



Science, Technology, Education and Health News from China

Number 122 – August 2014

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Introduction

The story of the month covers the Chinese Academy of Sciences' complete reform of its structures. In science, the world's deepest underground lab was launched by Tsinghua University and Yalong River Hydropower Development Company; a new network will be initiated to monitor the quality of China groundwater; China is preparing to launch an experimental recoverable moon orbiter; Tianhe-1A, one of the world's fastest supercomputers, is serving in the construction of new "smart cities"; China's Ministry of Agriculture has decided to restrict research groups to grow genetically modified (GM) rice and corn. In education, The Chinese Academy of Sciences decided to provide more funding support to foreign researchers; Jiangsu Province announced to increase scholarships for overseas students.

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



Story of the Month

Chinese Academy of Sciences Launches Institutional Reform

The Chinese Academy of Sciences CAS, China's flagship research institute, rolled out a complete restructuring program for its more than 100 institutes on August 19th. The reform aims to complete the working plan of such reform by 2020 and to finish restructuring by 2030.

According to the plan, CAS research institutions will be sorted into four functional categories - applied technology for industry ("Innovation Academy"); academic research ("Specialized Research Institute"); engineering ("Big Science Research Center"); and basic research that requires long-term investment ("Center of Excellence for Innovation").

The most critical part of the reform is to de-bureaucratize CAS research institutes and maximize research output. To this end, the four functional categories of research institutes, although remaining part of CAS, will be managed with different governance structure, management process, evaluation methods and funding instruments that would best fit the needs of their respective fields.

Innovation Academies aims to streamline the value chain "from research lab to market" by establishing a team of scientists, engineers and market specialists. It focuses on making technology breakthroughs, commercializing of the technology and eventually incubating technology startups. The Academy will be governed by a board of CAS officials, researchers, professors and industry representatives. Its funding sources and assessment will be mostly market-driven. CAS has been pushing for applied research since 2010. Its decision to create the innovation academy confirms the commitments of CAS to continue with this direction. Pilot Innovation Academies will be selected in the fields of small satellites, information engineering and space science, marine information technology and pharmaceutical products.

The **Big Science Research Centers** aim to establish a platform for open innovation. Such big science infrastructure will not only benefit engineers in China but will also attract international students and researchers from various backgrounds, therefore increasing international reputation of CAS and facilitating interdisciplinary research. The centers will be mostly funded by the government and evaluated by its clients. 3 comprehensive research centers will be piloted in Hefei, Beijing and Shanghai where several large facilities such as XFEL, NSRL, SSRF, BEPC have already been installed.

The **specialized research institutes** will follow priority topics that require long term observation from interdisciplinary perspectives and serve as think tanks, offering academic advises and proposals on macro management and sustainable development. Its funding sources include both stable support and project-based funding. Assessment is to be done through peer review, industry evaluation and local government evaluation.

The **Centers of Excellence for Innovation** focus on basic research, receive stable funding from CAS and are to be evaluated through international peer assessment. Pilot reform will start with the existing CAS centers of excellence established in 2013, covering the academic areas of quantum information, earth system science of the Qinghai-Tibetan Plateau, particle physics, brain science, thorium molten salt reactors and nuclear power systems.



News

1. China Expands World's Deepest "dark matter" Lab

(CAS, 6-08-2014)

China has begun expanding the world's deepest underground lab in southwest China's Sichuan Province, where scientists have been conducting experiments on mysterious "dark matter".

The second-phase construction of the Jinping Underground Laboratory, located at 2,400 meters under the surface of Jinping Hydropower Station, was launched on 1st August by Tsinghua University and Yalong River Hydropower Development Company.

The construction, scheduled to be completed by the end of 2015, will increase the lab's space to 120,000 cubic meters, allowing more experiments to be carried out simultaneously, the university said.

The Jinping lab, opened in December 2010, provides a "clean" space for scientists to pursue the invisible substance known as dark matter. Researchers said the extreme depth helps block most cosmic rays that mess with the observation.

The lab has accommodated a project called China Dark Matter Experiment, whose results were published in scientific journal Physical Review D in 2013.

Scientists are still searching for evidence to prove the existence of the hypothetical dark matter, which account for over a quarter of the universe's mass-energy balance but have not been directly detected.

(http://english.cas.cn/Ne/CN/201408/t20140806_125636.shtml)

2. Groundwater monitoring system 'three years away'

(South China Morning Post, 6-8-2014)

China is considering revising its 20-year-old standards for groundwater and will launch a new network to monitor quality in three years, according to an official with the Ministry of Land and Resources.

Zhang Zuochen, a deputy head of the ministry-affiliated China Institute of Geo-Environment Monitoring, said a revision to the existing standards for groundwater quality had been drafted. Internal consultation among ministries would start soon; Zhang was quoted by the 21st Century Business Herald as saying yesterday.

The nation is facing a worsening crisis over its groundwater as cities and farms in the arid north are forced to rely heavily on drawing water from underground. Industrial and agricultural pollution is also putting pressure on the system, with latest official data showing nearly 60 per cent of groundwater is either polluted or heavily polluted.

But the full scale of the problem is difficult to discern because quality standards are outdated and monitoring remains insufficient. By the end of last year, only 1.1 million square kilometers, or about 11 percent of the national territory, was being monitored for groundwater quality, according to Zhang.

Experts also said standards failed to cover some key pollutants that were becoming more common, such as organic chemicals from petrochemical industries.

"When the standards were drafted some 20 years ago, petrochemical pollutants were not a major concern, so they were excluded," said Song Xianfang, a researcher with the Chinese Academy of Sciences.



Song said the standards should have been revised every five years to keep pace with economic growth and shifting environmental problems.

In 2011, nearly 55 per cent of groundwater was either polluted or extremely polluted, meaning the water required intensive processing before it could be used. The figure rose to 59.6 per cent last year. A nationwide survey conducted in 1999 by the China Geological Survey, also affiliated with the land and resource ministry, found about 10 per cent of groundwater was rated as polluted or extremely polluted, while nearly 80 per cent of groundwater was clean enough for direct drinking.

In 2011, China published a 10-year plan to tackle groundwater pollution, and called for an effective monitoring system to be in place by next year.

But the target has now been extended to three years. Some experts have said the delay was due to a dispute over regulatory responsibility among the three relevant ministries - land and resources, environmental protection and water conservation.

(<http://www.scmp.com/news/china/article/1567193/groundwater-monitoring-system-three-years-away>)

3. **China to Test Recoverable Moon Orbiter**

(CAS, 12-08-2014)

China is preparing for the launch of an experimental recoverable moon orbiter, said the State Administration of Science, Technology and Industry for National Defence on 10th August.

The orbiter arrived in Xichang via air in southwest China's Sichuan Province on the same day and then transported to the Xichang Satellite Launch Center, according to a statement from the administration.

The launch will take place before the end of 2014, it said.

The plan is for the orbiter to be launched into lunar orbit and return to Earth at an escape velocity of 11.2 km per second.

The orbiter is one of the test models for China's new lunar probe Chang'e-5, which will be tasked with landing on the moon, collecting samples and returning to Earth.

The launch is aimed at testing the technologies that are vital for the success of Chang'e-5, the statement said.

China launched the Chang'e-3 lunar probe with its moon rover, Yutu, in late 2013. Chang'e-3 successfully landed on the moon and Yutu operated well until its control mechanism failed in January.

As the backup probe of Chang'e-3, Chang'e-4 will be adapted to verify technologies for Chang'e-5.

The more sophisticated Chang'e-5 mission, including unmanned sampling and returning, requires technological breakthroughs in moon surface takeoff, sampling encapsulation, rendezvous and docking in lunar orbit, as well as high-speed Earth reentry.

(http://english.cas.cn/Ne/CN/201408/t20140812_125734.shtml)

4. **China's Supercomputer Serves "smart city" Construction**

(CAS, 19-8-2014)

The assembly of China's next mega metropolis may leave architects and civil engineers feeling left out.



Developers with China's Tianhe-1A, one of the world's fastest supercomputers, are tapping into the binary brain's higher functions, moving it beyond animation and Internet financing to help in the construction of new "smart cities", said a researcher on 18th August.

The Tianhe-1A can digitize the planning, designing, construction and property management of buildings in a city, said Meng Xiangfei, head of the applications department of the National Supercomputer Center in Tianjin.

The costs and building materials, down to which types of cement and steel are needed, can be figured out through the computer's virtual designing software prior to the completion of a building, he said.

"For example, big data-based modeling of a subway project can reduce construction costs by 10 to 20 percent," said Meng, adding the big data platform has been used in underground construction projects.

With a sustained computing speed of 2,507 trillion calculations per second, in the future Tianhe-1A will have more use in urban planning, meteorological forecast, bio-medical and equipment production, said Meng.

Tianhe-1A has had more than 600 users and is carrying out more than 1,000 computing tasks per day.

(http://english.cas.cn/Ne/CN/201408/t20140819_125953.shtml)

5. **China pulls plug on genetically modified rice and corn**

(*Science, 20-8-2014*)

China's Ministry of Agriculture has decided not to renew biosafety certificates that allowed research groups to grow genetically modified (GM) rice and corn. The permits, to grow two varieties of GM rice and one transgenic corn strain, expired on 17th August. The reasoning behind the move is not clear, and it has raised questions about the future of related research in China.

The ministry, with much fanfare, had approved the GM rice certificates in August 2009. The permits enabled a group at Huazhong Agricultural University in Wuhan to produce two varieties of rice carrying a gene from the *Bacillus thuringiensis* (Bt) bacteria that provides pest resistance. At the same time, the ministry approved production of a corn strain developed by the Chinese Academy of Agricultural Sciences' Biotechnology Research Institute in Beijing. Researchers had altered the corn so that kernels contain phytase, a livestock feed additive that boosts absorption of phosphorus, which enhances growth. All of the certificates were valid for 5 years.

Since the certificates were issued, however, public skepticism about the benefits of GM crops has grown in China. Some scientists conducting GM plant research have been attacked when giving public lectures.

Why the ministry allowed the certificates to lapse is in dispute. Some environmentalists say public worries about GM crops played a decisive role. "We believe that loopholes in assessing and monitoring (GM) research, as well as the public concern around safety issues are the most important reasons that the certifications have not been renewed," writes Wang Jing, a Greenpeace official based in Beijing, in an e-mail to Science Insider.

Others believe agricultural economics also influenced the decision. China has nearly reached self-sufficiency in producing rice using conventional varieties, so the ministry has decided there is no need to commercialize Bt rice in the near future, says Huang Jikun, director of the Chinese Academy of Sciences' Center for Chinese Agricultural Policy. He says that with commercialization off the table, there was no point in renewing the certifications. Huang says "rising public concerns about the safety of GM rice" likely also played a role.

Whatever the reason, the decision marks an abrupt change in fortunes for transgenic rice in China. Five years ago, "China was widely expected to soon put GM rice on the country's dining tables," wrote Cao



Cong, a China policy expert at University of Nottingham in the United Kingdom, in a post on The Conversation, an Australian website. The Bt rice project "is now to all intents and purposes dead and buried," he wrote, blaming an "anti-GM movement whose power and influence are more than matched by its fervour and sheer, undiluted paranoia."

Huang says this decision does not reflect a change in China's overall policy regarding agricultural biotechnology. The government is increasing its support for Bt corn research, other specialists note; GM corn has faced less public opposition, in part because it is primarily fed to livestock.

(<http://news.sciencemag.org/asiapacific/2014/08/china-pulls-plug-genetically-modified-rice-and-corn>)

6. Academy to Hike Foreign Hires

(CAS, 25-8-2014)

The Chinese Academy of Sciences will beef up the number of foreign researchers it uses, as part of a move to promote internationalization for the next five years.

The academy released a reform outline on 19th August, saying that foreign researchers will account for 3 percent of all academy researchers, up from 1 percent currently, until 2020. It now has 56,000 researchers (excluding post doctorate and visiting scholars).

The academy launched a program called the CAS President's International Fellowship Initiative to enhance internationalization by hiring more foreign researchers in August.

According to Tan Tieniu, academy's deputy secretary-general and head of the academy's Bureau of International Cooperation, the academy aims to attract four types of international researchers: distinguished scientists who are well-recognized in their academic fields; visiting scientists holding tenured positions (professorship, associate professorship or assistant professorship or equivalent) with well-known international universities, research institutions or enterprises; postdoctoral researchers with excellent performances; and PhD students from the developed or developing economies.

"CAS, along with the World Academy of Sciences, provides generous scholarships to fund overseas students from developing countries to conduct PhD studies in CAS," Tan said, adding that the scholarship program allows 200 foreign students to receive four years of funding with which to pursue PhDs at the academy.

It is appealing for overseas students, Tan said. In 2014, the academy received 1,700 applications from all over the world.

The program plans to fund 30 distinguished scientists for one to two weeks' academic exchange activities — CNY 50,000 (USD 8,333) per week per person. The funding range is from CNY20,000 (USD3250.2) to CNY40,000 (USD 6500.5) monthly per person, as well as a round-trip plane ticket. One hundred postdoctoral researchers will receive an annual funding of CNY200,000 (USD 32502.4) apiece to conduct collaborative research for one to two years with CAS.

The program is part of the reform outline released on Tuesday. It is a 15-year plan for comprehensive reform in multiple aspects, including establishing and restructuring research centers for diverse research characteristics.

Ralf Altmeyer, a German virologist who currently leads the academy's Institute Pasteur of Shanghai, said he enjoys working in China with CAS.

"The infrastructure for an international environment has been built at CAS," Altmeyer said, adding that Chinese researchers are happy and ready to work with foreign colleagues.



"It is a very important initiative to cross the boundary and involve foreign scholars to conduct research in China. We should have been doing this a long time ago," said Wang Huiyao, president of the Center for China and Globalization, a Beijing think tank.

(http://english.cas.cn/Ne/CASE/201408/t20140825_126581.shtml)

7. Jiangsu to increase scholarships for overseas students

(China.org, 26-8-2014)

Jiangsu Province is expected to attract more overseas students after it announced that it was providing full scholarships ranging from CNY50,000 (USD 8,120) to CNY90,000 (USD 14650.6) for each person every year.

The program, initiated by the Jiangsu Provincial Department of Education, aims at promoting Jiangsu as major destination for overseas students. By 2020, the province is expected to recruit 50,000 students, among whom a target of 5 percent will be postgraduates from the province's prestigious universities, such as Nanjing University and Southeast University.

The province set up the "Jasmine Scholarship" in 2010, investing up to CNY15 million (USD 2.4 million) each year in the scholarship for overseas students.

The number of overseas students in Jiangsu hit 18,700 last year, among whom 76 percent are long-term students and nearly 50 percent have studied for degrees there.

According to Lin Yue, director of the International Cooperation and Exchange Office of the Education Department in Jiangsu Province, full annual scholarships of CNY50,000 (USD 8,120) to CNY90,000 (USD 14650.6) a person will be offered.

English is a requirement at universities that are popular with overseas students. According to Lin, those universities are now the cradle of the overseas alumni who are friendly to China and Chinese culture.

(http://www.china.org.cn/china/2014-08/26/content_33343955.htm)



(Collaborating Opportunities)

Venture Leaders China

Date: September 3th -10th

Place: Beijing & Shanghai

Contact:

<http://www.swissnexchina.org/services/for-startups/venture-leaders-china/>

Lift China Conference

Date: September 10th

Place: Shanghai

Contact: <http://liftconference.com/lift-china-14>

Shanghai BioCloud

Date: September 17th

Place: Shanghai

Contact: Swissnex China

Basel-Shanghai Business Forum

Date: September 18th

Place: Shanghai

Contact: Swissnex China

West Bund Design Exhibition, West Bund Shanghai

Date: September 25th - October 24th

Place: Beijing

Contact: Swissnex

China Visit EMBA University of Zurich

Date: October 21th

Place: Shanghai

Contact: Swissnex China

China Education Expo 2014

Date: October 25th – 26th

Place: Beijing

Contact:

<http://www.chinaeducationexpo.com>

World Federation of Colleges and Polytechnics WFCP World Congress 2014

Date: October 24th – 26th

Place: Beijing

Contact:

<http://www.wfcpbeijing.org/wfcp/index.shtml>