MANOHAR PARRIKAR INSTITUTE FOR
DEFENCE STUDIES AND ANALYSES
मनोहर पर्रिकर रक्षा अध्ययन एवं विश्लेषण संस्थान

CHINA SCIENCE AND TECHNOLOGY REVIEW

October 2025

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'Shanghai Declaration' at the 2025 World Federation of Engineering Organisations

Based on the theme "Engineering Shapes a Green Future", the 2025 edition of the World Federation of Engineering Organisations (WFEO) General Assembly and Global Engineering Congress was held in Shanghai, China from 12 to 17 October. Renowned engineers and research institutes and universities from more than 60 countries participated in the weeklong event. In the 2025 edition, the Congress aimed to explore how engineering and technology can be leveraged to address climate change, drive green economic growth and accelerate the implementation of the Sustainable Development Goals (SDGs).

In his keynote address, Ding Xuexiang, member of the Standing Committee of the Political Bureau of the Communist Party of China Central Committee and Vice Premier of the State Council, reminded the Congress about the Chinese government's earnest implementation of an innovation-driven development strategy, accelerating its efforts to develop as a strong country in the field of science and technology, and making major breakthroughs in key and core technologies, which have led to significant achievements in engineering sci-tech. He also assured that China will continue to deepen its international exchange and cooperation, boosting the development of global engineering sci-tech.

Subsequently, the Congress adopted the 'Shanghai Declaration', where it affirmed that engineering and technology should be the key driving force in addressing development bottlenecks and unlocking new momentum for global growth.

Meanwhile, at the event, the congress announced the 2025 top 10 engineering achievements. This included antibody-drug conjugates, Blackwell GPU architecture, DeepSeek open-source large language model, humanoid robots, and the barrier encircling project in the Taklamakan Desert, Xinjiang Uygur Autonomous Region.

Established in 1968, the WFEO is the largest and only non-governmental organization representing all engineering disciplines globally, connecting engineering organizations from over 100 countries and regions and more than 30 million engineers worldwide. The China Association for Science and Technology became a member organization in 1981. The 2025 edition of WFEO was jointly hosted by the WFEO, the China Association for Science and Technology, the Chinese Academy of Engineering, and the Shanghai municipal government.

Scientific Collaboration Projects

In a landmark gathering at the 6th Recent Advances and Controversies in the Measurement of Energy Metabolism (RACMEM) conference from 13-17 October in Shenzhen supported by International Atomic Energy Agency

(IAEA) and orchestrated by the Shenzhen Institutes of Advanced Technology (SIAT) of the Chinese Academy of Sciences (CAS), 221 experts representing 21 countries from diverse disciplines including physiology, clinical science, environmental studies, and quantitative biology urged the acceleration of development and standardization of energy metabolism measurement technologies to tackle pressing global challenges, from ecology under climate change to public health crises through collaboration.

Energy metabolism is the foundation to life, where the ensemble of biochemical reactions converts nutrients into usable energy within living systems. It dictates not only how organisms survive and function but also how they adapt to and influence ecological and physiological environments. Advances in metabolism measurement are thus critical.

However, in the backdrop of insufficiently precise and standardized existing technologies, researchers' ability to parse complex regulatory networks governing energy homeostasis and metabolic flexibility across species and conditions remains limited. Thus, the 6th edition of RACMEM called for fostering interdisciplinary collaboration and methodological advancement.

Meanwhile at the 2025 edition of the World Science and Technology Development Forum (WSTDF), hosted by the International Society for Digital Earth (ISDE) from 27-29 October in Beijing, which aims to respond to the growing global call for a paradigm shift in digital technologies, participants from research institutes and universities from 19 countries and relevant UN agencies adopted the "ISDE Thematic: Digital Earth as a Strategic Intelligence and Decision Theater." This newly blueprint will guide the ISDE 2026 agenda in transforming data and knowledge into informed, transparent, and ethical decision-making to advance the UN SDGs.

Scientific Research Breakthroughs and Discoveries

In a major breakthrough ensuring the safe operation and longer operating life of lithium batteries, researchers from the Institute of Physics of Chinese Academy of Sciences (CAS), Ningbo Institute of Materials Technology and Engineering of CAS and Huazhong University of Science and Technology developed a self-adaptive inter-phase in all-solid-state lithium batteries which could maintain intimate contact between the lithium metal anode and solid electrolyte without external pressure. During the research project, it was ascertained that contact between the lithium electrode and sulfide solid electrolyte in all-solid-state lithium batteries is not ideal, with numerous tiny pores and cracks present. These issues not only shorten battery lifespan but may also pose safety risks. In order to address the existing challenge, the team introduced iodide ions into the sulfide solid electrolyte, where during battery operation, the iodide ions move to the electrode interface under the electric field, forming an iodine-rich interface.

Further broadening artificial intelligence (AI) applications, the Institute of Zoology, CAS, by using an AI protein language model called Adaptive Convergence by Embedding of Proteins (ACEP), uncovered a key mechanism in explaining the evolution of similar functions in multiple organisms in similar environments. In the backdrop of the latest development, Zou Zhengting, head of the research team, stated that it not only deepens the understanding of the laws of evolution of life but hopes to achieve broader and more effective application of AI technology in evolutionary biology in future.

China Science Diplomacy

Under the theme "Collaboration in Science in a Changing World", the National Natural Science Foundation of China (NSFC) and German Research Foundation (DFG) jointly organized the Sino-German University Presidents' Meeting from 15 to 16 October in Beijing. The objective of the meeting was to assess the implementation of Sino-German science cooperation, where in recent years several agreements on science and technology between China and Germany were signed, and also map out the blue print for future cooperation. In the two-day event, more than 20 university presidents and scientists participated, including the Presidents of Peking University, Tsinghua University, the University of Bonn and the Technical University of Braunschweig. In his welcome remarks, Prof Dou Xiankang, President of NSFC, underscored the deepening of joint research, funding and academic exchanges between China and Germany.

Adding another milestone in China and Thailand cooperation on science and technology, on 29 October, a Memorandum of Understanding (MoU) on scientific and technological cooperation was signed between the National Natural Science Foundation of China (NSFC) and Thailand Science Research and Innovation (TSRI) in Beijing. The salient sections of the MoU include academic exchange, joint research and joint funding in basic and applied research, climate change and public health projects. Prof Dou Xiankang, President of NSFC and Prof Vissanu Meeyoo, Vice President of TSRI, expressed optimism that the latest agreement will deepen scientific collaboration in addressing global sustainable development.