



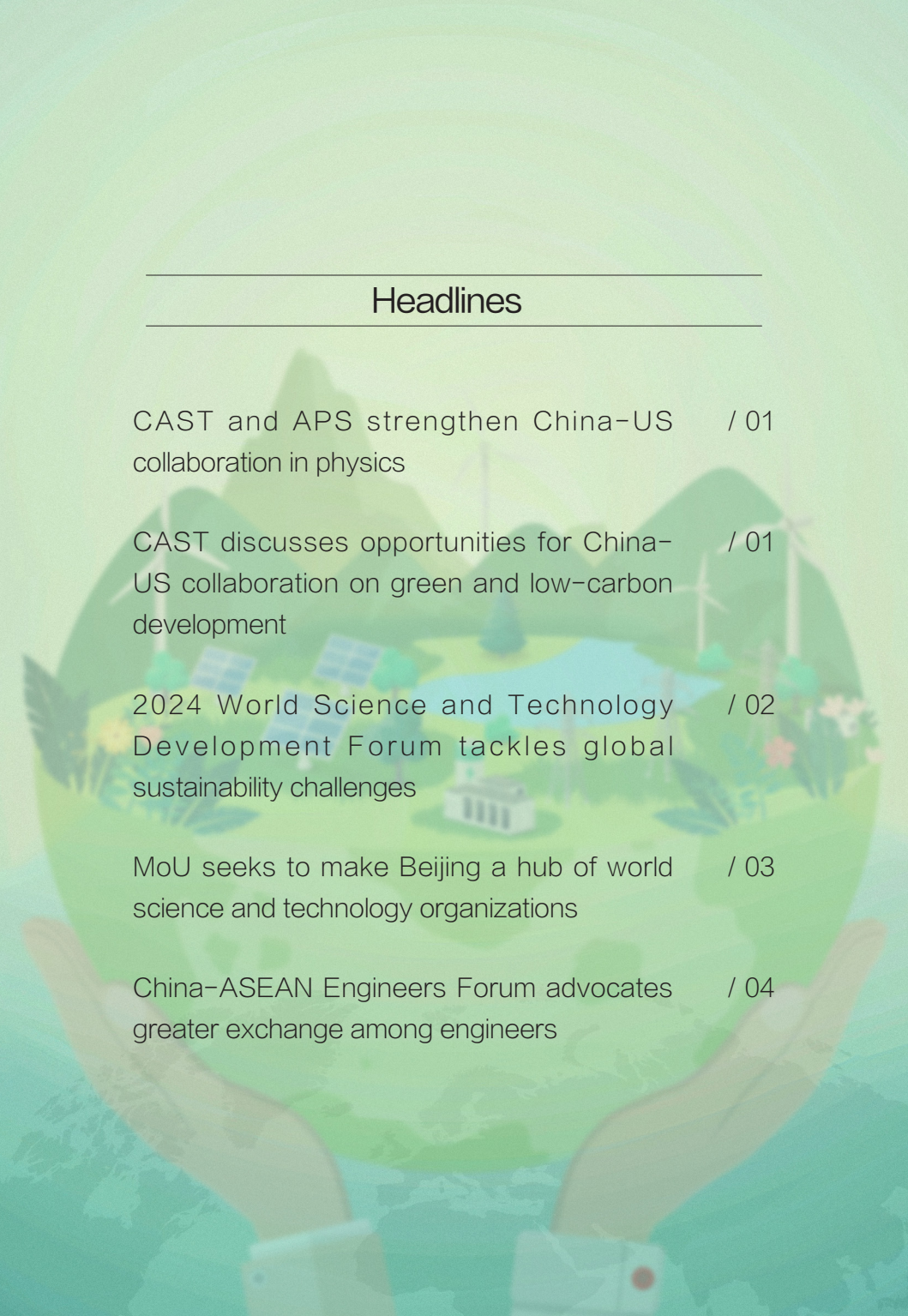
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CAST Newsletter

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Headlines

CAST and APS strengthen China-US collaboration in physics



CAST President Wan Gang meets with APS President Young-Kee Kim
Photo credit: Official website of CAST

On October 9, 2024, CAST President Wan Gang met with Young-Kee Kim, President of the American Physical Society (APS), to discuss opportunities for US-China cooperation in science, technology, and cultural exchange.

CAST has long prioritized openness, trust, and international collaboration within the global scientific community as well as fostering people-to-people exchange between China and the US in science and technology. Wan Gang reaffirmed CAST's commitment to strengthening ties between the physics societies of both nations. He expressed hopes for greater opportunities for young scientists to exchange ideas, forge personal connections, and collaborate on initiatives such as scientific publishing to tackle global challenges together.

APS has also been a strong advocate for international

scientific partnerships founded on integrity, transparency, and reciprocity. Young-Kee Kim highlighted APS's enthusiasm for deepening its collaborations with the Chinese Physical Society (CPS) and other Chinese institutions. She emphasized APS's plans to expand communication channels, maintain academic exchange, promote personal connections within the scientific community, and build mutual understanding and trust.

(Source: Official website of CAST)

CAST discusses opportunities for China-US collaboration on green and low-carbon development

On October 10, 2024, CAST President Wan Gang held in-depth discussions with former US Secretary of Energy Ernest Moniz, focusing on green and low-carbon development. The



CAST President Wan Gang meets with former US Secretary of Energy Ernest Moniz.
Photo credit: Official website of CAST

dialogue resulted in significant consensus on tackling climate change and advancing the global transition to sustainable energy.

Wan Gang stressed the importance of continued cooperation between the global academic and industrial communities and called for deeper exchange to promote green and low-carbon development to foster mutual benefits and shared success.

Ernest Moniz praised China's achievements in energy transition and its progress in the new energy vehicle industry. He expressed optimism about strengthening US-China cooperation through bilateral and

multilateral frameworks to jointly address climate change and other global challenges.

(Source: Official website of CAST)

2024 World Science and Technology Development Forum tackles global sustainability challenges



Plenary session of WSTDF 2024
Photo credit: Official website of WSTDF 2024

In a world facing challenges such as food security, energy crises, and climate change, the urgency of international cooperation has never been greater. Scientific and technological innovation has emerged as a critical pathway to address these pressing global issues. The World Science and Technology Development Forum 2024 (WSTDF 2024) provided a platform to shape the future of sustainability.

The forum, held in Beijing from October 22 to 24, revolved around the theme "Science and Technology for the Future." Discussions were structured around six core topics, each represented by an "I", namely: Intelligence: AI governance Innovation: Building an

International Trust Foundation for Cultivating the Ecology of Science and Technology Governance; Interdisciplinary Science-Based Solutions Towards Sustainable Development; Infrastructures: Open Science Infrastructure: Building a Collaborative Platform for the Sciences Decade; Innovation: Cross-Industry Resource Collaboration and Integration to Provide Innovative Application Scenarios for Enhancing the Intelligent Manufacturing Industry; Interaction: Harmonious Coexistence of Nature and Humanity: Environment and Health; and Integration: Science and Technology for Risk-informed Sustainable Development.

Representatives from around the world including scientists, entrepreneurs, educators, and young innovators gathered to explore how technological advances could address critical global challenges such

as climate change, energy crises, and the governance of science and technology, with the common goal of advancing sustainable development.

The forum served as a celebration of scientific innovation and a milestone for global scientific cooperation. Experts emphasized the need for a global data-sharing platform to break down barriers across borders and disciplines and ensure the efficient use of global scientific resources. The event also brought the unveiling of several key outcomes, offering new insights for international cooperation in science and technology.

(Source: Official WeChat account of VOC)

Academic Exchange

MoU seeks to make Beijing a hub of world science and technology organizations



MoU signing ceremony

Photo credit: Official WeChat account of CISTE

On October 15, during the 2024 China-Europe Talent Forum, the China Center for International Science and Technology Exchange (CISTE), in collaboration with the Beijing Association for Science and Technology and other partners, signed a Memorandum of Understanding to support the establishment of offices for more world science and technology organizations in Beijing.

The MoU focuses on six key priorities including hosting major international science and technology exchange events, fostering an environment conducive to the development of international scientific organizations, and encouraging the participation of scientific talent in these initiatives. It represents a significant step toward attracting international scientific organizations to Beijing and ensuring their long-term sustainability.

In recent years, interna-

tional scientific organizations have played a crucial role in promoting academic progress and fostering exchange of scientific resources. Through efforts such as setting international standards, arranging global research collaborations, hosting conferences and exhibitions, publishing scientific journals, establishing international awards, promoting open science, and facilitating personnel exchange, these organizations drive innovation and strengthen global cooperation.

CAST has been proactive in creating a supportive environment for the growth of these organizations, focusing on capacity building and fostering ecosystems that enable these organizations to thrive in Beijing.

(Sources: Official WeChat account of CISTE and news.cn)

China-ASEAN Engineers Forum advocates greater exchange among engineers



Panel discussion of the 2024 China-ASEAN Engineers Forum
Photo credit: Secretariat of CSE

On October 16, the 2024 China-ASEAN Engineers Forum convened in Beijing, bringing over 80 representatives from engineering organizations across ASEAN countries including Cambodia, Indonesia, Malaysia, the Philippines, Thailand, and Myanmar together.

At the opening ceremony, the Chinese Society of Engineers (CSE) and Philippine Technological Council (PTC) signed a Memorandum of Understanding. The forum also unveiled the *Initiative to Strengthen Engineering Capacity Building*, aimed at addressing shared challenges in the engineering sector. The initiative emphasizes deeper collaboration between China and ASEAN engineering communities in areas such as enhancing engineering education, continuous professional development (CPD), and capacity building for young engineers. It also seeks to strengthen

cooperative mechanisms, promote cross-regional mobility of engineers, and encourage mutual learning and exchange. These efforts are intended to equip engineers to tackle complex challenges, foster professional growth, and support career development.

Luo Hui, Director General of the Department of International Affairs of CAST and Vice President and Joint Secretary General of CSE, highlighted the forum's goals. "We hope engineering organizations in China and ASEAN countries will continue to strengthen collaboration, drive innovation in engineering and technology, and enhance the capabilities of engineers," she said. "Expanding and improving mechanisms for mutual recognition of engineering qualifications will guide engineers to use their expertise for the benefit of people and contribute to building a closer China-ASEAN commu-

nity with a shared future."

The China-ASEAN Engineers Forum has become a vital platform for fostering dialogue and exchange among engineering communities throughout the region. Collaboration between CSE and ASEAN engineering organizations has already yielded tangible results. Participants expressed optimism about furthering cooperation in CPD, mutual learning among engineers, and advancing mechanisms for mutual recognition of engineering qualifications.

(Source: Official website of CAST)

2024 International Engineering Congress highlights sustainable engineering for a better future

From November 8 to 9, the 2024 International Engineering Congress was held in Taizhou,



Signing ceremony of the *Taizhou Declaration*
Photo credit: *Taizhou Daily*

Zhejiang Province, under the theme “Sustainable Engineering for a Better Future.” The event aimed to foster global innovation and collaboration in engineering science and technology, with a focus on advancing engineering education in Asia-Pacific, Africa, and Latin America. It also sought to promote the international recognition of engineering qualifications to ensure that engineering serves humanity and shapes a brighter, more sustainable future.

With the world experiencing rapid technological revolutions and industrial transformations, innovation in engineering has become increasingly dynamic. Aridaí Herrera, President of the Pan American Academy of Engineering (API), highlighted this shift, noting that “artificial intelligence is revolutionizing how we design solutions, accelerating progress in the engineering industry in ways we could never have imagined.”

A key milestone of the congress was the signing of the *Taizhou Declaration*, which outlined several critical goals: fostering openness in engineering to advance professional development, establishing

ethical guidelines for emerging technologies, enhancing cooperation in engineering education across the Global South, and promoting the mobility of engineering graduates. The declaration also announced the creation of the Taizhou Global South Engineering Capacity Training Center, which will set benchmarks for international engineering education and capacity-building systems. Aung Kyaw Myat, President of the Myanmar Engineering Council (MEngC) and President of the Federation of Engineering Institutions of Asia and the Pacific (FEIAP), described the declaration as “a significant milestone in the development of the engineering industry that sets international standards for the quality of engineering education and professional benchmarks for future generations of engineers.”

China continues to play a pivotal role in advancing

international collaboration in science and technology by addressing global challenges such as climate change, public health, environmental protection, energy security, and food security. Looking ahead, Luo Hui, Director General of the Department of International Affairs of CAST and Vice President and Joint Secretary General of the Chinese Society of Engineers (CSE), reaffirmed China's commitment to global cooperation. "CAST and the CSE are dedicated to deepening partnerships with engineering organizations worldwide," she said. "We aim to promote scientific exploration, leverage technology to transform the world, and ensure engineering benefits humanity. Together, we are striving to strengthen the engineering community's role in global governance, support achievement of the UN Sustainable Development Goals, and contribute to a more

inclusive, equitable, sustainable, and peaceful future."

(Sources: Official website of CAST and official WeChat account of VOC)

International Awards

Chinese scientist Zuo Renguang receives Gold Medal from the Association of Applied Geochemists



Zuo Renguang accepts the AAG Gold Medal
Photo credit: voice.cug.edu.cn

From October 14 to 18, the 30th International Applied Geochemistry Symposium (IAGS 2024) was held in Adelaide, Australia. During the event, Chinese scientist Zuo

Renguang from the State Key Laboratory of Geological Processes and Mineral Resources at the China University of Geosciences (CUG) was awarded the Association of Applied Geochemists (AAG)'s highest honor—the Gold Medal.

Zuo has been a trailblazer in the field of mathematical geosciences by conducting pioneering research in spatial pattern recognition of geochemical elements and extracting geochemical anomalies through big data and artificial intelligence. His innovative approaches have provided effective solutions for identifying geochemical anomalies in complex geological conditions, driving a transformative shift in exploration geochemistry research powered by advanced data technologies.

As global demand for mineral resources continues to grow, applied geochemistry is becoming

ing increasingly essential in scientific research and resource development. Established in 1992, the

AAG Gold Medal honors scientists who have made exceptional contributions to applied geochemistry

and global mineral exploration.

(Source: voice.cug.edu.cn)

Scientist Profile

Chinese scientist Ye Jianwen bridges “valley of death” in synthetic biology



“If we dare to do what others won’t, we can achieve what others can’t.”

Ye Jianwen, associate professor at the School of Biology and Biological Engineering at South China University of Technology (SCUT), is making groundbreaking strides in synthetic biology. His expertise is designing and constructing microbial cell factories, regulating static and dynamic metabolism, controlling transcription and translation, and building metabolic network models for industrial applications. Ye also serves as an editor for prestigious journals such as *Military Medical Research*, *Synthetic and Systems Biotechnology*, and *Frontiers in Chemical Engineering* while serving as a judge for the synthetic biology innovation competition, SynBio Hive.

Ye Jianwen (third from left) with his colleagues
Photo credit: Official website of SCUT

Synthetic biology is experiencing rapid growth, but transitioning from research to industrial application remains challenging. Ye Jianwen is fearlessly tackling this

“Valley of Death” by focusing on the design and industrial use of microbial cell factories, harnessing the potential of halophilic bacteria in particular. “My current

work involves cultivating low-cost strains to produce green materials and advancing their industrial applications,” Ye explained.

Breaking bottle-necks in bioplastic scale-up

Plastics are essential synthetic polymer materials with wide-ranging applications, but petroleum-based plastics can take centuries to degrade. In the push for global carbon neutrality, synthetic biology offers promising green alternatives, yet bioplastics face a hurdle of high production costs. Researchers have sought new structures of polyhydroxy-alkanoates (PHAs), a family of biodegradable plastics, to address this issue, with microbial cultivation playing a central role.

Halophilic bacteria, known for adaptability to extreme environments and rapid growth, are resistant to contamination by other microbes. These traits make them ideal for open fermentation processes in industrial settings, providing natural cost advantages.

However, genetic modification of halophilic bacteria has been under-explored due to limited academic research and references. Moving from lab experiments to pilot production has been fraught with challenges. “Even if we engineer fermentation-ready bacteria in the lab, even a minor issue during scale-up could derail industrialization,” Ye noted. Undeterred, he developed theoretical computational models to optimize and scale up biological processes using halophilic bacteria. This breakthrough not only achieved full-scale production of PHA, from fermentation to commercialization, but also significantly reduced production costs and opened new possibilities for the industrial application of bioplastics.

Bridging the gap between lab research and industrial production

The transition from

laboratory research to large-scale industrial production has reached a critical phase that requires extensive validation and significant financial investment. Known as the “Valley of Death” in technology commercialization, this stage has been fraught with complexities. Factors such as air quality impacting microbial growth, compatibility of manual operations with automated processes, and compliance with factory equipment standards all require careful consideration to ensure success.

“The key to overcoming industrialization bottle-necks is to achieve product stability, particularly maintaining consistent metabolic activity in strains during scale-up,” Ye explained.

Looking ahead, Ye plans to focus on high-efficiency synthesis of functional proteins, PHA materials, and amino acid deriva-

tives. His research will target essential aspects of biomanufacturing including chassis design, raw material utilization, metabolic engineering,

fermentation scale-up, and process integration. By addressing these core areas, Ye aims to develop innovative methods and paradigms that will

advance the field of biomanufacturing.

(Source: *Science and Technology Daily*)



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