

Scientific Discovery Needs Coordination not Isolation

Voice of the World

Edited by QI Liming

At the World Economic Forum in February, Alessandro Curioni, director of IBM Research Europe, said that collaboration has long been key to scientific discovery and innovation, in both academia and industry. His views are widely shared by those in the science fraternity.

Science devoting to a community with a shared future

Science is a global language and endeavor and not owned by any one culture or society, and the values of equity and inclusiveness are key to the modern science system, according to Peter Gluckman, president of the International Science Council in August.

"As we face a more fractured geopolitical framework, science must work hard to build and maintain the global framework. Science can be an important and alternative track to try and repair some of these fractures as it did in the cold war. Science is at the heart of moving ahead on the global challenges that affect us all," said Gluckman.

Jerzy M Langer, President of the Warsaw Scientific Society, said at the meeting of China-Poland frontier science and technology cooperation on September 20, that science-based innovation is the best way for humankind to develop.

Langer said that as a deep partner of China-CEEC (Central and Eastern European Countries) Innovation Coopera-

tion Research Center, the Warsaw Scientific Society of Poland is willing to work with Chinese colleagues on common goals to make people's lives better.

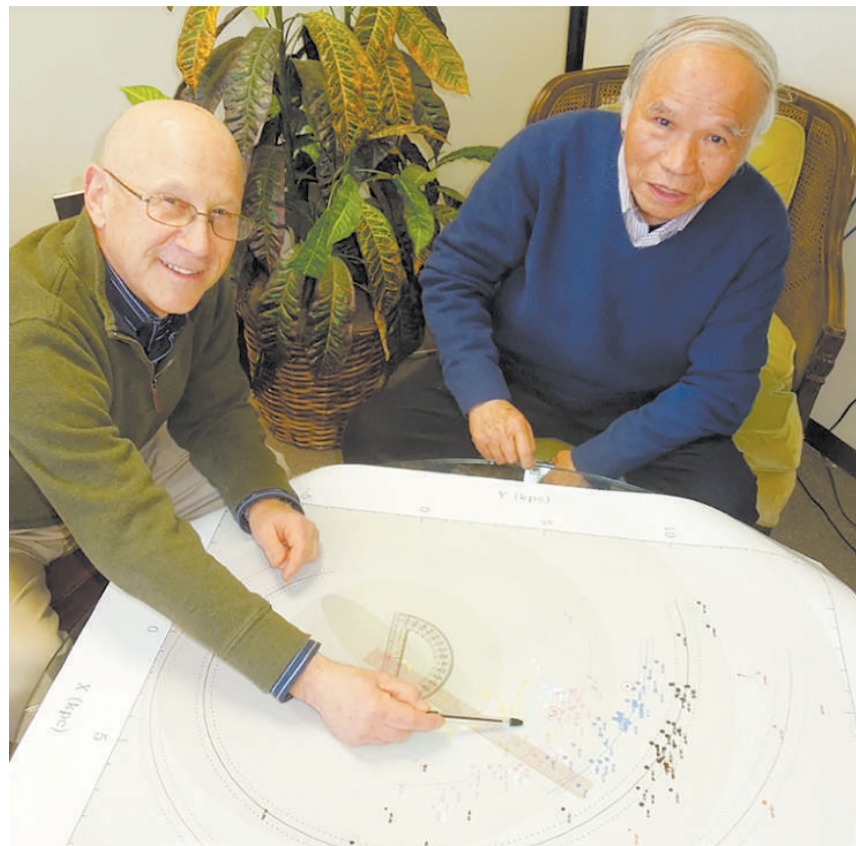
China-U.S. collaboration bringing strength in science projects

According to an article published in *Nature* recently, collaborative research between China and the U.S. has remained resilient. Such joint efforts are not only important for accelerating scientific advances, but for strengthening ties between the two nations.

In the Nature Index, which tracks output in 82 selected natural-sciences journals, China and the U.S. are each other's most important collaborative partners. Between 2015 and 2020, the number of papers co-authored by China and the U.S. leapt from 3,412 to 5,213, more than any other country pairing in the Index.

Duke University's Senior Adviser to the President for China Affairs, Dr. Denis Simon, argued that China-U.S. cooperation is key to tackling global problems. "There is no S&T related global problem, such as climate change, clean energy, clean environment, food safety, etc. whose meaningful solution will not depend on some form of close U.S.-China cooperation," he said.

According to Center for International & Global Studies at Duke University, as Chinese influence in science and technology continues to expand across the globe, it inevitably is going to become a key player in the rules-making apparatus in international and regional S&T affairs. The U.S. and other countries, rather than simply forging a so-called "anti-China alliance", need to find a better way to tap into China's enhanced capa-



Mark Reid (left) and Zheng Xingwu (right), whose work revealed the structure of the Milky Way. (PHOTO: NANJING UNIVERSITY)

bilities as part of a long-term collaborative consortium aimed at solving the world's most pressing issues.

Scientists and institutions calling for more inclusive coordination

Tommy Shih, associate professor in business administration at Lund University, said that the United Nations and many researchers have emphasized the critical role international collaborative science plays in solving global challenges like climate change, biodiversity loss and pandemics. The rise of non-Western countries as science powers is helping to drive this type of global cooperative research.

However, in the past few years, the U.S. decoupling policies have contributed to nations' behaving in more distrustful and insular ways overall. One result is that it is becoming increasingly difficult for researchers to collaborate with scholars in other nations.

According to the Conversation, a unique not-for-profit media outlets between academics and journalists that publishes research based news and analysis, many researchers in the U.S., Europe and China have voiced concerns that geopolitical rivalries are curtailing international research collaboration at a time when the world needs it the most.

There is a major risk that the impediments to international scientific collaboration will further increase, which will harm data sharing, the quality of research and the ability to disseminate results that contribute to solving problems.

A large number of researchers, university leaders and funding agencies in Europe, the U.S. and China have vented their frustration with the current situation. Many in the research community would like to see a more open and global science landscape.

Comment

Time to Tackle Global Food Crisis

By GONG Qian

The World Food Day is to be celebrated on October 16 with an inclusive theme this year of "Leave No One Behind."

However, despite food supplies being able to adjust to demand around the world, it is forecasted that 205.1 million people will be in a food crisis or worse in 45 countries or territories, according to the 2022 *Global Report on Food Crises Mid-Year Update* published in September.

So what is contributing to the crisis and how can it be dealt with?

Main factors behind food insecurity

The current global food crisis is largely driven by climate change, long-standing regional conflicts and the ongoing COVID-19 pandemic. Food trade restrictions are fueling the crisis.

Climate change has escalated frequent extreme weather events including floods, heatwaves and drought. This has devastated the food system, especially food production. The Intergovernmental Panel on Climate Change noted that the rising heat and rainfall associated with climate change are increasingly degrading land, making soil less productive. Researchers found that up to 30 percent of the expected increase in growth of European crops has been cancelled out by adverse weather.

The Russian-Ukraine conflict is one of the other key drivers of food insecurity. According to *National Geographic* magazine, the two countries produce nearly 30 percent of the world's traded wheat, and they are also the main suppliers of fertilizer. Now, the conflict has resulted in less or no grain exports from the two and soaring food and fertilizer prices.

According to *the Guardian*, at least 50 countries depend on Russia and Ukraine for 30 percent or more of their wheat supply, including developing countries in northern Africa, Asia and the Middle East.

However, the situation is getting worse. Some food trade restrictions have been put in place by countries to protect insufficient domestic food supplies. As of September 15, 21 countries have im-

plemented 30 food export bans, and six have implemented 11 export-limiting measures, according to the World Bank. For example, Turkey has stopped exports of butter, beef, lamb, and vegetable oils.

Urgent actions to solve food crisis

Facing these challenges and difficulties, global solutions are needed now more than ever.

In response, heads of FAO, IMF, WBG, WFP, and WTO issued a joint statement on September 21 to address the problem.

For example, the WBG is making up to 30 billion USD available over a period of 15 months in areas such as agriculture, nutrition, social protection, water and irrigation. The IMF is proposing a new "food shock window" within the IMF emergency lending instruments.

China has made compelling contributions to alleviating the world food crisis. According to the China's Foreign Ministry spokesperson Wang Wenbin, China has provided more funding and experts and undertaken more projects under the framework of the FAO's South-South Cooperation Program than any other developing countries. To date, China has offered more than 30,000 tons of emergency humanitarian food aid to developing countries in need.

Over the years, China has carried out agricultural cooperation with more than 140 countries and regions, and provided more than 1,000 agricultural technologies to other developing countries, driving their crop yield up by 30 to 60 percent on average and benefiting more than 1.5 million small agricultural households.

The road ahead to tackle the food crisis is arduous, but efforts can be made to accelerate change. "Our focus is on transforming agrifood systems to be more efficient, more inclusive, more resilient and more sustainable, for better production, better nutrition, a better environment and a better life for all, leaving no one behind," said Qu Dongyu, Director-General of FAO at a high-level event.

World Food Day is for everyone and everyone needs to be part of the change.

Hi! Tech

Major Breakthrough in Reusable Liquid Rocket Engine

By TANG Zhexiao

China's aerospace technology researchers recently announced a test flight of a reusable rocket engine, signaling that engine reusability technology in the country has reached the stage of practical use.

As a new generation launch vehicle, the liquid oxygen and kerosene rocket engine can be used for vertical take-off and landing, and is similar to those used by SpaceX on its Falcon 9

rockets.

Liquid oxygen and kerosene rocket engines can provide the main power for space flights. Carrying their own oxygen, they can function either in the air or a vacuum.

Using the advanced high-pressure supplementary combustion cycle system, the engines' thrust can be more than 60 percent higher than the existing "Long March" series of launch vehicle engines, and its carrying capacity is about three times that of the original.

Despite the advantage on thrust, the engines' fuel is non-toxic and only causes small amounts of pollution.

Technical challenges of the engines, such as repeat ignition technology, large-scale continuous thrust adjustment and thermal protection technology, have been overcome by researchers.

More attention will be paid to the high reliability, low cost and high performance of the engines in the future, according to the research team.



A view of the reusable liquid rocket engine developed by China's Xi'an Aerospace Propulsion Institute. (PHOTO: Xi'an Aerospace Propulsion Institute)

Advances in Management of Natural Resources

From page 1

Meanwhile, China's energy consumption mix has kept improving. Over the past decade, the proportion of coal in energy consumption decreased by 14.2 percent, while the proportion of non-fossil energy such as hydropower, nuclear power and wind power increased by 8.2 percent, according to the report *China Mineral Resources 2022* released by the MNR.

Efforts were also made to regulate the exploration and promote the construction of green mines and ecological rehabilitation of mines, during the past ten years.

As of December 2021, 10,202 exploration rights were registered nationwide, down by 1.6 percent year-on-year; and 32,536 mining rights were registered nationwide, down by 6.1 percent year-on-year. To date, there are more than 1,100 national-level green mines in China.

In Tangshan, Hebei province, an ecological park was built on mine subsidence of more than 30 square kilometers, improving local living conditions and bringing job opportunities.

International cooperation

Over the past ten years, China has been committed to the *United Nations (UN) 2030 Agenda for Sustainable Development* by innovating the methods of international exchanges

and cooperation in the field of natural resources.

In 2020, the country offered its updated 30-meter resolution global land cover data to the UN, while in May this year, the UN Global Geospatial Knowledge and Innovation Centre was inaugurated in Deqing, Zhejiang province.

Practical cooperation was also carried out in the field of geology and minerals through exchange platforms such as China International Mining Conference, and the China-ASEAN Mining Cooperation Forum and Promotion Exhibition.

Meanwhile China has participated in the global marine and ecological governance under the framework of the UN, and implemented the *United Nations Decade of Marine Science for Sustainable Development (2021-2030)*, so as to ensure marine science can promote sustainable development of the ocean.

By promoting the Blue Partnership, China has established maritime cooperation relations with more than 50 countries and international organizations, and provided tsunami warnings and other public goods and services to countries surrounding the South China Sea.

China will continue to improve the system for marine resources protection and exploration, and promote high-quality development of the marine economy, said the MNR.

What's Special about Chinese Feitian Spacesuit ?

By TANG Zhexiao



Chinese Feitian Spacesuit exhibited in Beijing Science Center. (PHOTO: VCG)

Supported by self-developed spacesuits, taikonauts Chen Dong and Liu Yang launched their spacewalk on September 17, completing all extravehicular activities (EVAs) outside China's space station and the newly-launched Wentian lab module.

Literally and separately meaning "flying" and "sky" in Mandarin, Feitian, the second-generation extravehicular spacesuit, is a micro manned spacecraft and it acts as the armor for astronauts to perform EVAs.

After being charged with the applicable pressure, it can protect the taikonauts' life by resisting high and low

temperatures and strong radiation in outer space.

Utilizing a bionic structure, designers use air-tight bearings at the joints of the upper and lower limbs, to make it move and rotate with body actions, according to Liao Qianfang, chief designer of the EVA spacesuit at the China Astronaut Center.

To demonstrate the suits' dexterity during the R&D and testing satage, the researcher wearing Feitian was able to grab a stick measuring a few millimeters.

Weighing 130 kg, the suit can be adjusted to fit each individual taikonaut, from 1.6 meters to 1.8 meters tall.

As the lifeline of astronauts, the tether is a rope connecting spacesuits to the spacecraft.

With the help of two orange tethers on the suit, of which the pulled weight can reach one ton, taikonauts can move and climb outside space station by repeated hooking.

Another special design is reflectors on the suit's gloves. Taikonauts usually observe the equipment via viewing window, which has a blind spot. Through the reflector, astronauts can see a positive image of device parameters on their chest equipment, making operation much easier.

China-Eurasia Expo Encourages Cooperation

From page 1

Meirzhan Yussupov, Chairman of the Management Board of KAZAKH INVEST National Company, said that Chinese companies are one of their main cooperative partners when Kazakhstan carries out major investment

projects, and they have actively participated in the industrialization process of the country.

"The China-Eurasia Expo provides a platform to promote mutual trust and cooperation," said Zhang Dong, deputy director of the Administrative Committee

of the China-SCO Local Economic and Trade Cooperation Demonstration Area, adding that the committee plans to build an SCO super port that can reach central Asia and Europe via Xinjiang.

For the past few years, Xinjiang has taken full advantage of its location

to actively facilitate the construction of the core area of the Silk Road Economic Belt. The region has signed 21 cooperative agreements with 25 countries and international organizations, and established economic cooperation relationships with 190 countries and regions, according to data released at a related press conference held by Xinjiang in July.