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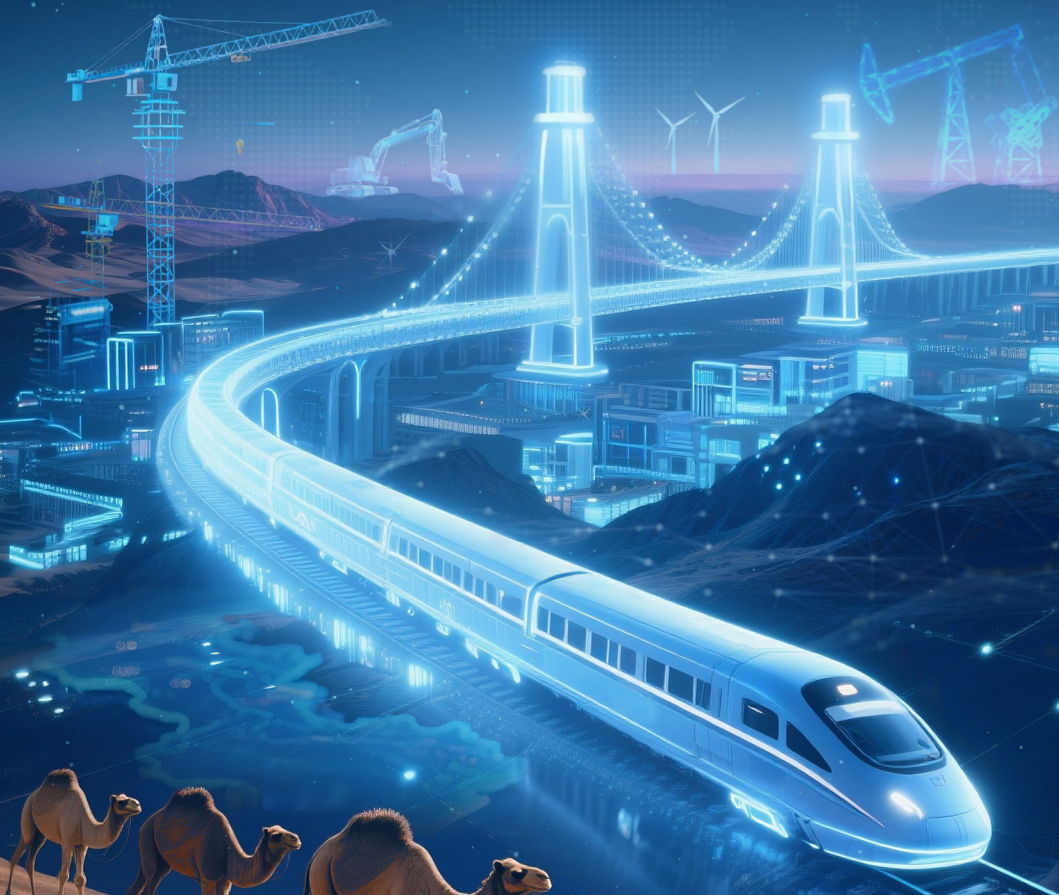
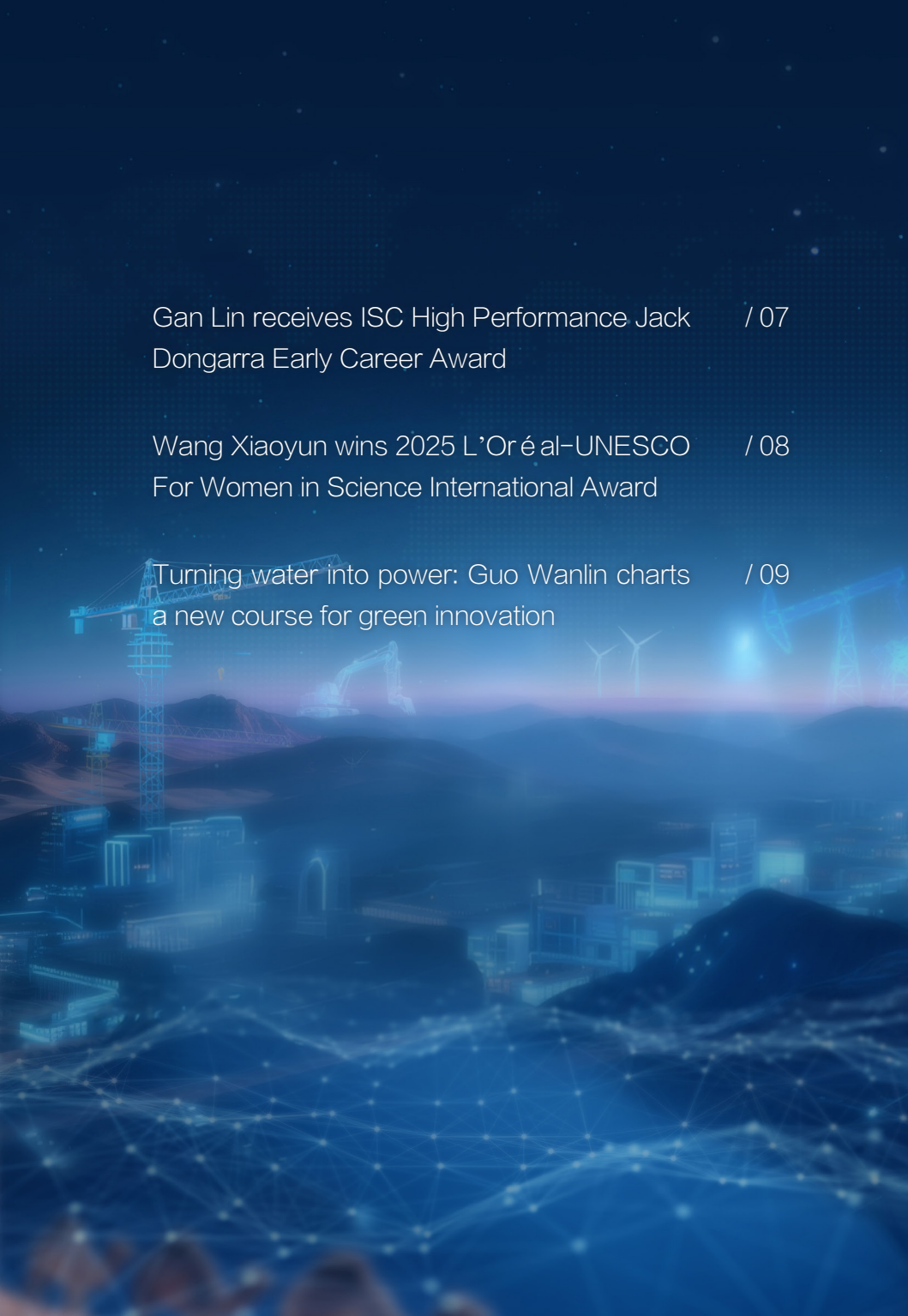
CAST Newsletter

Belt and Road Forum on Engineering Capacity Building outlines six core tasks and blueprint for global cooperation



Headlines



Headlines

Belt and Road Forum on Engineering Capacity Building outlines six core tasks and blueprint for global cooperation

Belt and Road Forum on Engineering Capacity Building

On June 11, 2025, the Belt and Road Forum on Engineering Capacity Building, hosted by CAST, was held in Chengdu, Sichuan Province. With the theme "Pioneering Engineering Innovation and Co-constructing Engineering Capacity," the forum focused on strengthening engineering capacity among Belt and Road partner countries, advancing engineering education, promoting mutual recognition of professional qualifications, and expanding access to continuing professional development (CPD) resources. The broader aim is to harness engineering and technology to improve livelihoods across participating nations.

In his opening remarks, CAST President Wan Gang emphasized that CAST and the Chinese Society of Engineers (CSE) have been committed to deepening international cooperation in engineering under the Belt and Road Initiative, and to supporting mutual learning and exchange among engineers. He called for joint efforts to promote innovation in engineering science and technology, accelerate the application of engineering achievements to empower industry and drive socioeconomic growth, and advance engineering education reform to build capacity across partner countries. Wan also highlighted the importance of open sharing of CPD resources to support lifelong learning for engineers, as well as the need to establish mechanisms for mutual accreditation of engineering qualifications. This, he noted, would facilitate the international mobility of engineering professionals and help ensure the long-term, steady progress of Belt and Road cooperation. He further proposed strengthening engineering governance. Key measures include the creation of the International Federation of

Engineering Societies for the Belt and Road (IFES), enhancing the provision of engineering-related public goods, developing a unified certification system for engineering capacity, and establishing shared ethical frameworks—all aimed at contributing to economic growth, trade connectivity, people-to-people exchange, and sustainable development across the region.

A major outcome of the forum was the release of the *Consensus on Engineering Capacity Building for the Belt and Road*, which outlines six core tasks to guide future cooperation. These include the joint development and sharing of engineering education curricula and resources; the establishment of mutually recognized and equivalent standards for engineering education and competency assessment; the open sharing of CPD resources to support engineers' professional growth; the alignment of technical engineering standards; the promotion of engineering ethics and professional conduct; and the enhancement of international exchange and cooperation in the field. Together, these initiatives are expected to lay a strong foundation for the formation of IFES.

Chinese Society of Engineers and Pakistan Engineering Council sign mutual recognition agreement for professional engineers

During the forum, the Chinese Society of Engineers (CSE) and the Pakistan Engineering Council (PEC) signed a Mutual Recognition Agreement for Professional Engineers.

The two organizations reached a consensus on aligning their engineering qualification systems with international standards. They affirmed the substantive equivalence of their competency frameworks, assessment procedures, and quality assurance mechanisms. Under the agreement, CSE members holding professional engineer qualifications will be eligible to register as professional engineers in Pakistan through a streamlined process. This will provide high-level talent support for the China-Pakistan Economic Corridor, a flagship project under the Belt and Road Initiative.

The agreement also sets a new precedent for international cooperation in engineering capacity building and qualification recognition. It reflects the growing global recognition of CSE's competency-based evaluation system, which aligns with the standards of the International Professional Engineers Agreement (IPEA) under the International Engineering Alliance (IEA).

(Sources: Official website of CAST and chinanews.com.cn)

China and Africa's scientific communities strengthen practical cooperation following summit commitments

On June 9, 2025, CAST Executive President He Junke met in Beijing with Blade Nzimande, South Africa's Minister of Science, Technology and Innovation, and his delegation. The meeting built on the Memorandum of Understanding on Cooperation signed between CAST and South Africa's Department of Science, Technology and Innovation during the 2024 Summit of the Forum on China-Africa Cooperation, held in Beijing last September. Both sides engaged in in-depth discussions on implementing the outcomes of the high-level exchanges between heads of state of the two countries.

He Junke reaffirmed the Chinese scientific community's commitment to openness, and collaboration. He expressed CAST's willingness to deepen ties with international partners—including South Africa—to advance scientific and technological progress for the common good. He also emphasized CAST's readiness to enhance practical cooperation and support the development of an all-round strategic cooperative partnership in the new era between the two countries.

Minister Nzimande praised China's achievements in science and technology, as well as its recent reforms to foster innovation. He expressed strong interest in expanding cooperation across multiple levels and sectors and looked forward to working closely with CAST to achieve greater outcomes in popular science outreach, joint research, talent development, and science education.

(Source: Official website of CAST)

Academic Exchange

GAITC 2025 highlights breakthroughs in AI innovation and industrial transformation

Opening ceremony of GAITC 2025

From June 7 to 8, the 2025 Global Artificial Intelligence Technology Conference (GAITC 2025), hosted by the Chinese Association for Artificial Intelligence (CAAI), was held in Hangzhou, Zhejiang Province. Themed "Communication, Fusion, Integration and Mutual Benefits," the event brought nearly 300 leading experts and scholars together to share insights on the latest advances in artificial intelligence.

A rich program of parallel events ran throughout the conference, including the inaugural Qingyuan Scholars Interdisciplinary Salon, the 2025 Global AI Innovation Contest, and an interactive exhibition—all highlighting the newest breakthroughs in AI and the emerging trends shaping intelligent industrial transformation.

The opening ceremony unveiled industry-specific foundation models developed in Hangzhou's Future Sci-Tech City, demonstrating the region's progress in applying large-scale AI models across real-world sectors. The ceremony also marked the launch of a special initiative focused on IP-based securitization financing for AI enterprises, creating new funding pathways to support innovation. In addition, the signing of technology transfer agreements for the third round of Zhuoxi Laboratory projects signaled a new phase in turning China's cutting-edge scientific research into practical applications in Hangzhou.

Inaugural Qingyuan Scholars Interdisciplinary Salon showcases youthful innovation

Group photo of the inaugural Qingyuan Scholars

On June 7, during GAITC 2025, the Chinese Association for Artificial Intelligence (CAAI) hosted the inaugural Qingyuan Scholars Interdisciplinary Salon, bringing together outstanding young researchers from around the world. Through dynamic presentations, they shared original research, explored new avenues for integrating AI across disciplines, and identified emerging opportunities for collaboration between

technology and industry.

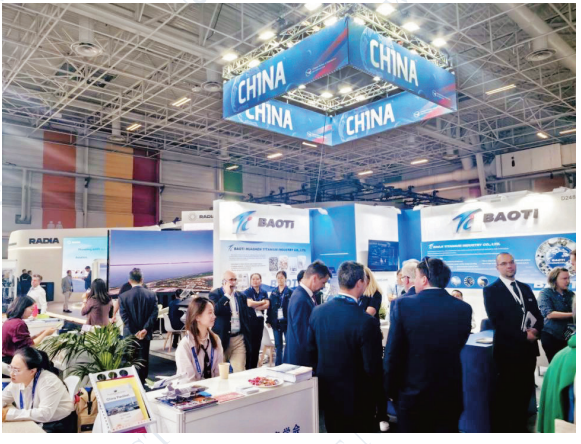
Fifteen young scholars from leading universities in China and abroad presented their latest work across a wide range of cutting-edge fields. In life sciences and medical AI, they discussed advancements in T-cell receptor recognition, virus mutation prediction, and early diagnosis of heart disease. In the field of next-generation computing architectures and devices, topics included memristor array computing, optoelectronic AI chips, and in-memory sensing technologies. Research on general artificial intelligence and large model optimization highlighted areas such as structured pruning, the HuggingGPT agent framework, and representation learning in recommender systems. Meanwhile, presentations on intelligent perception and human-computer interaction covered innovations in visual object tracking and multimodal vision-assisted systems.

Following the presentations, a panel of experts selected five participants as Qingyuan Scholars and ten as Promising Qingyuan Scholars. All were recognized on site with certificates in acknowledgment of their exceptional potential in both foundational research and real-world applications.

The launch of the Qingyuan Scholars Program marks a major step in CAAI's commitment to supporting the next generation of scientific leaders. Moving forward, the association aims to adopt a more open approach to global collaboration, empowering young scholars to pursue original research on a broader scale.

(Source: Official WeChat account of CAAI)

Chinese aviation delegation debuts at International Paris Air Show with innovations across industry value chain



China Pavilion at the 55th International Paris Air Show

From June 16 to 22, 2025, the 55th International Paris Air Show took place at Le Bourget Airport.

For the first time, the Chinese Society of Aeronautics and Astronautics (CSAA) established a dedicated China Pavilion (Booths C258 and D258, Hall 5), bringing together more than 20 of the country's leading aerospace enterprises to highlight China's latest achievements in aviation technology and to deepen cooperation within the global aerospace community.

The China Pavilion focused on advanced manufacturing and high-end equipment, offering a comprehensive display of the country's expanding industrial capabilities. Exhibitors represented every link in the aviation value chain—from established special steel producers showcasing internationally advanced smelting technologies for high-temperature alloys and titanium, to aircraft manufacturers and component suppliers presenting structural assemblies and precision engine technologies. The pavilion also featured cutting-edge technologies such as Level D full flight simulators, simulation systems for both commercial and general aviation, and advanced optical zoom gimbal cameras.

This marked the first time Chinese aerospace companies participated as a unified national delegation at the show. Throughout the event, CSAA organized a series of business matchmaking sessions, forums, and promotional activities. Looking ahead, CSAA affirmed its commitment to serving as a bridge between China and the global aerospace industry. By leveraging platforms like the International Paris Air Show, the organization seeks to foster deeper dialogue and mutual trust between Chinese and French—and more broadly, between Chinese and European partners—so as to explore new avenues for collaboration in technology, standards development, and global market integration.

Chinese and French representatives convene at International Forum on Green Aviation

International Green Aviation Forum

On June 17, 2025, during the International Paris Air Show, the Chinese Society of Aeronautics and Astro-

nautics (CSAA) and the French Aerospace Industries Association (GIFAS) co-hosted the International Forum on Green Aviation. The event brought together more than 80 representatives from over 30 Chinese and French organizations to explore collaborative approaches to sustainable aviation.

Amid growing global concern over climate change, the transition to green aviation has become a shared priority. In Europe, the Clean Aviation Joint Undertaking is leading efforts to steer the industry toward a climate-neutral future, with a goal of achieving net-zero emissions by 2050. Meanwhile, China is accelerating the development of technologies to improve energy efficiency, reduce carbon emissions, and promote the adoption of sustainable aviation fuels and alternative energy solutions. The forum featured a series of presentations, with industry experts from both countries sharing insights and strategies on advancing green aviation.

(Source: Official WeChat account of CSAA)

International Awards

Gan Lin receives ISC High Performance Jack Dongarra Early Career Award

Award winner Gan Lin at the ISC 2025 ceremony

On June 10, 2025, the 40th ISC High Performance Conference (ISC 2025) opened in Hamburg, Germany. During the event, one of the most prestigious honors for rising talent in high performance computing—the Jack Dongarra Early Career Award—was presented to Dr. Gan Lin, associate professor at the Yau Mathematical Sciences Center of Tsinghua University. He is the first Chinese scholar to receive this distinction since the award's inception.

Established by ISC, the award is named after Turing Award laureate and high performance computing pioneer Jack Dongarra. Introduced in 2023, it is

presented annually to individuals who demonstrate exceptional impact in fields such as high performance computing, computational science, numerical algorithms, parallel software, and machine learning.

(Source: *Science and Technology Daily*)

Wang Xiaoyun wins 2025 L'Oréal-UNESCO For Women in Science International Award

Wang Xiaoyun delivering a video speech

On June 12, 2025, the 27th L'Oréal-UNESCO For Women in Science International Awards ceremony was held at UNESCO Headquarters in Paris, honoring five exceptional women scientists from around the world. Among this year's laureates was Wang Xiaoyun, a member of the Chinese Academy of Sciences and professor at the Institute for Advanced Study, Tsinghua University. She is the ninth Chinese scientist to receive this prestigious honor since the award's inception.

Professor Wang was recognized for her significant contributions to cryptography and cryptographic mathematics, which are critical for secure data communication and storage. Her research revealed fundamental flaws in widely used hash functions—core components in digital signatures, blockchain systems, and various cryptographic protocols—and led to the development of new hash function standards. Today, these standards are used in bank cards, computer passwords, and e-commerce platforms. The visibility of her groundbreaking work has inspired many female students to pursue careers in mathematics and cybersecurity.

Speaking at the ceremony, UNESCO Director-General Audrey Azoulay emphasized the importance of inclusion in science: "To respond to the world's greatest challenges—health, climate disruption, water management—we need all minds, all voices, all perspectives," she said. "Because science is a universal language. And science needs women."

(Source: people.com.cn)

Scientist Profile

Turning water into power: Guo Wanlin charts a new course for green innovation

"We still have a long way to go in aquavoltaics, both technically and fundamentally. But we're determined to keep moving forward and lead the way."

Guo Wanlin is a member of the Chinese Academy of Sciences, professor at Nanjing University of Aeronautics and Astronautics, and director of the university's Institute for Frontier Science. He has long focused on mechanical theory and key technologies related to aerospace safety and intelligent systems. He developed a three-dimensional fatigue and fracture theory for aerospace structures, which has been systematically applied in the development and fault diagnosis of various aircraft models, including the Long March 5 launch vehicles, addressing urgent engineering needs. Guo also established a comprehensive physical mechanics framework for low-dimensional material structures, integrating mechanical, electrical, magnetic, optical, and thermal coupling effects. His predictions of intelligent properties—such as giant electrostrictive behavior in low-dimensional materials—have been experimentally verified and applied. He further proposed the concept of the aquavoltaic effect, extending classical theories of electrokinetics in electric double layers and passive sensing technologies, and introducing a novel top-down approach to fabricating sub-nanometer structures.

Photo of Guo Wanlin

The science fiction novel *The Wandering Earth* poses a profound question: If the motion of the sun becomes a threat to our planet, how can humanity continue to survive? After more than two decades of exploration in nanoscale physical mechanics, Guo Wanlin and his team have put forth a forward-looking, science-based answer: hydrovoltaics.

Finding a fulcrum to "move the earth"

At the turn of the 21st century, Guo Wanlin foresaw the rise of nanotechnology and shifted his focus from traditional fatigue and fracture mechanics to the emerging frontier of quantum-based nanoscale science. With clear determination, he led his team in establishing one of the world's first dedicated nanoscience research institutes.

Over the years, the team developed a robust theoretical framework for multiphysical coupling in low-dimensional nanosystems. As their understanding deepened and experiment conditions improved, breakthroughs soon followed. "The discovery of the hydrovoltaic effect began with an unexpected observation," recalled Yin Jun, then a doctoral student in Guo's lab. "During an experiment, Professor Guo noticed a voltage signal at both ends of a graphene film as it entered and exited a water-based solution. This sparked something completely new."

After more than three years of rigorous investigation, the team published their findings in *Nature Nanotechnology* in 2014. The study drew international attention, with scientists hailing it as a "pioneering result" that extended over two centuries of classical electrokinetic theory.

In 2018, the team published a follow-up paper in *Nature Nanotechnology* titled "Emerging Hydrovoltaic Technology." This marked the formal introduction of the hydrovoltaic effect and the birth of a new scientific field—hydrovoltaics, as a way to generate electricity directly from water.

For Guo Wanlin, hydrovoltaics is the "fulcrum" long sought to drive a new era of sustainable development. As the world faces mounting climate and environmental challenges, this emerging technology opens up unprecedented possibilities for capturing and converting solar heat and light into usable energy, enabling electricity generation not only from water, but even from moisture in the air.

Exploring scientific frontiers beyond the comfort zone

When the hydrovoltaic effect was first discovered, the electric signals it produced were measurable only in millivolts using highly sensitive instruments. But through years of steady progress, Guo Wanlin's team achieved a 1-volt, microamp-level output in 2019. At the time, their ambitious target of "10V@10mA"—10 volts at 10 milliamps—seemed far off. Yet by 2023, through a rigorous cycle of theoretical modeling and experimental validation, they reached that milestone ahead of schedule.

Hydrovoltaics is a deeply interdisciplinary field, requiring a broad knowledge base from every team member. For more than two decades, Guo has maintained a practice of weekly research meetings where each member presents updates and personal reflections. He frequently shares scientific articles to spark deeper inquiry. One of the team's most notable achievements came on July 19, 2023, when Yin Jun co-authored a paper as the corresponding author in *Nature* titled "Mixing of Moiré-Surface and Bulk States in Graphite." The publication marked a major leap for the university in fundamental research.

While hydrovoltaic technology continues to gain traction in global academic circles, Guo remains focused on venturing further into uncharted territory. He is now setting his sights on an even more profound mystery: the role of water in neural activity and the emergence of intelligence in the human brain. "We want to tackle humanity's deepest questions—from hydrovoltaic energy to hydrovoltaic ecosystems, and ultimately to hydrovoltaic intelligence," he says. It is this relentless drive to explore the unknown that propels Guo Wanlin and his team to the frontiers of science.

(Source: *Xinhua Daily*)

Upcoming Conferences

2025 World Robot Conference to be held in Beijing on August 8-12

The 2025 World Robot Conference (WRC 2025) will take place from August 8 to 12 at Beiren Etrong International Exhibition & Convention Center in Beijing's Economic-Technological Development Area. Co-hosted by the Chinese Institute of Electronics (CIE) and the World Robot Cooperation Organization (WRCO), the event will focus on the theme "Making Robots Smarter, Making Embodied Agents More Intelligent." The conference will feature four major components: high-level forums, a large-scale exhibition, frontier robotics contest, and a series of supporting events. Nearly 500 experts, scholars, and industry representatives from more than 20 countries and regions are expected to attend to explore the

latest technological advancements and real-world applications and around 200 leading robotics companies will showcase their latest innovations. In addition to the main conference, the World Robot Expo and the World Robot Contest will be held concurrently.

(Source: Official website of CIE)

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