Science, Technology and Education News from China

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Introduction

This month's newsletter starts with a review of China's *5 Year Plan for International Science and Technology Cooperation*. During October, Chinas Statistics Bureau released data for 2010 S&T expenditure. China tries to battle trash journals in pursuit of more quality papers. Chinese authorities decided to cut nuclear targets after Fukushima. China's mega science facility Spallation Neutron Sources started construction in Guangdong. China launched deep earth exploration to fill resource gap. In health, experts warn that antibiotics have been heavily overused in China. No methods are proven effective in detecting "gutter oil" so far, which frustrated the Ministry of Health.

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[1] Please click on the blue texts to activate the hyperlinks to either email addresses or related websites.

Policies

Ministry of Science and Technology Sets 12th Five Year Plan on International S&T Cooperation

Since the release of China's *12th Five Year Plan for Economic and Social Development 2011-2015* by China's State Council in March 2011, more detailed sectoral plans started to follow. Sectoral five-year-plans, usually made by individual Ministries, are made in line with the overall State Council plan but with clearer goals, priorities and implementation elements.

The 12th Five Year Plan for Science and Technology was released by the Ministry of Science and Technology (MoST) in July 2011. On top of this plan, an additional 12th Five Year Plan for International Science and Technology Cooperation followed in September, positioning international cooperation as a key priority for MoST in the next five years.

MoST plans to strengthen international cooperation from the following aspects: establish a clear and integrated strategy, significantly increase investment, improve and expand the instruments of cooperation, better coordinate and plan cooperation, encourage universities and research institutes for more active international exchange, encourage industry to make better use of international science and technology resource, and further attract overseas talents.

In the plan, a strong emphasis on opening-up, long-term cooperation, large facilities, physical presence, coordinated cooperation and industry participation.

The FYP for S&T Cooperation underlined 6 priories in the next 5 years: opening up national projects, creating a better environment for cooperation, deepening the level of cooperation and expanding instruments for cooperation; fostering more talents with international vision and better planning of international cooperation.

Priority cooperation areas set in FYP for S&T include exploitation and utilization of energy and resources, advanced new materials, advanced manufacturing, information network, modern agriculture, biology and medical sciences, environment protection, space and ocean. Bilateral cooperation should move to a "higher level with broader cooperation areas", and partnership should be long term ones with "more intensive and regular personnel exchanges". In terms of multilateral cooperation, China plans to be more proactively involved in large international science and technology research projects, such as International Thermonuclear Experimental Reactor ITER and Galileo Project. Meanwhile, China plans to start its own multilateral research initiative in the fields of climate change and clean technologies.

For the first time industry is mentioned together with universities and research institutes when it comes to international cooperation. It is stated in the FYP for S&T Cooperation that the government should facilitate a few joint innovation promotion projects in which industry should be the main cooperation partners. Besides further opening national science and technology projects to industry, in the next 5 years, Chinese companies are encouraged to more actively participate in international research by setting up R&D facilities abroad and investing in the relevant companies and facilities. MoST is committed to "increase funding to support industry's joint research projects", and to "encourage and support" industry's international initiatives, including hiring overseas talent, personnel exchange, joint research and R&D outsourcing.

The FYP for S&T Cooperation sends a very positive message, that international cooperation is expected to play a more important role in the development of science and technology with a significantly larger budget. But meanwhile, China is also getting selective in cooperation—funding should be earmarked, cooperation should be on a fair level with reciprocal exchange and facility or funding access. More importantly, experience with MoST has increasingly shown that China has a clear country-specific cooperation plan and priority areas.

Industry participation in international cooperation is underlined as one of the key areas of the 5YP. But given the reliance on existing R&D facilities and powerhouses, large corporations (private and state-owned) are foreseen as the main beneficiaries of the boost. R&D in small and medium enterprises SME is so far not a top priority for China.

News

1. China's 2010 S&T Expenditure Released

(MoST, 01-10-2011)

Chinese State Statistics Bureau, Ministry of Science and Technology, and Ministry of Finance jointly released on September 28, 2011 China's S&T expenditure for 2010. Statistics show that state treasury has steadily increased its input in science and technology activities, especially in R&D activities. In 2010, the treasury's S&T expenditure sat at **RMB 411.44 billion**, or RMB 88.95 billion up against the previous year, with a **27.6% growth**. S&T expenditure has taken 4.58% as a proportion of the national fiscal expenditures.

In 2010, China registered a **R&D expenditure worth RMB 706.26 billion**, with RMB 126.05 billion more than last year and a growth rate of 21.7. **R&D expenditure intensity (as a proportion of GDP) reached 1.76%**, slightly higher than 1.70% claimed by the previous year. China's R&D expenditure accounted for RMB 277,000 per R&D personnel (full-time), or 23,000 more compared with the previous year.

By activity type, China has invested **RMB 32.45 billion in basic research activities**, or 20.1% up over the previous year, with RMB 89.38 billion in applied research activities, or 22.3% more, and RMB 584.43 billion for experiment and development, or 21.7% up. Basic research expenditure accounts for **17.2%** of the R&D expenditure.

By executive agency, industry R&D expenditure reached RMB 518.55 billion, or 22.1% more over the previous year. Government research institutions' R&D expenditure reached RMB 118.64 billion, with a growth rate of 19.1%, and higher learning institutions RMB 59.73 billion for an increase of 27.6%. Industry, government research institutions, and universities were proportioned at 73.4%, 16.8%, and 8.5% respectively.

By sector, special equipment manufacturing claimed the highest R&D expenditure intensity (as a proportion of main business income) by 2.04%. The sectors with R&D expenditure intensity between 1.5% and 2% are **pharmaceuticals** (1.82%), **generic equipment** (1.59%), **electrical machinery** and **equipment** (1.59%), and **instruments, culture, office machinery** (1.50%).

By area, six provinces or municipalities, including Jiangsu, Beijing, Guangdong, Shandong, Zhejiang and Shanghai, registered an R&D expenditure exceeding RMB 30 billion, at a combined RMB 413.65 billion, or 58.6% of the national total. Seven provinces or municipalities, including Beijing, Shanghai, Tianjin, Shaanxi, Jiangsu, Zhejiang and Guangdong, secured an R&D expenditure intensity (as a proportion of local GDP) hitting or exceeding the national average.

(http://www.most.gov.cn/eng/newsletters/2011/201109/t20110930_90107.htm)

2. China Looks to Purge Academia of "Trash Journals"

(*Science,* 21-10-2011)

In China's booming economy, there are many ways to get rich. For a husband-and-wife team on Hainan, an island off China's southern coast, scientific publishing was their cash cow. For 7 years, Guo Hong and Fu Li operated 20-some journals, collecting a reported $1.5 million in publication fees from thousands of contributors. They solicited papers through elaborate Web sites, offering a discount on the publication fees common in China. But the journals were fake, provincial authorities allege. Upon receiving submissions, the couple would print up only a few copies—journal titles included Chinese Applied Nursing and Chinese Medicine Forum—to send to the author. Guo and Fu were detained in March; prosecutors have not yet filed charges.

The highly publicized takedown is one of several recent efforts to clean up China's academic publishing industry. In a country where low publication standards abound and every university or institute, it seems, has its own journal, the Chinese government is getting serious about raising standards. Although the Hainan journals fraud is an outlier, it's symptomatic of a larger problem: slapdash and irrelevant publications read by next to no one. At most Chinese journals, "the academic level is not high," Li Dongdong, vice director of the General Administration of Press and Publication (GAPP), which regulates

publications in China, noted in a speech in December. She estimated that two-thirds of journals are “not market-oriented.”

As Chinese science barrels ahead, a few of its journals are getting international attention, and leading Western publishers have set up shop on the mainland in response. But the country's 4700 scientific periodicals include a hefty number of what the Chinese press refers to as “trash journals.” Despite being second only to the United States in total papers published from 2006 to 2010, China ranked at the bottom of the top 20 countries for citations per article over the same period, with just 1.47 citations on average, according to Elsevier's SciVerse Scopus database and SciVal Spotlight country matrix, compared with 5.16 for the United States. It doesn't help that many institutions in China offer fat rewards for publishing in overseas journals with high impact factors.

China's 12th 5-year plan, in effect since March, sets a heady goal for journals. It calls for making cultural production—including media and publishing—a “pillar” industry. GAPP has moved swiftly. Earlier this year, the agency closed six obscure publications and reprimanded two others for violations that included indiscriminate printing of up to 200 papers per issue, over the limits set by publishing licenses. Then last summer, officials unveiled China Science and Technology Media Group, one of a handful of flagship publishers due to be rolled out over the next few years to compete with foreign rivals such as Wiley, Elsevier, and Springer. Li has talked about GAPP supporting a group of select academic journals; editors are unclear when funding might materialize.

(http://www.sciencemag.org/content/334/6054/301.full)

3. China Nuclear Targets to be Cut after Fukushima

(Reuters, 21-10-2011)

China was originally scheduled to release a revised blueprint for its nuclear sector this year, with many predicting a new 2020 target of 86 GW, up from the previous 40 GW.

Capacity at the end of 2010 stood at 10.9 GW, but projects already under construction would have pushed the total up to 40 GW by as early as 2015, and China's bullish reactor builders even suggested a target of 100-120 GW was within reach.

But Beijing promised to "adjust and improve" its plans for the sector after an earthquake and tsunami devastated Japan's northeast coast and left the aging Fukushima Daiichi reactor complex on the brink of meltdown.

Li Yongjiang, vice president of the China Nuclear Energy Association (CNEA), said on the sidelines of an industry conference in Hong Kong that new projects were likely to be resumed next year, but China had already lost a year of construction time.

"The 86-GW target was still a very tight target in the first place," he said, adding that the suspension forced the delay of around 10 GW of new capacity this year. "If we start from next year, we'll only be able to build 60 to 70 GW so we will definitely have to reduce (the target)," he said.

In March, the government ordered a nationwide inspection of existing plants and construction sites in order to allay public disquiet about the safety of nuclear power.

Areas of concern included the safety of the many "second-generation" reactors set to go into operation, the shortage of qualified safety and operational personnel, and the possible construction of nuclear projects in seismically vulnerable provinces like Sichuan.

Senior energy officials have expressed concern that the current impasse will hurt China's long-term aim to become a global leader in the nuclear sector.

The former head of China's National Energy Administration, Zhang Guobao, said in August that new industry policies had to be drawn up as soon as possible if the country was to avoid falling behind countries like South Korea and Russia.

(http://www.reuters.com/article/2011/10/21/us-china-nuclear-growth-idUSTRE79K0QU20111021)

4. Health Experts Warn Antibiotics "Heavily Overused" in China

(Xinhua, 19-10-2011)

Chinese medical experts have warned that antibiotics have been "heavily overused" at hospitals, which might cause serious side-effects for the health of an entire generation.

The average annual consumption of antibiotics per capita in China amounts to 138 grams, ten times the level in the United States, said Xiao Yonghong, an expert with the Institute of Clinical Pharmacology, Peking University.

Penicillin is the most overused. According to a report from the Health Ministry, the average dose of Penicillin that each Chinese has taken annually is almost three times higher than the international level.

According to the ministry, 70 out of 100 Chinese inpatients have received antibiotics while the maximum number set by the World Health Organization is 30.

About 97 percent of patients in the surgical department in China used antibiotics but research showed that a large number of surgical patients would not need antibiotics if hospitals conducted proper sanitation measures, the ministry report said.

Particularly, antibiotics are overused in the treatment of children. Nearly one third of the daily 10,000 outpatients at the Beijing Children's Hospital take intravenous drips that largely contain antibiotics, said Yang Yonghong, a doctor with the hospital.

[…]

The ministry launched a nationwide campaign over the past six months to regulate the use of antibiotics in the latest effort to ensure safe medical practice.

Although progress has been made, Vice Health Minister Ma Xiaowei admitted that the government faces great challenges as quite a few public hospitals have loosened supervision on prescription safety under heavy pressure from patients.

Tougher measures will be made to regulate the practice at small hospitals and those at local levels, he said. Insiders also noted that the overuse of antibiotics was partly driven by profit-seeking pharmacy firms.

There are more than 6,000 pharmacy companies in China that produce more than 1,000 sorts of antibiotics. About 60 percent of the newly approved medicines by the State Food and Drug Administration (SFDA) last year were antibiotics.

According to the SFDA, the country reported 690,000 cases of adverse drug reactions caused by abuse of medicine, including 600 deaths in 2010.

The SFDA announced a regulation on the clinical application of antibiotics last week, reportedly the strictest ever.

(http://news.xinhuanet.com/english2010/china/2011-10/19/c_131200641.htm)

5. Chinese Authorities Struggle to Eliminate "Gutter Oil"

(China.org, 14-10-2011)

A National Center for Food Safety Risk Assessment was established by the Ministry of Health and several central departments in Beijing in early October in the latest move to ensure food safety.

Meanwhile, the country's health and food safety watchdogs are continuing to seek an effective way to distinguish "gutter oil" from normal cooking oil, as none of the methods tried so far have proved satisfactory.

Illegally recycled cooking oil, or gutter oil as it is popularly known, is usually scooped up from the gutters and sewers behind cooking establishments, then clarified and resold to restaurants, but it can also be oil refined from low-quality pork, animal offal, and oil overused for fried food in a broader sense.

"The five detection methods proposed so far don't work in identifying the illegal oil and the authorities are still organizing experts to carry out research," Deng Haihua, spokesman for the Ministry of Health, said on Wednesday.

The ministry announced on Sept 18 that it was initiating a project with six central departments to develop better testing methods for gutter oil, and an expert panel was established to examine and verify the proposed methods.

Chen Junshi, an academician at the Chinese Academy of Engineering and a food safety expert, said the five alternatives were selected from all the potential detection methods gathered nationwide, but all were deemed ineffective.

"The panel made experiments with the proposed methods to differentiate gutter oil samples from ordinary edible oil, but none proved effective," Chen said.

The methods included detecting the four core indicators of gutter oil as defined by the Beijing Food Safety Monitoring Center - polycyclic aromatic hydrocarbon (PAH), cholesterol, conductivity and specific genes.

Experts said the failure to find a detection method once again shows that the safety of edible oil requires process monitoring.

"Law enforcement will only chase the tail of law breakers if the government only seeks to solve the problem technically, and fails to stop the illegal behavior happening," said Feng Ping, chief engineer at the China Meat Research Center.

(http://www.china.org.cn/china/2011-10/14/content_23621817.htm)

6. Groundbreaking for China Spallation Neutron Source CSNS in Guangdong

(Chinese Academy of Sciences, 24-10-2011)

Hundreds of scientists from the China Spallation Neutron Source CSNS project and from the institutes of the Chinese Academy of Sciences CAS gathered in Dongguan, Guangdong Province on October 20 for the groundbreaking of the project.

As a key mega-science facility, the 1.67 billion yuan (26 million dollars) CSNS Project was approved by the central government in 2005 and has been listed in the National Long and Medium-term Plan for S&T Development. According to the blueprint of the CAS-Guangdong cooperation, the facility will take seven years to complete with financial support from both the central government and the local governments. It is intended to start commissioning in 2016, and step in full operation in 2018. CSNS aims to be a world-class facility for a new generation of neutron sources, which is characterized with high-flux, broad-wavelength, safety and efficiency.

Neutron scattering technology is currently one of the most important tools for the studies of microstructure and dynamic process of matter. It is widely used in various basic and applied fields, ranging from condensed matter physics, chemistry, biotechnology, materials sciences, nano-science and technology to nuclear physics and medicine. Spallation neutron source, a state-of-the-art neutron scattering facility, could produce neutrons by GeV protons colliding a target of heavy metal. It has advantages of high pulse flux of neutrons and no long periodic nuclear wastes.

CSNS mainly consists of an H-linac and a proton rapid cycling synchrotron. It is designed to accelerate proton beam pulses to 1.6 GeV kinetic energy at 25 Hz repetition rate, striking a solid metal target to produce spallation neutrons. The pulsed-beam feature allows studies not only on the static structure but also the dynamic mechanisms of the microscopic world.

(http://english.cas.cn/Ne/CASE/201110/t20111024_76619.shtml)

7. Earth Exploration Launched to Fill Resource Gap

(Global Times, 25-10-2011)

A deep Earth exploration program, which could be the largest in the country's history, may lead to a breakthrough in China's natural disaster forecasting and search for new mineral resources, a senior geologist said.

The SinoProbe Program, also known as "deep exploration in China," aims to enable geologists to predict potential geological disasters and mitigate damage by further understanding the structure and evolution of the continental lithosphere beneath China. It is also meant to assist in mineral resource exploration, said Dong Shuwen, a deputy head of the Chinese Academy of Geological Sciences and principal investigator of the SinoProbe, according to the Shanghai-based *Oriental Morning Post*.

"The program is driven by the need for natural resources," Dong said earlier to the Oriental Outlook. "China has encountered challenges looking for resources buried deep as the resources in the Earth's initial layers, with an average depth of 400 to 500 meters, have largely been exploited."

According to the Ministry of Land and Resources, China is facing a widening gap between supply and demand with resources amounting to only half of the world's average per capita and the country is the world's second largest mineral consumer.

The program with a budget of 3 billion yuan (470.96 million dollars), funded by the Ministry of Finance and managed by the Ministry of Land and Resources, was approved by the State Council in late 2008. It has entered a stage of full-scale implementation recently, and will be completed in 2012.

Chen Xuanhua, deputy director of the Management Office of SinoProbe, told the Global Times the program has been carried out smoothly. "We have already made a lot of achievements with the technologies becoming more mature," Chen said. "And the initial experiment was proven to be a success."

"For years, China has lagged behind Western countries, such as the US and Canada, in deep earth exploration," said Chen.

Russia secured its status as the country with the largest amount of mineral resource reserves and the world's largest resource exporter by implementing a number of exploration programs in 2005, according to the report.

(http://www.globaltimes.cn/NEWS/tabid/99/ID/680674/Earth-exploration-launched-to-fill-resource-gap.aspx)

Events (November - December 2011)

November 2011

The 16th China International Exhibition on Quality Control and Testing Equipment
Date: November 2nd
Place: Shanghai
Contact: Shanghai Research Institute of Materials

The Third Annual China civil Aircraft Conference 2011
Date: November 2nd to 4th
Place: Shanghai
Contact: http://www.cdmc.org.cn/ccac

2011 China International Beverage Industry Exhibition on S&T
Date: November 6th
Place: Shanghai
Contact: China Beverage Industrial Association

Nano-Potonics International Conference
Date: November 6th
Place: Changchun
Contact: Changchun Institute of Optics. Fine Mechanics and Physics, CAS

Asia-Pacific Forestry Week 2011
Date: November 7th to 11th
Place: Beijing
Contact: FAO APFNet

The 12th China International EP Exhibition and Conference
Date: November 9th
Place: Changchun
Contact: China Association of EP Industry

The 8th International Conference on Numerical Optimization and Numerical Linear Algebra
Date: November 7th
Place: Xiamen
Contact: Academy of Mathematics and Systems Sciences, CAS

2011 International Conference on Computer Science and Logistics Engineering
Date: November 11th to 13th
Place: Zhengzhou
Contact: http://www.iccsle.org

The 1st CMI International Symposium on Immunology
Date: November 12th
Place: Hefei
Contact: University of Science and Technology of China

The 6th International Conference on Genomics
Date: November 12th to 15th
Place: Shenzhen
Contact: http://www.genomeconference.org

BIT's 2nd Annual World Congress of Immunodiseases and Theraphy 2011
Date: November 18th to 20th
Place: Guangzhou
Contact: BIT Life Science

2011 International Conference on Power Science and Engineering (ICPSE 2011)
Date: November 25th to 27th
Place: Chengdu
Contact: http://www.icpse.org

Bio World 2011
Date: November 20th to December 1st
Place: Shanghai
Contact: IMAPAC Pet Ltd

Marintec China 2011
Date: November
Place: Shanghai
Contact: Ministry of Industry and Information Technology

December 2011

International Conference on Environment and Health
Date: December 12th
Place: Xiamen
Contact: Institute of Urban Environment, China

The 4th Guangzhou International Conference on Stem Cell and Regenerative Medicine
Date: December 14th
Place: Guangzhou
Contact: Guangzhou Institute of Biomedicine and Health, CAS

Hadoop in China 2011
Date: December 2nd to 3rd
Place: Beijing Convention Center
Contact: Institute of Computing Technology, CAS

The 2011 International Conference on Computer, Communication and Information Technology
Date: December 3rd to 4th
Place: Beijing
Contact: http://www.icccit.org

3rd International Conference on Smart Materials and Nanotechnology in Engineering
Date: December 5th to 8th
Place: Shenzhen
Contact: Harbin Institute of Technology

2nd Unconventional Gas Asia Summit 2011
Date: December 6th to 9th
Place: China
Contact: http://www.szwgroup.com/2011/unconventional/

Intersolar China (Conference and Exhibition)
Date: December 6th to 9th
Place: Beijing
Contact: http://www.intersolarchina.com/

World Deepwater Summit & Expo
Date: December 6th to 9th
Place: Shanghai
Contact: http://www.worlddeepwaterexpo.com

International Conference on Computer Science and Software Engineering
Date: December 9th to 11th
Place: Wuhan
Contact: http://www.ciseng.org/csse2011

International Conference on Mechatronics and Materials Engineering 2011
Date: December 10th to 12th
Place: Qiqihar
Contact: Qiqiha'er University

3rd China Solid Waste Summit 2011
Date: December 13th to 14th
Place: Shanghai
Contact: http://www.solidwastesummit.com

The 2nd International Conference on Advanced Material and Manufacturing Processes
Date: December 16th to 18th
Place: Guilin
Contact: http://www.icammp.org

2011 International Conference on Chemical, Material and Metallurgical Engineering (ICCMME 2011)
Date: December 23rd to 25th
Place: Beihai
Contact: University of Guangxi