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WEEKLY EDITION

## Beijing 2022 Ushers in Cooperation and Development

By WANG Xiaoxia

The Olympic Winter Games Beijing 2022 started as scheduled on February 4. More than 30 heads of state, heads of government, members of royal families and heads of international organizations attended the opening ceremony at the Bird's Nest.

Chinese President Xi Jinping has engaged himself in a flurry of face-to-face high-level meetings with foreign dignitaries. Development and cooperation emerged as the key issues during these meetings.

The leaders agreed to strengthen cooperation across multiple areas including trade, infrastructure, industrial development, agriculture modernization, scientific and technological cooperation, biodiversity protection and tackling climate change.

Joint statements were issued between China and Russia, Ecuador, Papua New Guinea, Argentina, Pakistan, Mongolia and Kyrgyzstan respectively, for closer bilateral ties.

Apart from working together on key projects ranging from infrastructure and energy to the digital economy, the Belt and Road cooperation was much discussed.

Pakistan is willing to take active steps to promote the construction of the second phase of the China-Pakistan Economic Corridor, and strengthen cooperation with China in the fields of industry, agriculture and information technology, said Pakistani Prime Minister Imran Khan.

China is willing to increase its import of high-quality green agricultural

and sideline products from Kyrgyzstan, speed up advancing key cooperation projects, and support the construction of the China-Kyrgyzstan-Uzbekistan railway.

Meanwhile Luxembourg expressed its willingness to actively participate in the Belt and Road cooperation. The two countries will make efforts to tap the potential of cooperation in fields such as new and high technology and green economy, strengthen their air freight services, and promote cultural exchanges.

Argentina has also signed a Memorandum of Understanding with China on the Belt and Road cooperation.

Many leaders also voiced support for the Global Development Initiative (GDI) Xi proposed last year, which aims at speeding up the implementation of the 2030 Agenda for Sustainable Development.

Kazakh President Kassym-Jomart Tokayev said Kazakhstan will continue to actively support and participate in cooperation under the Belt and Road Initiative while supporting the GDI put forward by Xi.

According to the China-Russia joint statement, Russia confirmed its readiness to continue working on the China-proposed GDI, including participation in the activities of the Group of Friends of the GDI under the auspices of the UN.

UN Secretary-General Antonio Guterres, who came to China for the opening ceremony of Beijing 2022, hailed the GDI as one of great significance in promoting the realization of the UN 2030 Agenda for Sustainable Development and addressing the inequality and imbalance in global development.



Gu Ailing (left) in competition; Su Yiming (right) celebrated after claiming a historic gold medal in the men's snowboard big air; The National Ski Jumping Center, also called "Snow Ruyi," in Zhangjiakou, Hebei province. (PHOTO: XINHUA)

## Inactivated COVID-19 Vaccines Effective Against Delta Variant

By QI Liming

A cohort study named *Effectiveness of Inactivated COVID-19 Vaccines Against Illness Caused by the B.1.617.2 (Delta) Variant During an Outbreak in Guangdong, China*, was published in the *Annals of Internal Medicine* in February this year.

According to the study, China's two most widely used COVID-19 vaccines, developed by Sinovac and Sinopharm, were shown to be effective against the Delta variant of the novel coronavirus, based on real-world data in China.

The study included 10,805 people with SARS-CoV-2 infection and close contacts in Guangdong, China, during the Delta variant outbreak in May and June of 2021. All people included in the study were linked to a single COVID-19 index case, with exposure identified by contact tracing.

"No severe or critical cases occurred among vaccinated participants," said the study, noting that "By contrast, unvaccinated participants had 19 (0.3 percent) severe or critical cases."

Among those fully vaccinated participants, only six individuals were aged 60 years or older, according to the study.

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## WEEKLY REVIEW

### Five-Year Plan for Emergency Management System Issued

The State Council of China on February 14 released a plan to uplift the construction of the country's emergency management system during the 14th Five-Year Plan period (2021-2025). According to the plan, a unified, quick-response, and coordinated emergency management mechanism with higher levels of scientific and technological information and comprehensive support systems will be built by 2025.

### China Ranked First in PCT Application Again

According to the latest statistics issued by the World Intellectual Property Organization, China ranked first in international patent application volume in 2021 for the third consecutive year. Applicants from China filed 69,540 Patent Cooperation Treaty (PCT) applications, growing 0.9 percent from 2020.

### Powdery Mildew Resistance and Yield Retain in Wheat Achieved Simultaneously

Scientists from the Chinese Academy of Sciences illustrated that a mutant with a 304-kilobase pair targeted deletion in the MLO-B1 locus of wheat retains crop growth and yields while showing robust powdery mildew resistance. The result was published in *Nature* online on February 9.

## Editor's Pick

# Chinese Thought Behind Snow Sports Venues

Edited by CHEN Chunyou

At the Olympic Winter Games Beijing 2022, athletes from around the world think highly of the two snow sports venues, "Snow Ruyi" National Ski Jumping Center in Hebei's Zhangjiakou city, and "Snow Flying" Shougang Big Air in Beijing's Shijingshan district. The question on many competitors' lips is, what is the thought behind the venues' designs?

At the outset, Zhang Li, the designer of the two sports venues and dean of School of Architecture, Tsinghua University, was not familiar with the two competition events. From watching previous games, he gradually began to understand the use of the venues and realized that the beauty of sports is determined by the posture and curve presented by the athletes in the air. After many discussions and brain storming sessions, the vision of "Snow Ruyi" and "Snow Flying" became clear to Zhang.

### "Snow Ruyi" National Ski Jumping Center — a gift from nature

The design of "Snow Ruyi" is inspired by the traditional Chinese ornament Ruyi. In Chinese culture, Ruyi, usually made of jade or gold, represents auspiciousness.

When Zhang received the track curve of the National Ski Jumping Cen-

ter, provided by the International Skiing Federation (ISF), he decided to create the track capped by the top of "Snow Ruyi," a circular room with an outer diameter of 80 meters and an inner diameter of 40 meters. It can also be used for sightseeing after the competition.

The installation of a huge cantilevered building over the track, unrelated to the athletes, is unprecedented internationally. Zhang was not sure whether it would be certified by the ISF. However, considering the sustainable use of the stadium after the Games, the ISF finally agreed on the design with Chinese cultural characteristics. Thus the overall shape of "Snow Ruyi" was established.

The top of "Snow Ruyi" is composed of two jumping platforms, which can accommodate 500 people, and is more than 130 meters above the ground. The two S-shaped courses look like the main body of a Ruyi hanging in the air, while the bottom consists of a soccer field and audience area. The two courses are built away from the mountain, with the aim of protecting the surface runoff, and helping ecological restoration and animal migration in the future.

### "Snow Flying" Shougang Big Air — the first track-shared platform

The idea of "Snow Flying" is borrowed from Dunhuang Murals' Flying

Apsaras, whose fluttering ribbons are imitated by the profile curve of the venue. Resembling the movement of the Flying Apsaras, the Shougang Big Air perfectly combines the snow sports with traditional Chinese culture.

The Shougang Big Air is set to host freestyle skiing and snowboard big air events. An innovative design of the Shougang Big Air is the availability of a shared track, making it possible to switch the two tracks quickly according to the types of the competition events.

In the past, the freestyle skiing event was held in mountainous areas, while the snowboard big air event happened in the urban cities. The two events require two entirely different tracks, and they have never shared the same venue.

The ISF expects to see more snow sports events to be hosted in Shougang and idea of merging the two events into one venue seemed to make sense to the design team.

With the help of his friend Ge Yi, an architect of steel structures, Zhang drew the sketch of the track transformation, which perfectly combines the characteristics of the two competition events—the track for assisting skiing and landing remain untouched, and the slope curve is properly changed, making it possible for two different events to compete on the same track.

## Course Launched for Closer Lancang-Mekong Cooperation

By SU Zhe & WANG Xiaoxia

A training course on cloud computing and cloud security technology kicked off on February 9 in Yangon, Myanmar. Officials, diplomatic envoys and representatives from institutes attended the online opening ceremony.

The course, Cloud Computing (Mi-

crosoft Azure Development Operations Engineer Expert Course & Microsoft Azure Security Technologies Course) Training Course, was supported by the Mekong-Lancang Special Cooperation Fund and played a vital role in the establishment of the Myanmar ICT Development Institute.

Li Xiaoyan, minister counselor of the Chinese Embassy in Myanmar, addressed the ceremony, hailing the contribution made by the Lancang-Mekong Cooperation (LMC) mechanism to developing regional digital technology, narrowing the digital divide, and promoting high-quality development.

This training course will effectively help participants upgrade their skills, promote the construction of digital platforms and the development of the digital economy, and coordinate regional development, said Li, noting that China would like to work with Mekong countries to accelerate regional digital transformation, promote the high-quality development of the Belt and Road and post-pandemic economic recovery.

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# China's R&D Spending Hits Record in 2021

By LI Linxu

Despite the pandemic's impact, China's investment on research and development (R&D) keeps growing rapidly.

The country's spending on R&D climbed 14.2 percent to 2.79 trillion RMB in 2021, according to preliminary estimates of the National Bureau of Statistics.

Owing to the country's steady economic recovery and increasing innovation momentum, this figure has continued to register double digit growth since 2016, said Zhang Qilong, a statistician at the bureau, adding that the growth rate is well over the target set by the 14th Five-Year Plan.

During the 14th Five-Year Plan period (2021- 2025), the country's R&D spending is expected to grow by more than seven percent annually.

With a net annual increment of 347 billion RMB in 2021, China has become a major force driving the growth of global R&D spending. Since the turn of the millennium, it has overtaken Germany and Japan to become the world's second largest R&D spender.

In terms of R&D investment intensi-



Jiuzhang quantum computer model at 2021 Quantum Industry Conference. (PHOTO: XINHUA)

ty, the ratio of its R&D expenditure to Gross Domestic Product (GDP) reached 2.44 percent in 2021, an increase of 0.03 percentage point over the previous year, according to the statistics.

The number is a record high for China's R&D investment intensity, said Zhang, adding that 2.44 percent is close

to the pre-pandemic average level of OECD, 2.47 percent.

Furthermore, the spending on basic research rose 15.6 percent to 169.6 billion RMB, 1.4 percentage points faster than the overall R&D spending.

China's investment in basic research has rebounded to double digit

growth in 2021, said Zhang, adding that as the source of sci-tech innovation, basic research is high on the nation's agenda, with new breakthroughs made in a number of original innovation fields, such as space exploration, nuclear physics, quantum science and biological engineering.

The proportion of basic research to total R&D expenditure stood at 6.09 percent in 2021, an increase of 0.08 percentage point over the previous year.

The figure has surpassed six percent for the third year running since 2019, gradually closing the gap with the level of advanced countries.

China vows to boost basic research spending to record eight percent of R&D expenditure during the 14th Five-Year Plan period, according to the goals set by the 14th Five-Year Plan.

While maintaining a fast growth rate, China's spending on R&D still has room to improve in terms of scale, structure and efficiency, said Zhang, adding that the country will further accelerate the implementation of relevant policies and improve its investment mechanism so as to support sci-tech self-reliance and self-strengthening at higher levels.

# Transforming the Pharma Industry

By ZHONG Jianli

China will continue to innovate its pharmaceutical industry, and the R&D investment of the industry is expected to grow by an average of more than 10 percent annually during the 14th Five-Year Plan period (2021-2025). That's according to a document recently released by nine governmental departments, including the Ministry of Industry and Information Technology, the National Development and Reform Commission and the Ministry of Science and Technology.

The document, titled the *14th Five-Year Plan for the Development of the Pharmaceutical Industry*, details the country's goals, tasks and measures to realize innovation-driven development of the industry.

According to the plan, during 2021-2025, a number of innovative pharmaceutical products should complete clinical research and go to market. The manufacturing level of the pharmaceutical industry should be upgraded, and the industry should accelerate its step to go global and cultivate some world-renowned brands.

The plan stresses the importance of making breakthroughs on key core technologies, promoting the industrialization and application of innovative drugs and high-end medical devices, and improving the service system for R&D, thus creating a favorable environment to spur innovation.

To upgrade the manufacturing level of the pharmaceutical industry, the plan proposes to promote the digital transfor-

mation of the industry, apply the new generation of information technology to pharmaceutical R&D, and develop new models and forms of businesses.

It also calls for advancing green and low-carbon development of the entire industry chain, building a green manufacturing system, and carrying out carbon emission reduction actions.

Aiming to build new advantages for the industry to participate in international competition, the plan encourages overseas innovative drugs and medical devices to first register in China, while supporting Chinese enterprises in registering their innovative drugs at home and abroad at the same time.

In addition, the plan hopes that domestic and international laws, regulations and standards of the industry should be mutually recognized. The standards of traditional Chinese medicine should take a leading role around the globe.

In terms of nurturing more talent for the pharmaceutical industry, the plan backs the cultivation of professionals in drug discovery, clinical trial design, and biopharmaceutical manufacturing as well as inter-professional experts.

Through measures such as encouraging school-enterprise cooperation, building training bases, and setting up a career ladder for skilled workers, a group of highly-skilled personnel in the field of medicine should be nurtured. Also, localities and enterprises are encouraged to introduce overseas high-level experts in related fields.

## Production of Bing Dwen Dwen in Full Swing

Bing Dwen Dwen, the mascot for the Olympic Winter Games Beijing 2022, has recently become a smash hit.

Picture shows workers producing Bing Dwen Dwen merchandise at a licensed toy factory in Jinjiang city, Fujian province, Feb. 9.



## Case Study

# Foreign Experts Help Vitalize Shandong's Industrial Innovation

By ZHANG Wei & CHEN Chunyou

The Foreign Expert Station, founded in 2020 in Shandong's Weihai city, is a comprehensive service platform to improve communication between foreign experts and local enterprises. It has three brand activities, including online meetings, industrial park tours, and lectures.

To date, 207 high-level foreign experts have been recommended to local employers through the station.

### Common development

In order to better serve local enterprises, the station uses online meetings,

which provide a link between high-level foreign experts and Weihai's key enterprises, business parks, major R&D platforms, universities and institutes.

As an example, the platform has allowed researchers at Weihai Boyi Agricultural Technology Co., Ltd. to hold many online meetings with their Korean counterparts. The two sides exchange ideas on the development and application of composite microbial flora technology in the production process, and reach a point of cooperation.

The station has also recommended three Japanese experts to the local Wen-

deng Maxpower Tool Group Co., Ltd. Through several rounds of online discussions on the technical improvement of electroplating coating, automatic production lines, and process improvement of electroplating chromium, a satisfactory solution was finally reached for Maxpower.

### New ideas

More than 1,600 foreign experts are employed by Weihai city every year. To make full use of the skills of foreign experts in business management and technological innovation, the station introduced an industrial park tour program that helps foreign experts to become familiar with the characteristics of local industrial development, and deepens exchanges and cooperation.

As a result, a lot of useful ideas were proposed by the foreign experts. Some experts suggested that the food enterprises can explore ways of highly utilizing the low value-added products, while others said that for enterprises to operate more efficiently there was a need to remove burdensome red tape.

According to Jun Yousik, a Korean expert, these programs help learn about Weihai's industrial layout and innovation initiatives in the areas of intelligent equipment, new-generation information technology and special materials, noting that the platform helps them to use professional expertise to serve local industries, from which the experts also benefited.

### Innovative capability

In April 2021, the foreign expert's lecture program was officially opened. More than 30 entrepreneurs and researchers attended the lecture. Qin Zhiliang, a Singaporean expert in artificial intelligence (AI) and signal processing, and the winner of Qilu Friendship Award, gave a presentation on the development situation of AI, the application scenario of AI algorithms in related industrial fields, as well as its future prospects. He also had in-depth discussions and exchanges with the participating enterprises on intelligent technology for water quality testing and automation equipment manufacturing.

Senior experts in various fields have been invited to share their theoretical and practical experience, exchange ideas and explore cooperation with local entrepreneurs and scientists. Fourteen lectures have been held to date, benefiting more than 1,000 entrepreneurs and researchers, further stimulating the innovation vitality of enterprises and effectively promoting industrial development.

Online meetings connect people from every corner of the world, industrial park tours gather consensus from all parties, and open lectures spark innovation. All these events enrich the vision of expats, open a new dimension for them to participate in Weihai's development, and push their dialogue and interaction with the local enterprises and industries to new heights.

# Renewable Energy Drives Low-carbon Push

By LI Linxu

In its transition to a low-carbon economy, China has made notable progress in the field of clean energy.

Its installed capacity of renewable energy has broken the milestone of one billion kW in 2021, reaching 1.06 billion kW, according to the latest data released by the National Energy Administration (NEA) on January 28.

Among them, the installed wind power and photovoltaic power capacity both surpassed 300 million kW, with offshore wind power installations rising to first in the world.

To achieve the goals of carbon peaking and carbon neutrality, China saw steady growth in its renewable energy capacity last year, said a spokesperson from NEA at an online press conference, adding that it is a good start for the high-quality development of renewable energy during the 14th Five-Year Plan period.

By the end of 2021, the renewable energy capacity has accounted for 44.8 percent of the country's total installed power generation capacity.

Divided by energy source, the installed capacity of hydro, wind, and solar power stood at 391 million, 328 million and 306 million kW respectively,

accounting for 16.5 percent, 13.8 percent and 12.9 percent correspondingly.

In 2021, the country generated 2.48 trillion kWh of electricity from renewable energy sources, accounting for 29.8 percent of its total electricity consumption.

Meanwhile, the energy utilization rate of renewable energy resources maintained at a high level.

Last year, the hydropower utilization rate in the country's main river systems reached 97.0 percent, up 1.5 percentage points year-over-year.

According to an action plan released by the State Council last October, approximately 40 gigawatts of additional hydro power capacity will be installed during both the 14th and 15th Five-Year Plan periods.

China is a clean energy powerhouse and has played a leading role in many of the world's success stories to date, from solar power to electric vehicles, said Fatih Birol, executive director of IEA, in a report.

China's efforts to achieve the ambition of carbon neutrality will result in even greater flourishing across a wider array of low-carbon technologies and a significant decline in fossil fuel use in the coming decades, added Birol.



Foreign experts visit Weihai's enterprises, and exchange ideas on industrial innovation. (PHOTO: Weihai Science and Technology Bureau)



Zhejiang's largest offshore wind power farm in Zhoushan city. (PHOTO: XINHUA)

Editor's Note

From accurate weather forecasts to epidemic prevention and from clean ice-making technology to AI sign language interpreter, the Olympic Winter Games Beijing 2022 demonstrate a high level of technology in all aspects.

As President Xi Jinping emphasized when inspecting the preparatory work of the Games, in today's world, the role of science and technology in competitive sports is becoming increasingly prominent. To build a strong sporting country, it is necessary to achieve a high level of self-reliance and self-strengthening in sports science and technology.

Sci-tech innovation has been a distinctive feature of Beijing 2022 during its entire preparatory process. Technological innovation has supported the realization of the green Olympics. From venue construction and event organization to logistical services, a host of low-carbon, environmentally-friendly new technologies and applications were developed, which help ensure the smooth operation of the Games.

Even after the Games, these innovative technologies will be applied to various fields of economic and social development, to further promote the country's sustainable development and bring long-lasting benefits for the people.

We believe, with these precious sci-tech legacies, Beijing 2022 will be a model of presenting sustainability to the world.



Nucleic Test System for Indoor Olympic Venues

A bioaerosol nucleic acid detection system was specially developed to serve Beijing 2022 by Chinese researchers.

The system consists of two parts, namely a portable aerosol collector and a novel Coronavirus nucleic acid detector with high sensitivity.

After the samples are collected, the test results will be directly displayed on a screen through the novel Coronavirus nucleic acid detector.

The whole process is all done automatically. The specially designed system is lightweight and can collect aerosol particles up to 12 cubic meters in half an hour.

The system has been tested and verified in five Olympic venues and the main media center, and hundreds of samples have been collected at test events.

In the near future, this system can serve the Beijing Winter Paralympics. In the days to come, the system will also be used in large conference venues, terminals, train stations and other crowded closed places.



AI Auxiliary System Provides More Accurate Weather Forecast

In order to help Olympians perform well at the games, the Artificial Intelligence (AI) "model output machine learning" (MOML) algorithm empowers the weather prediction model to make the forecast more accurate.

At present, MOML algorithm has made breakthroughs in the forecast of temperature, humidity, wind speed, wind direction and other weather factors. It is able to improve the accuracy of forecasts by more than 10 percent compared with conventional methods.

It is understood that Beijing 2022 has realized the short-term meteorological near forecast "100-meter scale, minute level update."

The technology is expected to boost the development of winter sports in post Beijing 2022. At the same time, it could play a more important role in exploration, search and rescue, disaster prevention and other fields in the future.



AI Sign Language Interpreter Facilitates Olympics Broadcasting

Lingyu, a 3D AI sign language interpreter developed by Tencent, was seen interpreting for the hearing impaired when China won its first gold medal at Beijing 2022.

Over 90 percent of Lingyu's interpretation is understandable, which places her as a leader in technical ability in the industry.

A vocabulary of more than 1.6 million, including phrases and sentences targeted for sports events are included in Lingyu.

Lingyu first produces highly accurate sign language representation, then conducts joint modeling and prediction to generate sequences of actions, facial expressions and lip movements, thus generating a natural, and highly understandable sign language presentation.

Lingyu can also quickly acquire new words and learn relevant knowledge, which improve the accuracy.

AI sign language interpreters can be used in more scenarios such as live-stream and e-commerce in the future.



Artificial Snow for Beijing 2022 Meets the Goal of a Green Olympics

Artificial snow has been widely used in Olympics since Lake Placid in 1980. To ensure the success of a competitive surface, about 80-90 percent of Beijing 2022 venues are using artificial snow. Many athletes such as Australian snowboarder Matt Cox and New Zealand gold medal winner Zoi Sadowski Synnott, have praised the snow.



The whole process of snow-making at Beijing 2022 is using 100 percent renewable energy, presenting the world with a green Olympics. The water snow gun used is from rainfall and surface run-off, pumped from near-by reservoirs and water plants.

Most of the snow will melt into water and flow back from where it originates, and the rest will be captured and reused for snow-making, irrigation and other uses.

New Ice-making System Brings Better Scores

Since the start of Beijing 2022, many long-held records have been broken in the National Speed Skating Oval. New technology's contributions have not gone unnoticed.

The technology of developing a carbon dioxide transcritical direct cooling ice machine system was adopted for the first time in Winter Olympics history. By burying a steel tube under the two to three centimeters thick ice surface and letting liquid carbon dioxide flow through it to create heat exchange, the temperature difference of the ice surface can be controlled within 0.3-0.4°C. The smaller the temperature difference, the more stable the hardness of the ice surface is, which is more conducive to skating.



Besides, using carbon dioxide as the cooling material is also low-carbon and energy-saving. The greenhouse gas it produces is far less than using any other freezing medium.



All Photos: S&T Daily, Xinhua and VCG

Expat's Regards



Pronkina Olga:  
Russian teacher at Gansu University of Political Science and Law

冬奥会开幕式火炬设计科技感强,且火炬火为绿,低碳绿色,值得国际社区关注。

奥莉娅 2022.2.12

Поздравляю главу для церемонии открытия зимних Олимпийских игр, являетя историческим событием, с минимальными выбросами парниковых газов и экономичными затрат, чему стоит поздравить китайских организаторов.

Olga / Pronkina Olga / 12 февраля 2022 года

The advanced and scientific Olympic flame lighting session at Beijing 2022 conveyed the idea of being low-carbon and environmentally friendly, which is worth drawing on for the international community.



David Ferguson:  
Editor and writer with the Beijing-based Foreign Languages Press and recipient of China's Friendship Award.

If you want to experience both Winter Sports fun and the best of China's expertise in High-Tech, take the new 300 km/hr high-speed rail line from Beijing to Zhangjiakou!

David Ferguson - DWF

Post-Games Legacy Creates Sustainable Benefits

The scientific and technological achievements such as 5G studio in high-speed trains, zero-gravity beds, and smart restaurants with robot chefs have become eye-catching highlights of Beijing 2022.

Even after the Games, these technologies will boost the nation's sustainable development, creating lasting benefits for the people in the host cities and regions.

In fact, from assisting winter sports promotion to boosting economic opportunities and proposing sustainable solutions, Beijing 2022 has already begun bringing benefits to the people.

Intelligent robots' vital role

At the opening ceremony, the most eye-catching one is the first ever underwater Olympic torch relay between two submersible robots.

During the Games, various intelligent robots have worked hard to provide contactless services.

Robot chefs are deployed in smart restaurants at the main media center to minimize contact. Once the meal is ready, the AI system plans out the optimal route, and the dish will be transported on a track and arrive at the ta-

ble. Smart burger machines, automatic woks, and robot bartenders are also common sights.

To meet medical security needs at the Games, the intelligent medical robots provide emergency medical protection and service in competition zones.

Robots perform more effectively in epidemic prevention and control. AI-powered disinfection robots with a long battery life, automatic obstacle avoidance and self-charging function, have provided various contactless services at competition venues, saving a lot of manpower. They will be widely used in cleaning and disinfection of public areas after post-Games.

Sustainable competition venues

Beijing 2022 aims to create abundant new legacies from the Games. Besides making good use of existing facilities, the newly-built ice and snow venues will be open to the public for free or at low prices.

By making use of natural carbon dioxide cooling technology for the first time, the National Aquatics Centre (known as the Water Cube) will continue to host ice sports, swimming events and large cultural performances, offering both multi-purpose and long-term

use.

Owning two venues of the National Alpine Skiing Centre and the National Sliding Centre, Yanqing competition zone will expand its tourism to outdoor culture, leisure and sports activities and offer opportunities for both summer and winter sports when the Games are over.

The non-competition venues will also leave an impact on their surroundings. The main media center will continue to operate as a conference and event facility, while the Yanqing and Zhangjiakou Olympic Villages will become hotels, apartments and a business cluster to serve the region's booming winter sports.

Green legacy for society

The green legacy of Beijing 2022 will also boost sustainable development.

Accelerated by the Games, the Zhangbei flexible direct current grid project uses wind and solar energy to transfer electricity from Zhangjiakou to Beijing. It will continue to deliver clean electricity to Beijing residents and boost the city's use of clean energy after the Games, expecting to save 49 million tons of standard coal and 12.8 million tons of carbon

dioxide emissions each year, according to official data.

Sustainable transports facilities are also a legacy of the Games. At Beijing 2022, fuel-efficient vehicles account for 100 percent of all passenger cars and 85 percent of all vehicles. After the Games, the charging facilities built at competition venues and along roads between Beijing and Zhangjiakou will be operated for community use, meeting the energy supply-demand needs of hydrogen fuel and pure electric vehicles in the future.

After Beijing set a target to hold a high-tech Winter Olympics, 133 types of technologies in a number of key areas have been applied in the early part of 2021. Since October last year, another 228 technologies have been tested and applied in test events, athlete training schedules and preparatory work for the Games, according to Wu Yuanbin, an official from the Ministry of Science and Technology.

These dazzling technologies, some of which haven't been widely applied in our people's lives yet, have received increased exposure through Beijing 2022 and expects to create more benefits for Chinese people and the global community.

## Scientific Exchange Key to Advancement

By LONG Yun

On September 30, 2021, Tudor Ratiu, an eminent mathematician from Switzerland, spoke at the Chinese Government Friendship Award ceremony as a representative of other award recipients. This award is China's highest honor bestowed upon foreign experts in recognition of their contribution to promoting social and scientific exchanges between China and other countries.

Ratiu has been working in China as Chair Professor of Mathematics at Shanghai Jiao Tong University (SJTU) since 2016. He is also the vice head of Network of International Centers for Education (NICE) program of the Ministry of Education in SJTU. He actively promotes the internationalization of mathematics at SJTU by drawing on his work experience in prestigious institutions globally.

### Understanding the world through Math

As a mathematician, Ratiu is one of the first fellows of the American Mathematical Society and has published a series of high-level papers in leading international academic journals in geometry, dynamical systems, mathematical physics, and several monographs.

Conducting research in mathematics is a challenging and tedious task for many people, but for Ratiu the decision to be a mathematician was made when he was about 14 years old. "At that point, it was clear that being a mathematician was what I wanted to do. My parents also supported this decision," he said.

He was well aware of the difficulties that awaited him. "Researchers in my field either get a positive answer or



Professor Tudor Ratiu. (COURTESY PHOTO)

they do not get anything. It is psychologically challenging," he said, noting that the sense of accomplishment gained after making new discoveries makes the difficulties worthwhile.

Ratiu is devoted to comprehending the world through the exploration of understanding mathematical structures. "Through this approach, I can find the same pattern that fits other things and come up with more new academic findings," he said, emphasizing that this approach is a time-honored endeavor appreciated by many scientists. Four hundred years ago, Galileo explicitly stated: "The great book of nature is written in mathematical language."

### International cooperation

As a professor with teaching experience on four continents, Ratiu values communication, people-to-people exchanges and collaborative efforts from various professions, fields and countries.

He is a firm believer in the power of diversity of thought to propel progress. Ratiu always encourages students whose majors are not mathematics to solve problems in his classes using their own expertise.

During his working days at SJTU, he has invited and recommended many distinguished overseas experts and outstanding young scholars to work full-time or part-time in SJTU. He has also promoted international research cooperation between SJTU and some prominent universities, as well as actively participated in the university's talent training and curriculum reform.

Apart from seeking more international cooperation opportunities, Ratiu is looking forward to forging links between academia and industry. He mentioned some well-known polytechnic universities in China that are taking steps to facilitate the transfer of tech-

nology from academia to industry, such as the construction of sci-tech parks. "It is critical for professors and students to see the needs of industry and the country as a whole. Meanwhile, those working in this area should keep an eye on the developments achieved in academia," he said.

### China, the future of innovation

Ratiu first visited China in 1989 to conduct research at Peking University. He was impressed by China's open academic environment and natural beauty.

Ratiu is optimistic about China's sci-tech development and ready to make his own contribution. "China, based on my experience, will become a center of innovation in the future," he noted.

"It is astounding how well Chinese universities have done over the years," he said, which he attributes to the progress in China's stellar academic environment.

Government-supported programs, in his opinion, are also factors driving academic progress. "These government programs are undeniably successful, and their success can be quantified. For example, my university has risen in leaps and bounds in global university rankings," he said.

Ratiu's affection for China extends beyond the professional sphere. He told *Science and Technology Daily* that one of the main reasons he feels emotionally attached to China is because of the people, who he describes as being friendly and inclusive, making him always feel welcome.

The Lunar New Year was approaching on the day we spoke to Ratiu and when asked about his plans for China's most important holiday, he said he and his wife would be celebrating the occasion with Chinese friends.

## Letter to the Editor

### The Power of WeChat

By Fawad Sharif

August 29, 2016 was just another day when I first arrived in Xi'an, a beautiful city and provincial capital of Shaanxi province. One of things I was introduced to was the convenience of digital technology that I had never dreamt of, although I had downloaded the WeChat social media app earlier, which I believed was a tool for communication at most. To my surprise, I would go on to learn the app carried a list of features that simply startled me.

Soon after my arrival while walking around my new neighbourhood, a friend stopped at a local taba (small convenience store) and offered me a bottle of vitamin water. I expected my friend to take out his wallet and pay in cash for the water. Instead, he tapped his phone with the shopkeeper's phone and we moved on. Fearing to be ridiculed, I played it cool but all the while wondering why he had not paid.

I kept thinking of what had happened and eventually I couldn't bear not knowing any longer and I blurted out, "Why didn't you pay for the water?" In response, he told me he had scanned the QR code in the shopkeeper's phone and made the payment transfer electronically. "How could that be possible?" was my confused response.

Since then I have learned my way around, and WeChat has made my life extremely convenient. Everything from communicating to making payments, hotel reservations, Didi taxi hailing and train/airline tickets are all possible on WeChat. I do not have to move unless I want to, as I can even order a cooked meal or fresh vegetables to be delivered right to my doorstep. I am convinced that WeChat has contributed enormously to Chinese socio-technical development. It allows you to outsource a list of daily chores and save time for other critical tasks to be completed. The value it has delivered during the pandemic is worth acknowledging.

In a country that spreads out across millions of miles and has a population of more than 1.4 billion people, monitoring the spread of COVID-19 and receiving instructions on how to remain safe has undoubtedly been a colossal challenge. However, WeChat performed

outstandingly in communicating instructions from the top down and reporting back from bottom up, limiting the challenges and allowing China to stand out and shine on the world map.

I still recall the lockdown from January to March 2020, when the streets were closed to contain the spread of the virus. It was hard to find a way to the supermarket and purchase groceries. WeChat again came up with a solution, showing the local area map and marking closed streets with red stickers. That saved me from enormous trouble as I could follow the green route and reach the store. In addition, when the government wants to record the movement of potential COVID-19 carriers and all the places they have visited, as well as the transport they used, this can also be traced and checked. WeChat offers services to resolve this challenge as well.

A QR code is generated on the phone of every individual and it must be scanned before taking any means of public transport and entering a public place. The code is generally green, signifying a healthy person. Another useful option called mini-app was also developed to allow policy-makers, public servants, social services, the general public, mega-stores, and small businesses to create their own customized tools based on their needs. These mini-apps have enabled small businesses, specifically restaurants and food delivery, to survive and prosper during the pandemic.

There were 3.2 million estimated new entrants into the food delivery chain during the pandemic, who lost their earning opportunities but were enabled to reset their operations. In a nutshell, WeChat has streamlined public services and brought convenience to public life.

In my country of Pakistan, things are not as convenient app-wise. People still have to carry loads of cash while traveling, which is a security risk. And when making purchases, customers have to queue and wait longer to make payments --all very different to the ease of using WeChat, which has gained wide acceptance across China.

Dr. Fawad Sharif is a postdoctoral fellow in the School of Management of Northwestern Polytechnical University, Xi'an.

## Traditional Eastern Wisdom

### China: Birthplace of Skiing



Local Tuvan people are skiing on homemade skis in Altay. (PHOTO: VCG)

By BI Weizi

The origin of skiing can be traced back to 10,000 years ago in Altay prefecture of Xinjiang Uygur Autonomous Region, China.

In 2005, a well-preserved carved painting was found in Altay, which clearly recorded the scene of ancient ancestors chasing prey with skis on their feet and poles in their hands. According to the archaeologists, this petroglyph is at least 12,000 years old.

In 2015, at the International Ancient Skiing Culture Exchange Conference in Altay, more than 30 skiing history researchers from 18 countries, including Norway, Sweden and Finland, jointly issued the Altay Declaration, agreeing that Altay is the oldest skiing region in the world.

The discovery of the Altay cliff paintings was preceded by ancient history books that recorded the skiing and

skating activities of Chinese people. The oldest description of skis appears in the book of *Shan Hai Jing* written by a Chinese scholar of Han Dynasty between 206 BC and 225 BC.

"... people of the Dingling nationality living in the Altay mountains of northwest China sped like goats in the valleys and on the flatlands wearing the 'horns of goats' - a kind of knee high fur boot under which is bound a wooden board with a hoof-shaped front tip," the book describes.

During ancient times, skiing was an essential part of people's productive lives during the coldest periods of the year. It's hard to move around and go hunting without skis. The bottom of the skis are covered with horse-hide and fur, which allows the skis to slide downward faster while preventing them from slipping backward when traveling uphill.

As people's needs for survival in winter were satisfied, ice and snow

sports for the sake of recreation and relaxation, started to emerge.

During the Sui and Tang Dynasties (613-628), the ethnic minorities in the north of China mastered ice and snow sport. Song Dynasty (960-1279) saw the invention of Bingxi, which is a winter event performed regularly for royal members.

Beginning with the ice parades of the royal army, Bingxi gradually became a showcase for the skating skills of soldiers and stimulated widespread public interest. Bingxi in the Qing Dynasty (1644-1912) included the speed and figure skating we now see at the Winter Olympics.

From the wisdom of survival in the ice and snow in ancient times, to the passionate competition in the modern Winter Olympics, humankind has always been keen to discover the unique pleasures and great rewards hidden in the cold.

## Service Info



Foreign experts in Xiamen gather to explore the beauty of the Spring Festival and the Olympic Winter Games Beijing 2022. (PHOTO: LUO LEI from Xiamen Municipal Bureau of Science and Technology)

### Course Launched for Closer Lancang-Mekong Cooperation

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Myo Thein Kyaw, Myanmar's Union Minister for Science and Technology, said the training course would benefit the economic development, research, education and health sectors in Mekong countries, and enhance cooperation between Myanmar and the Mekong-Lancang region.

U Win Zeyar Tun, vice Chair of the LMC National Coordination Unit, said the training course would help achieve the LMC's two main goals of

promoting connectivity and poverty reduction, and help overcome the economic difficulties caused by the pandemic.

The training course, organized by the Myanmar Information and Communication Research Center, will be held online from February 9 to 25, with a total of 53 trainees from Lancang-Mekong countries, including 39 from Myanmar. Most of the Chinese trainees are from the China-ASEAN Information Harbour.

### Inactivated COVID-19 Vaccines Effective against Delta Variant

From page 1

"This does support the idea that the inactivated vaccines did have an impact on prevention of COVID-19 Delta infection," said Jerome Kim, director general of the nonprofit International Vaccine Institute, who did not participate in the study.

According to *Contagion*, a fully integrated news resource covering all areas of infectious disease, the study noted that inactivated vaccines may not be equally effective against Delta and other

variants. Waning effectiveness suggests that booster shots may be necessary.

In addition, China has moved a step closer to developing a home-grown mRNA vaccine against COVID-19, with the publication of early trial results for its prime candidate ARCoV.

No serious adverse events were recorded in the phase 1 clinical trial data, published by *The Lancet Microbe* recently, but scientists said it was too early to judge its success, and everything hinged on large-scale study.



Nanshan National Park is located in the Chengbu Miao Autonomous County, Shaoyang City, Hunan Province, with a total area of 635.94 square kilometers, and is one of the first 10 national park system pilot areas in China. (PHOTO: XINHUA)