

Brazil and China: A Strategic Partnership in Science, Technology and Innovation

By Luciana SANTOS



Luciana Santos is the minister of science, technology, and innovation of Brazil.

As the world faces growing global challenges, collaboration between Brazil and China in the fields of science, technology, and innovation (ST&I) emerges as a strategic model to drive scientific

and technological advancements with far-reaching impacts.

This partnership is anchored by the Sino-Brazilian Commission on Consultation and Cooperation, established in 2004, which facilitates dialogue and co-ordination between the two nations in areas such as ST&I, industry, information and communications technology, and space — sectors that, on the Brazilian side, are overseen by Brazil's Ministry of Science, Technology and Innovation (MCTI).

In recent years, this partnership has strengthened and expanded, focusing on critical topics for sustainable development and technological autonomy. In April 2023, during Brazilian President Luiz Inacio Lula da Silva's visit to China, significant agreements were signed, including a memorandum of understanding (MoU) between the MCTI and China's Ministry of Science and Technology (MOST), covering areas such as nanotechnology, clean energy,

artificial intelligence, and biotechnology.

This collaboration aims to foster the foundations of sustainable development and broaden joint research initiatives and young scientist exchange programs, strengthening connections between the scientific communities of both countries.

At the G20 Summit, set to take place in Brazil on November 18 and 19, a new set of ST&I cooperation agreements is expected to be signed between Brazil and China, further consolidating this bilateral commitment. The new MoUs will address areas such as renewable energy, applied artificial intelligence, nuclear technologies, and advanced information and communication systems.

Thus, signing these agreements will reflect the continued dedication of both countries to building a robust and cooperative innovation ecosystem, providing mutual benefits in areas crucial to global security and economic development.

Cooperation on new scientific frontiers

The two countries have focused on high-tech and innovation fields, establishing bilateral research hubs such as the China- Brazil Center for Research and Innovation in Nanotechnology and the China- Brazil Center for Climate Change and Innovative Energy Technologies. These centers are dedicated to developing advanced technologies in areas such as new energy sources, accelerator physics, photonics, and low-carbon solutions.

Advancements in establishing bilateral biotechnology centers and solid-state lighting reinforce the mutual commitment to developing technological solutions that meet global and local demands for sustainability and innovation.

In the space sector, the CBERS (China- Brazil Earth Resources Satellite) program stands out as one of the oldest and most successful collaborations between the two nations, with six satellites

launched and the current development of the CBERS- 5 geostationary satellite. This series of satellites plays an essential role in environmental, agricultural, and territorial monitoring, providing detailed images that support disaster monitoring, deforestation control, natural resource management, and urban planning initiatives.

The continuity of the CBERS program, a priority for President Lula and the MCTI, symbolizes innovation and the strategic South- South partnership, as well as Brazil and China's commitment to environmental protection and technological independence.

Challenges and the future

The cooperation between Brazil and China in ST&I holds immense potential to help address current global challenges while enabling the development of long-term solutions for sustainable development and autonomy in strategic technological areas.

In the field of AI, for example, joint

work facilitates advances in solutions applicable to a wide range of sectors that require innovative and adaptable approaches. In renewable technologies, joint projects focused on clean and photovoltaic energy reflect the commitment to sustainability and the adaptation of both countries to the demands of a low-carbon global economy.

Over the next decade, building on the fruitful relationship between MCTI and MOST, cooperation between Brazil and China is expected to continue expanding and deepening, with a focus on strengthening research in advanced materials, AI, new technological frontiers, and other fields of sustainable development.

This ongoing engagement highlights the importance of international partnerships in ST&I as essential tools for progress, prosperity, poverty reduction, inequality and hunger reduction, environmental protection, combating climate change, and health access.

Young International Scientists Say

China, Brazil Good Friends and Good Partners



By GONG Qian

When Dr. Juan Carlos Mateus Sanchez, a researcher at Brazil's National Institute of Metrology, Quality and Technology (INMETRO), was selected as a young international scientist in 2019 to undertake research at a Chinese institution for 12 months, he immediately said yes.

"It was a great opportunity that I could not pass up," Dr. Sanchez told *Science and Technology Daily (S&T Daily)*.

Over the past decades, as bilateral relations between China and Brazil have maintained steady growth, their sci-tech collaboration has become a model of South-South cooperation and played an important role in enhancing people-to-people exchanges and contributing to global sci-tech innovation.

Learning from China's experience

The National Institute of Metrology (NIM), China and INMETRO are both national metrology institutions. They develop and maintain national primary measurement standards and use them to ensure accuracy and reliability of measurement results. In 2017, NIM and INMETRO signed a new memorandum of understanding, identifying electromagnetic (EMC) as a priority topic, which enabled Dr. Sanchez to collaborate with his Chinese counterparts.

"China has given the right place

of importance to metrology, realizing the huge impact that it has on the development of economy, industry and the society," Dr. Sanchez, the leader of the EMC laboratory of INMETRO, said.

During his stay at NIM in 2019, Sanchez compared the measurements of electric fields generated in different laboratories of China and Brazil by designing an E-field sensor probe, which he calls "the most important achievement".

The young scientist developed the sensor along with a team of Chinese researchers led by NIM's Dr. Meng Donglin, who was also his mentor. "At that time, a few people doubted whether we could make it, considering the technical challenges and limited research funding," Dr. Meng said.

Eventually, with a fund of 150,000 RMB and advanced equipment from NIM, they spent nearly eight months developing such a device involving three types of updates while collaborating with a Chinese manufacturer.

Based on their research, they co-authored a published paper and also put the device to use in Dr. Sanchez's lab, using it to establish the standard field strength between 80 MHz to 2 GHz in his home country, which filled a gap in metrological testing capabilities. The device provides accurate measurements for other laboratories in Brazil, improving product quality and promoting industrial development.

What's more, China and Brazil have mutually recognized measurements in this field, facilitating trade in

mechanical and electrical products between them.

From finding common R&D demands, tailoring feasible cooperation plans, and imparting knowledge and skills to tracking the cooperation outcomes while involving enterprises, the sustainable cooperation between NIM and INMETRO provides a successful example for BRICS members and Global South countries, said Zhu Xiumei, project coordinator of International Cooperation Department at NIM.

Close friends with mutual trust

Dr. Sanchez is very thankful for his Chinese colleagues, especially Dr. Meng. "He is my personal friend and we are very close," Dr. Sanchez said. "He is patient and gave me all the support I needed."

When developing the sensor, Dr. Sanchez was new to the different measurement standard equipment in the laboratory and the experienced mentor helped him to use them.

Dr. Sanchez demonstrated his outstanding capabilities in literature search, communication and teamwork, Dr. Meng said. "Although we have different personalities at work, we are all genuinely committed to R&D collaboration. It is very crucial to build mutual trust and foster empathy in international cooperation."

Upon Dr. Sanchez's arrival in Beijing, his Chinese colleagues went out of their way to make him and his family adapt to their new life in Beijing smoothly. They helped him to rent an apartment, open a bank account, and buy daily necessities. They also taught

Dr. Sanchez how to use mobile payment and ride-hailing apps.

In the early days of the COVID-19 pandemic, when there was a shortage of masks, one of his colleagues drove to his home to deliver them. "They called me every day to see if I need something and to check if I had any symptoms," Dr. Sanchez said.

He calls his experience in China valuable for his life and career. Even after returning to Brazil, Dr. Sanchez stayed in close touch with his Chinese friends, exploring academic issues while sharing personal lives. As an ancient Chinese poem goes, "If you have a friend afar who knows your heart, distance cannot keep you two apart."

Broader cooperation in next 50 years

Dr. Sanchez returned to NIM in 2023 and he is promoting further cooperation between NIM and INMETRO.

Over the past half century, the Brazil-China friendship has been continuously strengthened and cooperation has become increasingly diversified, Brazilian President Luiz Inacio Lula da Silva said in his congratulatory letter on the 50th anniversary of the establishment of diplomatic relations between China and Brazil in August 2023.

Brazil is the first developing country to cooperate with China in high-tech areas such as satellites. In 1988, the China-Brazil Earth Resources Satellite (CBERS) project was given priority and since then, the two countries have jointly developed six earth-resources satellites.

Data from these satellites sup-



Brazilian researcher Dr. Juan Carlos Mateus Sanchez (left) and his Chinese mentor Dr. Meng Donglin at the National Institute of Metrology, China. (COURTESY PHOTO)

ports the socio-economic development of China and Brazil and is widely applied in agriculture, forestry, water resources, land resources, environmental protection, and disaster prevention and mitigation.

Institutions such as the China-Brazil Center for Climate Change and Energy Technology Innovation, China-Brazil Joint Laboratory of Agricultural Sciences, and the China- Brazil Joint Laboratory for Space Weather are serving as important platforms to strengthen their sci-tech cooperation.

Political mutual trust, economic complementarity, and mutual learning in development serve as the corner-

stone of the thriving China-Brazil relations, Song Junying, director of the Department of Latin American and Caribbean Studies at the China Institute of International Studies, told *S&T Daily*. Now, both sides are seeking closer synergy between the Belt and Road Initiative and Brazil's reindustrialization strategy.

In the next 50 years of bilateral relations, the two sides will open up a new path together and build a bright shared future, Lula said.

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The Marangatu photovoltaic power station, invested by a Chinese company, in the northeastern Brazilian state of Piaui. (PHOTO: XINHUA)