

# 'What Matters Is We Can Cooperate'

## Dialogue

By LONG Yun & ZHONG Jianli

In 2023, the "World's Top 2% Scientists" list published by Stanford University recognized 21 scholars from the University of Nottingham Ningbo China (UNNC) in the single-year database and eight in the career-long database. Among these distinguished scholars is an Italian scientist, Enrico Marsili, currently Associate Professor in Green Chemicals and Energy at the China Becons Institute of UNNC, who is included on both lists.

Known for his kindness and passion for research, Marsili is a popular figure in his school and the academic community.

**To be a scientist**  
From a young age, Enrico Marsili was captivated by the world of science. "I became interested in science when I was in high school. I wanted to contribute to the progress of humanity," he recalled. As fate would have it, Marsili found his career path in engineering at a very young age.

"The thing I like about science, and being a scientist, is that we work and live at the edge of knowledge. We have the privilege of generating new information every day, something that you cannot find yet in books or papers," said Marsili.

At the same time, his aspiration extends beyond discovery and he dreams of seeing on the market products that he designs, thus benefiting a large number of people through his research.

**Tangible benefits**  
Today, Marsili's research mainly focuses on biofilms and biofilm electrochemistry. He describes biofilms as microstructured communities of microorganisms that function like a city, cooperating and building their environment using biomaterials they produce.

These biofilms are crucial for environmental processes like digestion, water treatment and purification, and nutrient cycling, but can be harmful when they cause antibiotic-resistant infections in patients. "Sixty to 80



Professor Enrico Marsili. (PHOTO: SCIENCE AND TECHNOLOGY DAILY)

percent of infections are caused by biofilms, and among them, some can end people's lives," said Marsili, highlighting the importance of his work in both environmental and biomedical fields.

Biofilm electrochemistry, one of his research focuses, involves using electrochemical signals to study microbial communities. Marsili finds this intersection of electricity and biology particularly fascinating, as it opens up new ways to sense, characterize, and remove harmful biofilms, especially in medical settings. He is quite convinced of the potential of his work to bring about significant advancements in health and environmental sciences.

**Science has no borders**  
"Do we need to cooperate? Do we want to cooperate?" are questions that inform Marsili's outlook. "The answers are yes and yes," he said emphatically.

Firmly believing in the necessity of international cooperation in science, he said that global challenges, which include things like the transition to renewable and sustainable energy, understanding and mitigating climate change, and dealing with an aging population, require all the human beings available on the planet to be

involved.

While acknowledging the tensions and obstacles in international collaborations, he nevertheless emphasized the importance of overcoming them to fulfill the mission of improving the world through scientific methods and research.

"Science has no borders. As long as we speak a common language, whether it's mathematics, physics, English, or the language of images, what matters is that we are able to collaborate," said Marsili.

The ease of communication in today's digital world, compared to the past, facilitates these collaborations, allowing scientists to share data quickly and work together effectively.

**The beginning of his China story**  
Marsili's journey to UNNC began with a fascination for Asian culture, sparked during his time in Singapore. "Singapore was my first Asian country, but most people there speak Chinese and have a Chinese background. So, I became fascinated with Asian culture, particularly Chinese culture, and I just wanted to know more [about it]," he said.

This curiosity, coupled with the desire to live closer to his wife's family in

Thailand, led him to seek employment opportunities in China.

When the opportunity at UNNC arose in 2022, Marsili was quick to seize it. He was particularly drawn to the fact that his new environment focused on research, providing ample stimulus to solve problems and improve people's lives.

The international community at UNNC and the support from the administration have facilitated his collaborations with Chinese colleagues and students, making his work transition smooth and productive.

"Something is moving very well [at UNNC] in terms of people, which is the most important part of research, because we are [all] human. Getting together [with colleagues and students], I have had a fantastic time here," said Marsili.

**Witnessing China's progress**  
Marsili lauds China's efforts in promoting international cooperation, particularly through facilitating international travel and open exchange formats. "International cooperation means putting several scientists in the same room, giving them enough coffee, and waiting until they do something interesting" he quipped, underscoring the importance of creating environments where scientists can freely collaborate and innovate.

Reflecting on China's progress in science and technology, Marsili is particularly impressed by the country's advancements in electric vehicles, big data, and communication technologies. "China is undoubtedly the current global leader in electric vehicles and will be so for a long time, because it has established a vertical supply chain from the minerals used in batteries up to the manufacture of electric vehicles," he said.

Returning to the issue of research, Marsili said he is impressed with China's robust research environment, highlighting the ease of communication and the extensive investment in quality research and researchers.

China's supportive ecosystem, combined with its commitment to advancing science, makes it an ideal place for researchers like Marsili to thrive.

## My China Story

# China, Where Dreams Come True

By YIN Wei

"Ni hao! I am Kashan Khan from Pakistan. I am very honored today to share my story with you."

At the graduation ceremony of Tianjin University (TJU) on July 5, Kashan Khan stood on the podium and delivered his speech in fluent Mandarin, earning rounds of warm applause from the attending teachers and other students.

While doing his graduation, Khan published 26 high-level papers, 16 of which he authored on his own or co-authored as the first or corresponding author. The cumulative impact factor of these papers exceeds 90, making him the doctoral student with the most published papers ever in his research group. Furthermore, he was a reviewer for more than 10 science citation index journals. His research contributions have been highly praised by academic circles both in China and internationally.

When asked about the key to his success, Khan attributed it to three factors: passion, diligence, and encouragement and guidance from his mentors.

Working in civil engineering has been Khan's dream since childhood. "My father is an engineer. When I was young, I saw many construction machines at his workplace, which sparked my interest in this field," he said.

After obtaining his bachelor's degree in Pakistan, Khan wanted to study in a country with strong civil engineering expertise and infrastructure capabilities. "I discovered that among the world's 10 tallest buildings, China has the most," he explained, adding that it convinced him that studying in China would be the best choice.

Khan came to China in 2016. It was the beginning of an adventure filled with both challenges and rewards.

Khan's doctoral supervisor, Professor Chen Zhihua, calls him dedicated and a selfless student. "He has a



Kashan Khan. (COURTESY PHOTO)

tenacious spirit, and I believe he will shine in the international field of civil engineering," Prof. Chen said.

With the help of teachers from the School of International Education, Khan quickly overcame the language barrier, obtaining various Chinese proficiency test certificates. This care and support made him thrive in his studies at the TJU, achieving success both in language and research.

His feelings for the TJU and China grew deeper. After graduating and receiving over 30 job offers from countries like China, Canada and the UK, Khan chose to stay at the TJU for postdoctoral research.

He is full of confidence and expectations for the future. He hopes to achieve breakthroughs in research and apply his knowledge to practical engineering to advance construction technology.

"I am especially grateful to the Chinese government for giving me this opportunity to study in China," he said. "I hope to use better research achievements to give back to China and contribute to building a community with a shared future for mankind."

*This article was contributed by the TJU.*

# Bast Fibers Strengthen Forbidden City Walls

## Traditional Eastern Wisdom

By BI Weizi

Featuring toughness, hygroscopicity and natural antibacterial properties, bast fibers (including jute, flax, hemp and kenaf) made from the inner growth of dicotyledonous plant stems, have been used in China for construction purposes since ancient times.

The most famous example is the Forbidden City, home to 24 emperors from the Ming and Qing Dynasties. As the center of political power in China for over 500 years from 1420 to 1924, the Forbidden City was found to have bast fibers used in its construction of walls and roofs.

When plastering the walls of ancient buildings, the walls were first wet

with water. This was followed by nailing the bast fibers to the wall, which provided a rough surface on which the plaster layer could adhere, reducing the peeling and hollowing of the plaster layer in time.

The plaster used on the wall was mostly hemp mortar. Hemp ropes and sacks were soaked in water, chopped, and then dried in the sun. Once dried, they were beaten with wooden sticks until soft, and then mixed with mortar. Research shows the fibers became entangled and increased the contact area of mortar on wall. This greatly reduced the cracking problem caused by drying and shrinkage of the plaster brought on by the elements.

Bast fiber can also bear some tensile stress and delay the destruction of the granular layer and its scientific use in the Forbidden City reflects the outstanding architectural wisdom of the Chinese.



Taihe Dian, the largest hall of Forbidden City. (PHOTO: VCG)

# Challenges to 5G Network at Sea

## Science Outreach

By Staff Reporters

Although 5G networks operate smoothly on land, coverage at sea

remains a formidable challenge with 5G coverage on marine routes being discontinuous and the signal unstable.

However, this situation has changed on the Shandong-Liaoning sea route. China has achieved full broadband coverage over an area of 20,000 square meters. It is the country's first large-scale and continuous

5G network coverage at sea. Now, passengers on the route can enjoy a network experience identical to that on land.

According to information and communication expert Chen Zhigang, continuous 5G network coverage at sea requires precise propagation models to predict and optimize the transmission characteristics of network signals in complex marine environments. The construction of offshore base stations involves overcoming natural constraints and safety risks associated with sea operations, while also taking into consideration equipment durability against corrosion, water and moisture.

Furthermore, implementation of ultra-long-range coverage technologies, such as base station site selection plan-

ning, high-gain antenna deployment, and high-power base station utilization requires meticulous planning and optimization.

As China's marine industry accelerates its intelligent transformation, emerging sectors like marine aquaculture, smart marine equipment, and marine big data are flourishing, driving an increasing demand for maritime communication.

The marine coverage of 5G networks provides vessels with real-time critical information on weather, sea conditions, and navigation, enhancing navigation safety. It also assists fishermen in remote monitoring of fishing boats and intelligent management of fishing nets, thereby promoting information sharing and efficiency in the fishing industry, Chen said.

# A University's Blooming Success with Azalea

From page 1

Creating suitable growth regulators was another significant experiment, as even a small increase or decrease can significantly impact flowers. After several years of testing, the researchers created a new growth regulator formula. "One to two months before the bloom of flowers, we estimate the flowering period based on the maturity of the buds

and decide whether to speed up or delay the progress," senior experimenter Li Xiaohong said.

Additionally, the team used temperature adjustment measures and pruning to precisely regulate the flowering period. In October 2018, they finally found the optimal formula combining light, temperature, regulator concentration, and physiological and biochemical factors.

**Blooming red fortune**  
"With the formula, you can make azaleas bloom anytime and anywhere," Hu said.

The university has patented its technology both internationally and domestically.

"In 2022, the JGSU began to cooperate with our county," said Li Ping, head of the azalea planting professional coop-

erative in Shuicha, a town in Taihe county in Jiangxi.

Over the past two years, the technology has enabled villagers to breed 50,000 seedlings annually, supporting over 200 young people who returned from outside the town and tried their hand at starting businesses. This has generated an overall output value of more than 15 million RMB, benefiting over 2,000 people.