Power of Architecture as a Force for Good

Dialogue

By CHEN Chunyou

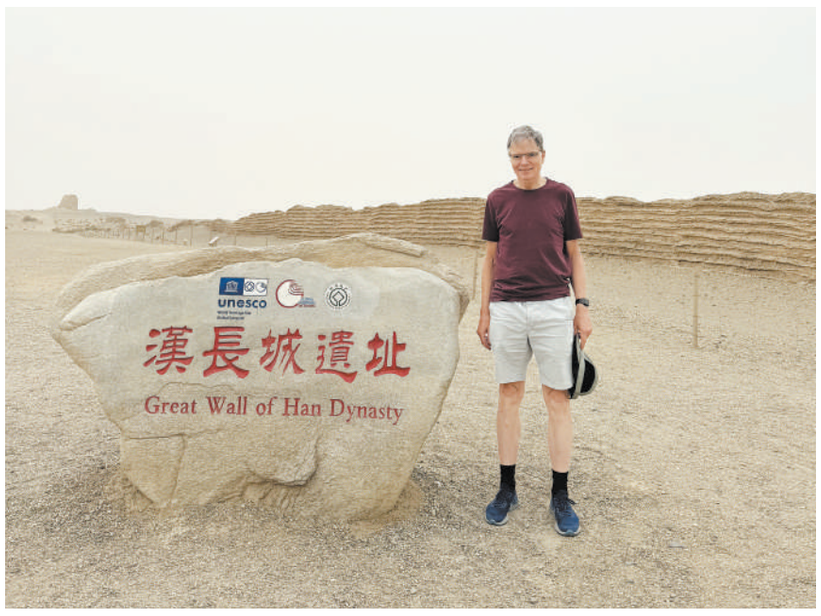
Dutch architect Ole Bouman had his incredible encounter with the East when he visited Dunhuang, a small city in northwestern China with an immense treasure trove. "I had a once-in-a-lifetime opportunity to visit the Mogao Grottoes at dusk, with just the sound of birds accompanying me in my encounter with this incredible legacy of Buddhism in China," Bouman told *Science and Technology Daily*.

The Mogao Grottoes are a complex of caves located in what was an important juncture of the ancient Silk Road, containing an amazing collection of Buddhist art, sculpture and texts.

Bouman is currently a professor at the College of Architecture and Urban Planning of Tongji University in Shanghai. In October 2023, coinciding with the 10th anniversary of the Belt and Road Initiative (BRI), he decided to go on a cycling project. He started from Amsterdam, the Netherlands, and then spanned 18 countries and covered nearly 11,000 kilometers, finishing the journey in Shanghai in July this year. He said it was a dialogue between the West and the East.

For the 63-year-old, cycling is a way of learning about the world. During his trip, he witnessed many different kinds of architecture.

The seeds of this fascination were planted when he was eight years old and his father gave him his first bicycle, which nurtured his interest in adventure and traveling. In college, he majored in history and architecture. "I like architecture because it offers a reality check to many theories and assumptions. Every piece of architecture is first and foremost a fact on the ground, verifying or falsifying the expectations that caused its realization," he said.



Professor Ole Bouman at the Great Wall of the Han Dynasty in Dunhuang, Gansu province, northwest China. (COURTESY PHOTO)

Architecture as shaper of lifestyles

He came to Shanghai for the first time in 2005 and subsequently, worked in Shenzhen periodically until in 2015 he chose to settle down and work in China.

"I'm particularly attracted by the Chinese respect for knowledge as a matter of fact, rather than a matter of hypothesis. I don't say this is intrinsically better, but it's effective for addressing the most pressing issues of today," Bouman said.

In 2022, he began to teach architecture at the Tongji University. In his perspective, architecture serves as a medium to shape future lifestyles. The definition of architecture as the making of buildings is an artificial one, belonging to a paradigm of individual designers, clients and contractors. "If we shift focus from making an existing practice more sustainable to redesigning the architectural discipline itself, engaging architects to much larger challenges and expanding their social mandate, we could conceive of an entirely new practice and even aesthetics," Bouman said.

"China, for its alternative economic model with a much stronger role for government, has a special responsibility and opportunity to lead the way to this new paradigm for architecture," he added.

BRI's magic on infrastructure

Bouman has traveled extensively through BRI partner countries, observing notable changes in infrastructure.

He said the BRI is reshaping the infrastructure landscape in many regions, ideally harmonizing with local traditions and enhancing residents' livelihoods. "In places like the Karakol region in Kyrgyzstan, I witnessed how Chinese-led projects boost modernization," he said.

"This is perhaps thanks to the legacy of the ancient Silk Road, which, as a conduit for cultural exchange, offers a historical precedent that people of this generation can draw upon to ensure the BRI strengthens, rather than dilutes the unique identities of the regions it touches," Bouman said.

"This is also what I try to show how people look at communities, at legacies, at patterns of peaceful development, at practices of preservation and other forms of historical respect," he said. "By seeing a bigger picture, we can act upon a bigger scale."

Architecture as a bridge

Throughout his cycling journey, he maintained close ties with his students, sharing interesting discoveries, and visiting the sites they suggested. "In one way, I was the teacher and the other way, they were my guide. That was a very nice balance between learning and teaching," Bouman said.

As he pedaled through diverse landscapes, from the ancient Silk Road to the bustling cities of today, Bouman realized that architecture is about more than just buildings — it's about shaping the way we live and interact with each other and our environment. "In each city, I saw the potential for architecture to be a force for good, to not only build structures but to build bridges — between cultures, between past and future, between people and the planet. It is this vision that I hope to carry forward, and to inspire in the next generation of architects," he said.

After returning to Shanghai, he hosted an exhibition showcasing his experiences. "I hope to share what I have seen and felt throughout the journey, especially the folk customs, cultural legends, architectural and historical sites and natural scenery of various places," Bouman said.

To aspiring architects, his advice is: "Engage with the full spectrum of architectural practice — from materials science to urban policy. Don't be afraid to experiment with new ideas and technologies, as the future of architecture lies in our ability to adapt and innovate, and remember, every challenge is an opportunity to redefine what architecture can achieve in service of society."

Service Info

New Measure to Promote High-quality Service Trade

By LONG Yun

China's State Council has introduced a new guideline to promote high-quality development of trade in services with a focus on high-standard opening up.

The guideline says institutional opening up of trade in services will be promoted and a negative list management system for cross-border trade in services will be established while improving the standardization of service trade.

The guideline outlines 20 key tasks across five areas, emphasizing the acceleration of digital, intelligent, and green development in the sector.

Leveraging open platforms

The role of open platforms in driving service trade development will be maximized. The 22 free trade zones and the Hainan Free Trade Port are highlighted as pilots for further opening up, with a gradual nationwide expansion of cross-border service trade.

China will encourage establishing national demonstration zones for innovative service trade, focusing on areas such as market access, regulatory frameworks, and risk management, to create high-quality development hubs.

Meeting international standards

China is committed to aligning its service trade regulations with international standards. The guideline emphasizes the implementation of commitments under regional trade agreements such as the Regional Comprehensive Economic Partnership.

Reform of the domestic service trade sector will be deepened, including standardizing service licenses, qualifications, and technical standards, ultimately simplifying the approval processes and enhancing the transparency of regulatory policies to reduce costs for cross-border trade services.

Technology and green development

In the technology sector, the guideline focuses on promoting exchanges and application of technological achievements. The goal is to improve the technology trade management and promotion system, build platforms for connecting innovation resources, and expand international cooperation networks.

Facilitating cross-border transfer of technology from R&D centers and other measures are also highlighted as ways to boost the application and commercialization of sci-tech achievements.

Green development is a key aspect of the guideline. Green technologies and trade in green services will be developed, and a directory of green service imports and exports will be created.

Facilitating talent mobility

The guideline also addresses the need to facilitate cross-border exchange of global talent. Measures include providing convenient entry and exit procedures for managers and technical personnel of foreign-invested enterprises, as well as their family members.

High-level foreign professionals and their research staff will be offered visas and residence permits to invest, work and engage in business exchanges in China. Foreign professionals will be allowed to obtain domestic qualifications and employment opportunities in certain sectors.

Inbound tourism will be developed to make obtaining visas convenient and streamline the entry process for international visitors.

A variety of payment services will be provided in hotels, tourist attractions and other public venues to accommodate overseas tourists. Additionally, accommodation arrangements will be made more convenient for foreigners visiting or residing in the country.

How 'Black Myth: Wukong' Became a Hit

Science Outreach

By Staff Reporters

Black Myth: Wukong, a recently released action role-playing game inspired by the classical Chinese novel *Journey to the West*, has rapidly become a smash hit with gamers in local and international markets. The game's outstanding visuals, unique storyline and gameplay have also earned it rave reviews from global media outlets.

But what is the secret to creating such powerful visual effects? The answer lies in spatial computing.

Spatial computing is various human-computer interaction techniques that are perceived by users as taking place in the real world, instead of constrained to and perceptually behind computer screens, said Qiao Xiuquan, professor at the School of Computer Science of Beijing University of Posts and Telecommunications. The key technology of spatial computing lies in the integration of virtual reality, augmented reality and mixed reality, aiming to realize the interaction between the virtual and the physical worlds at the digital level, said Qiao.

Using spatial computing technology, the production team behind Black Myth: Wukong created realistic objects, buildings and landscape graphics by scanning real temples, Buddha statues, forests, rocks, etc. to provide an immersive game experience for its players. Combined with precise motion capture technology, the game's characters' movements are smoother and more natural, and their appearance is more vivid, greatly enhancing the player's sense of immersion.

In addition, spatial computing technology can also be applied in many other fields. For example, in culture and tourism, it can bring cultural relics to life, realizing the virtual reality interaction. In the geographic information system, it is used to analyze geographic data such as topography, land use, and transportation networks, to provide decision support for urban planning. Spatial computing also has great potential in intelligent transportation. For example, self-driving cars use it to identify the location of roads and traffic lights, in the process of autonomous navigation.

Qiao said that spatial computing realizes the seamless integration of the physical and virtual worlds. By accurately scanning and replicating the physical world, the technology can create digital twins in digital space, realizing real-time perception of the physical world and feedback control, and can predict the trend of things.

Expats Activity

Ex-UNESCO Chief Visits Sci-tech Headquarters

By Staff Reporters

Irina Bokova, former director-general of UNESCO, paid a visit to the International Science and Technology Organizations headquarters in Beijing on September 12.

She toured the offices of various international science and technology organizations, gaining an insight into their operations, international exchanges, and personnel activities. Over 10 international science and technology organizations, including the International Panel of Mesoscience and the International Society for Digital Earth, held talks with her.

Bokova noted that the organizations in the hub cover multiple emerging fields and industries, reflecting the latest developments in science and technology innovation.

She applauded the efforts to foster openness, trust, and collaboration within the global scientific community.

The Beijing International Science and Technology Organizations headquarters was inaugurated in May 2023. It houses 12 institutions, including international science and technology organizations, foreign non-governmental organizations' Beijing offices, and international scientific project offices.

Irina Bokova talks with Chinese scientists. (COURTESY PHOTO)

Time Travels Through Sci-tech

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At the site of the ruins of the ancient city Liangzhu in Zhejiang province, east China, a laboratory has been built to analyze this prehistoric civilization that knew how to cultivate rice and manufacture jade items. Archaeologists have combined remote sensing, geographic information system technology and hydrology to analyze the ancient water reservoirs and dams at the site, revolutionizing the study of ancient hydraulic systems in the Yangtze River region.

China has also pioneered underwater archaeology, discovering shipwrecks from the Song and Ming dynasties in the South China Sea. The use of a remotely operated vehicle at a depth of 6,000 meters in recent days marks a milestone in underwater exploration.

Cui Jianfeng, a professor at Peking University, said with the help of sci-tech, the early exchanges between Chinese and foreign cultures are also coming to light. China has conducted extensive underwater and land-based archaeological work along the ancient Silk Road, he told *Science and Technology Daily (S&T Daily)*. These efforts have unearthed evidence of a vibrant trade along the ancient Silk Road and cultural exchanges between different civilizations.

Bringing history within reach

Cui's team has built a "DNA" database for ceramics through elemental analysis, determining the origin of ceramic artifacts. This system, developed in collaboration with a big data company, can now identify a ceramic item's origin in one minute. The system can be used to authenticate ceramic antiques.

In recent years, historical artifacts have become cultural ambassadors between nations. Sci-tech advancements have made history more accessible than ever.

In 2021, the excavation of a sacrificial pit at Sanxingdui was live streamed, receiving over 7 billion views on Chinese social media site Weibo.

Museums and exhibitions are now using advanced technologies, including 3D displays and virtual reality, to make visitors more engaged. For instance, the exhibition on the Terracotta Warriors provides a 500-billion-pixel panoramic view of Pit No.1, providing a detailed look at each warrior. "Can you imagine? I've visited the Terracotta Warriors 13 times already," Croatian artist Vitomira Loncar told *S&T Daily*.

Joint cultural heritage preservation

China's tech-empowered archaeological findings have been significant, contributing to the development of global archaeology. For instance, in 2022, a roughly one-million-year-old Homo erectus skull fossil was discovered in Shiyan, Hubei province, making it possible to study the evolution of the species in East Asia. Also, the discovery of the 30,000- to 40,000-year-old Nwya Devu site in Xizang autonomous region enhanced global understanding of early human adaptation to extreme environments.

A notable example of China's international archaeological collaboration occurred in the Copán site in Honduras, where one of the ruins of the Maya civilization is located. Chinese and Honduran archaeologists jointly excavated Site 8N-11, which was China's first archaeological project in Central America.

China has collaborated with research institutes from Germany, Belgium, the UK and France to address challenges in preserving the mausoleum of Emperor Qin Shi Huang and optimizing ceramic restoration techniques.

As an archaeologist said, "We come from different civilizations and use different methods, but we share a common goal: to preserve humanity's cultural heritage."