

Sci-tech Collaboration, A Ladder to Solutions

Dialogue

By LONG Yun & XU Keqi

"A good sci-tech collaboration can be a ladder to solutions for common challenges facing humanity," Finnish scientist Peter Lund said in a recent interview with *Science and Technology Daily*.

Lund, a Professor of Advanced Energy Systems and Engineering Physics, has long dedicated his time and effort to the research of green and renewable energy at Aalto University in Finland and holds an honorary professorship at Southeast University (SEU) in Nanjing, east China's Jiangsu province.

Childhood dream comes true
His success in the sci-tech field is not accidental, but rather a result of his upbringing in an intellectually stimulating environment that valued innovation and exploration. Born in 1957, the same year the then Soviet Union launched the earth's first artificial satellite, Sputnik I, Lund's early life was filled with the excitement of space exploration.

"This curiosity and drive to discover new things stem from my childhood and influenced my decision to become a scientist," said Lund.

In 1979, at the very beginning of clean energy development, the field was virtually unexplored, providing an exciting and open frontier for this young scientist. "When I started my PhD studies, I was the first person in Finland to work on solar energy. It was thrilling to be in a position where I had to discover everything from scratch," he said.

As his career flourished, Lund's research focused on developing clean energy solutions to replace fossil fuels,



Professor Peter Lund. (COURTESY PHOTO)

primarily with renewable energy. Solar energy has been a major theme in his research. However, as reliance on solar energy increases, it becomes crucial to address its variability, as it is heavily dependent on the weather. Lund emphasized that clean energy technologies are not just about the sources, but also about ensuring energy availability when needed. "Therefore, balancing the energy system to ensure a continuous energy supply is essential," he said.

He also attaches great importance to raising public awareness of the importance of clean and renewable energy. According to Lund, solving energy issues is one of the most central pressures in our society, especially considering the mitigation of climate change, environmental issues, and energy security.

Lund's research not only supports the global transition to sustainable energy, but also advances scientific understanding in energy systems and materials

science. "We are a crucial link in the chain of science that leads to solutions," he said.

Science is about cooperation
"Being a part of the solution" is an idea that runs through the interview. Lund firmly believes in the transformative power of international scientific cooperation in addressing global challenges.

"My research field still faces many challenges," he said, adding that, "Science is an open platform where we collaborate with peers in different countries. Each brings their contribution, and together, we find solutions."

As a scientist actively involved in global exchanges for about four decades, he has experienced the benefits of international cooperation firsthand. "Cooperation multiplies resources. It's a leverage to your own research. One plus one in international cooperation is much larger than two," he said.

When faced with common challeng-

es, cultural differences become secondary. "Putting the pieces together through collaboration brings the solution. This shared goal is a highly motivating factor," said Lund.

Learning from China
Reflecting on over two decades of collaboration with China, Lund noted that the country has made a significant leap forward in research, infrastructure, and education. "China has had a very long-term vision, which we see now, and it's been an amazing journey," he said.

According to Lund, his partnership with SEU exemplifies China's dedication to research excellence. The cooperation started with a joint symposium on clean technology organized over a decade ago, in which he got acquainted with Wang Jun from SEU. Since then, he has been amazed by the robust research ecosystem of the university, which he regards as one of his most successful international endeavors.

He lauded China's open innovation system, which efficiently translates research findings into practical applications, and its long-term approach to research funding, characterized by steady and incremental increases over time.

Lund is impressed by the synergy between R&D and industrial improvements in China, emphasizing the country's pivotal role in contributing to sustainable development. "Today, if I recall some numbers, China invests more in R&D as a percentage of its GDP than the entire European Union, which used to be a very large innovation center."

According to Lund, "China's progress in clean and renewable energy has been just amazing. A notable milestone was around the 2008 Olympic Games, which highlighted China's efforts and achievements in renewable energy deployment and development."

My China Story

Bridging Cultures from Spain to China

By LONG Yun & GONG Qian

In 1976, Ignacio Ramos's father embarked on a cultural trip to China, returning to Spain with a suitcase full of souvenirs and a repertoire of endless stories. Two years later, Ignacio Ramos was born, and throughout his childhood tales of his father's journey to China and the many artifacts he had brought back left an indelible impression on a young mind longing to also explore new horizons.

A journey across continents
After completing his Ph.D. in Germany, Ramos spent some time in China. He also served as a university professor at a prestigious Spanish university, where he taught and researched humanities and international relations.

In 2022, Ramos decided to settle in China and accepted an offer from Jilin University (JLU). "As I grow in my relationship with China, I feel touched ever again when I encounter elements in Chinese history and culture that resound with what I have also experienced very far away," said Ramos, now an associate professor at JLU focusing on cross-cultural communication.

History of Sino-Western exchanges
Ramos has dedicated much of his research to uncovering the history of Sino-Western exchanges during the Ming and Qing dynasties.

He has uncovered the mutual trust, collaboration, and positive exchanges that characterized the relationship between ancient Spain and China in the 17th century.

In those exchanges, some historical figures stand out like Diego de Pantoja, a Spanish Jesuit who lived in China during the late Ming dynasty (1368AD-1644AD) playing an active role in promoting this harmonious interaction. Pantoja's efforts in cultural and scientific exchange highlight a period when Spain and China traded valuable knowledge and goods, building a cooperative relationship.

Moreover, Ramos highlights a growing awareness among Western people of China's vital role in global governance. "In other words, they realize that China is a reliable partner for a peaceful world, no matter what many doom-mongers have been repeatedly uttering through influential TV channels," said Ramos.



Professor Ignacio Ramos. (COURTESY PHOTO)

Preserving cultural heritage through ancient routes

Since his teenage years, Ramos has been captivated by the ancient Camino de Santiago pilgrimage route, a UNESCO World Heritage Site. Renowned for its stunning architecture, natural beauty, and international encounters, this trail sparked his enduring passion for cultural heritage routes and their profound significance.

Recognizing the growing interest in cultural tourism among Chinese citizens, he gradually found that the Camino de Santiago cultural route had become an opportunity for intercultural dialogue and research with Chinese people. This interest in cultural heritage routes in Spain seamlessly translated into his engagement with similar routes in China.

In late June, Ramos traveled to Huashan and Hengshan, two of the Five Great Mountains in China, which hold profound cultural and historical significance.

The Five Great Mountains have been revered in Chinese culture for centuries, symbolizing not only natural beauty but also spiritual and cultural heritage. According to Ramos these mountains, or cultural heritages, serve as a connected web of geocultural references, reflecting the essence of Chinese civilization.

"The importance of these routes in preserving cultural heritage is evident. Walking these paths connects people with the wisdom and history carved into them, fostering a mature identity, a boundless spirit, and a respectful approach to history and the present," he said.

Agricultural Wisdom in 24 Solar Terms

Traditional Eastern Wisdom

By ZONG Shihan

Ancient China developed a comprehensive agricultural calendar known as the 24 solar terms based on the changes

in nature. The calendar reflected the changes in the four seasons, temperature, and rainfall, providing crucial guidance for agriculture.

Over 2,000 years ago, Liu An of the Western Han Dynasty recorded the 24 solar terms comprehensively in his book the *Huainanzi*. In 2016, the 24 solar terms were included in UNESCO's

Representative List of the Intangible Cultural Heritage of Humanity. They are also hailed as "the fifth great invention of China" in the international meteorological circles.

The 24 solar terms are time periods determined according to the changed positions of the sun on its path or ecliptic. When the sun shines vertically on the equator, it is the vernal equinox. Starting from the vernal equinox, every 15 degrees of solar movement gives rise to a new solar term. When the sun returns to the vernal equinox, it completes a tropical year, which is 360 degrees, which is divided into 24 solar terms.

The 24 solar terms integrate astronomy, geography, and farming activities, achieving a harmonious unity between heaven and earth, human beings and nature. Spring plowing, summer weeding, autumn harvesting, and winter storage — these four major agricultural activities are refined under their frame-

work, making the agricultural rhythm more precise.

During the vernal equinox, wheat seedlings sprout, and farmers are busy weeding and fertilizing the land. Spring rain nourishes the seedlings and awakens the insects. Then comes the grain in ear period when the crops mature and farmers are immersed in harvesting crops as well as planting the next season's crops. Soon the summer heat gradually recedes, and the land is covered with golden rice paddy, signaling the season of harvest.

Over long-term agricultural practices, farmers correlated weather and phenology in the 24 solar terms with agricultural activities, compiling catchy proverbs so that they could be easily remembered, disseminated and implemented. Though modern agriculture today has made adjustments to farming activities with technological support, the agricultural wisdom embodied in the 24 solar terms still continues to be respected.



During the slight heat, farmers rush to harvest early rice. (PHOTO: VCG)

Science Outreach

By SHI Shi & ZONG Shihan

What should sailors do if they get seasick? According to Zhang Ming, a deputy researcher of the General Administration of Sport of China, an ancient Chinese martial art is the answer.

"Generally speaking, a person with a strong balance ability has a strong resistance to seasickness. In light of this studies have shown that Tai Chi can improve the balance ability," he said.

Balance is related to multiple mechanisms such as vision, muscular

Tai Chi Can Prevent Seasickness

strength, and the vestibular nervous system. Among them, the vestibular nervous system is one of the important systems that maintain human body balance. When people are on a boat, due to various factors such as the rocking, bumping, rotation, and acceleration of the hull, the position of the human body will also change frequently. Once these changes exceed the adaptability of the human body's balance organs or exceed the tolerance limit of the vestibular system, it will lead to temporary dysfunction of the vestibular nerve function, inducing seasickness

symptoms such as nausea, vomiting, and dizziness.

So, why does Tai Chi help improve balance ability? Zhang said that it is because Tai Chi has many movements such as weight transfer, body rotation, and standing on one leg. Repeated practice can effectively exercise the leg muscles and enhance balance ability. It requires continuous attention to body posture and limb movements, which helps stimulate the vestibular nervous system to improve balance ability and coordination ability.

Take the 10th move "Cloud

Hands" in the 24 forms of Tai Chi as an example. In the process of the movement, the two hands alternately form a circle up and down, taking the waist as the axis of rotation, and the hands move around a circle or arc. Zhang Ming said that this spiral movement of the trunk can increase the stimulation of motor neurons, which is conducive to improving the balance function of the brain. In addition, the lower limb movements of "Cloud Hands" include seven support methods, which can increase the strength and endurance of the lower limb muscles.

UN Adopts China's Resolution on AI Cooperation

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Fu Cong, China's permanent representative to the United Nations, said China looks forward to the adoption of the resolution as an opportunity to work with member states for its active follow-up and implementation by prioritizing development and following a people-centered approach based on equality, mutu-

al benefit, integrity and innovation.

The resolution reflects the extensive consensus among countries on enhancing AI capacity-building and speaks volumes about the political will of countries on enhancing capacity-building and bridging the AI divide through solidarity and cooperation, the Chinese Foreign Ministry said.

Technology Rescues Ailing Cultural Relics

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"Now, the protection of soil sites in China has gradually transitioned from rescue protection to preventive protection," said Zhou.

The team continuously monitors environmental factors, studies sand erosion patterns, restores structural and surface damage, and uses "space-earth" integrated monitoring and 3D panoramic data to create a simulation model, all incorporated into the digital Loulan system.

Stabilizing Kuiguang Tower

China's long list of cultural relics boasts over 3,000 ancient towers, with brick structures being the most common. One striking example is Kuiguang

Tower in Dujiangyan, Sichuan province. This national first-class cultural relic stands 52.67 meters tall, features 17 floors and weighs 3,460 tons.

Over 100 years, the tower has begun to tilt significantly. "The tower body reached a tilt rate of 26 per mille, which greatly exceeded the four per mille allowed by national norms," said Wang.

In 1999, experts proposed a method to correct the tilt by deepening and expanding the foundation, then lifting the tower. The restored Kuiguang Tower withstood the devastating 2008 Wenchuan earthquake, showcasing the successful integration of traditional craftsmanship and modern technology.