

# A Place to Grow and Contribute Meaningfully

## Dialogue

By LONG Yun, QIN Mian & BI Weizi

In 2017, when Pakistani scholar Muhammad Salman Nasir first arrived in China to begin his PhD, he had a clear scientific mission: to advance catalytic technologies for renewable energy. What he didn't anticipate was how deeply the country would shape his sense of purpose and belonging.

"Beyond my research, my time in China, moving from Xi'an to Shanghai, and now [to] Tianjin, has profoundly influenced both my personal growth and professional perspective," Nasir said. "What started as a pursuit of a PhD, transformed into an immersion into the living, breathing fabric of Chinese society."

### A deliberate choice

Currently, Nasir is an associate professor at Tianjin University (TJU). "My decision to pursue doctoral studies and a research career in China was really driven by three key factors: academic ambition, alignment with global sustainability trends, and the unique research ecosystem here," he said.

At the time, China was accelerating its commitment to the "dual carbon" goals, aiming to peak emissions before 2030 and achieve carbon neutrality by 2060. That national vision, combined with massive investment in hydrogen, solar fuels, and carbon utilization, convinced him this was where research could make a real impact. "China's emergence as a global leader in clean energy research presented an incredible opportunity," Nasir said.

He chose TJU not just for its reputation. "My lab is renowned for interdisciplinary energy research, bridging materi-



Muhammad Salman Nasir. (COURTESY PHOTO)

als science, chemical engineering, and mechanical systems, which perfectly matched my integrated approach to catalyst and reactor design," he said. He also appreciated the university's strong industry ties and support for international researchers.

### Science that serves society

Nasir's current work focuses on using sunlight to turn CO<sub>2</sub> and plastic waste into green hydrogen, sustainable fuels, and useful chemicals. Rather than chasing small improvements, he aims for solutions that can scale up. "Instead of isolated projects, I see my work as contributing to an integrated toolbox for green transformation," he said.

Nasir stressed that university labs play a special role in the transition to carbon neutrality. "University laboratories, like the one I work in at TJU, are innovation hubs where big ideas meet real-world challenges. We serve as essential testing grounds for high-risk, high-

ward technologies, those that industry may see as too uncertain but that hold transformative potential."

Importantly, his team designs with global access in mind. "The solutions we're advancing, low-cost, modular, and solar-powered, are designed to be adapted and scaled in varied contexts," he said. "By sharing these technologies and the knowledge behind them, we aim to support countries in leapfrogging fossil fuel dependency."

### The culture of collaboration

Nasir has been consistently impressed by the students and young researchers he works with. He noted their diligence, technical skill, and ability to connect lab work to bigger social goals. "Their thinking is often highly strategic. They quickly grasp not only the 'how' of an experiment but also the 'why' behind it, aligning their work thoughtfully with broader scientific and national sustainability objectives," he said.

He also values the cross-disciplinary teamwork in his lab, where chemists, materials scientists, and engineers regularly collaborate on complex energy problems. This spirit, he added, reflects China's wider research environment: well-funded, strategically focused, and increasingly open to global talent. "This environment has been instrumental to my work," Nasir said. "The strategic alignment with national energy priorities gave my research on solar-driven hydrogen and CO<sub>2</sub> conversion a clear sense of purpose and relevance."

### A home, not just a workplace

In China, Nasir has found a sense of community. "From morning tai chi sessions to lively debates on AI and sustainability in campus cafés, there is a tangible spirit of collective aspiration, where education is viewed not just as personal advancement, but as a contribution to the broader society," he said.

Beyond the university, China's cities shaped his view of modernity. "You can taste centuries of history in a bowl of hand-pulled noodles, then minutes later ride a high-speed train or pay for groceries with your phone. This seamless coexistence of old and new taught me that modernization in China doesn't erase tradition — it converses with it."

He also spoke warmly of everyday kindness: strangers offering help on the subway, vendors remembering his order, colleagues inviting him to Mid-Autumn Festival dinners. "I felt a consistent culture of warmth and mutual respect," he said.

For Nasir, his academic journey has come full circle. He came seeking a place to do meaningful science and over time that place has become much more. Nasir has stayed because he found something rarer: a place where his work, his family, and his values all fit.

## Tech+Culture

# 'Deep Sea Warrior' Rescues Shipwrecked History

By BI Weizi & LI Zhaoyu

Against the backdrop of blue lighting and the sounds of ocean waves and distant whale calls, 377 pieces of Ming Dynasty treasure are telling the story of the Maritime Silk Road as it was 500 years ago, at the Grand Canal Museum of Beijing.

These artifacts come from the No. 1 and No. 2 shipwrecks on the northwest slope of the South China Sea. The two Ming Dynasty shipwrecks were discovered on the seabed of the South China Sea in October 2022, at a depth of approximately 1,500 meters. Shipwreck No. 1 was laden with export ceramics from Jingdezhen, while Shipwreck No. 2 was carrying ebony that had been brought back from overseas. This discovery filled a gap in China's historical record of import trade return voyages along the Maritime Silk Road and bears witness to the prosperity of two-way trade along this ancient route.

So how did archaeologists manage to find these exquisite artifacts? At this depth, the seabed is perpetually dark, with water temperatures ranging from 3°C to 4°C. Without technological support, the deep seabed is an archaeological blind spot, necessitating the use of a variety of deep-sea technologies and equipment during this discovery.

For example, archaeologists used 3D laser scanners and high-definition cameras to create panoramic photographs and scan the shipwreck site in 3D, gaining an initial understanding of where the artifacts were located.

Furthermore, archaeologists deployed the Deep Sea Warrior, a manned submersible independently developed by China with a maximum diving depth

of 4,500 meters, to conduct underwater operations. The archaeologists aboard the Deep Sea Warrior then descended to a depth of 1,500 meters to conduct thorough investigations and record and study the site, as well as extract artifacts and samples.

As soon as the Deep Sea Warrior reached the bottom of the planned route, its lights were switched on. Two robotic arms, each with a robotic hand at the end, were connected to the outside of the manned submersible. One of these robotic hands, covered in a flexible material, carefully extracted artifacts that had lain buried for hundreds of years.

Due to the environment being drastically different once the artifacts had surfaced, without proper treatment, they would quickly crumble.

The high salinity of the deep sea, coupled with chloride ions filling the pores of ceramics, causes repeated crystallization and dissolution due to rapid changes in temperature and humidity. Therefore, the immediate priority for newly recovered artifacts is cleaning and desalination.

A comprehensive approach is required for cleaning, utilizing physical scrubbing and chemical solvent soaking depending on the artifact's material, glaze and degree of contamination. This ensures that the historical information and artistic value of the artifact are not damaged when removing the dirt.

After cleaning comes desalination. Cultural relic conservationists soak the artifacts in deionized water and use desalination technology to gradually remove the salt that has seeped into the ceramics. This process often takes several months, or even longer.

# Project to Boost Space Resource Development

## Science Outreach

By Staff Reporters

China will carry out a major project, "Tiangong Kaiwu," during the 15th Five-Year Plan period (2026-2030) to advance space resource development, the China Aerospace Science and Technology Corporation announced on January 29.

The project will build an integrated experimental system and ground support infrastructure, with priority to breakthroughs in small celestial body prospecting, intelligent autonomous mining, low-cost transportation, and in-orbit processing.

Pang Zhihao, a spaceflight technol-

ogy expert and veteran space writer, said the core of this project is to establish a full-chain system, "prospecting, mining, transportation, and in-orbit processing," to shift deep-space resource use from scientific exploration toward engineering implementation.

This will support lunar bases, deep-space missions, and the space economy.

### What are space resources?

Pang explained that all exploitable matter, energy, environments, and information beyond Earth's atmosphere constitute space resources. They can be roughly classified into four categories.

Material resources include helium-3 on the moon, rare precious metals and rare earth elements on asteroids, and water ice on extraterrestrial bodies. These can enable in-situ oxygen and water production, mining, and future nuclear fusion fuel supply.

Energy resources refer to uninterrupted solar power in space, which offers higher intensity and stability than on Earth, enabling space-based solar power stations.

Environmental resources, such as microgravity, high vacuum, and strong radiation, allow production of ultrapure materials and biological agents impossible on Earth, and provide ideal conditions for astronomical observation and scientific experiments.

Information resources come from communication, navigation, and remote-sensing satellites that build global networks, and space telescopes that capture fundamental cosmic data to support governance and basic research.

"Space resources span from near-Earth orbit to interstellar space," Pang said. "They are a strategic reserve to transcend Earth's limits, carrying both practical value and long-term civilizational significance."

Developing these resources can ease Earth's resource shortages and environmental pressures. This will drive cross-disciplinary advances in aerospace, materials science, and AI, with civilian applications upgrading entire industries. It will also foster new sectors like commercial spaceflight, in-space manufacturing, and asteroid mining, forming a space economy that is a global growth engine.

Crucially, it will expand human survival options through off-world set-

tlements, helping safeguard civilization against planetary threats.

### The biggest challenges

Pang said the main obstacles are technological, cost, and regulatory constraints.

Extreme environments pose immediate hurdles: Lunar surface temperatures swing by 300°C, Mars suffers planet-wide dust storms for about one-quarter of the year, and asteroids have near-zero gravity, requiring stable operations under micro- or low-gravity conditions.

Communication delays further limit control. A one-way signal between Earth and Mars can take up to 20 minutes, making remote operation impossible. Systems must rely on AI to autonomously conduct prospecting, mining and fault response, demanding highly reliable algorithms and sensors.

Transportation economics remains prohibitive. Under current technology, shipping raw space ore to Earth costs more than the material's value. Solutions include reusable rockets, in-orbit processing, and electromagnetic launch systems to cut costs.

Realistically, resources should first serve in-space needs, such as refueling or habitat construction, rather than Earth return.

Pang emphasized that while space resource development remains in its early stage globally, it will become a key enabler as we move from an Earth-bound civilization to an interplanetary one.

## Traditional Eastern Wisdom

# Legendary Chinese Bows

By BI Weizi

The bow served as the dominant weapon in ancient Chinese combat, and mastering its use was regarded as a vital military and ritual skill for thousands of years. Over the centuries, archers were used as infantry, chariot riders and cavalry. Although the significance of this weapon was challenged by the sword and crossbow, it continued to be an essential part of a commander's strategy on the battlefield, particularly during initial maneuvers, withdrawals and city defenses.

The bow has consistently been a key element of Chinese culture, with hunting and shooting from horseback being a popular activity among the aristocracy in China, possibly as far back as the Shang Dynasty (1600-1046 B.C.). The Shang notably granted the designation of Archer-Lord to the chiefs of conquered tribes, illustrating the great regard the bow enjoyed in ancient China, similar to the sword's status in western Europe.

The designs of both the bow and the arrow changed over time and across different locations. The most basic bows were crafted from wood or horn, whereas composite bows began to emerge during the Shang period — these bows consisted of as many as eight parts, including individual bamboo strips joined together or fastened with silk. Various types of wood utilized included silkwood thorn, wild mulberry, orange wood and quince.

All these woods, bamboo and horn were meticulously chosen and blended for their compressive or elastic qualities to achieve the most potent firing power.

Glues were created from plant or animal substances, and eventually fish glue was discovered to be the most effective. Animal sinew or tendon was utilized to wrap the completed bow and enhance its flexibility. The last step was to apply lacquer to the bow, safeguarding it from moisture. The bowstring was probably crafted from twisted strands of silk, leather or plant fibers, particularly bamboo.

It is noteworthy that arrows were often included in tombs, representing their significance to the deceased in the afterlife.

In the sixth century B.C., Confucius reinforced the significance of archery in the national consciousness by asserting it was among the six skills in the aristocratic education system in ancient China for self-cultivation.



An ancient Chinese bow is on display in Jincheng, Shanxi province, September 29, 2024. (PHOTO: VCG)

# Tech Goods Highlighted in Spring Festival Market

From page 1

Behind the diverse and novel tech goods lies the rapid development of China's evolved industrial chains. Enterprises have established a complete in-

dustrial ecosystem that integrates technology R&D, core components manufacturing and assembly.

According to the Ministry of Industry and Information Technology, China's

digital industry is developing rapidly. By the end of 2025, the industrial revenue exceeded 38 trillion RMB.

The country now has one hundred 5G-enabled manufacturing plants that

have reached world-leading performance levels, with an average production capacity increase of 25 percent and operating costs reduced by 19 percent.