

# Science and Technology Daily

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WEEKLY EDITION

## China, Thailand Launch ASEAN's First 5G Smart Hospital

By Staff Reporters

China-Thailand digital economic cooperation has become the focus of bilateral exchanges since the two established ministerial dialogue on digital economy cooperation in 2019.

Thailand's National Broadcasting and Telecommunications Commission, Siriraj Hospital, and Huawei Thailand jointly launched a new 5G smart hospital project in mid-December 2021 at Siriraj Hospital in Bangkok, marking the first and largest 5G smart hospital project in the ASEAN region.

Patients at Siriraj Hospital will have access to a full range of digital services, including 5G ambulance, cloud-based AI diagnostics and telemedicine.

Thai Prime Minister, Prayut Chan-ocha said at the launch that the utilization of digital technologies and 5G in the medical field would help reduce processes for medical personnel, decrease overall risk, and will improve the effectiveness and efficiency of healthcare for patients. "We hope the project will act as a blueprint for all smart hospitals in Thailand going forward," said he.

Under the 5G Smart Hospital project agreement signed by Siriraj Hospital

and Huawei, the two sides will work together on nine sub-projects. Currently, 5G portable medical boxes, 5G unmanned vehicles, 5G medical carts, and 5G smart hospital beds have been piloted at Siriraj Hospital.

A Joint Innovation Lab will be established. Around 30 5G-medical applications are expected to be incubated and promoted nationwide in 2022, according to Huawei. With the help of Huawei, Thailand has built 20,000 5G stations in the past two years and owns more than 4.2 million 5G subscribers for now, leading in 5G adoption among ASEAN countries.

Chinese Ambassador to Thailand, Han Zhiqiang, praised the China-Thailand 5G cooperation, saying, "It has become a model for the region, helping Thailand become the first country in Southeast Asia to launch 5G for commercial use."

"China is glad to work together with Thailand to address common challenges and drive economic development, and will keep supporting companies like Huawei in improving the lives of Thai and Chinese people through concepts such as Smart Hospitals," said Han.



Mobile irrigation machine is working in the wheat field in Hebi City, Henan province. (PHOTO: XINHUA)

## Editor's Pick

## Smart Farming Produces Bumper Harvests for 18 Consecutive Years

By WANG Xiaoxia

Agriculture is the foundation of the national economy, and grain has a major bearing on national prosperity and people's livelihoods.

China's annual grain production has exceeded 650 billion kg for seven consecutive years, with a bumper harvest in 18 consecutive years, according to National Bureau of Statistics. This ongoing growth is driven by China's efforts in pushing forward the digital and intelligent transformation of agriculture.

**5G + agriculture improves productivity**

In the past, the whole process of agricultural production was mainly completed by manual labor. But now, agricultural production efficiency has been greatly improved, thanks to the applica-

tion of the 5G network and big data platform.

A smart farm in Hebi City, Henan province has launched a remote diagnosis and treatment service platform for animals and plants, on which conclusions are drawn by comparing the real-time images with those from the pest database, with accuracy up to 86 percent, according to Zhang Shulun, vice president of Nong Xin Tong Group in Hebi.

A number of sensors keep collecting parameters such as soil moisture and the number of spores, which is invisible but an important indicator of wheat disease. Once the parameter registers as abnormal, the system will give early warning to diseases and pests, said Zhang.

Another 5G digital agriculture plantation, located in Linying County, Henan

province, is the largest chili planting base in central China. Multiple types of sensors monitor the conditions of chili, and upload the information to the big data platform through 5G networks. After careful analysis, measures will be carried out accordingly, in terms of seeding, irrigation, fertilizing and pesticide spraying.

The pepper seeding machine can sow more than 60 mu (40,000 square meters) of land in a day. Precise irrigation and fertilization can save more than 50 percent of water and reduce the use of fertilizer by 10 to 30 percent. With the disease and pests monitoring and early warning mechanism, the loss caused by disease and pests is reduced by 70 percent, while pesticide use is down by 60 percent, said Han Peifeng, researcher from the county's Agriculture and Rural Bureau. **See page 2**

## Over 1 Billion kW: Installed Capacity of Green Power in 2021

By Staff Reporters

At the national energy work conference held at the end of December last year, the National Energy Administration (NEA) announced that the installed capacity of power generators using renewable resources has exceeded one billion kW — a historic breakthrough.

Though fossil fuels still play an important role in electricity generation in China, the country is working towards a greener mode of energy consumption.

In 2021, the annual generated energy via new energy resources surpassed one trillion kWh for the first time.

By November of 2021, the installed capacity of generators by water drew close to 400 million kW, increasing 5.5 percent year-on-year. In June of 2021, the Baihetan hydropower station, the world's largest hydropower station under construction, began operation with

two generating units. With a total installed capacity of 16 million kW, the Baihetan hydropower station can generate more than 62.4 billion kWh of electricity on average annually, after all 16 units are operational.

Up by 29 percent on a year-on-year basis, the installed capacity of wind power topped 300 million kW. In 2021 China saw huge technological progress in its wind power projects. At an altitude of 5,158 meters, the world's highest wind power project began operation in Xizang Autonomous Region last December. Not long before that, the first typhoon-resistant floating offshore wind turbine in the world was put into use in Yangjiang, Guangdong province.

The installed capacity of solar power saw an increase of 24.1 percent in 2021 compared with that of 2020.

Apart from the achievements in installed capacity, the utilization rate of wa-

ter power, photovoltaic power and wind power delivered praiseworthy performance, reaching as high as 97.8 percent, 97.9 percent and 96.9 percent respectively, effectively reducing energy loss.

With a total installed capacity of 53.26 million kW, nuclear power generation also played its part. The world's first High Temperature Gas-Cooled Reactor - Pebble-bed Module (HTR-PM) at the Shidaowan nuclear power station in Shandong province was connected to the grid on December 20, 2021. This is a clear indication of the country's progress in nuclear power generation.

The year 2021 was a fruitful year for greener power generation. In 2022, the NEA will accelerate the research and development on technological equipment, especially in fields such as renewable resources, and greatly promote the innovation of technology in the energy industry.

With the large number of sci-tech achievements in 2021, it is no easy task to select the top 10 in China and in the world. After putting their heads together the editors at S&T Daily reached consensus, voting the following accomplishments (the list is in random order) as the pick of the sci-tech crop last year.

## Top 10 Sci-tech Achievements in China in 2021

1. Scientists from the Institute of Genetics and Developmental Biology of the Chinese Academy of Sciences (CAS) proposed de novo domestication of wild allotetraploid rice. Research results show the possibility that this rice can be developed into a new staple cereal to strengthen world food security.

2. With the quantum computer prototypes "Jiuzhang 2.0" and "Zuchongzhi 2.1" successfully developed in 2021, China achieved a quantum computational advantage in two mainstream technical routes: one via photonics quantum computing technology and the other via superconducting quantum computing technology.

3. After more than nine months, Tianwen-1, China's first Mars probe landed on the red planet and pictures captured by the rover Zhurong were released. **See page 4**

## Top 10 Sci-tech Achievements in the World in 2021

I. A research group developed an intracortical Brain-computer interface (BCI) that decodes attempted handwriting movements from neural activity in the motor cortex and translates it to text in real time. The participant of the study, whose hand was paralyzed from a spinal cord injury, "typed" 90 characters per minute with 94.1 percent raw accuracy online.

II. Muons, which are large, unstable electron-like particles, are more magnetic than originally predicted according to researchers who are involved in the Muon g-2 experiment at the Fermi National Accelerator Laboratory in the U.S. If the results hold up, they could reveal the existence of completely new fundamental particles.

III. A study published by *Science* showed that quantum entanglement was directly observed and recorded at the macroscopic scale. A previous study displayed that it was possible to measure the position and momentum of the two drumheads used in the experiments at the same time. These findings could be applied to manipulate and entangle objects on a macroscopic scale, which can contribute to next-generation communication networks. **See page 4**

## Green Olympics

## Green Transportation System Escorts Beijing 2022

Edited by TANG Zhexiao

Beijing's commitment to reducing its carbon footprint has also extended to its green transportation system. The Beijing 2022 Winter Olympic Games aims to break ground in green transportation, trying to become an Olympic Winter Games to use such a large number of environmentally friendly vehicles.

At the end of 2017, Beijing issued a document noting the application of hydrogen production and hydrogenation core technology in relevant areas of the 2022 Olympic and Paralympic Winter Games should be promoted.

Zhao Tongan, deputy director of transportation for the Beijing Organizing Committee for the Olympic Games, said that during Beijing 2022, transportation services will use clean energy and promote the use of hydrogen fuel vehicles.

Along with hydrogen fuel vehicles, other service vehicles to be used include electric vehicles, natural gas vehicles, hybrid vehicles and traditional energy vehicles. Clean energy vehicles will account

for 100 percent of the passenger cars and 85.84 percent of all vehicles, the highest compared with all previous Winter Olympics.

Clean energy shuttles will be available to connect high-speed railway stations and spectator parking lots to all the venues. Charging stations and hydrogenation stations will be installed for official vehicles in competition zones.

During the games, the application of the new energy vehicles is expected to reduce about 11,000 tons of carbon dioxide emissions, equivalent to the carbon sequestration of more than 30 square kilometers of forest in a year.

As the co-host city of Beijing 2022, Zhangjiakou has eight hydrogen refueling stations. It will deploy more than 600 hydrogen powered vehicles in the city's competition zone for Beijing 2022, according to the local government.

In addition, Beijing 2022 has released a WeChat social media program to encourage and guide the public to practice a green and low-carbon lifestyle, allowing users to record their low-carbon contributions.



Clean energy vehicle in Beijing 2022. (Graphic design: TANG Zhexiao; PHOTO: VCG)

Clean energy vehicles will account for 100% of the passenger cars and 85.84% of all vehicles during Beijing 2022.

WECHAT ACCOUNT E-PAPER



# Highlights: Revised Sci-Tech Progress Law to Spur Innovation

By ZHONG Jianli

China's revision to its *Law on Progress of Science and Technology* has been approved by lawmakers and enacted on January 1, 2022.

This is the second revision to the law since it took effect in 1993 – the first amendment was in 2007.

The latest revision aims to highlight the strategic position of scientific and technological innovation, by enhancing the country's innovation system and making breakthroughs in key areas and core technologies.

The updates include promoting sci-tech development to support the country's carbon neutrality goal, increasing investment in basic research, reducing the administrative burden of researchers and giving them more incentives, and strengthening international sci-tech cooperation.

### Basic research bolstered

Basic research is the source of innovation. The latest revision lists basic research in its own separate chapter, indicating the importance China places on basic research.

According to the revision, a mechanism should be set up to provide stable financial support for basic research.

Actually, in recent years China has been increasing its spending on basic research. The budget arrangement in basic research exceeded six percent of China's total R&D spending for the first time in 2019, and is expected to reach eight percent during the 14th Five-Year Plan period (2021-2025).

The revised law also stipulates that governments at all levels should guide enterprises in increasing investment in basic research and encourage society to invest in basic research through donations or establishment of funds by providing them with finance, tax and other policy support.

### National labs highlighted

National labs are placed on a more important position in the revision.

It states that national strategic sci-tech forces should be developed to play a leading role in key areas and original innovation. These forces include national laboratories, national sci-tech R&D institutions, high-level research-oriented universities, and leading tech companies.

It is also mandated that the coun-

try should make efforts to advance areas of key fundamental research, frontier technologies with huge application potential, as well as research with social significance.

The protection of intellectual property rights is always essential for spurring innovation. So the revision makes it clear that the reform of the ownership of sci-tech achievements should be intensified so as to promote the transfer and transformation of such achievements.

### Sci-tech personnel motivated

In order to encourage sci-tech personnel to be more creative and innovative, the revision stresses the importance of creating a favorable environment for sci-tech personnel.

For example, the new version calls for improving the training, selection, use, and evaluation mechanisms for innovative personnel and teams. It encourages sci-tech R&D institutions, institutions of higher learning, and enterprises to motivate sci-tech personnel by means of equity, options or dividends.

It's worth mentioning that the revision also includes clauses to provide

support for female sci-tech personnel.

An addition stipulates that governments, enterprises and institutions should improve the mechanism for training, assessing and motivating female scientists, care for female sci-tech workers during their maternity period, and encourage women to play a bigger role in science and technology progress.

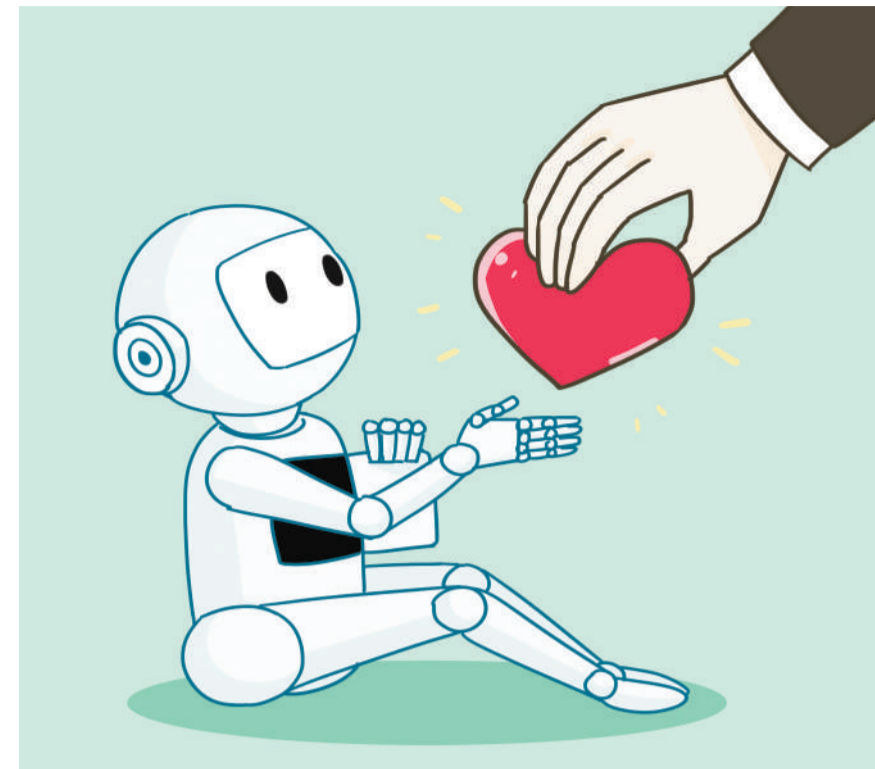
### Int'l cooperation strengthened

International cooperation is also added as a separate chapter in the revision.

It calls for promoting international sci-tech cooperation and communication in an open, inclusive and mutually beneficial way.

As the world faces common challenges such as climate change, major natural disasters and infectious diseases, the law encourages collaborative R&D among scientists and researchers at home and abroad to tackle these challenges together.

To attract foreign experts to carry out sci-tech R&D work in China, the revision calls for improving relevant social services for these experts. They will have priority in obtaining permanent residency in China or Chinese nationality.



Science and technology for social good. (PHOTO: VCG)

## Ethical Governance Vital to Healthy Research and Development

By LI Linxu

As a new round of scientific and technological revolution is gaining momentum, the penetration and disruptiveness of sci-tech innovation has been profoundly changing human life as we know it.

China has always attached great importance to the ethics of science and technology, and is committed to further enhancing the ethical governance.

Recently, the guideline on strengthening ethical governance of science and technology was reviewed and approved by China's relevant authority.

The guideline emphasizes several upholding principles, such as serving the well-being of humanity, respecting people's right to life, maintaining openness and transparency in science and technology, and fostering a cultural concept and safeguard mechanisms of "technology for social good."

The approval of the guideline is a hallmark event in the country's ethical governance, and is of great significance to the healthy development of sci-tech innovation, said Wang Guoyu, a professor of ethics in the School of Philosophy at Fudan University, adding that the ethical governance mechanism should

be proactive and dynamic.

Although the guideline is yet to be published in full, its draft version solicited public opinions last July.

The draft guideline specified the research in relation to ethics sensitive areas, such as life science, medicine and artificial intelligence, should establish an ethics review committee.

As to international cooperation in the field of science and technology, the draft guideline also calls for strengthening ethics reviews and regulations.

A list of high-risk activities will be set up, according to the draft guideline, adding that a public filing system of significant ethics risk projects will be explored.

Ethics education is highlighted in the draft guideline, which calls for making the ethics related content a compulsory subject in the country's undergraduate and postgraduate education, so as to educate young students to establish a correct consciousness of ethics in science and technology.

It is worth mentioning that *China's Law on Progress of Science and Technology* also highlights the important role of ethical governance.

In 2020, China established an ethics review committee at national level.

## China-South Africa Educational Cooperation Mutually Beneficial

By GUO Guozhong  
CHEN Chunyu

South Africa is an important cooperative partner of China in Africa. How can China and South Africa seize the opportunity of bilateral cooperation in the new era? What can both sides do to further integrate advantageous resources and unleash the benefits of synergies? The cooperation in vocational education may provide answers to these questions.

The 2021 Annual Conference of China & Africa (South Africa) Technical and Vocational Education Cooperation Alliance (CASATVECA) and Education and Industry Integration Seminar was held in Changzhou, Jiangsu province from December 13-15, 2021.

In order to promote the pragmatic development of vocational education with South Africa and other African countries, strengthen the integration of industries and education, and promote the joint "going global" of Chinese vocational colleges and enterprises, CASATVECA was launched in Changzhou in January 2018, by the China Center for International People-to-People Exchange (CCPIE) under the Ministry of Education and the Industrial and Manufacturing Training Authority under the Department of Higher Education and Training of South Africa.

At present, there are 108 Chinese members and 37 South African members in the alliance. In the past three years, with the support and joint efforts

of the alliance members, the number of colleges and enterprises served by the alliance has continued to grow, and the brand influences and social effects have witnessed a steady increase. The overseas education projects were initiated by the member colleges, creating a new model for talent cultivation and collaborative innovation.

Du Kewei, the director general of CCPIE, said that the alliance has played its role in promoting China-Africa educational cooperation and cultural exchanges, nurturing South African technical personnel and better serving the building of the Belt and Road Initiative.

Against the backdrop of the global pandemic, in which South Africa is deeply affected, the China-Africa vocational education cooperation is conducive to maintaining fruitful results achieved by China and South Africa and exploring new prospects in a changing situation, which also demonstrates China's commitment to its mission, said Li Xudong, counselor in charge of education at the Chinese Embassy in South Africa.

It is hoped that the alliance can deeply implement the principles of the 8th Ministerial Conference of the Forum on China-Africa Cooperation and pool the skills in areas such as the training of high-level technical personnel and the integration of industry and education, helping achieve common progress of the two countries in the post-COVID-19 era, said Li.

## Latest Achievements on the CHTF

The 23rd China Hi-Tech Fair (CHTF) was held in Shenzhen, Guangdong province during Dec 27-29, 2021.

Participants coming from 39 countries including France, Germany, and Russia took part in the fair, showcasing the latest achievements in the fields of new-generation information technology, high-end manufacturing, smart cities, new energy, and new materials.

Photo below shows an educational robot on the fair. (PHOTO: XINHUA)



## Declaration on Int'l Science Communication Released at 3rd BRISCS

By Staff Reporters

Committed to broadening the channels for international exchange and cooperation on science popularization and promoting the intensive sharing of science popularization resources, the 3rd Belt and Road International Science Communication Seminar (BRISCS) was held on December 16, 2021.

During the seminar, the Declaration on International Science Communi-

cation was jointly released by participants, aiming to strengthen cooperation between scientific research entities and science popularization institutions, along with promoting international engagement in youth science education.

Speaking at the seminar, Li Yong, deputy director-general of the Department of Science and Technology Talent and Popularization of the Ministry of Science and Technology (MOST), called for joint efforts to enhance the public's

scientific literacy, promote the sharing of scientific achievements and contribute to the building of a community with a shared future for humankind.

It is hoped that the seminar could help enhance mutual understanding and learning between people of all civilizations and contribute to the advance of science, technology and innovation along the Belt and Road, said Ruan Xiangping, senior counsel of the Department of International Cooperation of

MOST.

BRISCS is a concrete step in the Belt and Road Science, Technology and Innovation Cooperation Action Plan, with the aim of pooling resources, gathering views, exploring cooperation and promoting communication.

The seminar brought together 21 experts from 18 countries on four continents and more than 20 Chinese experts, who shared their views and experiences on science popularization.

## Smart Farming Produces Bumper Harvests for 18 Consecutive Years

From page 1

### Remote farm management

Remote farming, monitoring and managing of farms remotely, is now realized through the application of Internet of Things.

Shannong Modern Agricultural Industrial Park is the largest grain cultivation demonstration base in Zhejiang province, with annual output of 10 thousand tons of rice and seven thousand tons of wheat. A digital farmland management system is constructed in the park, consisting of a monitoring system and a remote control system.

Real-time data is being updated to the monitoring system. You can see what's going on in the field from the APP on your mobile, said Lu Linhan, a

technician at the agricultural park, adding that measures can then be taken accordingly through the remote control system.

In the wheat field, six sets of high-definition infrared machines, an automatic irrigation and drainage pumping station, a micro weather station and 10 solar-powered insect-killing lamps operate simultaneously.

If the system picks up that the water level exceeds the threshold, Lu could tap on his phone to activate the automatic drainage system, activating a water pump hundreds of meters away.

### New business models invigorate grain transaction

For the agricultural industry, busi-

ness operation is equally important to production. The integration of information has accelerated the transaction of agricultural products.

Known as China's "grain barn," Heilongjiang province boasts the country's largest plantations of rice, corn and soybean. In 2021, Hailun city in west-central Heilongjiang produced a bumper harvest of fresh edible corns. The city's e-commerce service base was particularly busy with packaging corns and selling the products to retailers directly from the farms.

A digital platform integrates the city's agricultural business data, in order to provide information services for transaction of agricultural products and transfer of rural land management

rights, and to maximize the profit of agricultural production.

By November of 2021, the city's e-commerce turnover of agricultural products had reached 608.47 million RMB, up 23.9 percent year on year. The online retail sales reached 132.87 million RMB, up 44.1 percent year on year, according to the city government.

Big data can help trace the production and circulation of farm produce, while also regulates trade practices. Each bag of rice delivered from the Shannong park is labeled with a QR code. Scanning it, you can trace the specific time of sowing, fertilizing, harvesting and processing, as well as the type of fertilizer used.

"The whole life of rice is made into a trajectory chain, ensuring the quality of products and their legal transaction," said Lu from the Shannong park.

# Technological Trends Emerging in 2022

## Voice of the World

Edited by QI Liming

As 2022 dawned, five disruptive trends in science and technology have been put forward by media, researchers and investors worldwide. These trends, listed below, are predicted to impact many aspects of life and business going forward.

**China-U.S.: Continuous bickering over technology, but no split envisioned**

According to Nina Xiang, founder of FutureLogic, China and the U.S. will continue fighting over familiar issues in similar fashions as in the past. The U.S. is likely to add more Chinese companies to its Entity List—a roster of companies that have to apply for special licenses to buy U.S. technologies and products.

But like a married couple who argue all the time, yet manage to keep their union intact, the two tech superpowers both understand their deep interdependence. China's tech sector, especially the manufacturers, is a part of the U.S. global semiconductor supply chain, which in turn relies heavily on the Chinese market to finance its massive research and development. Divorce is out of the question.

**Chinese tech behemoths: Worthy of investment**

Heath Behncke, co-founder and managing director of Holon Global Investments, an Australian specialist investor in global disruption, believes the market is massively undervaluing the disruptive potential of large Chinese



Internet of Things and metaverse in our daily life. (PHOTO: VCG)

tech companies.

Behncke said the market is too pessimistic about Chinese tech. There will be a re-rating of large Chinese tech companies in 2022. "The largest Chinese stocks are trading on earnings multiples that are a third of those in the U.S. right now, you can buy Alibaba at seven times its forward earnings, on our numbers. This is a company that serves a billion people, and has 150 billion USD of cash and portfolio investments and a strong position in its market."

**Internet of Things (IoT): Enormous potential productivity**

The notion of devices that communicate via the Internet is not new. But the scale of IoT could be much larger than expected. ARM Limited, a leading

company in AI, forecasts one trillion connected devices in 2035, from 150 billion currently.

Alex Pollak, chief investment officer of Loftus Peak, a global fund manager, believed, "2022 is the year when the Internet of Things will become a much bigger reality thanks to the decentralized processing power that the 5G network provides. For many people, the Internet of Things could capture and monitor health data or physical performance. Industries will use connected devices in agriculture, transportation, manufacturing and across sectors. The potential productivity gains are enormous."

**Computing power: Higher demand for AI processing power**

Andrew Macken, chief investment

officer of Montaka Global Investments, said the boom in machine learning will require unprecedented computing power. "Machine learning is far more data-intensive than anything we have seen before. The computing intensity of everything is about to go through the roof as AI is incorporated into most new devices."

The New York-based Macken believed cloud computing is the best way to approach this trend. "Most of the 'compute' from machine learning will take place in centralized data centers or in a distributed cloud (cloud computing that runs across multiple locations). There will be higher demand for cloud companies that can provide that processing power for AI."

**Metaverse: To spark the creation of new brands**

The metaverse combines VR, augmented reality, video and other technologies, so users can "live" in a digital universe. Some futurists have likened the metaverse to a 3D Internet where we experience things virtually through an avatar.

Loftus Peak's Pollak said 3D business meetings will be an early application of the metaverse. If Pollak is right, the use of VR in business will lead to more people owning VR headsets at home. That, in turn, will drive commercial applications, such as tourism and shopping, in the metaverse.

Chris Wheldon, Portfolio Manager of Magellan High Conviction Fund, said that the metaverse could spark the creation of new brands as people look to express themselves in the metaverse.

## Opinion

# Decoupling Economic Growth from Excessive Carbon Emissions

Edited by QI Liming

Børge Brende, a Norwegian politician and diplomat serving as President of the World Economic Forum since 2017, said that more global cooperation is needed in facing global challenges like climate change, the COVID-19 pandemic and loss of biodiversity, when he received an exclusive interview with the China News Service.

**In the future, global challenges need global response. The relationship between the U.S. and China is critical for future progress.**

Brende said: "We would like to see cooperation between the two largest economies in the world - China and the U.S., be it in climate area, be it on biodiversity, saving all our species, be it also on trade, but also on technologies. We have an internet, we don't want the split internet. So global challenges have to have global solutions."

We also know in many other topics like pollution, plastics in ocean and all this, we need to collaborate and we have to collaborate more. The greenhouse gases don't travel with the passport. And we have seen the Covid does not respect borders. The only way mov-

ing forward is that we realized that we're in the same boat and we have to collaborate.

Brende pointed out that we have no opportunity when it comes to failing. Too much is at stake. Our planet is on fire. You see this summer with the droughts, with the wildfires. We really now are seeing the costs of climate change and it will just be increasing in the years to come.

We cannot continue to move around the deck chairs on Titanic, we now have to take steps forward to make sure that we do introduce the transition from a fossil-fuel-based society and build a bridge towards a renewable-based society. And it has to happen now.

**Not only to tackle climate change, but also to protect biodiversity, we had very important breakthroughs now in China.**

Brende said, that here we have to thank China a lot. Through its manufacturing and producing, solar has been a major contributor to driving down the prices for solar energy. We have now seen a lot of solar panels being not only developed, but we have seen investments and they're all over the world driving down the prices and increasing

amount of renewables.

"If I have said 10 years ago that the price for solar would fall to 1/10, people would say that's over-ambitious. But today we know that solar is 10% of what it cost 10 years ago. And through the development of more modern solar panels, these are now available. And they're also very competitive when it comes to traditional energy sources," he said, adding that "I think the goals that China has set for itself - carbon neutrality by 2060 and peak at least in 2030 - are ambitious goals. But I think they are also realistic goals. And I think the measures are there to implement. And also in China, one has seen flux, one has seen also drags and seeing on the ground that climate change has a real cost."

**What is importance for China, also for the rest of the world, is that transition to low-carbon economy will have to take place in the years to come, because the opposite also comes with a huge developing impact.**

Brende said, China has now seeing poverty eradication through two decades' effort that we have not seen in the history of mankind before happening so fast, but now it is also a very im-

portant avenue that we have to go down is now how to make sure that you still can continue an inclusive growth, continue to eradicate poverty and secure development, but decouple this economic growth from growth in CO<sub>2</sub> emissions and greenhouse gases and other emissions that will pollute the air.

Because that also has a huge development cost. No one wants their children to grow up in the world that is heating and where there is no clean air. It's definitely like squaring a circle, this decoupling. But as I said, we have seen when it comes to the price of solar, when it comes to the price of wind, we had dramatically reduced these prices in a decade. That's why it's so important now to make sure that the new technologies that we need, for example, green hydrogen, and also vehicles and vessels that emit zero will have to be reduced the price for this. And then we have to use a clear incentive.

"So, I'm sure that China will be able to also deal with this dilemma and this decoupling as China has been able to deal with other challenges in its past," he said.

(Source: China News Service)

## Comment

# Scientific Fightback Against Political Origin Tracing

By Staff Reporters

Thea Kolsen Fischer, a member of the World Health Organization (WHO) team who visited China to investigate the origins of the coronavirus, recently published her personal experiences in Wuhan city in her book *Virusdetektiven*. The book details her COVID-19 tracing research in China, working with the WHO-initiated Independent Panel for Pandemic Preparedness and Response, including being witness to China's struggle against the pandemic, the objectively difficult but ultimately satisfactory investigation results. Also, in the book, how she was involved in the political game let the public witness U.S. media's ability to reverse the truth.

What attracted the most attention around the book is her experience being interviewed by the American media, such as *The New York Times* and *The Wall Street Journal*. Her answers were distorted to the public by these media. In other words, this is a scandal that uses science as a political tool.

It is not the first time science has encountered this kind of situation. In early 2021, after the WHO team's investigation in China, the review panel praised China for its transparency. However, western media, such as *The New York Times*, used this to fabricate false reports, such as "China resistance to revealing information about the early days of the coronavirus outbreak" and "Chinese scientists refused to share raw data." This distortion upset many WHO experts who refuted the media allegations. Among them, panel member Peter Daszak tweeted directly on February 13, 2021 that, "Shame on you @nytimes (*The New York Times*)!"

As a result, *The New York Times* published a full interview with Daszak on February 14, in which Daszak re-

vealed some information that had never been released before." For example, he said that, "China acted quickly and professionally in the early stage of the pandemic, and had already conducted extensive and in-depth investigations and studies."

Today, more and more WHO experts are speaking out in this regard.

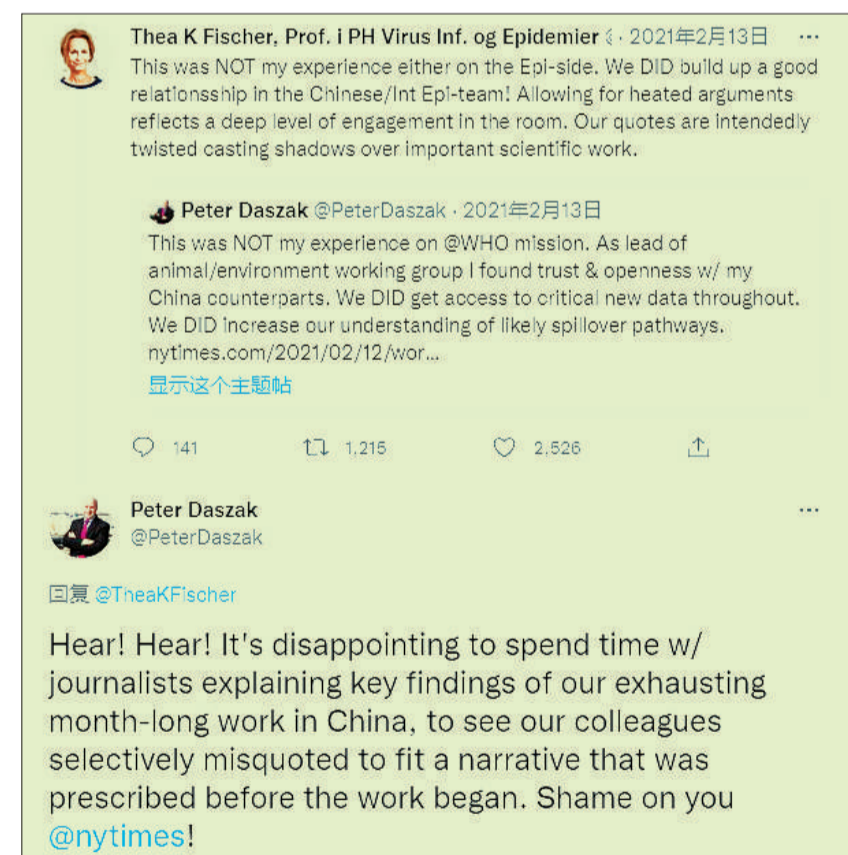
Fischer's revelation of the "political traceability" conspiracy in the U.S. resonated with the scientific community. That is, when facts are distorted because of ulterior motives, there is certain to be a backlash.

China is an ancient civilization, one of the core values of which is reflected in the fact that after thousands of years of exploration and trial and error, the entire nation has reached a consensus on respecting and adhering to common sense. Therefore, today, in the face of political smearing by inferring guilt, we understand that even if a lie is repeated a thousand times, it will not become a truth.

Science, to some extent, is the most standardized summary and conclusion of common sense. To participate in science requires honesty to pursue the truth and take pride in that honesty.

However, during the last difficult two years of the pandemic, some respected scientists, who should have otherwise been pioneers in the fight against the coronavirus, were caught in the irrational frenzy of political battles. They became scapegoats for those with vested interests or those who avoid getting punished for their malfeasance.

This is not the first or second time western media have politically distorted the truth of the origin tracing of COVID-19. However, after scientists like Daszak and Fischer stood out to voice for the truth, it is gratifying that the support from scientific community is increasing.



Daszak and Fischer tweet against distorted American's COVID-19 origin tracing reports. (PHOTO: SCREENSHOT)

# From Safety to Taste, Innovation Knows No Bounds

## Hi! Tech

Edited by QI Liming

**Transparent smart N95 mask imminent**

A Singaporean company claims to make the world's smartest mask with Project Hazel: a new reusable N95 respirator. It's a concept design with a glossy outside shell made of waterproof and scratch-resistant recycled plastic, which



Concept N95 masks. (PHOTO: SCREENSHOT)

is transparent to allow for lip-reading and seeing facial cues when you chat with people. The smart mask also features interior lights which come on au-

tomatically when it's dark, allowing you to express yourself clearly regardless of the lighting conditions.

The main features of this mask lie within its two circular zones that flank your mouth. They're used for ventilation, giving the device an almost futuristic gas mask look. Project Hazel will use active disc-type ventilators, filtering air that's breathed in, as well as the CO<sub>2</sub> that's being exhaled. The company adds that it will be certified to filter 95 percent of airborne particles, including the COVID-19 virus and other common

pathogens.

With a dual-purpose fast charger that simultaneously sterilizes, the smart mask is always ready to go. It glows from red to green for easy reference when checking battery level. Each Project Hazel mask will include a large charging case that sterilizes the mask with UV light when it's not in use, although this is still in the concept stage.

**Lickable TV screen: Imitating the flavors of the food it displays**

A Japanese professor has developed a prototype of a lickable TV

screen, that allows for the flavor profiles of food to be created. With this device, all you need to do is to lick the screen and taste the food on the display.

The device is called Taste the TV (TTTV) and it involves 10 flavor canisters spraying a combination of flavors onto a plastic film that's layered onto a flat-screen TV, in an attempt to recreate the taste of a food item.

"The goal is to make it possible for people to have the experience of something like eating at a restaurant on the other side of the world, even while stay-

ing at home," said Meiji University professor Homei Miyashita.

He added that this device might be put in use for budding sommeliers and chefs, who need to taste things while honing their craft, but are disadvantaged because of remote learning.

If made commercially, the TV would cost 875 USD, he estimated.



Tasting on TV lickable screen. (PHOTO: SCREENSHOT)

## Enrico Drioli: Bringing Membrane Science to the Public

By LONG Yun

Today, membrane science and engineering represents one of the most visible research areas widely applied in industrial, medical, and biotechnological sectors. The enormous growth in the scientific community formed over the years has shown their worldwide acknowledged importance.

Enrico Drioli, who serves as the Emeritus Professor of University of Calabria, Italy, is one of the pioneers advancing membrane science and engineering, helping to make it more accessible to the public. In 2021, Drioli received the Chinese Government Friendship Award for his outstanding contribution to promoting China's membrane science. He was proud that the Chinese government recognizes the significance of the field in which he and many Chinese researchers have been working for the last decades.

In a recent interview, Drioli shared his enthusiasm and insights in membrane science and engineering with *Science and Technology Daily*.

### A problem-solver in membrane science

Drioli's interest in science stemmed from his personality. "I like to solve problems that aren't relaxing at all, because it's a lot more fun and gives me a lot more satisfaction," he said.

His first coming to China happened in the 1980s for academic exchange with Chinese counterparts. He enjoys the way of life in Weihai and Nanjing, cities which he says are similar to where he lived in Italy and is a big fan of Chinese cuisine.

Even when asked about the challenges he has encountered in his scientific career, he still emphasized his satisfaction

after solving problems the world faces. "When I was a young student, I have already decided to spend my time, future, and life in research. I am never bothered by the challenges, as I am sure that I will find the appropriate approach to dealing with them," he said.

"The most important part of the scientific research is that my research has been realized in real big factories, not just in publications," he said, noting that science cannot be just restricted to the academic environment. In fact, the "big picture" challenges that membrane science seeks to address include water purification, wastewater treatment, desalination and so on.

Drioli hopes to make the voice of science heard throughout the world. "I'm suggesting that we should take actions in the education sphere. We should encourage students to understand the impact that science can have on our daily life as early as possible," he said.

### The function of international cooperation

Membrane science and engineering are becoming more generally acknowledged and promoted worldwide for their critical roles in achieving sustainable development through the concerted efforts of researchers.

But it was quite different decades ago. "When I was a student, the role of membrane science was not fully realized," said Drioli. According to him, at the turn of the century, significant progress was made in this subject by addressing environment-related issues such as wastewater treatment.

In addition to the research progress, Drioli applauded the function of international cooperation and scientific societies to strengthen the bonds



Professor Enrico Drioli. (COURTESY PHOTO)

among researchers in different countries.

"These days, international cooperation is largely recognized," he said, adding that he is proud that he has been promoting international collaboration since the 1980s when it was not so common, and even met opposition.

Along with the growth of international cooperation, a significant number of scientific conferences and exhibitions also play essential roles to make membrane science understandable to the public.

"Although significant and positive progress has been made in the last thirty to forty years, the impact of membrane science and engineering on our modern society is still in its early stages," said Drioli.

### Industrialization is a push to scientific progress

Researchers in China have made great progress in membrane science.

For example, many universities have created research centers in this field. "Today, the contribution to the Journal of Membrane Science from Chinese scientists outnumbers that of the United States. And I'm delighted that China is now collaborating on an international level on an actual project in membrane science," he said.

However, as he always advocated, the scientific progress in this field lies not only in publishing papers, but also in realizing its continuous contribution to addressing environmental problems and energy production.

Drioli marvels at China's initiatives to transfer scientific results to actual industrial activities. He mentioned the recent establishment of the Membrane Science and Technology Industrial Parks in Weihai and other places in China is a practical approach to promoting the development of membrane science and technology.

## Traditional Eastern Wisdom

### Gunpowder: One of China's Four Great Inventions

By BI Weizi

Gunpowder, the world's first explosive, is a substance that can burn rapidly and reliably under the action of appropriate external energy, and at the same time generate a large amount of high-temperature gas.

Gunpowder is made from a mixture of sulfur, saltpeter and charcoal. As early as the Neolithic era, ancient Chinese learned about charcoal when firing pottery and used it as a fuel. During the Shang and Zhou dynasties, charcoal was widely used in metallurgy. Charcoal produces less ash than firewood and burns hotter, making it a better fuel.

The invention of gunpowder can be traced back to the 9th century, when Chinese alchemists made "immortal pills" that was imagined to keep a person living forever. Of course, they did not find the drug, but gradually invented the formula of gunpowder in the process of refining.

Gunpowder was first used to make fireworks during festivals and some other major events. It was later used as an explosive substance in the military, such as cannons and fire-arrows. Cannons and muskets were already quite sophisticated in China during the Song Dynasty, making China's technology a world leader.

Chinese gunpowder advanced the course of world history. Friedrich Engels spoke highly of China's role in the invention of gunpowder saying, "It has now been proved beyond doubt that gunpowder was transmitted from China to the Arabs through India, and from the Arabs to Europe through Spain, together with gunpowder weapons."

Gunpowder shook up the feudal rule in Western Europe, and the power of the chivalrous class, supported by their cold weapons, declined. The invention of gunpowder greatly advanced the course of history, and was one of the important pillars of the European Renaissance and Reformation.

## Top 10 Sci-tech Achievements in China in 2021

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This made China the second country to land on Mars, which was also a big leap forward in China's space exploration program.

4. The Large High Altitude Air Shower Observatory (LHAASO) in Sichuan province, has detected photons with an energy level of more than one PeV in the Milky Way, one with a record-breaking 1.4 PeV, which is the highest energy photon ever observed. These findings changed people's traditional understanding of the Milky Way.

5. The Shenzhou series spacecraft successfully sent Chinese astronauts to the country's Tiangong space station on two occasions, for a three months and half a year stay respectively. This means China's manned spaceflights have passed the testing phase.

6. The Baihetan hydropower station, the world's largest hydropower station under construction, began operation in June 2021. With a total installed capacity of 16 million kW, the Baihetan hydropower station is second in capacity to the Three Gorges hydropower station. All 16 units of the station were domestically produced.

7. A series of policies on science and technology institutional reforms were carried out in 2021, which is also

the first year of executing the 14th Five-Year Plan. Research funding management, the evaluation system of sci-tech achievements, a new exploration mechanism for strategic projects, and setting up more projects for young scientists were all included.

8. Researchers from the Tianjin Institute of Industrial Biotechnology, under CAS, achieved a world first by successfully synthesizing starch from carbon dioxide artificially. The researchers designed a new approach of starch synthesis with only 11 core reactions to convert carbon dioxide into starch in the laboratory.

9. A research group led by Prof. Chen Xiuxiong from the University of Science and Technology of China (USTC), solved various problems about constant scalar curvature Kähler metrics on a compact Kähler manifold. The problems remained one of the key issues for more than 60 years in the mathematics field.

10. The neutralizing monoclonal antibody combination therapy against COVID-19, BR1-196/BR1-198, was approved in China, making it the first of its kind in the country. Trial data found that the therapy could reduce the risk of hospitalization and death in high-risk patients by around 80 percent.

## Top 10 Sci-tech Achievements in the World in 2021

From page 1

IV. Helping China become the second country to successfully land on Mars, Tianwen-1 made headlines all over the world. After more than nine months, China's first Mars probe landed on the red planet and pictures captured by the rover Zhurong were released.

V. Scientists from the University of Copenhagen revealed what happened a microsecond after the Big Bang, using the Large Hadron Collider (LHC). The researchers found the quark-gluon plasma (QGP), the first matter that emerged after the Big Bang, was a perfect liquid and it also changed shape over time in a way different from other forms of matter.

VI. CRISPR, a gene-editing technology, was used directly in a human body for hereditary transthyretin (TTR) amyloidosis treatment for the first time. The results showed that the treatment was effective. Based on studies, the in-body treatment could also modestly improve vision in people with inherited blindness.

VII. A kidney from a genetically modified pig was transplanted into a human body in the U.S. and functioned for 54 hours without displaying rejection from the body. The successful transplant was the first of its kind, a poten-

tial breakthrough that could bring hope to patients who need organ transplants to survive.

VIII. Effective treatment against variants of the novel coronavirus are constantly emerging. Merck's molnupiravir (antiviral medication) could reduce risk of hospitalization or death by 30 percent, Pfizer's PF-07321332 candidate by 89 percent, and China's first domestically developed neutralizing monoclonal antibody combination therapy by 80 percent.

IX. Scientists from several American universities managed to build the first living robots Xenobots 3.0 that can reproduce by themselves. These AI-designed living robots can find single cells, gather up and create copies of themselves. This entirely new approach of replication could offer more personalized treatment in the future.

X. Scientists generated 2,000 new protein sequences by the AI neural network they used. They offered completely random protein sequences and introduced mutations into them until the neural network predicted that the sequences would fold into stable structures. No interference was made to the AI network and these new proteins were what it "dreamed" up.

## Photo News



2022's first ray of sunshine in Hainan Free Trade Port. (PHOTO: XINHUA)

### The Sunrise of New Year in Hainan

Hainan, a tropical island at the southernmost of China, has a land area of 35,400 square kilometers, and a population of about 10 million.

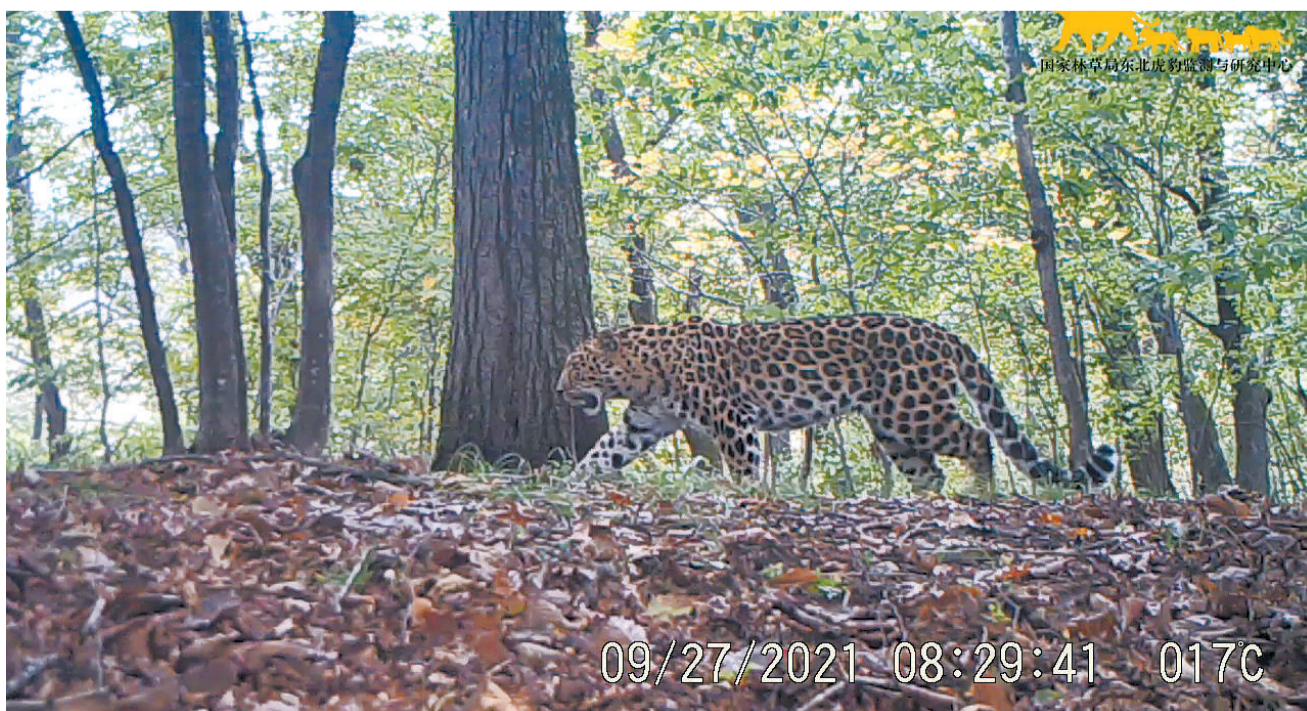
On April 13, 2018, the central government announced its support for building Hainan province into a pilot free trade zone with Chinese characteristics, and supports Hainan in gradually exploring and steadily advancing the construction of a free trade port.

Hainan is committed to building itself into a comprehensive deepening reform and opening up pilot zone, a national ecological civilization pilot zone, an international tourism consumption center, and a major strategic service guarantee zone.

Hainan is one of the regions with the most preferential policies and the highest degree of openness in China.

### The Northeast China Tiger and Leopard National Park

The Northeast China Tiger and Leopard National Park was built in 2017 as a sanctuary for highly-endangered Northeast tigers and Amur leopards. The park spans an area of over 1.46 million hectares in the provinces of Jilin and Heilongjiang. The endangered Northeast tigers and Amur leopards' populations are on the rise. Populations of other wild animals, such as spotted deer and boars, are also on the rise, suggesting an improving eco-environment in the park. About 500 Northeast tigers, one of the world's most endangered species, are believed to be living in the wild.



The endangered Northeast tiger. (PHOTO: XINHUA)