

'Scientific Knowledge Is Like Water, It Flows Everywhere'

Dialogue

By LONG Yun & BI Weizi

Professor Martin Banwell has spent more than four decades in organic chemistry. He has published over 500 papers, filed 14 patents, and delivered countless international conference addresses. He was elected a Fellow of the Australian Academy of Science in 2004 and received the Officer of the Order of Australia in 2018.

At the Australian National University, his research group was one of the largest and most productive in the chemistry school. His work received funding from Australian government agencies and major international pharmaceutical and chemical companies.

A bond that began at home
His connection with China runs deep. His father, a consulting geophysicist for the United Nations, was enthusiastic about Chinese culture and self-taught in Mandarin. This early exposure left an impression that would not fade.

So when an opportunity to visit Jinan University in Guangdong province in south China arose in April 2014, he took it. Over the following years, he returned regularly to China. Between 2016 and 2019, he held a visiting appointment as Zhujiang Scholar Chair Professor at the university. During this period, he contributed to several national-level research platforms, including a joint laboratory for traditional Chinese medicine modernization and innovative drug discovery.

In October 2018, Jinan University established the Institute for Advanced and Applied Chemistry Synthesis on its Zhuhai campus, appointing Banwell as its first dean. He moved to China full-



Professor Martin Banwell. (COURTESY PHOTO)

time the following year and was honored the Chinese Government Friendship Award in 2021.

With the institute in place, his next challenge was to build a research center that could operate at an internationally competitive level, while also training young researchers and translating basic research into practical applications.

Over the years, the institute has attracted prominent scholars from China and abroad, strengthening Jinan University's engineering and applied science programs. Banwell has pushed for international collaboration and maintained working relationships with academic peers, companies, and government agencies.

A dynamic research environment
Banwell describes China's academic environment as dynamic, competitive, and stimulating. He cites the country's broad support for scientific research and its sizable chemical industry as key factors in his decision to move there.

"I feel as though China is a major focal point of research in chemistry in

the world these days," he said. "The combination of all these possibilities makes life attractive here." He also acknowledged his colleagues at Jinan University for laying the groundwork for his research.

From his perspective, China is increasingly focused on using organic chemistry to address global warming and other environmental challenges. He emphasized the role of green chemistry in building a sustainable future. He also pointed out that Guangdong province, with its strong chemical industry, places greater emphasis on translating laboratory research into commercial products than the Australian system does.

"China has numerous successful examples and astounding accomplishments in research and innovation," he said.

Banwell regards failure as part of the research process. "We should always prepare to encounter failures and interpret or exploit them properly so that we eventually achieve our goals," he said. He believes that funding and perseverance are

the most important factors in turning university research into commercial applications. Since moving to China, he has continued to receive industry funding and some of his research outcomes have been commercialized.

Training the next generation
Throughout his career, Banwell has supervised over 80 doctoral students, including more than 20 Chinese students, and hosted more than 100 visiting scholars from China. Many now hold academic or industry positions across the country.

He regularly takes students and young researchers to international conferences such as the Maritime Silk Road Industry-University-Research Collaboration Conference and the Lingnan Organic Chemistry Forum. He encourages them to present their work and stay current with emerging trends.

"Academic research is international by nature," he said. "We build on the work of others to update our knowledge and decide where to go next."

Building bridges through science
Banwell said international scientific exchange retains its fundamental value. "Scientific knowledge is like water, it flows everywhere" and collaborative efforts are essential for advancing knowledge.

"We hope that outstanding experts in chemistry from other countries will visit China in the not-too-distant future and so enhance already fruitful academic exchanges," he said. "Their work on drug development and green chemistry complements ours extremely well."

He sees science as a way to build understanding between nations. "I think science is an excellent way of building bridges between China and Australia," he said. "I am hoping to play a role as a bridge between the two countries with the advantage of knowing both well."

deployed, functioning as boats in water and as vehicles on land. They can adapt to complex terrain and facilitate rapid evacuation of the injured and transport of supplies.

To connect water-surrounded people to higher ground, emergency mechanized bridges can quickly build 51-meter crossings with a 60-ton capacity.

Drones play a pivotal role in aerial capabilities, bridging the "last mile" of rescue operations. At the Xijiang Education Park, heavy-lift drones were used to deliver drinking water, food, and other supplies to the stranded teachers and students — a far more efficient method than traditional boats.

Pang said China's flood control and disaster relief capabilities are becoming increasingly high-tech, shifting from manned to unmanned, and from traditional to intelligent systems.

As netizens said, the appearance of the "rescue aircraft carrier" instills a profound sense of security.

the production schedule across all workshops and production stages in real time, dynamically adjust the production plan, and monitor the operation status of equipment online. This has solved the industry-wide challenges of segmented management, data silos, and delayed oversight.

In addition, the company has established a digital platform integrating core business systems like production plan, corporate resource plan and quality management, achieving data connection of the entire process, including R&D, planning, manufacturing, quality control and delivery, greatly enhancing cross-department coordinating efficiency.

According to Fan, business data and financial accounting are interconnected, which not only enables more precise business control and clearer cost accounting, but also provides early risk warning and continuous release of data value, providing solid support for scientific decision making.

My China Story

Building Resilience Across Borders

By YIN Wei, YU Boyang & LONG Yun

In the laboratory at Tianjin University (TJU)'s School of Architecture, Pakistani PhD student Asma Bibi is refining her "Climate- Mental Health- Community" tri- resilience model. She hopes to help communities in Pakistan rebuild after climate disasters through a science-based framework.

Asma has spent over a decade on grassroots climate action, community development, and mental health advocacy in Pakistan. Her mission was shaped by a pivotal experience: the devastating floods of 2010. "I witnessed entire communities lose their homes and struggle to recover from the trauma. That disaster made me realize that climate change is not only an environmental issue; it also causes long-term psychological and social suffering."

Determined to make a difference, Asma began working in flood-affected communities, promoting climate awareness, mental health support, and ecological restoration.

Over the past 13 years, her efforts have reached communities across Pakistan. To date, Asma has organized over 1,200 public outreach activities, planted more than 16,000 trees, and carried out projects in 28 cities and 300 villages.

Seeking stronger academic foundations for her fieldwork, she came to China in 2024 to pursue a PhD in landscape architecture at TJU.

"I chose TJU because of its interdisciplinary research environment," she explained. "My academic interests connect climate resilience, psychology, and nature-based solutions. The expertise of my supervisor in child mental health and plant therapy aligns perfectly with my background and research goals."

Her background in psychology and mental health has given her a deep understanding of human suffering, but at TJU's Department of Landscape Architecture, she is learning something transformative: how to scientifically design environments that support both ecological and psychological recovery. What has reshaped her thinking most, she says, is China's "sponge city" concept and its long-term commitment to integrating blue-green spaces with community planning. She is now learning to design not just for flood control, but for people's well-being. Her tri-resilience model, connecting climate resilience, mental health, and community strength, is being built on evidence-based research.

Her research focuses on the relationship between climate change, psychological well-being, and sustainable community development. She hopes to transform years of grassroots experience into scalable, evidence-based solutions that can help climate-vulnerable communities improve both ecological resilience and mental well-being.

While pursuing her studies at TJU, Asma has continued to gain international recognition for her work. In 2025, she received the R.K. Pachauri Award for Youth-Led Climate Action, which honors



Asma Bibi. (COURTESY PHOTO)

young climate advocates dedicated to practical community engagement.

When asked about the key differences between China and Pakistan in addressing climate challenges, Asma offered a frank comparison. She observed that the difference lies in systematic planning versus reactive response. China treats ecological governance as a long-term national strategy, while Pakistan responds to floods only when they come. What she finds most applicable from her studies in China, she said, is the country's integrated early warning systems, community-level disaster networks, and the sustained "short-intervention to long-term development" approach.

With her 10 years of grassroots work in 300 villages and her training at TJU, she wants to bring back two things. She wants to bring back the science of climate-responsive design which she is learning in landscape architecture. Also, she wants to bring back frameworks for sustained community mental health support drawn from her psychology background. She believes Pakistan has no shortage of will or community spirit, but what it lacks are structured, evidence-based frameworks. That is what she aims to build.

Reflecting on her journey from grassroots activism in Pakistan to academic research in China, Asma said two guiding principles have shaped her path. The motto of TJU, "Seeking Truth from Facts," has taught her the importance of practical action and perseverance. She also quoted a Pakistani proverb, "Slowly, slowly, the container fills." "Meaningful achievements are built step by step over time," she added.

Asma is deeply grateful for the support she has received in China. "None of these accomplishments belongs to me alone," she said. "I am thankful for the guidance of my professors, the encouragement of my classmates, and the strong academic platform provided by TJU. More importantly, they reflect the spirit of friendship and mutual support between young people in China and Pakistan."

Looking ahead, Asma hopes to continue advancing her "climate- mental health- community resilience" framework while strengthening academic cooperation between China and Pakistan. "There is tremendous potential for joint research in climate adaptation, post-disaster psychological recovery, and ecological governance," she said.

Sci-tech Backyard Makes Brazilian Agriculture Smarter

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Farm managers now tap and swipe on their phones or computers as if playing a mobile game — plowing, tending, scheduling, and harvesting all flow through a single digital nerve center. The results are tangible: Input and labor costs have dropped by eight to 12 percent, while corn and sugarcane yields have climbed six to 10 percent.

Yet the most profound story is written in the lives of the farmers. In Apodi, a family of three used to spend four backbreaking days getting a five-hectare plot ready for cultivation. Now, with a digital crawler tractor tailored by

the STB, the job can be finished in a single morning. Then there's a farmer who lost an arm in an accident — the team custom-adapted a harvester for him, and today he's skillfully piloting his machine through the fields. The STB is forging a new generation of Brazilian technicians.

This cooperative spark isn't working in Brazil alone, it is also lighting up lives in Thailand and Belarus. It carries a simple but powerful message: shared technology, applied with heart, can turn small farms into engines of hope, nourishing both people and the planet for years to come.

'Ark of Life' Delivers Hope Amid Severe Floods

Science Outreach

By FU Lili & BI Weizi

Due to the extreme, persistent rainfall brought by Typhoon Maysak, multiple areas in south China's Guangxi Zhuang autonomous region were flooded. At the Xijiang Education Park in Guigang, floodwaters rose to nearly five meters, leaving a large number of students and faculty members marooned.

In this critical moment, China Anneng Group, an enterprise specializing in emergency rescue and engineering,

rushed to the scene with its emergency motorized pontoon bridge system. Dubbed the "waterborne rescue aircraft carrier," the folded pontoon sections automatically sprang open when placed in the water, and expanded rapidly into a massive floating platform. With this equipment, rescue personnel evacuated over 6,000 people in less than 24 hours.

What exactly is this "rescue aircraft carrier?" *Science and Technology Daily* spoke to Pang Linxiang from the China Anneng Emergency Technology Research Institute. Pang explained that the motorized pontoon bridge is a specialized, modular, self-propelled rescue equipment that integrates three functions: pontoon, bridge, and propulsion. Boasting a load capacity of over 60

tons, it can transport more than 500 people in a single trip.

For this reason, it is often called a "rescue aircraft carrier" or an "ark of life."

The system comprises two types of modular units: mid-river and shore-side pontoons. During transport, the units remain folded on specialized vehicles. During rescue operations, they can automatically launch into water and unfold in just over 10 minutes. Multiple sections quickly connect via hydraulic locks and flexible connectors as needed.

The motorized pontoon bridge does not operate in isolation. According to Pang, a coordinated "land-water-air" technological matrix is emerging. Alongside the pontoon bridges, amphibious all-terrain vehicles are being

Integrated digital management

Digital transformation does not mean only the intelligentization of production and equipment, but all-round upgrading of the management system.

In the development and design segment, the company has established a modular design platform and a platform integrating design, craft and manufacturing. Using parameter-based design tools and simulation knowledge base, all links are seamlessly connected. Tasks like designing blades and laying out piping that used to take days or even weeks now take only a couple of hours, greatly reducing the product development cycle.

The upgraded manufacturing operation management system plays a key role in production control, enabling end-to-end digital, closed-loop control across the entire process, from issuing production plans and accurately assembling materials to executing manufacturing operations and tracing product quality.

The management staff can check

Traditional Turbine Factory Turns Intelligent

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Thanks to this, high-pressure assembly production capacity has been enhanced by 20 percent.

Digital and intelligent upgrading also extends to the quality inspection of products. Digital facilities like three-coordinate measuring machines and LiDAR are deployed in the inspection area to collect all-round data of components.

High-definition shooting equipment captures the product details in real time and uploads the photos to the cloud in a millisecond. The photos are analyzed by an intelligent AI system, and deficits that are difficult for the human eye to discern, like weld deviations and microscopic cracks on the inner walls of cylinders, are detected and prompt warnings issued.

The company's services continue to

be available even during on-site operation and maintenance. At the sites where its equipment is used, the staff can connect to the remote technology meeting room of the company by wearing AR glasses with 5G modules. On-site images can be transmitted in real time and voice communication conducted simultaneously.

Problems that used to require several days for resolution and required on-site visits by experts can now be remotely solved instantly, significantly cutting the time the client has to stop the machine, Fan said.

The private 5G network now covers 160,000 square meters of the factory's production area, and core business like mechanical processing, welding, heat treatment and assembly have all been digitalized with technologies like digital twin and 3D modeling.