cities are among the world's top 10 scientific research hubs. Data shows that Beijing has topped the list for nine consecutive years, while Shanghai, Guangzhou, Wuhan, Nanjing and Hangzhou have all made it into the top 10. China has historically held the majority of the list's top 10 global scientific research cities.

On the Global Innovation Index 2025, published by the World Intellectual Property Organization, China has become one of the top 10 most innovative economies in the world for the first time, and it ranks first in the world in many sub-indicators related to intellectual property rights. Meanwhile, "Shenzhen- Hong Kong- Guangzhou" ranked first globally as a sci-tech cluster.

In terms of the key indicator contribution share, Chinese cities have demonstrated a strong growth momentum. Data shows that the research output in Beijing increased by over nine percent



A Chinese researcher checks the dryness of seeds in a biodiversity laboratory. (PHOTO: XINHUA)

between 2023 and 2024, while Shanghai's grew by 20 percent.

The research output of other Chinese cities in the Nature Index top 10 list also rose, with a commentary pointing out that these changes in rankings reflect "a broader trend that China is expanding its leading edge."

Moreover, in terms of disciplines, the Nature Index shows that Chinese cities continue to dominate the lists in the fields of chemistry, physical sciences, and earth and environmental sciences.

Chinese scientific researchers making their mark

The development of scientific research cities in China cannot be separated from the tireless research capabilities of scientists. Against the backdrop of an overall increase in scientific research output, the international influence of

Chinese scientists has also continued to grow.

A recent study published in the *Proceedings of the National Academy of Sciences (PNAS)* highlights this structural shift. Data shows that Chinese scientists now lead more than half of all joint research projects with peers in the UK, with similar leadership patterns emerging in collaborations with partners in the U.S. and Europe.

Analysis by the Swedish Foundation for International Cooperation in Research and Higher Education offers further validation. Its November report noted that when ranked by high- impact publications, rather than total volume, China has surpassed the U.S. in research strength, particularly in mathematics, computing and engineering.

"I have witnessed first-hand the developments that have led to what many

may find a surprising, even shocking, development," said Erik Forsberg, the report's author, referring to the rapid evolution of China's academic capabilities over the past two decades.

Chinese research aiding global sustainable development

The academic achievements of Chinese research have been increasingly applied in policy-making, especially in the sustainable development fields.

A recent global report released by Springer Nature, a world-renowned scientific publishing organization, shows that China is the largest contributor to papers related to the Sustainable Development Goals (SDGs). Chinese scientific achievements are playing an increasingly important role in the formulation of global SDG policies.

China's SDG- related research findings have been widely cited in various SDG policy documents, with 25 percent of citations coming from international organizations such as the World Health Organization. Since 2022, the impact of Chinese SDG- related papers on global health and environmental policy documents has been particularly significant, the report said.

"China's research results are widely cited across different countries," said Nicola Jones, director of the SDG Programme at Springer Nature, highlighting the global utility of Chinese scientific output.

This aligns with a broader trend noted by *Nature* Editor-in-Chief Magdalena Skipper. Skipper observed that while scientific research is a global endeavour, China is making an increasingly influential contribution to the global research ecosystem across multiple metrics.

Opinion

China's AI Ascent Draws Int'l Interest

By SUN Jin & ZHANG Hao

As China's advancement in AI draws global attention, Andrey Belevtsev, senior vice president and head of technology at Russia's Sberbank, shared his perspective on China's evolving AI landscape in an interview with *Science and Technology Daily*.

Belevtsev identified China's competitive advantages. On the one hand, the Chinese government encourages competition. On the other hand, China excels at bridging the gap between technology and business, accelerating technology transfer.

Most importantly, China also possesses a reliable talent foundation: a large pool of highly skilled engineers.

"AI should serve as a complementary technology that extends human intellect and capacity," he said.

He observed that across human history — particularly throughout the evolution of information and communication technologies — technological enhancement of human capabilities has never triggered widespread unemployment. Instead, these innovations propel economic growth.

Educationally speaking, it is imperative to expedite public competency in AI application, encompassing both its potential outcomes and inherent constraints. Rather than fearing AI, we should effectively govern associated risks.

For AI governance, Belevtsev stressed the necessity of ethical oversight while cautioning against excessive restrictions.

When specific technological domains undergo accelerated advancement, it's important to uphold ethical imperatives vis- a- vis innovation. That said, the systems and approaches adopted should primarily be enterprises' own responsibility.

Excessive regulations may become



Andrey Belevtsev. (COURTESY PHOTO)

obstacles hindering the pace and quality of technological advancement. However, technologies implemented in education, healthcare, or public administration must comply with local laws, traditions and cultural norms.

"As the 21st century's foundational technology, AI will penetrate every economic sector," he said. "Hence, it is essential to consider how to properly formulate risk management policies from the outset. Risk management should focus on self-regulation and multi-stakeholder cooperation between institutions, enterprises and market actors."

"We have a strong interest in the work of our Chinese partners and in our joint research projects. We are confident that our collaboration will achieve mutual benefit and win- win outcomes," Belevtsev added. "We hold the highest regard for Chinese enterprises and scientists' work in AI. Our cooperation, particularly in research, proves important to advancing global AI development and delivering benefits across nations."

Next Step for Humanoids: From Puppets to Partners

Comment

By LI Gangyang, WANG Xinlong & LUO Shaqi

The last few years have seen a dazzling spectacle of robotic achievements. We have seen humanoid robots execute flawless backflips and intricate dance routines. These demonstrations, by established industry pioneers as well as ambitious new entrants, are remarkable feats of engineering, proving that we can build machines with the kinematic complexity to mimic human movement.

But what will it take to transition them to the real world?

Today's most impressive humanoid demonstrations are triumphs of dynamic locomotion and trajectory tracking. But when faced with strong resistance, these systems often fail. A robot may over-torque its joints, overheat, or lose balance entirely. It was trained to move,

not to struggle. Closing this gap demands "whole- body intelligence," the ability to coordinate every limb and joint to generate and withstand force while remaining stable.

Two challenges stand out. First, robots lack a human-like reaction mechanism. When we push a heavy object, we automatically adjust posture, shift weight, and engage core muscles — subtle biomechanical strategies missing from most control frameworks.

Second is the notorious "curse of high- dimensionality": with dozens of joints and hundreds of sensory inputs, effective whole-body coordination is an immense learning problem. Reinforcement learning must navigate vast state and action spaces, often leading to unstable or inefficient behaviors.

A new paradigm is emerging to overcome these limits. Rather than scripting responses, researchers are enabling robots to learn the fundamental principles of physical interaction from the ground up.

A prime example of this trend is the Thor framework developed at the Beijing Academy of Artificial Intelligence (BAAI). When a 35 kg Thor robot pulled a 1,400 kg vehicle, it was not executing a rigid plan; it had learned to use its entire body to manage force, much like a trained athlete.

This new solution is characterized by two key insights: reward learning that encourages human-like biomechanics, and control architectures that break whole- body coordination into manageable components. The result is generalizable physical intelligence.

A robot capable of understanding force interaction can apply the same principles across tasks — from opening heavy doors to stabilizing loads or maintaining controlled pressure on a surface. The robot is no longer just a collection of moving parts — it becomes a holistic physical agent, demonstrably stronger, more stable, and vastly more capable in the real world.

Across the industry, a consensus is

emerging: Mastering physical interaction is the next milestone. In this sense, work on frameworks like BAAI's Thor is not an isolated effort, but part of a broader transition toward "whole- body, force-aware" humanoids. We are finally moving away from simply programming robots to do tasks, toward teaching them to understand the physics of the work itself.

The ultimate goal is not just to build smarter machines, but to build a future where humans and robots can work side- by- side to solve humanity's grand challenges.

Achieving this vision will require an open, global and collaborative ecosystem, where foundational research is shared to accelerate progress for all. We are proud to contribute our research to this collective endeavor toward a future where humanoid robots can finally, and reliably, stand their ground in the real world.

The authors are from BAAI.

China Holds Central Economic Work Conference to Plan for 2026

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The country will implement more proactive and impactful macroeconomic policies, formulate more far- sighted, more targeted and better- coordinated policies, continuously expand domestic demand and optimize supply, and develop new quality productive forces according to local conditions.

Efforts will be made to develop a unified national market and continuously prevent and defuse risks in key areas. It is imperative to secure the steady development of employment, businesses, markets and expectations, getting the 15th Five-Year Plan (2026-2030) off to a good start.

China will continue to implement a more proactive fiscal policy and maintain necessary fiscal deficits, overall

debt levels and expenditure scale, while standardizing tax incentives and fiscal subsidy policies.

China will continue implementing a moderately loose monetary policy, employ various monetary policy tools such as reserve requirement ratios and interest rates in a flexible and efficient manner to maintain ample liquidity.

China will guide financial institutions to scale up support for domestic demand expansion, sci- tech innovation, micro, small and medium enterprises, and other key areas.

The RMB exchange rate will be kept generally stable at an adaptive, balanced level, the meeting said, adding that China will make macro policy orientations more consistent and effective, and refine expectations management

mechanisms to bolster social confidence.

In terms of tasks of next year's economic work, the meeting said domestic demand will remain as a focus in building a robust domestic market.

Special initiatives should be advanced to boost consumption, and the supply of high- quality consumer goods and services should be expanded. Unreasonable restrictions in the consumption sector should be removed, and the potential of service consumption should be unlocked.

China will work to stabilize and revive investment, appropriately increase the scale of investment within the central government budget, and continue to leverage the role of new policy-based financial instruments. China will also advance urban renewal in a high-quality manner.

It will be essential to enhance innovation-driven development to accelerate the cultivation of new growth drivers. China will develop international technological innovation centers in Beijing (Beijing- Tianjin- Hebei region), Shanghai (Yangtze River Delta), and the Guangdong- Hong Kong- Macao Greater Bay Area.

Efforts will be made to advance the AI Plus Initiative, improve AI governance and foster innovation in science and technology finance.

The meeting underscored the need to steadily advance institutional opening up, expand self-initiated opening up in the service sector in an orderly manner, and make solid progress in developing the Hainan Free Trade Port.

Source: Xinhua

Energy Cooperation Gets New Direction

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Wang Peng, executive dean of the National Energy Development Strategy Institute at North China Electric Power University, said that President Xi's message charts the course for safeguarding the stability and smooth operation of global energy industrial and supply chains. China stands as both an active advocate and steadfast practitioner in establishing a fair, equitable, balanced and inclusive global energy governance system.

Facing the highly globalized nature of industrial and supply chains, China maintains a dialectical understanding of the relationship between self-reliance in energy technology and international cooperation. It is expanding and deepening joint scientific research with other countries, strengthening global energy technology cooperation, and helping to enhance the resilience of the global energy industrial and supply chains, said Wang.

President Xi's emphasis on "injecting greater stability into world energy security and the green and low-carbon transition," has strengthened the power industry's commitment to green development, said Yang Kun, executive vice chairman of the China Electricity Council.

In this regard, China has achieved power grid interconnection with multiple countries and provides clean energy products and services to over 200 countries and regions. In the past year, exports of wind and solar power products helped reduce global carbon emissions by approximately 2.65 billion tonnes, according to Yang. The council

will continue to engage deeply in global and regional energy governance, contributing China's strength to the global energy transition, he added.

Igor Artemyev, president of the St. Petersburg International Mercantile Exchange in Russia stated President Xi's congratulatory message emphasized "promoting the establishment of a more fair, just, balanced and inclusive global energy governance system." This statement has also fostered consensus for cooperation between the two countries, according to Artemyev.

Both sides can join hands to establish an autonomous and controllable trading and pricing platform, forming a more credible and practical price reference system that better aligns with the realities of the global energy market. This will not only build a solid barrier for the security and stability of China- Russia energy trade, but also provide diverse and inclusive pathways for countries to participate in energy cooperation, Artemyev noted.

The National Energy Administration (NEA) will continuously deepen practical energy cooperation with key countries including Russia, safeguard China's energy security under open conditions, and advance the construction of a more equitable, fair, balanced and inclusive global energy governance system, said Wei Xiaowei, director general of the Department of International Cooperation at the NEA.

Wei added that President Xi's message fully affirmed the achievements in China- Russia energy cooperation and provided directional guidance for future collaboration.

Green Development in China Reshapes the World

Dialogue

By LONG Yun & DAI Xiaopei

Erik Solheim, co- chair of Europe-Asia Center and former under secretary-general of the UN and executive director of the UNEP, is vocal about China's global role.

Recently, following his participation in the "Understanding China" conference in Guangzhou in southern China, he posted on X that "the rise of China is the most peaceful rise of a major power in history. China has brought everyone out of (extreme) poverty and helped other nations grow."

In an interview with *Science and Technology Daily* in Beijing on December 5, the same day the *Global Environmental Think Tank Development Report 2025* was released, Solheim went beyond these broad statements to offer detailed, firsthand observations on what he sees as China's real contributions to sustainability, the persistent misconceptions in the West, and how the world should respond.

"China is now the total dominant force in all green technologies," he said. "China is the indispensable nation for the green transition, producing 60 percent or more of renewable energy, electric vehicles and batteries. In terms of the solar energy field, that share reaches 90 percent."



Erik Solheim. (COURTESY PHOTO)

He cited specific companies as proof of this leadership. "Chinese companies in electric cars and batteries are the world's leading players. So driving the technology and making the production at scale of all these technologies is the number one contribution," he noted.

In addition, China's environmental progress is not limited to industry. "China is also the biggest tree planter in the world. It has announced the largest national park system in the world, which is, up to now, the most significant."

He described a dramatic transfor-

mation in everyday environmental conditions. "Ten years ago, I would never have gone running in Beijing. It was polluted. Now the sky is blue, the sun is shining, and the air is fresh."

For Solheim, technology and the protection of nature are the two most important pillars to sustain China's ecological development.

He expressed frustration that many in the West remain unaware of this shift. "Many people are not following the news, so they remain in the past. They have seen pictures of Beijing with heavy pollution, and they believe that is

still the case. They haven't really refreshed their minds."

He also pushed back against the notion that China's green manufacturing dominance stems from low labor costs. "It is not because salaries are low in China. It is because China is super-efficient and has the most robots, the most efficient production anywhere in the world."

His recommendation to Western governments is pragmatic: embrace Chinese investment. "My main suggestion is to invite more Chinese companies to invest in Europe, in the U.S., but of course also in Africa and everywhere else, because then these companies will bring the technology and this business practice, and we can learn from it."

On the global stage, Solheim emphasized China's deepening ties with the rest of the developing world. He argued that this economic centrality positions China to help reshape global governance. "China is absolutely critical for trade, for technology, for economic prosperity, and for green development. But China can also help establish a new, fairer global system."

The current global system has been fundamentally dominated by the U.S. up to now. "To build a fairer order, China needs to work with India, Indonesia, Brazil, and all the other nations of the Global South to establish a fairer global system that is representative of the 21st century."

No Shortage of Food for Taikonauts

Science Outreach

By Staff Reporters

In 2025, an unexpected delay to the Shenzhou-20 mission gave the public their first close-up of China's space station's logistical support capabilities. As the taikonauts' scheduled return time was extended, concerns arose. Was there enough food? Could their basic needs be met?

However, Wu Dawei, deputy chief designer of the astronaut system at the China Astronaut Research and Training Center, quickly dispelled these doubts with the following response: "The space station's food and living supplies are more plentiful than

you can imagine."

This wasn't just some ad hoc response, but rather the result of careful planning and preparation. Even the laboratory mice in orbit was included in the allocation of supplies, they got the taikonauts' soy milk. The mice eventually returned to Earth healthy, proving the success of the experiment and reflecting the space station's flexible and efficient resource management.

Contrary to popular belief, space food on the Chinese space station is no longer limited to processed food in toothpaste- like tubes or compressed biscuits. Today, the taikonauts' menu exceeds 190 items. Every food item is scientifically categorised and stored. Most are processed using high-temperature sterilisation in soft cans or freeze-drying technology, which allows them to be stored at room temperature for over a year.

These foods are stored in cargo bags in the space station. Fresh fruit and vegetables, such as apples, tomatoes and lettuce, are regularly supplied by the Tianzhou cargo spacecraft and stored in specially designed refrigerators at a temperature of 2-4 °C. Developed by a Chinese company, this refrigerator is lightweight, energy- efficient and impact- resistant, and can be remotely monitored to ensure the freshness of the ingredients.

But why go to such great lengths to ensure good quality food? It's because the effects of the space environment on the body far exceed what people imagine.

In weightlessness, for example, the rise of bodily fluids can lead to a decrease in taste and smell of over 30 percent, which can make astronauts prone to a loss of appetite. Therefore, the menu includes strongly flavoured foods such as Sichuan cuisine, chilli

sauce and rich soups to stimulate appetite. The nutritional design is also extremely precise: high protein to prevent muscle atrophy, high calcium and vitamin D to combat approximately one percent monthly bone calcium loss, low sodium and high potassium to protect the cardiovascular system and dietary fibre to alleviate slowed intestinal motility. Every meal is the result of scientific calculations.

The reason the Chinese space station's material reserves are "more plentiful than you can imagine" lies in its highly systematic support system. Every link has undergone repeated verification, from the regular resupply of the Tianzhou spacecraft and the intelligent management of on- orbit supplies to long- term food preservation technology and emergency allocation mechanisms. Even the soy milk consumed by the mice is part of this coordinated operation.

of the Pythagorean theorem.

Despite containing errors and rough approximations, such as assuming the Earth to be flat and using this model to infer celestial phenomena, the Zhoubi Suanjing occupies an irreplaceable position in the history of Chinese astronomy.

The book's pioneering use of the "gougu" theorem and observational measurement techniques greatly influenced later mathematicians, who further developed and applied these methods. From the Tang (618- 907 CE) and Song (960- 1279 CE) periods onwards, the Zhoubi Suanjing was formally included in the imperial curriculum as an official mathematics textbook, contributing significantly to the evolution of Chinese mathematical thought. The book also spread beyond China. During the Tang dynasty, it was introduced to Japan and became one of the official mathematics textbooks, thereby extending its influence further into East Asia.

Tech+Culture

Ancient Tibetan Papermaking Lives on

By Staff Reporters

Located at nearly 4,000 meters above sea level, Awang Quyang, 46, is testing a new plant-based dye for Tibetan paper. As a fifth-generation inheritor of the Zhigong Gaxiu Tibetan papermaking technique, listed as a municipal-level intangible cultural heritage in Lhasa, he has helped adapt the ancient craft for modern use.

The workshop, in Tangjia township, Mozhugongka county, Xizang autonomous region, has walls displaying sheets of colored paper, from deep red to indigo, some printed with classical Tibetan scriptures, others with contemporary designs. Nearby are notebooks, pen holders, lanterns, and other products made from this paper, showing how a 1,300-year-old tradition is finding new relevance.

Tibetan papermaking dates back to the 7th century. The unique method has been passed down within one family since the 11th century. Many historical texts preserved in the Potala Palace and Jokhang Temple were written on this paper.

"The paper can last hundreds of years without rotting or being damaged by insects," said Quyang, holding a well-preserved sheet made with traditional methods. The key lies in its raw material: the root of the Langdu plant (wolfsbane), which is naturally toxic and insect-resistant. The process involves more than 10 steps, peeling, boiling, pulping, forming and drying, resulting in paper that is durable, resistant to decay and hard to tear.



An inheritor makes Tibetan paper in Lhasa, southwest China's Xizang autonomous region. (COURTESY PHOTO)

Long High-pressure Steel Pipes Now Homegrown

From page 1
Forging long steel billets

The forging of steel billets was the next challenge. The first time, due to the slower lifting speed, the billet hardened before being fully forged to the set length, because of the rapid drop in temperature. After much deliberation, Xu Ruibing, the senior engineer at NHIG, decided to take a two- pronged approach, optimizing the processing technique and controlling the cooling time.

The core difficulty lay in temperature control. Xu believes that only by achieving precise temperature control during the processing, can engineers ensure that the billet does not cool down before being drawn to a sufficient length.

Relying on the vast amount of data in manufacturing steel pipes, the team developed an intelligent temperature control system. It models through complex algorithms, monitors the temperature of each part of the steel billet in real time, and precisely regulates the processing method based on the temperature.

The team further optimized the processing technology, and soon after that the first ultra-long billet that met the requirements was delivered.

Drilling and grinding

The steel billet is solid. It needs to

be drilled from both ends to form a uniform, smooth and straight circular channel. Then, its surface is ground to finally form a steel pipe.

The allowable deviation of concentricity at both ends of a 17-meter-long steel pipe is thinner than a person's fingernail, Xu explained, to demonstrate the difficulty of the task.

Through countless attempts and improvements, the NHIG developed an extremely rigid deep hole drilling machine system, and drill pipes specifically for super-long steel pipes.

The machine system features excellent shock absorption performance and stability, effectively resisting the deflection of drill pipes caused by gravity, said Xu, adding that the drill bit is made of super-hard materials with special geometric design. Its ability and efficiency to drill deep holes in hard steel have been significantly enhanced.

The team also developed a deep hole honing machine specifically for extra-long steel pipes. Using the mentioned deep-hole drill pipe, grinding stones of different specifications were sent into the deep hole for precise honing. Eventually, the inner side of the 17-meter-long pipe ultra-high pressure pipe was polished as smooth and flawless as a mirror, signaling that it was ready for service.

Zhoubi Suanjing: Fundamentals of Astronomical Calculations

Traditional Eastern Wisdom

By BI Weizi

The Zhoubi Suanjing (The Mathematical Book on Gnomons and Circular

Paths), written around the 1st century BC, is the oldest surviving Chinese book on the fundamentals of astronomical calculations. The book is known for its early use of the Gougu theorem (a Chinese version of the Pythagorean theorem), along with its detailed astronomical and calendrical methods. It is one of the 10

classic books on mathematics from ancient China.

The original preface explains that the word zhou (周) refers to the Zhou dynasty (11th century-221 BCE). However, zhou also means "circuit, circle, round", thus referring to astronomical movements. The word bi (脾) means "thigh" (gu). Together with its shadow, referred to as a "hook" (gou), the two sides of a right-angled triangle (or a carpenter's square) are formed (the adjacent and the opposite). Using these two pieces of information, the length of the hypotenuse can be calculated. This formula corresponds to the Pythagorean theorem (modern term: gougu dingli).

Mathematically, the book covers fractional multiplication and division, arithmetic sequences, methods for calculating the circumference of a circle, linear interpolation, extracting square roots from arbitrary positive numbers, representing decimal fractions using remainders and the earliest recorded use



The Zhoubi Suanjing is on display at the National Museum of Chinese Classics in Beijing. (PHOTO: VOG)