



Science and Technology Daily

VOL.6-NO.253

AUGUST 15-16, 2026

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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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 Graphic



WECHAT ACCOUNT



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