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WEEKLY EDITION

Chinese Cities Rise with Innovative Hubs

By Staff Reporters

Chinese cities have performed well in the number and growth rate of researchers and scholarly outputs, according to a report jointly issued by the Administrative Center of Shanghai R&D Public Service Platforms and the global publishing company Elsevier on February 28.

With most data collected between 2016 and 2020, the report selected 20 cities from Asia, North America and Europe, and evaluated them with indicators like researcher population and output, researcher mobility, international collaboration, patent related activities and commercialization.

Data shows the outstanding performance of Chinese cities in attracting and reserving researchers. Beijing, one of the 20 cities, has the largest researcher population, followed by Shanghai, London, Boston and New York. Chinese cities (Beijing, Shanghai, Shenzhen and Hong Kong) are in the top five in the compound annual growth rate (CAGR) of number of researchers, with Shenzhen taking the lead.

In terms of research mobility (data from 1996- 2020), Shenzhen was only second to Seoul concerning the inflow of researchers. Shanghai and Beijing

ranked second and third, when it comes to the proportion of sedentary researchers who have not published papers with affiliations outside of their city.

Scholarly outputs from Chinese cities have been rocketing as well, with Beijing and Shanghai leading the total publication count. Shenzhen ranked first in terms of CAGR of total publications, and the three other Chinese cities all make top five in this category.

The quality of the scholarly output also matters. Beijing ranked top regarding number of the top one percent highly cited publications. Shenzhen, Shanghai and Hong Kong claim the top three for the CAGR of top one percent highly cited publications with Shenzhen at 29.3 percent, far ahead of the other cities. Shenzhen also tops the CAGR of papers published on *Cell*, *Nature*, or *Science*, all well acknowledged scientific journals, with an astonishing 67.4 percent.

Beijing ranked first for the number of total international collaboration publications, and Hong Kong leads in the share of international collaboration publications of the city's total publications. All four Chinese cities ranked top five for the CAGR of international collaboration publications, with Shenzhen leading at 32.7 percent.



A berthed ship, filled with liquefied natural gas (LNG) at an LNG filling station in Macun port of Chengmai county, south China's Hainan province. (PHOTO: XINHUA)

Editor's Pick

LNG Storage Helps Energy Efficiency

By TANG Zhexiao

It is treated as a fuel for the energy transition, is incredibly dense, and is a colourless fossil fuel that can be conveniently transported in ships around the world like crude oil, yet produces half as much carbon as coal when it burns.

Liquefied natural gas (LNG), is a kind of natural gas that has been cooled down to liquid form for ease and safety of non-pressurized storage or transport.

Chinese state-run energy firm CNOOC announced on February 20 that it has completed pouring concrete for the platforms of six LNG storage tanks in Yancheng Binhai Port Industrial Park, Jiangsu province.

As the largest of its kind in the world, the tanks are designed and built to have a total designed storage capacity of 270,000 cubic meters.

Innovation during the construction

China's first industrialized LNG plant was completed and put into operation in November 2001. To date, more than 230 LNG plants have been built, widely distributed in Inner Mongolia Autonomous Region, Xinjiang Uygur Autonomous Region, Shaanxi and Sichuan provinces.

After years of scientific research, CNOOC has successfully solved the design problems and realized a number of technological breakthroughs in the field of LNG storage tanks.

The six completed tank main bodies have a total pouring volume of 70, 860 cubic meters, equivalent to 30 standard Olympic size swimming pools. Each storage tank is 60 meters high, equivalent to the height of the National Stadium (the Bird's Nest), and can stack three Boeing 747 at the same time.

For mass concrete pouring, the concrete expands with heat if effective temperature control measures are not taken, said Ren Jianxun, deputy manager of the Yancheng LNG Terminal project extension department.

To deal with this problem, the project team made innovations. Four groups of 16 temperature sensors were assembled on the upper, middle, lower and surface of each pouring area. With accuracy as low as 0.1 °C and data stored in the cloud, technicians can monitor temperature in real time to realize intelligent and precise temperature control.

Meanwhile, the pouring area was adjusted to a 45-degree symmetrical arrangement, reducing the length of the construction joints, effectively preventing cracks and improving the construction quality.

See page 2

China-Uzbekistan Freight Train Debuts

By TANG Zhexiao

China has been Uzbekistan's largest trade partner since the establishment of the China-Uzbekistan comprehensive strategic partnership in 2016.

On February 27, a fully loaded freight train set off from Alashankou Port in northwest China's Xinjiang Uygur Autonomous Region bound for Uzbekistan. This is the first cross-border e-commerce train launched after Alashankou city was approved as a comprehensive pilot zone for cross-border e-commerce.

The commodities aboard included solar energy components, steel accessories, clothes, textile supplies and other goods manufactured in Jiangsu and Zhejiang provinces and other regions, with a total product value of 5.59 million RMB (about 884,354 USD).

In order to ensure the rapid customs clearance of cross-border e-commerce trains, Alashankou Customs established a green channel, providing clearance services 24/7 throughout the process.

He Bin, assistant general manager of the freight company for this cross-border e-commerce train, said they will continue to increase investment in the construction of the core area, to build an international logistics channel along the Silk Road and the new Silk Road Economic Belt.

Official data shows Alashankou Port, also known as Alataw Pass, has exported a total cross-border e-commerce trade volume of about 1.6 billion RMB as of February 26.

As a new form of foreign trade with great potential, cross-border e-commerce is developing rapidly. According

to the Ministry of Commerce (MOFCOM), China's cross-border e-commerce imports and exports climbed 15 percent year-on-year to 1.98 trillion RMB (about 311 billion USD) in 2021, with pilot zones playing a significant role in spurring the growth.

Wang Kaixuan, director of the department of Eurasian affairs at MOFCOM, said China-Uzbekistan e-commerce has broad prospects and is expected to become a new growth point for practical bilateral cooperation in the future.

Trade between China and Central Asian nations has grown more than 100-fold in the past 30 years. China is willing to work with the five countries in Central Asia to enhance cooperation and bring the economic and trade cooperation to a new level, according to Minister of Commerce Wang Wentao.

The Hunt for Planets Like Home

By TANG Zhexiao

Is there a "wandering Earth" in the distant depths of the universe?

To try to find an answer to this question, more than 100 researchers from various Chinese institutes have participated in the Earth 2.0 project of the Chinese Academy of Sciences (CAS). They plan to conduct a "census" to search for Earth-like planets in the Milky Way.

Ge Jian, director of Earth 2.0 project of CAS, said the project aims to discover Earth-like planets in different orbits, including searching for another Earth-sized (0.8-1.25 times of the Earth's radius) planet in the habitable zone of sun-like stars.

In the past twenty years, the exoplanet research and relevant key technologies have become more developed.

See page 3

WEEKLY REVIEW

China's First Low-Earth Orbit Broadband Communication Test Constellation to Be Formed

Six satellites produced by Beijing-based company GalaxySpace were launched from the Xichang Satellite Launch Center in southwest China's Sichuan province on March 4 and have entered their planned orbit. These satellites will form China's first low-Earth orbit broadband communication test constellation together with the first satellite of GalaxySpace.

Sci-tech Cooperation Plan between Eastern and Western China Set up

Together with eight other ministries, the Ministry of Science and Technology issued an implementation plan on sci-tech cooperation between eastern and western China on March 4. The plan pointed out that by 2025 the sci-tech innovation capability of western China will be greatly uplifted and the spillover effect of sci-tech innovation in eastern China will be more obvious.

Producing Gasoline from CO₂, Hydrogenation Completes Trial Operation

The world's first demonstration device for 1,000 tons per year production of gasoline from carbon dioxide (CO₂) hydrogenation located in Zoucheng Industrial Park, Shandong province, completed its trial operation and technology assessment on March 4.

QLEDs with Ultrahigh Pixel Resolution Invented

Chinese scientists managed to create quantum-dot light-emitting diodes (QLEDs) with an ultrahigh pixel resolution of 9,072 × 25,400 pixels per inch via transfer printing combined with the Langmuir-Blodgett film technology. The research was recently published in *Nature Photonics* online.

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