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Chinese Academy of Sciences tops 'Nature Index 2025 Research Leaders' list

The Chinese Academy of Sciences (CAS) continued to maintain the top position for the 13th consecutive year in the list of 2025 Research Leaders based on *Nature Index Data* from 1 January 2024 to 31 December 2024, which was released on 11 June. CAS was followed by Harvard University in the United States of America. Notably, 12 Chinese universities made it to the top 20 ranking, including the University of Science and Technology of China (USTC), Zhejiang University, Peking University, University of Chinese Academy of Sciences, Tsinghua University, Nanjing University, Shanghai Jiao Tong University, Fudan University, Sichuan University, Jilin University and Nankai University.

Discipline-wise, the CAS continues to rank first globally in chemistry, physical sciences, and earth & environmental sciences and secured second rank in the life sciences. The ranking is determined on the basis of research articles published by authors affiliated to the relevant institution in 145 high-quality journals across the natural and health sciences.

In the backdrop of several Chinese universities entering the rankings, the Chief Editor of Nature Index, Simon Baker, declared that "the data reflect a profound shift in the global research landscape" where due to continued investment in science and technology, China could transform "into rapid sustained growth in high-quality research output" which was earlier dominated by the Western nations.

Second Edition of Belt and Road Conference on S&T Exchange

The second edition of the Belt and Road Conference on Science and Technology (S&T) Exchange based on the theme "Building the Innovation Silk Road for Shared Development: Working Together for a Belt and Road Science and Technology Community", was held in Chengdu, China from 11-12 June. In the two-day conference, representatives from more than 100 countries participated.

At the conference, a range of new intiatives were announced. One major intiatives was the launching of the International Meridian Circle Program (IMCP), where five prominent institutions i.e. the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP), the Korea Polar Research Institute (KOPRI), Nigeria's National Space Research and Development Agency (NASRDA), Thailand's King Mongkut's Institute of Technology Ladkrabang (KMITL), and Uganda's Muni University signed an agreement with the National Space Sceince Center of Chinese Academy of Sciences. The objective of IMCP is to establish the world's most comprehensive ground-based monitoring network to decode space weather (disturbances in geospace driven by solar activity). Geospace is critical for human activities like spaceflight, communications, and navigation, and disruptive space weather events pose significant risks globally. Indeed, the United Nations and major space-faring nations recognize these threats and have initiated action plans, highlighting the need for unified international research.

Other major intiatives include collaborative projects in AI and traditional Chinese medicines and the creation of additional joint laboratories, research alliances and technology transfer hubs.

The first Belt and Road Conference on Science and Technology Exchange was held in November 2023 in Chongqing, China. Chen Jiachang, Vice Minister of Ministry of Science and Technology stated that over the years, China has established scientific and technological cooperation with more than 160 countries and "will continue to deepen scientific and technological cooperation with Belt and Road partner countries to ensure that scientific and technological progress is shared by all humanity."

Scientific Collaboration Projects

In a landmark boost to professional collaboration, the Chinese Society of Engineers (CSE) and Pakistan Engineering Council (PEC) signed a Mutual Recognition Agreement for professional engineers during the Belt and Road Forum on Engineering Capacity Building in Chengdu on 11 June. Under the agreement, the CSA members can acquire registration and practice qualification in Pakistan. The expectation is that the agreement will provide high-level technical support to the China Pakistan Economic Corridor and other Belt and Road Initiative projects.

Scientific Research Breakthroughs and Discoveries

Amid the restriction on chip export by the United States on China, in a landmark development a team of engineers headed by Xie Peng and Han Xilin from the Shanghai Institute of Optics and Fine Mechanics (SIOM) of the Chinese Academy of Sciences, in collaboration with Nanyang Technological University, Singapore developed the world first ultra-high parallel optical computing integrated chip named 'Meteor 1'. The chip can perform more than 100 computing processes in parallel and can achiece a peak performance of 2560 TOPS (Tera Operations Per Second) at a 50 GHz optical clock speed, a benchmark againist NVIDIA'S advanced GPU (Graphical Processing Unit) chips. In the backdrop of this breakthrough, Han Xilian from SIOM stated that "it's like transforming a single-lane highway into a super highway capable of handling a hundred vehicles."

A research team headed by Zhang Qiang from the Changchun Institute of Applied Chemistry of the Chinese Academy of Sciences has successfully developed a fully integrated wearable sweat sensing patch for online analysis of multiple Parkinson's disease-related biomarkers. Parkinson's disease is a progressive neurodegenerative disorder, in which diagnosing the early stage of symptoms like tremors and slowed movement are critical for treatment. According Prof. Zhang, the newly developed technology will enable real-time detection of biomarkers in sweat, allowing non-invasive, dynamic tracking of disease progression, and thereby can offer new possibilities for early intervention during the "golden window" of treatment for Parkinson's patients. Prof. Zhang added the

technology is only the size of a Band-aid but contains a 'miniature detector.'

Researchers from the Guangzhou Institutes of Biomedicine and Health have developed a new cocktail hydrogel which can promote the regeneration of the neurovascular unit and repair damaged brain tissue. This can provide an important theoretical basis and novel strategies for cell replacement therapy for cortical brain injuries.

China Science Diplomacy

The 9th edition of the Shanghai Cooperation Organisation (SCO) Ministers of Science and Technology Meeting was held in Chengdu, China on 12 June. Representatives from SCO attended the meeting, which was chaired by Yin Hejun, Chinese Minister of Science and Technology. In his opening remarks Yin Hejun called on the member states to firmly establish a sense of 'community of shared destiny' and upheld the 'Shanghai Spirit.'

The objective of the meeting was the implementation of the consensus reached at the 24th meeting of the Council of Heads of States of SCO member states in 2024. Meanwhile, it also reviewed the implementation of the development plan in the field of artificial intelligence among theSCO member states and the progress of selected scientific research projects. The 10th edition of the SCO Ministers of Science and Technology Meeting will be held in Kyrgyzstan in 2026.

The 13th BRICS Ministerial Meeting on Science and Technology and Innovation was held in Brasilia, Brazil on 25 June. Attended by BRICS member states, the meeting was chaired by Brazil's Minister of Science, Technology and Innovation Luciana Santos. During the event, a Memorandum of Understanding on 14 Working Groups on Science, Technology and Innovation was also signed with new BRICS member states including Indonesia and other partner states such as Belarus, Cuba, Malaysia, Uganda and Vietnam.

The member states adopted the "Brasilia Declaration on Science, Technology and Innovation of BRICS 2025", underscoring the importance of expanding access to and mastery of technologies and innovations by countries of the Global South. It also sets forth the expansion of cooperation among the member states to create more accessible technological languages and infrastructure that enables the expansion of new tools such as Artificial Intelligence. The declaration also endorsed the BRICS Innovation Action Plan 2025-2030, prepared by the Working Group on Science and Technology, Innovation and Entrepreneurship (STIEP) during a meeting held in Rio de Janeiro on 10-11 June.