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2026 Beijing ICBS: Advancing Basic Science for Humanity

By LONG Yun

"The Chinese government has made an unprecedented commitment to basic research. From sustained funding and long-term strategic planning to talent recruitment and the development of research platforms, China has become increasingly fertile ground for fundamental research," Shing-Tung Yau, chair of the International Congress of Basic Science (ICBS), said in his opening address at the 2026 ICBS.

The congress which opened at the Yanqi Lake International Convention and Exhibition Center in Beijing on August 9, drew more than 400 distinguished scholars from around the world, along with over 800 researchers and students from universities, academic organizations, and research institutions across more than 30 countries and regions.

Nine distinguished scientists received the ICBS Medal: mathematician Claire Voisin, mathematical physicist Horng-Tzer Yau, number theorist and algebraist Shou-Wu Zhang, theoretical physicist Andrea J. Liu, experimental particle physicist Wang Yifang, theoretical condensed matter physicist Xiao-Gang Wen, chemical engineer and materials scientist Bao Zhenan, biophysicist Zhuang Xiaowei, and molecular biologist Zhang Feng.

The ICBS Medal recognizes groundbreaking and revolutionary achievements in basic science worldwide and celebrates extraordinary contributions to scientific progress. The medals span three major disciplines, mathematics, physics, and engineering, and are named in honor of nine scientific giants: Emmy Noether, Shiing-Shen Chern, Andrew Wiles, Marie Curie, Samuel C.C. Ting, David Gross, Chien-Shiung Wu, Steven Chu, and Charles Kuen Kao.

During the sharing session, several award-winning scientists turned their focus to the long-term value of basic science and the driving force of curiosity. Zhuang Xiaowei, professor at Harvard University, said: "One of the most precious characteristics of basic science is that, at the outset, exactly how our research will turn into a product that directly impacts our everyday life is often not immediately clear." Yet she emphasized that research do come, often from directions not originally intended.

"Many tools and knowledge now transforming modern technology and medicine were not discovered for the purpose we use them today. They came from scientists simply trying to understand the nature and underscores the importance of basic science," Zhuang added.

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New Graphic



WECHAT ACCOUNT



E-PAPER



Members of China's 16th Arctic Ocean scientific expedition team work on the ice surface of the Arctic Ocean on August 9, 2026. China's research icebreaker Xuelong 2 will carry out more than 20 operations at seven ice stations to obtain scientific data for research into changes in Arctic sea ice and the evolution of its ecosystems. (PHOTO: XINHUA)

STI Frontier

New Life for Exhaust Steam

By LU Zijian & HAN Rong

Recently, China's first hundred-tonne exhaust steam ejector completed its first operation cycle. The ejector recovers the large amount of waste heat generated by thermal power to use for heating in cities.

Starting from the bottom

Exhaust steam refers to steam that has already performed work and is discharged from equipment such as steam turbines. An exhaust steam ejector uses turbine extraction steam as the motive steam to recover exhaust steam that would otherwise be discharged.

The recovered steam heats the circulating water in the district heating network. The heated water is then delivered to end users without consuming any additional energy.

A research team from Taiyuan University of Technology (TYUT) in north China began to tackle the technological barriers of developing a hundred-tonne exhaust steam ejector in 2020. In the initial stage, the team conducted theoretical research using simulation models. But the first prototype's performance was far from satisfactory.

Zhang Xiaoxian, a member of the research team, said the ejector in the research paper was too small, like trying to build a heavy-duty truck with a toy car model. The errors became huge after the parameters were enlarged several hundred times.

The team turned to the underlying principles. To quantify the ejector's entrainment capability, they broke it down into three key sections — the nozzle, mixing section and diffuser — and carried out more than 10,000 computational

fluid dynamics simulations.

They adjusted details such as the size and angle of each part like adjusting a microscope, and figured out that even changing 0.1 mm of the nozzle's diameter would influence the ejector's entrainment capability.

Drawing on data from more than 10,000 simulations, they derived an equation for calculating the motive steam entrainment ratio and established a full-scale design methodology for adjustable high-temperature, high-pressure steam ejectors.

Adjusting the cone for flexibility

Combined heat and power units operate under highly variable conditions, with heat demand fluctuating significantly between day and night. As a result, the volume of exhaust steam can rise and fall dramatically.

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A More Comprehensive Transport Network by 2030

By LU Zijian

The completion rate of China's main framework of the national integrated transportation network will be raised from the current 91 percent to 95 percent by 2030, Xu Chengguang, vice minister of transport, said at a press conference in Beijing on July 21.

During the 15th Five-Year Plan period, the construction of large corridors along the rivers, seas and borders will be emphasized, as well as corridors connecting Xinjiang and Xizang autonomous regions, the New International Land-Sea Trade Corridor and corridors crossing rivers, seas and bays. Railway, highway, waterway, civil aviation, postal and express delivery infrastructure will be improved.

The function of comprehensive transportation hub cities will be enhanced. Twenty international and 80 national comprehensive transportation hub cities will be developed and the agglomeration and service capabilities of hub cities based on different levels and categories enhanced. The efficiency of inter-modal connections and transfers as well as integrated transport services will be improved.

In addition, around 80,000 km of transportation infrastructure will be renewed and upgraded through digital and intelligent transformation by 2030, with investment in such projects accounting for around 50 percent of total fixed-asset investment in transport

A diversified and resilient system of

international transportation corridors will also be built. The global network of international maritime trunk routes will be improved, connectivity with major global air cargo hubs strengthened, and key overseas hubs such as overseas ports optimized and enhanced for better security and resilience of the country's international logistics supply chains.

Cai Tuanjie, safety director of the Ministry of Transport (MOT) and director general of the Transport Service Department of MOT, said a modern logistics network will be built by developing backbone logistics corridor, enhancing connectivity among key logistics hubs and nodes, and addressing gaps in urban and rural logistics infrastructure.

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International Cooperation

China-Europe Freight Trains Facilitate Eurasia Cooperation

By LU Zijian

The China-Europe freight train service has become an important bridge for closer international economic and trade exchanges, connecting production and consumption between the two regions and promoting commodity circulation and industrial complementation among the countries along the routes.

Liang Linchong, director-general of the department of regional opening-up at the National Development and Reform Commission of China, said this at a recent press conference. A flagship project of the Belt and Road Initiative, the China-Europe freight trains have completed more than 130,000 journeys to date, transporting goods worth over 520 billion USD in total.

The annual trips made by these trains surged from 1,702 in 2016 to 20,022 in 2025, with an average growth rate of 30 percent year on year. They have transported more than 50,000 kinds of products in 53 categories, and the proportion of the goods' value in the total value of China-Europe trade in goods is increasing annually.

Liang said over the past decade, China has signed nine bilateral and multilateral intergovernmental cooperation agreements with countries along the China-Europe freight train routes, and hosted two China Railway Express Cooperation Forums, resulting in 159 practical cooperation outcomes.

An important platform for deepening connectivity across Eurasia, this freight train service has also improved the infrastructure network along the routes. It now operates on 96 routes, forming a diversified overseas corridor network reaching 236 cities in 26 European countries. The efficient and multi-directional transport network integrates both land and sea links.

A case in point is the Trans-Caspian International Transport Route, an important route for the southern corridor of the China-Europe freight train service. Countries along this route are jointly expanding and upgrading infrastructure, including ports, railways, border crossings and logistics terminals, and addressing bottlenecks and constraints to boost transport volumes.

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WEEKLY REVIEW

C919 Begins International Flights

China's domestically developed large passenger aircraft, the C919, began its international service on August 12. The route operated by Air China connects Beijing and Ulaanbaatar in Mongolia, with one round trip per day.

Lithium Battery with High Endurance & Power Developed

Researchers at the Dalian Institute of Chemical Physics, Chinese Academy of Sciences developed a 25-ampere-hour pouch-type lithium-metal primary battery. It delivers long energy life and strong power bursts at temperatures down to -40°C. It exceeds 750 Wh/kg and 1285 Wh/L energy density at low discharge rates.

Scientists Create New Super Steel

A team at the University of Hong Kong has created an unusually corrosion-resistant stainless steel that could replace costly titanium components used to produce green hydrogen. The breakthrough could reduce structural material costs by roughly 40 times and make seawater-based hydrogen production far more economical.

Neuroscientists Find Brain Can Reason Without Words

MIT neuroscientists have found striking evidence that language and logical reasoning are powered by separate systems in the brain. Even people with severe language impairments were able to solve challenging logic puzzles, while the brain's language-processing regions stayed largely quiet during reasoning tasks.

New Climate Plan Accelerates Green Transition

Policy Express

By CHEN Chunyou

China has released the national climate change response plan for the 15th Five-Year Plan period (2026-2030), setting clear targets to cut carbon intensity and expand its carbon trading system, as it pushes for a faster and broader green transformation.

The plan, issued by the Ministry of Ecology and Environment (MEE) and 18 other departments, is the first of its kind to lay out a full set of climate goals across all major sectors at the five-year planning level.

According to the MEE's Department of Climate Change, the plan is designed to reduce climate-related risks and adverse impacts, and ensure both high-quality development and high-level security.

By 2030, the plan aims to:

- Cut carbon dioxide emissions per unit of GDP by 17 percent from 2025 levels;
- Reduce emissions per unit of output in industries covered by the national carbon market by roughly three percent;
- Complete the construction of a



The Fuxing 220-kilovolt substation, Xiong'an New Area's first full-lifecycle near-zero carbon facility in Hebei province. (PHOTO: XINHUA)

national voluntary greenhouse gas reduction trading market;

- Basically put in place a product-level carbon footprint management system.

The plan also calls for tougher controls on non- CO2 greenhouse gases, with a target to reduce them by 30 million tonnes of CO2 equivalent. It envisions a more climate- resilient society,

with better systems in place to adapt to changing weather patterns and rising climate threats.

If these efforts continue over the following five years, China expects to meet its 2035 nationally determined contributions under the Paris Agreement, paving the way for its long-term goal of carbon neutrality.

Key action areas include cutting

CO2 emissions in energy- intensive sectors, building a carbon footprint tracking system, improving climate risk response, stepping up adaptation measures, and playing a more active role in global climate governance.

For the first time, the plan dedicates a full chapter to managing non-CO2 gases — specifically methane, nitrous oxide, and fluorinated gases. Concrete steps include: expanding coal-mine methane capture and use, promoting water-saving irrigation in rice fields to cut methane, and promoting smarter fertilizer use to limit nitrous oxide emissions from farming.

On the market side, the plan envisions a major digital upgrade of China's national carbon market. It will use Internet of Things technology to build a more accurate carbon data collection network, install over 10,000 monitoring gateways for voluntary emission reduction projects, and unify data management — all to make regulation smarter and more efficient.

In addition, the government will keep updating its national catalogue of low-carbon technologies for promotion, while stepping up support for research and pilot projects on carbon capture, utilization, and storage.



Driving High-quality Development of Internet Fundamental Resources

By TANG Zhexiao

Four departments, including the Ministry of Industry and Information Technology and the Cyberspace Administration of China, have issued a guideline for high-quality development of Internet fundamental resources.

Centering on core resources such as IP addresses, domain names, autonomous system numbers and network identifiers, the document lays out 16 key tasks covering six major areas. It aims to bolster high- quality development of China's Internet fundamental resources and support building a cyber power and "Digital China."

Boosting fundamental innovation capacity

The document sets four targeted measures:

First, basic theoretical research will be strengthened. Leveraging emerging technologies including AI, quantum communication and blockchain, systematic

research will be conducted on core operational mechanisms and underlying architectures.

Second, breakthroughs will be achieved in core and key technologies. Supported by national key R&D programs, technical bottlenecks in high-performance IPv6 transmission, mega- constellation networking for satellite Internet, and resource public key infrastructure will be tackled.

Third, innovation platforms will be improved. Fundamental and forward-looking research and experimental trials will be scaled up to produce more original innovative achievements.

Finally, the standard system will be refined and national standards better aligned with international ones.

Upgrading digital infrastructure

Both the optimization of existing infrastructure and the layout of new facilities will be advanced.

On one hand, traditional infrastructure will be upgraded. Resolution nodes

for the ".CN" country-code top-level domain will be expanded and the transition to full IPv6 single-stack operation promoted.

On the other hand, new-type infrastructure will be explored and developed. Efforts will be intensified to improve supporting planning for satellite Internet and accelerate the integration of industrial Internet identifiers and the domain name system.

Protecting the security bottom line

A fundamental resource security guarantee initiative will be implemented to shore up defenses in four key dimensions:

- Ensuring supply security through coordinated planning and rational allocation of IPv6 address resources;
- Securing operational stability by formulating full- process classified and tiered security specifications and strengthening operational assurance for the ".CN" domain name;
- Enhancing risk monitoring by

establishing an AI- and big data- powered cross- departmental collaborative monitoring mechanism to identify and defuse potential risks;

- Improving emergency response capabilities by optimizing tiered emergency plans and conducting regular practical drills.

By strengthening support for network, Internet of Things connectivity, data connectivity and intelligent connectivity, nationwide addressing and switching capabilities will be optimized and large-scale industrial application of AI facilitated.

The guideline also clarifies arrangements for enhanced international communication, coordination and global governance participation. China will engage in affairs of international bodies, advance the formulation of international standards, and promote the development of international organizations for emerging digital sectors.



Blueprint for Industrial Decarbonization

By TANG Zhexiao

To facilitate all-round green transformation of the economy and society, the Ministry of Industry and Information Technology (MIIT) has released the 15th Five-Year Plan (2026-2030) for accelerating green and low-carbon development of the industry sector.



Workers operate intelligent manufacturing equipment in a coil digital workshop. (PHOTO: XINHUA)

The plan lays out phased development goals. By 2030, China will optimize its industrial and energy consumption structure, peak carbon dioxide emissions in the industrial sector, and significantly increase the proportion of green energy applications.

Seven priority initiatives, including an industrial carbon peaking campaign, have been arranged to build a comprehensive new framework for eco-friendly, low-carbon industrial growth.

Efforts will be accelerated for the green transformation of key industries such as steel, non-ferrous metals, petrochemicals and chemicals, building materials, and textiles. At the same time, green equipment will be developed, electric and hydrogen- powered aircraft will be promoted, and sustainable aviation fuel will be used in domestic civilian aircraft.

In terms of international cooperation, the plan proposes promoting green cooperation under the Belt and Road Initiative, expanding global green manufacturing partnerships, and strengthening multilateral and bilateral cooperation on green and low-carbon issues.

Domestically, the plan emphasizes that green and low-carbon technological innovation should fuel the development of green productivity. Efforts will focus on technological R&D and industrialization applications, promoting key green and low-carbon technologies and the implementation and transformation of scientific and technological achievements.

Furthermore, the plan envisions

jointly promoting intelligent manufacturing and green manufacturing, leveraging digital and intelligent technologies and artificial intelligence to empower green production, restructuring industrial production organization models, and enhancing the quality and efficiency of green transformation.

Two supporting frameworks are scheduled for constant improvement: the industrial resource-recycling system plus the green manufacturing and service system.

Industries such as recycled resources from waste steel, waste non-ferrous metals, waste plastics, waste paper, and used tires will be cultivated and strengthened. By 2030, the annual recycling and utilization volume of waste steel and waste plastics will reach 300 million tonnes and 22 million tonnes respectively.

Green factories and green industrial parks will be built, green supply chains formed, and a group of leading green manufacturing forces with international competitiveness will be created.



Case Study

Shenzhen Strengthens Basic Research Investment

By CHEN Chunyou & LUO Yunpeng

China's southern tech hub Shenzhen is doubling down on basic research as it pushes to strengthen its innovation foundation and secure a leading position in frontier science.

Recently, the Shenzhen Institutes of Advanced Technology (SIAT) of the Chinese Academy of Sciences, together with more than 100 laboratories from six Asian countries, unveiled Asia's first 10-year roadmap for synthetic cells. The roadmap focuses on creating an artificial single- celled biological system, one of the world's most advanced scientific frontiers.

"This marks a key leap for China in basic research on synthetic life and synthetic cells, and demonstrates the country's determination to make greater contributions to this field through open cooperation," said SIAT president Liu Chenli.

Breakthroughs in basic research rest on a foundation of long-term, patient capital. Since 2020, Shenzhen has mandated by law that at least 30 percent of its municipal science and technology R&D funds will go to basic research and applied basic research. The city has also improved its funding mechanism by combining competitive grants with stable fund support.

"Quantum technology demands high investment and long cycles. Basic research funding is vital for building world-class infrastructure, attracting top talent and nurturing future industries," said Liu Song, vice dean of the Shenzhen International Quantum Academy.

Shenzhen is strengthening its R&D system through high spending and diversified policies. Its 15th Five- Year Plan (2026-2030) calls for accelerating AI applications across all industries, leveraging both hardware and software strengths to become a pioneering AI-powered city.

T&S Communications, a local company, is developing new optical

communication equipment to meet the surging demand from the AI market. "With policy and financial support, we have succeeded in packing hundreds of optical fibers onto flexible boards, achieving an ultra-fineness thinner than a strand of hair, as well as their mass production and sales," said Hou Dan, the firm's technical director.

In recent years, Shenzhen's annual public budget spending on science and technology has averaged more than 40 billion RMB, accounting for over nine percent. The funds are used to support national and provincial laboratories and other innovation platforms to pursue original and leading-edge research.

In promoting innovation, Shenzhen puts enterprises in the driver's seat, channeling over 60 percent of its municipal R&D funds directly to support corporate R&D.

During the 15th Five-Year Plan period, the city will steer more innovation resources toward enterprises, roll out incentives to boost corporate R&D, expand its enterprise innovation credit system that channels precise funding to high-potential innovators, and mobilize venture, patient, international and industrial capital into key technological fields.

Official data shows Shenzhen's basic research investment has grown at an average annual rate of 19.7 percent over the past three years. The city's 15th Five-Year Plan targets to raise its R&D intensity to seven percent of GDP by 2030, boosting basic research and original innovation while integrating education, science and technology, and talent to improve overall innovation efficiency.

"Shenzhen has gone through a phase of catch-up innovation and is now entering the uncharted territory of original innovation," said Zhang Lin, director-general of the Shenzhen Municipal Science, Technology and Innovation Bureau. "By setting clear quantitative targets, we demonstrate our determination to invest in basic research and deliver more original results."



A view of the Guangming Life Science Park in Shenzhen, Guangdong province, home to advanced life science research facilities. (PHOTO: XINHUA)

China-Europe Freight Trains Facilitate Eurasia Cooperation

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In the first half of 2026, the freight volume of China-Europe freight trains along the southern corridor increased by more than 90 percent year on year.

The China-Europe freight train service provides new opportunities for inland regions to pursue opening-up and development. It has fostered the growth of border port and hub economies, and helped countries and regions along the routes better integrate into the open world economy, Liang added.

Thanks to it, Malaszewicze, a small border town in Poland, has become a key logistics distribution center of the European Union. German city Duisburg has transformed itself from a traditional industrial city to a crucial European logistics hub.

Looking ahead to the 15th Five-Year Plan period (2026-2030), China will improve transport organization services.

Liang said coordination across the China-Europe freight train network will be strengthened, transport organization models optimized, and customs clearance facilitation enhanced. The stability and reliability of end-to-end transit times will be improved.

The corridor network will be improved by coordinating different modes of transport, including rail, road, maritime and air transport, and developing new multi-modal transport routes. Furthermore, intergovernmental cooperation mechanisms will be strengthened to enhance coordination with countries along the routes and ensure secure and smooth operation.

In addition, China will further advance the digital, intelligent and green development of the freight train service, enhance collaborative innovation capabilities, accelerate the application of new technologies and equipment, and foster new drivers of growth.

U.S. Targets Chinese Optical Transceivers at Its Own Risk



By LIANG Yilian & HU Dingkun

On August 4, U.S. media reported that the Federal Communications Commission (FCC) is drafting measures to ban imports of new Chinese optical transceivers, with some officials aiming to publish and implement the policy later this year.

Optical transceivers are critical components of data centers, enabling high-speed data transmission over fiber-optic cables. According to France-based market research firm Yole Group, driven by investment in AI data center infrastructure, the global optical transceiver market is projected to reach 112 billion USD within five years, up from 23 billion USD in 2025.

Reuters reported people familiar with the matter as saying that the U.S. government is concerned that Chinese optical transceivers could potentially be used to "steal data," "install malware" or "disrupt service" at U.S. data centers. These claims, once again, are driven by the familiar rhetoric of "national security," while offering no evidence that Chinese optical transceivers pose such threats.

Viewed in the broader context of Washington's recent actions against China's AI sector, the proposed restrictions on Chinese optical transceivers fit neatly into an increasingly comprehensive effort to constrain China's position across the AI supply chain.

In this ecosystem, chips sit upstream as the "engines" that provide computing power; data centers are the



Robotic arms strap battery packs in a factory in Nantong, Jiangsu province, July 24. (PHOTO: XINHUA)

midstream "factories" where those engines are deployed; large AI models are the downstream "products"; and applications constitute the end-use scenarios. Electricity provides the energy that powers the entire chain.

The U.S. has already targeted China upstream by restricting access to advanced chips. Downstream, it has amplified concerns over issues such as the alleged "distillation" of Chinese AI models, laying the groundwork for further restrictions. At the application end, Washington has moved to restrict Chinese-made humanoid robots, quadruped robots and drones. It has also targeted Chinese grid-connected inverters, placing them on the FCC's "covered list."

Taken together, these moves suggest that Washington is seeking to exert pressure across the entire AI value chain and reduce its dependence on Chinese technology. Regardless of whether this

strategy can achieve its intended effect, banning new Chinese optical transceivers would amount to another move targeting the "midstream" of the AI ecosystem, making Washington's restrictions appear increasingly "comprehensive."

However, this could prove to be a severe miscalculation. According to global technology market intelligence firm Counterpoint Research, a comprehensive ban on new Chinese optical module imports would have an immediate and severe impact on U.S. data center operators, including Amazon, Microsoft, Meta, and Google. Currently, four Chinese manufacturers — including Zhongji InnoLight and Eoptolink — collectively account for roughly two-thirds of global optical module supply.

By contrast, top American competitors Coherent Corp. and Lumentum Holdings hold transceiver revenue shares of only about 17 percent and 6

percent respectively. U.S. companies are simply incapable of replacing Chinese suppliers or providing sufficient optical module volume within a 12- to 24-month horizon.

Counterpoint Research further warned that "a missing batch of optical transceivers renders billion-dollar GPU allocations idle" and that "constraining transceiver imports risks delaying the commercial turn-up of next-generation 800G/1.6T clusters by multiple quarters."

These reports have sparked widespread discussion on overseas social media, with many industry insiders viewing the proposed ban as unwise. Jukan, an analyst at U.S. semiconductor-focused investment research firm Citirini Research, said: "The U.S. restriction on imports Chinese optical transceivers is nothing short of self-inflicted damage — U.S. data centers will literally grind to a halt."

At present, U.S. data center construction is already facing multiple headwinds, including power supply-demand imbalances, insufficient production capacity for large transformers, inconsistent regulatory policies across states, and public opposition driven by rising electricity costs. These factors have already resulted in severe construction delays. In May, JPMorgan reported that 60 percent of the data center capacity the U.S. plans to complete by 2027 has not yet broken ground.

It is evident that banning new Chinese optical modules will do little to contain China, but it will inevitably exacerbate the existing struggles in U.S. data center construction. In addition, it will impose more obstacles and burdens on the development of U.S. AI technology and industry.

Voice of the World

China's Open AI Models Reshape Global AI Landscape

By LIANG Yilian

The recent release of high-performance Chinese AI models — including DeepSeek, GLM-5.5, and Kimi K3 — has drawn global attention. With affordable pricing and rapidly improving capabilities, these systems are quickly gaining adoption worldwide.

While China's investment in AI lags far behind that of the U.S., its AI models certainly do not, according to *The Economist*. Newer releases suggest DeepSeek was not a one-shot event but part of a pattern of Chinese labs catching up quickly, according to the Center for Strategic and International Studies.

The Economist highlighted that American AI spending appears excessive compared to China's more cost-conscious approach. In 2026, Chinese tech giants are expected to invest less than one-tenth of what U.S. firms spend on data centers, yet their models are nearly as capable. China's Moonshot AI's Kimi K3, for instance, reportedly achieves 95 percent of Anthropic's Fable 5 performance at 70 percent lower operating costs.

This cost advantage reflects differences in development strategies, infrastructure choices, and efforts to optimize model performance with fewer resources. On August 3, Alibaba added to the trend with a new model that, by certain metrics, reportedly ranks among the global leaders.

As Chinese open-source models are increasingly almost as good as the closed systems made by leading U.S. companies, Raffi Krikorian, the chief technology officer at Mozilla told AP News, "The open frontier is becoming increasingly Chinese-built."

Meanwhile, as Washington considers possible restrictions on Chinese AI models, a group of major U.S. tech firms — including Microsoft, Meta, and Nvidia — recently signed an open letter advocating for "open" AI models, *The Washington Post* reported.

Business magazine *Fortune* captured the shifting dynamics with the headline "China's Moonshot, Z.A.I., and DeepSeek are challenging U.S. AI labs — and beating them on cost." The article noted that "Kimi K3 blew up the timeline: Chinese AI is now cheap enough and good enough." Paul Triolo, a partner at DGA-Albright Stonebridge Group, told *Fortune*: "The AI ecosystem in China is probably much better than people thought." As a result, AI users globally are adapting to a new reality in which Chinese AI models are competitive with U.S. models on capability and far superior on price, according to *Fortune*.

Most Chinese AI models are open-source — meaning anyone can examine and build on them — at a time when frontier models from U.S. companies like Anthropic and OpenAI remain closed-source, according to *The Washington Post*. "Chinese model vendors are expected to leverage open-source software to promote their global usage and adoption," said Lian Jye Su of technology research firm Omdia.

This openness has also benefited U.S. companies. TechCrunch reported that American open-weight AI firm Arcee has gained advantages from Chinese models. "We have tremendous respect for the people building those models, the individual researchers," said Lucas Atkins, chief technology officer of Arcee.

Young Scholars from China Shines on the World Stage

Opinion

By YAO Yian

Last month, Wang Hong and Deng Yu became the first Chinese mathematicians to win the Fields Medal, and their stories have inspired people across China. During a press conference of the Ministry of Foreign Affairs, a spokesperson responded to a related question, saying: "This is not only the result of individual hard work, but also a vivid reflection of the vibrant spirit of today's Chinese youth, embodying the confidence and courage to forge ahead and give their all."

China's youth-driven innovation has already shown many results, spanning basic science, hard-tech entrepreneurship and global scientific collaboration.

On the day that Wang Hong and Deng Yu received their awards,

Wang Xingxing, a young entrepreneur in China's robotics field, appeared on the cover of *Time* magazine alongside his manned exoskeleton.

Yang Zhilin's Moonshot AI, which created Kimi K3, took the world by storm.

Professor Shing-Tung Yau, a Fields Medalist, echoed this sentiment, remarking that China has become a fertile ground for basic research.

Undoubtedly, China's high-quality basic and undergraduate education has laid a solid foundation for academic journeys, serving as a compelling testament to the world-class system for cultivating top-tier research talent.

In the past, the "Qian Xuesen Question" — which queried why China's schools failed to produce outstanding scientific and tech talent — provoked deep national reflection. Today, the integrated development of education, science and technology, and talent is providing the

solution, accelerating synergy between independent technological innovation and homegrown talent cultivation.

Du Mengran, a 39-year-old ocean researcher at the Institute of Deep-sea Science and Engineering, Chinese Academy of Sciences, has devoted 12 years to her field. *Nature* named her a "Deep Diver" and one of the 10 people who shaped science in 2025, alongside Liang Wenfeng, the founder of the DeepSeek AI model. In June 2025, the UN endorsed the Global Trench Exploration and Diving program proposed by her institute, in collaboration with partners from more than 10 countries. Du is the Chinese chief scientist of the expedition.

These achievements are largely attributed to China's concerted efforts to enhance its independent innovation capabilities, tackle cutting-edge fundamental scientific questions, and lay a solid foundation for basic research. This is

the way to break free from the path of dependence and secure first-mover advantage in technological competition.

Scientific progress thrives on open cooperation and inclusive exchange. In this era of "big science" marked by accelerating transformation, it is precisely the deepening scientific exchanges and collaborations between China and the rest of the world that provide young scientists with richer opportunities, cutting-edge perspectives, and a broader stage.

Today, China has become a vibrant hub for strengthening basic research and accelerating scientific and technological innovation. With a growing number of outstanding overseas students returning to pursue their careers and an increasing influx of foreign scientists arriving for exchanges and collaboration, it is rapidly transforming from a global participant and contributor to science and technology into a pioneer and leader.



Visitors experience the multilingual AI transparent screen at the iFLYTEK AI Experience Center in Hefei, Anhui province, August 6. (PHOTO: XINHUA)

Hi-Tech

Prefab Homes Built Like LEGO

By GONG Qian

Chinese modular buildings have gained soaring popularity in overseas markets with fast-growing export volumes.

Data from the General Administration of Customs of China shows that between 2015 and 2025, China's export value for prefabricated buildings rose from 1.47 billion USD to approximately 4.34 billion USD. In the first quarter of 2026, modular building exports grew 45 percent.

Modular building is an innovative building method where the structure is broken down into individual modules. These are manufactured in a factory, and then transported to the construction site for assembly. Simply put, components such as ceilings, floors, and utility pipelines are fully prefabricated on an assembly line and then assembled on-site like giant LEGO blocks.

This approach has revolutionized the building process by allowing factory production and on-site work to proceed simultaneously. With over 70 percent of

the work completed in the factory, construction timelines can be reduced by more than 60 percent. Furthermore, this method effectively alleviates traffic pressure at construction sites, minimizes land occupation, and reduces environmental pollution.

Moreover, modular construction reduces construction waste by over 75 percent, material loss by more than 25 percent, on-site electricity consumption by over 60 percent, and water usage by over 66 percent.

Factory assembly line ensures millimeter-level precision control, enhancing the building's waterproofing, sound insulation, and seismic performance. The modules can be disassembled, stacked, and flexibly expanded, with a recycling and reuse rate exceeding 90 percent.

The export boom of prefabricated homes reflects the accelerated global expansion of China's new quality productive forces in intelligent construction. The vision "welcome to your home made in China" is becoming a reality across an increasing number of countries.

New Life for Exhaust Steam

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This severely tests the exhaust steam ejector's ability to adapt. Regardless of changes in load or operating conditions, it must precisely regulate steam flow while maintaining stable entrainment. The design and geometry of its regulating cone are critical to achieving this capability.

Initially, the team adopted the conventional straight-cone design that had been used across the industry for years, Ma Suxia, leader of the research team and a professor at TYUT, said. But it was a crude way of regulation — like an old-fashioned faucet. Open it too far and it overdrives the ejector; close it too much and it provides insufficient entrainment.

When the thermal power plant experiences an extreme cold snap or

during unit startup or shutdown, the equipment is highly susceptible to flow instability and ejector failure.

The team decided to rethink the regulating cone. After dozens of simulation iterations, multiple rounds of prototype redesigns, and hundreds of comparative tests under different operating conditions, they finalized a new streamlined curved regulating cone.

Compared with the conventional straight-cone design, the new cone offers a smoother flow transition and has a more efficient flow-passage geometry. With only a slight axial movement, it can precisely regulate the motive steam flow rate within milliseconds, enabling stable operation under varying loads, extreme weather and other demanding operating conditions.

Sealing for safety

As the only movable core component of the equipment, the adjustable cone has many weak points. Due to frequent axial movement and drastic changes in operating conditions, steam leaks are highly likely to occur at the clearances between moving and stationary components. This could lead to energy waste and equipment damage, or even accidents that would impact the electricity and heat usage in the entire region.

In the laboratory, experiments can be done by simply sealing the weak points, but the weaknesses will expose themselves easily when large engineering equipment is put into operation in a thermal power plant, Ma said.

To guarantee electricity and heat supply in cities, combined heat and power units have to operate 24/7 all year round with very little maintenance. Thus, the sealing system cannot have even the slightest design oversight or

manufacturing defect.

To solve this problem, the team learned from factories that have practical production experience and explored sealing materials and structures.

A solution was finalized. A special supporting structure would be added to the adjustable cone to prevent it from deforming or breaking under high pressure. Graphene is used to design a multiple sealing structure that fits perfectly while ensuring smooth, jam-free adjustment.

In extreme-condition tests evaluating the sealing structure's stability and durability, the ejector completed the entire test without steam leakage, component jamming or noticeable deformation. The regulating cone moved smoothly throughout its full travel, maintaining stable sealing performance.

If the technology is widely adopted across China's thermal power sector, it could reduce carbon emissions by more than 100 million tonnes.

From Curiosity to Frontiers: ICBS Honors Four Women Scientists

Dialogue

By Staff Reporters

Among the nine recipients of the ICBS Medal awarded at the 2026 International Congress of Basic Science (ICBS), four are women: Claire Voisin, Andrea J. Liu, Bao Zhenan, and Zhuang Xiaowei.

Shing-Tung Yau, chair of ICBS, highlighted this in his opening address, noting that "women researchers are contributing to every stage of scientific progress through their distinctive intellectual perspectives and sustained dedication." He hoped the scholarly journeys of these four laureates would inspire more women to pursue their dreams with courage and to embark on the path of science toward truth and the unknown.

While the quartet shares the same prestigious honor, the paths that led them to the forefront of global science are as diverse as their fields of study. Their stories are shaped by childhood curiosity, deliberate choices and decades of unwavering commitment.

'Made of freedom, adventure, and hope'



Professor Claire Voisin

For Claire Voisin, mathematics was a sanctuary discovered amidst the joyful chaos of a large family. Born in France as the 10th of 12 children, she did not have a room of her own until high school graduation. Her intellectual curiosity was broad, including philosophy, painting and poetry. While at the prestigious école Normale Supérieure, she seriously considered switching to philosophy, a dilemma that lasted for years. Ultimately, a philosopher friend advised her to stay in mathematics. Looking back, Voisin admits she never had a single, defining moment of decision; her path was a natural, organic evolution.

She describes mathematical research

as "a wonderful experience, made of freedom, adventure, and hope," though she does not shy away from acknowledging the failures and despair that researchers inevitably face. For her, the recognition is not only a great pleasure but also a welcome encouragement for the future. Her devotion to algebraic geometry stems from its "incredible wealth of concepts and a variety of viewpoints." She once remarked that its richness makes it "worth studying for one's whole life, and even one's second life." Underlying all her work is the conviction that "all the powerful theoretical tools we develop will sooner or later find an application."

'The returns do come, and often from directions not originally intended'



Professor Zhuang Xiaowei

Zhuang Xiaowei's scientific journey began with an innate intuition for the physical world. Born in Jiangsu, east China, to a university professor couple, she was a quiet child who never attended kindergarten. Her extraordinary physical insight was apparent early on. At 15, she took the national college entrance exam and was admitted to the prestigious Special Class for the Gifted Young at the University of Science and Technology of China. There, she achieved perfect scores in all four core mechanics courses.

Her career has been driven by the curiosity that unites all scientists, "an understanding of how nature works, ranging from elementary particles to living systems and to the universe." She develops tools to unveil nature's mysteries, yet she is keenly aware that "exactly how our research will turn into a product that directly impacts our everyday lives is often not immediately clear."

In an era when "the world wants applications and returns at a mass pace," she reminds us that "history keeps teaching the same lesson. The returns do come, and often from directions not

originally intended." Her own inventions, STORM, one of the earliest and most widely used super-resolution imaging methods, and MERFISH, a massively multiplexed single-molecule imaging method, stand as proof of this.

'The seeds of the technology of tomorrow'



Professor Andrea J. Liu

Andrea J. Liu's path to physics was not a straight line, but a choice made in the face of another powerful passion: history. Born in New York and raised in Iowa, the daughter of a condensed matter physicist, she initially found herself drawn to the human stories of history while an undergraduate at UC Berkeley, even planning to switch majors.

The turning point came when she encountered Maxwell's equations. The four simple, elegant formulas that unified electricity, magnetism, and light captivated her. The sheer beauty of their mathematical structure and the profound physics they contained won her over, securing her future in the physical world. She traces her love of physics back to her father, "with whom I wrote my first seven physics publications," while her interest in communicating science came from her mother, "who was a writer."

Receiving the Marie Curie Medal at ICBS holds special significance for Liu, who regards Curie as "a physics hero who exemplifies the values of ICBS." She points to Curie's research on radioactivity as a classic example of how fundamental discoveries lead to unexpected applications — "radiation therapy for cancer, which she also pioneered." In an age when "technology is so dominant in the public conversation and people even wonder whether AI is better at science than scientists," Liu says "the importance of basic science requires more emphasis than ever." She sees "the inspiring fundamental discoveries that people are making today" as "the seeds of the technology of tomorrow,"

and she considers it "part of our professional duty to stand up for science."

'Science begins with curiosity'



Professor Bao Zhenan

Bao Zhenan's scientific approach was shaped by a simple childhood experiment. At the age of three, her father asked her if a popsicle would sink or float if thrown into a lake. She guessed it would sink, but after trying it, she watched it float.

Born into a family of scientists, Bao was encouraged from a young age to be endlessly curious. At 17, she entered Nanjing University's Chemistry Department. Throughout her career, she has been driven by a simple question: "Can we create electronic materials and sensing systems that behave more like human skin?" By bringing together chemistry, materials science, electronics, and biology, her group has recreated skin's softness, stretchability, and self-healing properties in synthetic materials, moving electronics beyond the limitations of rigid silicon. Her innovations are now opening new possibilities in healthcare, robotics, prosthetics, and human-machine interfaces, including NeuroString, "a hair-thin sensing fiber that may transform how we monitor the brain, the heart, the gut, and many other organs over long periods of time."

For Bao, "science begins with curiosity" and "the excitement of discovering something that no one has known before," but she believes "the journey does not end there. It becomes even more meaningful when those discoveries are translated into technologies that improve people's lives." Beyond her own research, she envisions a world where nations work together toward the betterment of humanity.

This article is compiled based on speeches and materials from the 2026 ICBS.

Tech+Culture

When 1,500-year-old Cliff Comes Alive

By ZHAO Xiangnan & LONG Yun

speak with the present.

Imagine a temple nailed to the side of a sheer cliff, its wooden walkway clinging to the cliff face more than 50 meters above ground. Built in AD 491 during the Northern Wei Dynasty, the Hanging Temple (Xuankong Temple) near Datong, Shanxi province in north China, has defied gravity and belief for over a millennium.

It is the only surviving temple in China to enshrine the three major philosophical and religious traditions of Confucianism, Buddhism, and Taoism. *Time* magazine once named it one of the world's 10 "most precarious buildings."

Today, the ancient cliff has another miraculous temple, this one created with light and shadow. The light show "Why the Hanging Temple Endures" debuted on May 18, recreating the millennium-old temple through light and shadow and bringing to life the epic history of the Hengshan Mountain region.

The light show turns the mountain's Cuiping Peak into a giant screen. With the mountain and river as the backdrop and the ancient temple as a stage prop, the thousand-year cultural feast creates an immersive audio-visual feast.

Boasting a staggering projection area of more than 37,500 square meters, the show has been certified by Guinness World Records as the world's largest cliff projection show. At the award ceremony, an immersive cliffside performance unfolded, where legendary characters like the poets Li Bai and Yuan Haowen, the traveler Xu Xiake, and the Taoist reformer Kou Qianzhi appeared, "crossing" a millennium to

In developing cultural heritage tourism, the core challenge is how to balance heritage preservation with the visitor experience. The production team employed customized cold-light source technology so that there would be no risk of ultraviolet or thermal radiation damage to the ancient temple. Every aspect, from the sound field design to the stage aesthetics, was devised to ensure zero impact on the cultural relics, maximizing tourism resources while ensuring cultural protection.

To project a fluid image onto the rugged, uneven surface of the peak, the production team fused multiple cutting-edge technologies, including multimedia digital lighting, real-time rendering, and ultra-large projection mapping and splicing. This achieved a seamless fusion of light and the mountain, where the real landscape and digital images enhance each other. "Once the light created the Hanging Temple across this giant cliff, the Hengshan Mountain ceased to be just a mountain," said Yang Jianlin, the director of the show. "It became a space-time theater where one could 'travel' through 1,500 years of history."

The performance plan fully complies with the temple's conservation plan. All equipment was installed "invisibly" on the cliff face, and is completely detachable. All audio, lighting, and electrical equipment uses the customized cold-light source technology, averting any potential hazard from chemical damage or heat aging of the ancient structure. "The impact of the light on the Hanging Temple is much weaker than that of normal daytime sunlight," Yang said.



Live scene from the light show "Why the Hanging Temple Endures." (COURTESY PHOTO)

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Bao Zhenan, K.K. Lee professor of chemical engineering at Stanford University, said: "Science begins with curiosity. It begins with the excitement of discovering something that no one has known before. The prize is the pleasure of finding things out. I could not agree more."

Addressing the impact of AI, Shing-Tung Yau said in recent years, AI has emerged as an important tool for basic science, with continued achievements in AI-assisted mathematical and scientific research and demonstrating remarkable efficiency and capability. Yet he remains convinced that "original thinking, spontaneous inspiration, and the eternal quest for truth and beauty in science are uniquely human endeavors that will continue to drive the major revolutions in basic science through interdisciplinary thought and the courage to explore the unknown."

Andrea J. Liu, Hepburn Professor of Physics at the University of Pennsylvania, said: "In these times, when technology is so dominant in the public conversation and people even wonder whether AI is better at science than scientists, the importance of basic science requires

more emphasis than ever. Similar to radioactivity, the inspiring fundamental discoveries that people are making today might contain the seeds of the technology of tomorrow."

Yau also noted that last month, two Chinese mathematicians, Wang Hong and Deng Yu, achieved landmark theoretical breakthroughs and were awarded the Fields Medal, one of the highest international honors in mathematics. "These two major achievements resonated throughout the international mathematical community and inspired extraordinary enthusiasm for fundamental research at home and abroad. This is both a historic opportunity for scientists of our time and an exceptional stage upon which a new generation of young scholars can demonstrate their talent," he said.

Quoting mathematician David Hilbert's resounding declaration from nearly a century ago, "We must know. We will know," Yau said: "That unwavering commitment to truth has echoed across the decades and remains alive in the heart of every scientist. May we remain true to the original spirit of scholarship, and on the journey of basic science advance with conviction toward truth and beauty."

China's Ancient Dayan Qiuyishu Algorithm for Linear Congruences

Traditional Eastern Wisdom

By BI Weizi

Dayan qiuyishu, or the "Great Extension Method for Finding Unity," is an algorithmic procedure in ancient Chinese mathematics used to solve systems of linear congruences. Systematically formalized by Southern Song mathematician Qin Jiushao in 1247, it pre-dates and is equivalent to the modern Chinese Remainder Theorem.

The term literally translates to "method of finding one" (qiuyi), which

refers to finding the modular multiplicative inverse — a core step mathematically equivalent to the Euclidean algorithm.

Qin detailed this method in his famous work, Shushu Jiuzhang, the Mathematical Treatise in Nine Sections, where he used it to solve practical, complex problems like astronomy calendars, tax distributions, and sizing up military forces.

In a general linear congruence problem:

$$\begin{aligned}x &\equiv r_1 \pmod{m_1} \\x &\equiv r_2 \pmod{m_2} \\&\dots \\x &\equiv r_n \pmod{m_n}\end{aligned}$$

The generalized algorithm works by calculating the total least common

multiple of the moduli:

$$(M = m_1 \times m_2 \dots \times m_n)$$

Then, to satisfy each specific modular equation, Qin determined a multiplier constant (k) using a step-by-step division process until it satisfied the condition:

$$k \times \frac{M}{m_i} \equiv 1 \pmod{m_i}$$

Once these multipliers are established, summing the weighted modular remainders yields the final answer that solves the entire set of equations.

Compared to the corresponding Western algorithm, the ancient Chinese method emphasizes the practical execution of procedural steps; in the West, it was not until the 18th century that

freight transport hubs. During the 14th Five-Year Plan period (2021-2025), the government supported 37 cities to ensure this. During the 15th Five-Year Plan period, it will support around 30 additional cities for about three years, Cai said.

Moreover, major ports, key inland

ports, large logistics parks, major industrial parks, and China-Europe (Asia) Railway Express assembly centers will be focused on to develop around 1,000 multimodal transport hubs. Tailored measures will be adopted to address bottlenecks at each hub and enhance multimodal transport.

A More Comprehensive Transport Network by 2030

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The planning and development of international logistics infrastructure will be strengthened.

A new round of initiatives will be launched to address weak links and strengthen national comprehensive

The digital and intelligent transformation of transport and logistics will be advanced. China will explore major innovation projects such as autonomous driving for freight trucks in typical application scenarios, regulate the operations of online freight platform operators, and plan pilot programs to standardize the use of autonomous delivery vehicles.