

# Remaining Open to New Possibilities

## Dialogue

By LONG Yun & BI Weizi

Recently, Italian professor Antonio Capone delivered a lecture titled "From the Moon to the Internet: A Journey Through History and Innovation" at Xi'an Jiaotong University (XJTU), which received widespread applause from the students. "I aimed to draw a parallel with how we must embrace the spirit of innovation across various fields today, and remain open to the unexpected transformations that research can bring," he told *Science and Technology Daily*, when explaining the inspiration behind his presentation.

As a full professor at Politecnico di Milano, where he serves as dean of the School of Industrial and Information Engineering and director of the Advanced Network Technologies Laboratory (ANT-Lab), Capone has spent decades researching networking and communication technologies and promoting the spirit of innovation.

### Building smarter networks

Capone's research centers on making communication networks more efficient, adaptable and sustainable. His team is currently advancing mobile radio networks to function at high frequencies, which promises to unlock the potential of larger bandwidths. This work aims to deliver faster data speeds while reducing energy consumption and operational costs. "The transformations in network infrastructure today may be invisible to most users," he said, "but they are fundamentally reshaping how we connect, paving the way for future applications that will revolutionize user experiences."

Capone also highlighted key breakthroughs in the field, including advancements in fiber optics for faster data transmission, quantum communication



Professor Antonio Capone. (COURTESY PHOTO)

technologies to enhance cybersecurity, and the development of new materials for processing terahertz signals. In urban areas, innovations such as smart propagation environments are improving coverage and connectivity, even in densely populated settings. While optimistic about the future, Capone acknowledged the challenges of balancing rapid technological progress with sustainability goals.

### International collaboration

Capone's first encounter with China was in 2011, when he joined an international collaboration aimed at developing energy-efficient communication technologies. Since then, his ties with Chinese institutions have significantly deepened in academia and industry. "Science and technology should be independent of conflict and geopolitical tensions," he stressed, adding that global collaboration benefits humanity and fosters shared progress.

As dean at Politecnico di Milano, Capone facilitates agreements with Chinese universities, enabling students to earn dual degrees and participate in exchange

programs. These initiatives have equipped students with global perspectives and practical experiences. He described these collaborations as enriching for both sides, fostering cultural and academic exchange.

Reflecting on his teaching experience at XJTU, Capone expressed admiration for China's rapid digital transformation. "China has shown what is possible when technology reaches almost the entire population in such a short time," he said.

"China is undoubtedly a global leader in communications and networking technologies," he said, noting the competitiveness of Chinese companies and their significant contributions to global research. According to Capone, Chinese researchers are consistently present at top international conferences and in journals, delivering groundbreaking work that pushes the boundaries of the discipline. Capone has forged industry partnerships with Chinese institutions, which have led to innovative patents and advancements in networking technologies.

### A call to adapt and innovate

As an educator, Capone is passionate about preparing students for the rapidly evolving tech industry. He believes that universities should go beyond teaching technical skills, focusing instead on cultivating creativity, curiosity and a lifelong passion for learning. He advocates for innovation in teaching methods, suggesting that educators should inspire students by demonstrating how a love for technology drives discovery and innovation.

Capone also emphasized the importance of multidisciplinary education in fostering creativity and problem-solving. According to him, while some students should specialize in technical fields, others should be trained to bridge disciplines and work collaboratively in teams. "Society needs a balance of specialists and creative thinkers who can connect different fields," he said, adding that, "This approach is critical for addressing the complexities of the modern workforce."

For young researchers and engineers, he encourages them to view networking and communication technologies, not just as a technical domain but also as a transformative field with the power to shape society. He urges young professionals to remain adaptable, embrace interdisciplinary approaches, and stay mindful of the social impact of their work.

"Networking technologies are at the core of modern life, powering everything from global connectivity to smart cities and autonomous vehicles," he said, adding that, "solutions you create in this field have the potential to address global challenges, reduce inequalities, and improve lives. Approach your career with purpose, knowing that your work can help build a better, more connected world."

LEI Yanjun and HAO Liu from XJTU also contributed to this article.

## Letter to the Editor

# A Life Devoted to Science Communication

By Karl Kruszelnicki

The universe is random, but science is like a solid rock underneath everything, anchoring us amidst the randomness. It provides a foundation that allows us to build upon our knowledge reliably. As far as the popularization of science goes, it builds bridges between complex concepts and public understanding.

Before becoming a science communicator, I spent 28 years being educated. I hold degrees in mathematics and physics, biomedical engineering, medicine and surgery, and to round out my thinking, I also studied electronic and electrical engineering, astrophysics, computing and psychology. After leaving school, I worked as a doctor, physicist, touring band manager, film producer, TV weather presenter and car mechanic. Eventually, I poured all these experiences into my work as a science communicator.

Since the 1980s, I've been hosting science programs on television and radio, writing popular science articles for newspapers and magazines, giving talks, and recording science podcasts, and have authored 48 popular science books. I found that people have a strong thirst for scientific knowledge. For instance, radio listeners ask many recurring questions: Why is the sky blue? Why does it rain? Why do black holes have varying masses but singularities with zero volume?

Nowadays, misinformation poses a significant problem. In a video about offshore wind turbines, the speaker claimed that these turbines cannot operate because humans haven't solved the technical issue of laying underwater cables. However, this problem was already

resolved in the 19th century, and today there are 1.5 million kilometers of submarine cables worldwide.

An article from last year discussed inaccurate nutrition trends on TikTok and mentioned that researchers examined the habits of 2,000 young individuals in Western countries. The study found that 87 percent of these young people were more likely to take health advice not from trained professionals or trusted magazines but from social media platforms. Approximately two-thirds actually acted on this advice.

While it's good to follow medical advice, concern arises when one considers that according to research, only a small percentage of the medical and nutritional information on TikTok is accurate.

This reminds me of my time at the Sydney Children's Hospital (in Sydney, Australia). A false report on television about adverse reactions to the whooping cough vaccine led to a drop in vaccination rates and an increase in infant deaths. I couldn't stand by any longer, so I've started doing science communication on short video platforms too.

We have a saying in Australia: you catch more mice with food rather than words. In terms of science popularization, you initially attract people with engaging content, and then you can bring them in. So I hope to attract them in this way, and then they will accidentally get a little bit more involved.

The author is a research fellow at the JSM Centre, University of Sydney. In 2019, the United Nations awarded him the UNESCO Kalinga Prize for the Popularisation of Science. This article is based on his speech at the 2024 World Conference on Science Literacy.

## Traditional Eastern Wisdom

# Ageless Beauty of Chinese Architectural Motifs

By BI Weizi

Traditional Chinese color architectural motifs on buildings make an important contribution to the world's architectural art history. They not only demonstrate China's unique art aesthetics, but also reflect the culture and ideological concept of the Chinese people.

The color architectural motifs were first used to protect the wooden frame from water and insects, and then serve the purpose of decoration and hierarchy for ancient Chinese architecture. Paint was originally applied to wooden structures to protect the wood from moisture, rot and moths, thus prolonging the life of the building. Later, the focus shifted to decoration, and as late as the Song Dynasty (960-1279), colored motifs became an integral part of palace construction. The usually luxurious and elegant motifs followed strict rules regarding the degree of decoration and the amount of gold used, according to the status and function of the building. This combination of aesthetics and functionality reflects traditional Chinese philosophy and ethics.

Official designers in the Qing Dynasty (1644-1911) developed a range of color painting techniques used in official buildings that varied in style and subject matter: Hexi was characterized by splendor and bright colors; Xuanzi was known for large and vibrant paintings; and elegant Sushi paintings mimicked a style popular in eastern China.

The process of these color motifs began with templates. Symmetrical design

is an integral part of Chinese architecture, so the first step is to draw the center line of the painting and fix the pre-designed pattern on the painting position. The second step is to shoot the score sheet, which is fixed on the pre-designed paper on the building, and then the powder bag is tapped along the pattern lines to present the template on the building. Last, glue, oil and powder are blended to form a paste, which is used on the lines to form a relief effect on the color painting to further reflect the three-dimensional nature of the color painting.

As a typical representative of Chinese traditional culture, architectural decorative motifs have a profound significance in the history of Chinese architecture. Nowadays, they tend to be more diverse and personalized, and their cultural connotation has been integrated into various fields.



Traditional Chinese color architectural decorative motifs on the ceiling of the Palace Museum. (PHOTO: VCG)

# SKA: World's Super Telescope

## Science Outreach

By Staff Reporters

The Square Kilometre Array (SKA) is currently the most important large-scale telescope project in the international radio astronomy community, and refers to a giant radio telescope array with a signal-collecting capacity equivalent to a total collecting area of approximately one square kilometer.

The SKA program team began the construction in 2016 at two sites, one in South Africa and the other in Australia. Two-thirds of the project's antennas will be built in South Africa and the rest of Africa, while the remaining third will be built in Australia and New

Zealand. Twenty countries, including China, Australia, the United Kingdom and South Africa, are participating in this international collaboration.

The SKA uses three types of antenna arrays, namely high-frequency dish arrays, mid-frequency aperture arrays and low-frequency aperture arrays, with receiving capabilities covering the continuous frequency band from 70 MHz to 10 GHz (upgradeable to 25 GHz). To provide a signal collection area of one million square meters and to meet the requirements for high sensitivity and high resolution images, the SKA consists of more than three thousand dish antennas, each with an aperture of 15 meters.

In the center of the array, the antennas are densely distributed, with half of the antennas located within a five-kilometer radius of the center. The rest of the antennas are distributed in

the form of five rotating arms extending in all directions, and at the edges, far from the center, the antennas are widely spaced. According to the design, the antenna arms must extend 3,000 km from the center to the edge.

With a receiving area of one square kilometer and the above-mentioned frequency range, it is 50 times more sensitive and 10,000 times faster than the largest centimeter-wave integrated aperture telescope currently in operation, the Jansky Very Large Array.

The SKA is dedicated to answering funda-



The first prototype dish for the Square Kilometre Array radio telescope. (PHOTO: XINHUA)

mental questions about our understanding of the universe, in particular those related to the formation of the first generation of celestial bodies, the evolution of galaxies, the universe's magnetic field, the nature of gravity, extraterrestrial life and civilizations, dark matter and dark energy, and others.

# Cash-pooling Service for Multinationals Optimized

By ZHONG Jianli

The People's Bank of China (PBC) and the State Administration of Foreign Exchange (SAFE) announced enhancements to a pilot cash-pooling service on December 18, integrating domestic and foreign currency management for multinational corporations (MNCs) in China.

The pilot cash-pooling service was initially launched in March 2021 in Beijing and Shenzhen, targeting large MNCs. A second batch of pilots was introduced in 2022, accompanied by poli-

cy optimizations.

According to data from SAFE, 54 MNCs to date have participated in the pilot program. They have utilized the policies to conduct cross-border fund transfers totaling approximately 466.94 billion USD, benefiting 3,188 domestic and overseas member companies.

Drawing upon the previous experience, PBC and SAFE have launched further optimizations to these policies in 10 cities and provinces, including Shanghai, Beijing, Jiangsu, Zhejiang, Guangdong, Hainan, Shaanxi, Ningbo, Qingdao, and

Shenzhen.

The latest policy highlights that domestic members of MNCs are allowed to engage in currency swap borrowing among themselves, for cross-border payments related to current accounts.

The filing process and review time for materials related to foreign payments and receipts have also been streamlined. This is expected to cut the processing time for related foreign exchange business by an average of between 50 to 75 percent.

In addition, MNCs will be permitted

to determine on their own the collection ratio of external debts and overseas loans based on macro-prudential principles.

The principal enterprise of MNCs is allowed to handle centralized collection and payment for overseas member companies through a domestic main fund account.

The series of policy optimization is expected to enhance the operational efficiency of cross-border fund management for MNCs, further facilitating their activities in global markets.