Hi-tech Asian Games

Green, High-tech Games: A Platform for Unity

19th Asian Games
Hangzhou 2022

By Staff Reporters

On September 23, the day of Autumn Equinox, one of the traditional Chinese solar terms, the 19th Asian Games opened in Hangzhou, east China's Zhejiang province, staging a Chinese-style romance combining ancient culture with high-tech advancements.

Green and futuristic

Besides celebrating the gathering of athletes from the continent, the Games also demonstrated China's commitment to sustainability with advanced technology.

"It is a truly unique opening ceremony, featuring a breathtaking futuristic light show as its centerpiece," Indian national daily *The Times of India* reported, adding that the futuristic spectacle integrated artificial intelligence and eco-friendly technology, setting the stage for an unforgettable Asian Games experience.

Japanese newspaper *Yomiuri Shimbun* reported the significant role of digital technology. One highlight was replacing traditional fireworks with a digital version that used the latest imaging technology.

Associated Press and Reuters also reported the absence of "real fireworks" and instead, the use of electronic flashes, 3D animations and a virtual torchbearer, underscoring the "green games" character of the Hangzhou Games. This shift towards eco-friendly technology is a step forward in world sports events.

History meets hi-tech

The Hindu, another Indian daily, commented on the ceremony showcasing the past while anticipating the future in the present. It called the inaugural ceremony a symbol of "the pride of the past and the might of the future
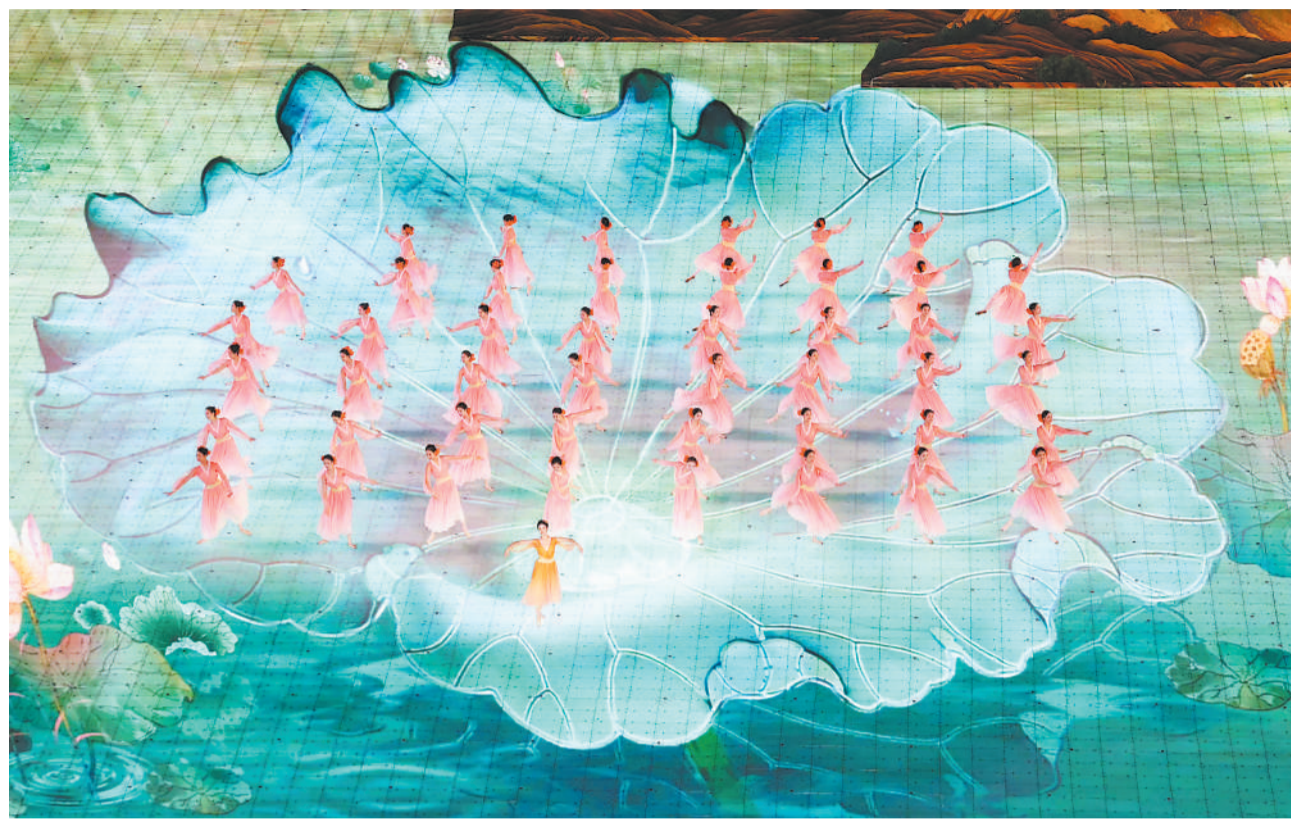
The 19th Asian Games opens in Hangzhou, east China's Zhejiang province, on September 23. (PHOTO: XINHUA)

converging in the present in a spectacle grand enough to put any doubts on China's ability to put on a show to rest" and showing China's ability to host a spectacular event even in the post-COVID era. The theme of environmental sustainability was evident throughout, it added, with nature's beauty, greenery, and harvests featured prominently.

"The Asian Games demonstrate the inheritance and development of China's excellent traditional culture," Mohammad Saiyedul Islam, a Bangladeshi doctoral fellow from the Jiangxi University of Finance and Economics, told *Science and Technology Daily (S&T Daily)*.

Commenting on the display of the elegance of Chinese culture and the

seamless blending of ancient and modern elements through advanced augmented reality technology, Islam called the opening ceremony "a harmonious union of technology and art, as well as between humans and nature." To him, the Games symbolize "connection, communication and integration."

Unity in diversity

Pakistani daily *Pakistan Today* called the Hangzhou Asian Games a powerful symbol of unity. "With the interplay of Chinese and Asian styles, [the opening ceremony of the Asian Games] conveys to the audience a vision of building a community with a shared future," it wrote.

Italian Dr. Alessio Fortunato, a visiting professor of the Northwest A&F

University in China, spoke to *S&T Daily* about the significance of people from diverse backgrounds coming together to celebrate, saying it signaled hope for a better future.

American writer Laurence Brahm emphasized how sports and culture can bridge divides, particularly in today's world marked by risks like de-globalization and de-coupling. According to Brahm, the Hangzhou Asian Games is not only promoting cultural exchange but also showcasing innovative technology, fostering a sense of collective progress. "So, in moments like this, we can all come together in the spirit of competition and the spirit of self-improvement, which is what sports is all about," he told *S&T Daily*.

Futuristic Technologies Shine Games' Opening Ceremony

Edited by ZONG Shihan

The opening ceremony of the Hangzhou Asian Games showcased an impressive array of cutting-edge technologies. From digital torchbearers to zero-carbon methanol fuel, and from digital fireworks to massive display screens, these hi-tech applications have made the Games a futuristic vision.

Here are some of the high-tech factors behind this event.

First digital ignition ceremony

At the opening ceremony, millions of digital torchbearers coalesced into a single one, creating the first digital flame ignition ceremony in the history of the Asian Games.

To ensure as many people as possible could participate in the online torch relay, a large-scale computer lab was established to test hundreds of smartphones in different models and from different generations.

Galacean, China-developed 3D interactive engine for the web and mobile devices, was used to ensure that the platform for digital torchbearers could accommodate a billion users and support 97 percent of smartphone devices.

In addition, AI technology was used to capture thousands of movements and made hundreds of thousands of design drawings, resulting in the creation of more than two trillion different images for digital torchbearers. This facilitated global participants who wanted to customize their digital torchbearers.

At the opening ceremony, the final digital torchbearer and the flesh-and-blood torchbearer lit the flame together, achieving resonance between the digital and the real world.

Green fuel for the real torch

The use of methanol fuel, which has zero carbon emission, to light up the torch emphasized China's commitment to a green Asian Games.

Though methanol has a history of more than a century as a clean renewable energy source, it had never been used as the main fuel for a large event before.

In the past, the main fuel for such events was mostly natural gas or hydrogen. While natural gas produces some emissions and requires pipelines logistics for transportation, hydrogen, though with zero emission, is risky to store and transportation.

The zero-carbon methanol is synthesized using hydrogen from coke oven gas and carbon dioxide captured from industrial exhaust. To produce one ton of this fuel, about 1.37 tons of carbon dioxide is used up, leading to an atmospheric clean-up.

Methanol also has zero emission combustion and is safe to store and transport, making it ideal as a torch fuel, especially due to the bright and stable flame it produces.

Digital fireworks mean no pollution

The opening ceremony used digital fireworks instead of real ones, conveying the concept of environmental protection to the world.

Computer graphics technology was used to create 3D models of fireworks, which included not only their shape and color but also their texture and explosion effect.

To make the digital fireworks more realistic visually, real-time technology was used during the production progress, such as Unity and Unreal Engine.

In addition, digital fireworks used augmented reality technology to synthesize with live video images so that they looked more realistic.

Unlike actual fireworks, the digital ones do not cause any damage to the environment, and are low cost, diverse in forms, as well as far safer.

Screens for advanced performance

The opening ceremony created a digitally advanced performance with two key hardware devices: a mesh screen and a ground screen.

The mesh screen, a massive screen 185-m long and 20-m high hanging in the air, was the equivalent of nine IMAX screens. While playing videos, it provided 3D presentations with the huge ground screen, improving the visual effect.

Nearly 24,000 screens constituted the 6,000 square-m ground screen, which was the world's most advanced 3-mm pixel ground screen. The spectacles produced by the two screens together included the scenery of the Qiantang river that passes through Hangzhou.

PHOTO ①②④: ZHOU Weihai/S&T Daily;
PHOTO ③: VCG

Scientific Literacy Helps Determine Our Future

Edited by QI Liming

Making science more popular and improving the scientific literacy of the public in a joint global effort-that's the core spirit of the World Conference on Science Literacy.

Initiated by the China Association for Science and Technology (CAST) in 2018, the World Conference on Science Literacy has been held four times, cumulatively attracting more than 3,000 individuals working in the field of scientific literacy in China and across the world.

This year, at the 2023 World Conference on Science Literacy, foreign participants from 13 international organizations and sci-tech institutions across 29 countries came together to share their experience.

Lidia Arthur Brito, United Nations Educational, Scientific, and Cultural Organization (UNESCO) assistant director general for natural sciences, welcomed delegates to the conference via video that saying science literacy is key for the empowerment of citizens and fostering informed resilient societies.

In addition, the scope of scientific literacy within a nation profoundly influences public awareness of science's crucial role in sustainable development.

"It [scientific literacy] shapes societal attitudes toward scientific progress, policies, and investments. Furthermore, it guides the younger generation towards careers in scientific research. The depth of scientific literacy does become a fundamental determinant in shaping a nation's scientific trajectory. Here we acknowledge China's remarkable commitment to elevating its popular scientific literacy and promoting scientific research," said Brito.

Scientific literacy is a kind of literacy that everyone should enjoy.

José Vieira, president of the World Federation of Engineering Organizations (WFEO) believes that, "As engineers, we all know how much our discipline is critical to building more resilient societies, industries, and to successfully fight climate change and adapt to its consequences. We are well aware of the implications of innovative technologies, and how important it is to reflect on its best uses and the ethics of our practices."

This is an ambitious goal, and we should strive to make this dream available to global citizens, he added.

In a fast-moving world, science and technology are shaping our lives in unprecedented ways. They have become powerful driving forces for progress, innovation, and prosperity.

Amakobe Sande, United Nations International Children's Emergency Fund (UNICEF) representative to China, also expressed her feelings about China at the conference, "It has truly been exciting to witness how scientific and technological interventions and innovations have helped to alleviate poverty and transform lives in China, allowing great progress towards meeting the sustainable development goals. China has also introduced a national strategy to integrate education, science and talent, creating opportunities for success."

Science is a beacon of human development, providing the tools to unlock the mysteries of the universe, confront many global challenges, and shape the world we aspire to live in.

According to Smriti Aryal, head of UN Women China, science literacy plays a pivotal role as it equips individuals with the knowledge and skills needed to navigate the complexities of modern life.

"Yet progress towards modernization is attainable only when it is inclusive and equitable. So, today from [the] UN Women's perspective, to fully unleash the global talent to strive towards development goals by using science and innovation, and empowering women and girls in the scientific field and literacy is necessary. It's a worldwide investment for our shared future," said Aryal.

Meanwhile, Peter Gluckman, president of the International Science Council (ISC), told the conference that CAST is a critical member of the ISC, and ISC have many interactions with CAST to work together to use science to achieve a better outcome for all of humanity.

Issues such as promoting the construction of global public scientific literacy organizations, strengthening the global capacity for science popularization, promoting the assessment of global public scientific literacy, advancing mutual learning among civilizations, and joining hands to seek modernization, were also discussed in depth during the conference.

Clarivate Unveils Citation Laureates 2023

Clarivate named 23 world-class researchers from institutions in five countries as Citation Laureates on September 19, 2023, in London, U.K. These are researchers whose work is deemed to be of Nobel class, as demonstrated by analysis carried out by the Institute for Scientific Information (ISI) at Clarivate.

This year's Citation Laureates have made significant contributions across a diverse range of fields, including cancer treatment, human microbiomes, synthetic gene circuits, spintronics, designer molecular structures, sleep/wake cycles, wealth inequality and urban economics.

Sixteen of the honorees are based at leading academic institutions in the United States, two each are based in Japan, the United Kingdom and France, and one is based in Germany.

Since 2002, analysts at the Institute for Scientific Information have drawn on publication and citation data from its index of trusted journals to identify potential Nobel Prize winners in the areas of Physiology or Medicine, Physics, Chemistry and Economics.

Experts at the ISI have identified 71 Citation Laureates prior to their Nobel Prize success – often years before they were recognized in Stockholm since then.

— the Institute for Scientific Information (ISI) at Clarivate