



# Science, Technology, Education and Health News from China

## Number 125 – November 2014

Please note that the previous newsletters can be downloaded from the website of the Embassy of Switzerland in China: [www.eda.admin.ch/beijing](http://www.eda.admin.ch/beijing)<sup>1</sup>. To subscribe/unsubscribe or send us your comments, please send an email with the corresponding subject to [chenchen.liu@eda.admin.ch](mailto:chenchen.liu@eda.admin.ch).

### Introduction

The story of this month covers China's master plan to reform research funding management. In science and technology, a UN space science center was set up in Beijing, China is considering to allow foreign GMO research, China's Tianhe-2 super computer retains top rank for the 4<sup>th</sup> times, China's R&D expenditure reaches record high last year, China to build global quantum communication network in 2030, China's moon probe safely returns to earth. In education, Shanghai Jiaotong University publishes university ranking in Greater China; flow of Chinese graduate students to the U.S. slows.

### Contents

Story of the Month .....	2
News .....	3
1. UN Space Science Center Set Up in Beijing .....	3
2. Ranking of Top Universities Greater China 2014 .....	3
3. China's Tianhe-2 Super Computer Retains Top Rank .....	4
4. China is Considering Foreign GMO Research.....	5
5. Flow of Chinese Graduate Students to U.S. Slows .....	6
6. Chinese Moon Probe Returns to Earth.....	7
7. China's R&D Expenditure Reaches Record High.....	7
8. China to Build Global Quantum Communication Network in 2030 .....	8
(Collaborating Opportunities).....	8

### Contact

**Nektarios PALASKAS**  
**Science and Technology Counsellor**  
**Head of Science, Technology and Education Section**  
**Embassy of Switzerland in the People's Republic of China**  
 Tel: +86 10 8532 8849  
 Email: [nektarios.palaskas@eda.admin.ch](mailto:nektarios.palaskas@eda.admin.ch)  
[www.eda.admin.ch/beijing](http://www.eda.admin.ch/beijing)

*We invite you to follow the Swiss Embassy on Weibo! <http://e.weibo.com/swissembassy>  
 We also invite you to follow Swissnex on Weibo! <http://e.weibo.com/swissnexchina>*

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



## Story of the Month

### China to Reform Research Fund Management

State media Xinhua has announced a key reform in China's research landscape that will impact some 100 competitive research funding schemes currently being managed by nearly 40 ministries and government departments. More than 50% of the state research expenditure will be affected by the reform. The other 40% are stable funding to cover operational costs of academies and state key laboratories.

The goal of the reform is to shift the responsibility of managing state research funding schemes from the ministries to a unified research funding platform, and to re-organize the 100 competitive funding into **five new schemes** to maximize efficiency and curb corruption, as government departments will no longer have decision-making power in granting research funds.

The current **National Natural Science Foundation** will continue to fund basic research and frontier research, and to support talent and research team development.

The current **National Science and Technology Major Projects** remains as an instrument to achieve technology breakthroughs in high priority areas of strategic national interests, such as GMO product development, moon probe project, high-definition earth observation project, large passenger aircraft, etc.

The newly created **Key National Research and Development Programs** will be a combination of basic research, applied research and product development programs, integrating the current national high-tech development program ("863" program), national basic research program ("973" program), all international cooperation funds and various other development-oriented grants. It looks to address key challenges in socio-economic development by funding the entire research and innovation chain from science to technology and to market. At this point it is not yet clear how international cooperation projects will function in the future.

The newly created **Technology Innovation Foundation** will support industry R&D activities and encourage technology transfer and commercialization of research findings. The existing Torch program, Spark Program and InnoFund managed by the Ministry of Science and Technology will most likely be merged into this Technology Innovation Foundation.

The **Infrastructure and Talent Program** helps with improvement of research infrastructure and provide stable support to talents and research teams.

All five funding schemes will be incorporated into a **unified national science and technology management platform**, to be managed by a third-party agency. This agency, independent from any ministry, will be fully in charge of receiving, reviewing and governing the funds. A unified review and governance system will be established and applicable for all new schemes.

Besides the professional agency, a **joint working committee**, a **strategic consulting committee** and a **review committee** are to be established to set strategies and priorities areas in China's research sector. The joint working committee is to be coordinated by the Ministry of Science and Technology with participation from the ministry of Finance, the National Development and Reform Commission, and other relevant departments. The consulting committee and review committee will play a consulting role when reviewing mega-sized research projects.

According to the information available online, the national science and technology management platform will kick-start with pilot integration programs. 2015 and 2016 are transition periods during which existing funding schemes will be gradually merged and integrated into the 5 new schemes. The platform is expected to be fully operational in 2017 with the 5 new funding schemes while the old schemes will stop permanently.



## News

### 1. UN Space Science Center Set Up in Beijing

*(China Daily, 18-11-2014)*

The United Nations Center for Space Science and Technology Education in Asia and the Pacific (China) was established in Beihang University in Beijing on November 17<sup>th</sup>.

The center will integrate educational resources in space science and technology, enhance the teaching of space knowledge in Asia and the Pacific and help broaden international cooperation, Xu Dazhe, director of the China National Space Administration and chairman of the center's council, said during a ceremony to mark the establishment.

Huai Jinpeng, president of Beihang University, which is one of China's top aerospace institutes, said the university will strive to build the center into a world-class education and research platform for space science and technology.

The center, which was initiated by the UN General Assembly and administered by the UN Office for Outer Space Affairs, aims to boost developing countries' scientific and technological capabilities through space applications programs, the university said in a statement.

Each center is conceived as an institution that should offer the best possible education, research and applications programs, opportunities and experience to the participants in all its programs. Thus the principal goal of each center is the development of the skills and knowledge of university educators and research and applications scientists, through rigorous theory, research, applications, field exercises, and pilot projects in those aspects of space science and technology that can contribute to sustainable development in each country.

The initial programs of each center focuses on the following four core disciplines:

- remote sensing and geographic information systems;
- meteorological satellite applications;
- satellite communications and geo-positioning systems; and
- space and atmospheric sciences.

([http://usa.chinadaily.com.cn/china/2014-11/18/content\\_18937336.htm](http://usa.chinadaily.com.cn/china/2014-11/18/content_18937336.htm))

### 2. Ranking of Top Universities Greater China 2014

*(Shanghai Jiaotong University, 18-11-2014)*

The 2014 Ranking of Top Universities in Greater China (RTUGC) is released on November 18<sup>th</sup> by the Center for World-Class Universities at Shanghai Jiao Tong University, which is the fourth time since its inauguration in 2011. RTUGC was the first attempt to compare top research universities in four regions of Great China, namely Mainland, Hong Kong, Macau and Taiwan. It presents the Top 100 universities in this area by using 13 indicators of education, research, faculty and resources. The target audiences of RTUGC are those students, university leaders, policy makers and other stakeholders who need to understand universities' performance in the context of Greater China.

Tsinghua University in Beijing remains No.1 in the ranking. National Tsing Hua University in Taiwan overtakes National Taiwan University as the second. The Hong Kong University of Science and Technology climbs to 4th from 7th in 2013. Peking University remains in 5th place as it was in last year. Other Top 10 universities are: The University of Hong Kong, The Chinese University of Hong Kong, University of Science and Technology of China, National Chiao Tung University and Zhejiang University.



The highest ranked university in Macau is University of Macau (54th), followed by Macau University of Science & Technology (57th).

RTUGC provides insight into the features and relative advantages of top universities in each region. Mainland and Taiwan universities perform better in postgraduate education; Hong Kong and Macau universities show a higher degree of internationalization. Taiwan universities have a higher percentage of academic staff with a doctoral degree. The ranking highlights the fact that Mainland universities dominate the indicators of gross performance while Hong Kong and Taiwan universities are in the lead in per capita performance indicators. For instance, all of Top 10 universities in terms of the total number of SCIE & SSCI papers are from the Mainland, but there is only one Mainland university listed among Top 10 in terms of number of SCIE & SSCI papers per academic staff. Tsinghua University in Beijing tops the list of both annual research income and annual educational expenditure, and The University of Hong Kong and City University of Hong Kong take the first place on research income per academic staff and educational expenditure per student respectively.

Center for World-Class Universities at Shanghai Jiao Tong University (CWCU) is dedicated to the theoretical and policy study of World-Class Universities with a more than 25-year history. CWCU began to publish the Academic Ranking of World Universities (ARWU) in 2003 and updated it annually. CWCU initiated the "International Conference on World-Class Universities" in 2005 and has organized this biennial event since then. CWCU endeavors to build databases of major research universities in the world and a clearinghouse of literature on World-Class Universities, and provides consultations for governments and universities.

([http://www.shanghairanking.com/Greater\\_China\\_Ranking-2014-Press-Release.html](http://www.shanghairanking.com/Greater_China_Ranking-2014-Press-Release.html))

### 3. **China's Tianhe-2 Super Computer Retains Top Rank**

*(Top 500, 17-11-2014)*

For the fourth consecutive time, Tianhe-2, a supercomputer developed by China's National University of Defense Technology, has retained its position as the world's No. 1 system with a performance of 33.86 petaflop/s (quadrillions of calculations per second) on the Linpack benchmark, according to the 44th edition of the twice-yearly TOP500 list of the world's most powerful supercomputers.

In fact, there was little change among the ranking of the world's top 10 supercomputers in the latest edition of the closely watched list. The only new entry was at number 10—a 3.57 petaflop/s Cray CS-Storm system installed at an undisclosed U.S. government site.

A detailed analysis of the latest TOP500 list was announced on November 18<sup>th</sup> at the SC14 conference in New Orleans. At that time, the full list will also be published at TOP500.org.

Although the United States remains the top country in terms of overall systems with 231, this number is down from 233 in June 2014 and down from 265 on the November 2013 list. The U.S. is nearing its historical low number on the list.

The number of European systems rose to 130, up from 116 last June, while the number of systems across Asia dropped from 132 to 120. The number of Chinese systems on the list also dropped, now at 61, compared to 76 in June 2014. Over the same period, Japan increased its number of systems from 30 to 32.

Since its inception in June 1993, the TOP500 list has served as a consistent measure of the performance growth of supercomputers, since all systems are ranked according to performance running the same Linpack benchmark application. With the latest list, the overall list-by-list growth rates of performance continue to be at historically low values for the last two years.

This lag in the overall average performance of all 500 systems is noticeably influenced by the very large systems at the top of the list. Recent installations of very large systems – up to June 2013 – have



counteracted the reduced growth rate at the bottom of the list, but with few new systems at the top of the past few lists, the overall growth rate is now slowing. This offers an indication that the market for the very largest systems might currently behave differently from the market of mid-sized and smaller supercomputers.

This is supported by the fact that the performance of the last system on the list (No. 500) has consistently lagged behind historical growth trends for the past five years, a trajectory that now increases by 55 percent each year. Between 1994 and 2008, however, the annual growth rate for the No. 500 systems' performance was 90 percent.

On the latest edition of the list, the No. 500 system recorded a performance of 153.6 teraflops (trillions of calculations per second), compared with 133.7 teraflop/s six months ago. The last system on the newest list was listed at position 421 in the previous TOP500. This represents the lowest turnover rate in the list in two decades.

(<http://www.top500.org/blog/blog/lists/2014/11/press-release/>)

#### 4. China is Considering Foreign GMO Research

(*WantChinaTimes*, 18-11-2014)

US-based international chemicals and health care company DuPont said it supports its subsidiary and partners in China engaged in genetically modified organism (GMO) research and development, now that China is considering lifting a ban on foreign investment in GMO research in the country, according to the Beijing-based China Business Journal.

On November 4<sup>th</sup>, the National Development and Reform Commission (NDRC), China's top economic planner, updated a draft catalogue of industries in which foreign investment is allowed, which will result in lifting the ban on GMO research funded by foreign companies, even though developing and growing crops will still remain prohibited. The draft will remain in the consultation phase until December 3<sup>rd</sup>.

China banned the research and development of GM crops by foreign companies more than a decade ago, although the government has been devoting resources to the research and development of GMOs.

In response to the recent change, Williams Niebur, vice president of DuPont, told the paper that the firm is very pleased to see the change while the company itself feels greatly encouraged. Niebur added that he hopes foreign enterprises will be allowed to participate in discussions over the matter while the draft is seeking consultation. If the draft is passed, DuPont will allow its subsidiary and partners in China to participate in GMO research and development, he stated.

Currently, international companies, including DuPont Pioneer, Monsanto and Bayer are at various stages of collaboration with China's research institutions.

China's deputy minister of agriculture Yu Xinrong said in a speech delivered during a food safety summit on November 7<sup>th</sup> that the Chinese government is supportive of international agricultural companies taking part in GMO research and development in China.

Yu also said that lifting the ban on foreign investment in GMO research is a step towards further opening up China's agriculture industry and will greatly boost GMO innovation.

Although the Chinese government has been investing heavily in research institutions and local enterprises engaging in the research and development of GMOs, public debate on the safety of this type of crop has become increasingly intense over the last few years. Many choose to shun GM food and have been very concerned over news about mislabeling or GMOs leaking into the market.



High level officials and the Ministry of Agriculture have responded stating that these kinds of crops are safe and that GMO crops have been important for boosting grain yields over the last few years, the report said.

(<http://www.wantchinatimes.com/news-subclass-cnt.aspx?id=20141118000047&cid=1201>)

## 5. Flow of Chinese Graduate Students to U.S. Slows

(*Science*, 21-08-2014)

For years, U.S. university administrators have worried that China's massive investment in higher education would eventually mean fewer Chinese students seeking to earn advanced science and engineering degrees at their institutions. A new survey from the Council of Graduate Schools (CGS) hints that the time may be approaching: For the second straight year, graduate applications from Chinese students are essentially flat. So is the number of acceptances, the first time that has happened in nearly a decade.

China is the biggest single source of foreign applicants to U.S. graduate programs, composing roughly one-third of the total, so any changes in their behavior could have a potentially huge impact. And their presence is quite large: Chinese students submitted nearly 300,000 applications this year to the 285 universities that responded to the latest CGS survey and received nearly 72,000 offers of admission. (The survey's respondents confer roughly two-thirds of all U.S. graduate degrees and represent 82 of the 100 largest graduate-degree awarding institutions.)

"We started seeing these trends last year," says CGS's Jeff Allum, who authored the report, part of an ongoing effort to monitor the graduate admissions process for foreign students at some 500 U.S. institutions. "Now we are more and more convinced it's real and not just a blip."

If that's the case, the next big question for university administrators is why students from the world's two most populous nations are on such divergent paths. The survey provides no answers, although theories abound.

One popular explanation is that China's continuing investment in its academic research infrastructure is making it easier for its students to receive world-class training at home. "The government has boosted its spending on science, and Chinese universities are upgrading their equipment," notes Robert Bernhard, vice president for research at the University of Notre Dame in Indiana. "That type of capacity building has led to a bullish feeling about research."

Allum points to a countervailing trend that could also be a contributing factor. The Chinese government began raising standards for college admissions in 2007 in response to high unemployment rates among new graduates, he notes. So half a dozen years later, the overall pool of potential applicants to graduate school may be somewhat smaller than earlier in the decade. But he admits that "we know much less about China. It remains a bit of a mystery."

Allum speculates that U.S. institutions may also be benefiting from more restrictive immigration policies in the United Kingdom, traditionally a popular destination for Indian graduate students. In addition, he notes that India's track record of applications has traditionally been more volatile compared with China's. "India tends to have good years and bad years," he says. "The fluctuations are much greater."

[...]

(<http://news.sciencemag.org/education/2014/08/flow-chinese-grad-students-u-s-slows>)



## 6. Chinese Moon Prober Returns to Earth

*(Space.com, 01-11-2014)*

China's latest moon mission, which some people are calling Chang'e 5 T1, returned to Earth at around 6 am on November 1<sup>st</sup> local time, ending an eight-day unmanned flight designed to test out technology for a future lunar sample-return project.

Chang'e 5 T1 launched on October 23<sup>rd</sup> atop a Long March 3C rocket, then completed a flyby of the moon before swinging back toward home. The mission sent a test capsule barreling into Earth's atmosphere Friday at 25,000 mph (40,000 km/h); the capsule survived the harrowing trip intact and touched down as planned in north China's Inner Mongolia Autonomous Region, the state-run Xinhua news agency reported.

Chinese officials said the data gathered during the mission should help researchers design and build a capsule that will bring lunar rocks and dirt to Earth, which China hopes to accomplish by 2017.

China is currently embarked on an ambitious moon-exploration program that started in 2007 with the launch of the Chang'e 1 lunar orbiter. Chang'e 2, another orbiter, followed in 2010, and in December 2013 the Chang'e 3 mission put China's first lunar rover down on the moon.

The country also aims to put people on the moon, perhaps sometime in the 2020s

Chang'e 5 T1 also carried the first private mission to the moon as a piggyback payload. Luxembourg-based LuxSpace's 4M mission hitched a ride on the Long March 3C, then stayed attached to the rocket's upper stage for a lunar flyby and return to Earth.

The 31-pound (14 kilograms) 4M payload and the rocket stage were expected to end up circling Earth rather than re-enter the planet's atmosphere.

The 4M mission has been transmitting signals continuously during its trip to the moon and back, and LuxSpace wanted radio amateurs around the world to tune in; their data could help develop and demonstrate a new crowd-based spacecraft tracking and navigation system, mission team members said. 4M also carries gear to measure radiation levels in Earth-moon space.

The private mission was partly an homage to Manfred Fuchs, the founder of LuxSpace's parent company OHB, who died in April. (4M stands for "Manfred Memorial Moon Mission.") The entire cost of 4M is less than \$1 million, LuxSpace representatives have said.

<http://www.space.com/27627-china-moon-mission-earth-return.html>

## 7. China's R&D Expenditure Reaches Record High

*(China Daily, 31-10-2014)*

China's expenditures on scientific research and development (R&D) reached a record high in 2013 as the country pushed for an innovation-driven economy, according to official data released on October 31<sup>st</sup>.

China's R&D expenditures totaled 1.18 trillion yuan (\$193 billion) in 2013, up 15 percent year-on-year, according to a joint report published by the National Bureau of Statistics, the Ministry of Science and Technology and the Ministry of Finance.

Expenditures on elementary research, applied research, and experimental development accounted for 4.7 percent, 10.7 percent and 84.6 percent of the total.

Last year's R&D expenditures were the highest ever recorded, both in total amount and by share of GDP, the report said.



R&D funds accounted for 2.08 percent of the country's gross domestic product (GDP) in 2013, a higher proportion than the 1.98 percent registered in 2012, figures from the report show.

Companies and enterprises invested the most on R&D, with 907.58 billion yuan recorded in 2013, up 15.7 percent year on year. Government-affiliated research institutes and universities spent 178.14 billion yuan and 85.67 billion yuan, up 15 percent and 9.8 percent from a year earlier, respectively.

Six provincial regions, including Jiangsu, Guangdong, Beijing, Shandong, Zhejiang and Shanghai, invested the most on scientific R&D last year.

([http://usa.chinadaily.com.cn/china/2014-10/31/content\\_18837026.htm](http://usa.chinadaily.com.cn/china/2014-10/31/content_18837026.htm))

## 8. China to Build Global Quantum Communication Network in 2030

(CAS, 3-11-2014)

China will build a global quantum communication network by 2030, said a leading Chinese quantum physicist on November 2.

"China's quantum information science and technology is developing very fast and China leads in some areas in this field," said Pan Jianwei, a Chinese quantum scientist and professor at the University of Science and Technology of China.

The field of quantum communication, the science of transmitting quantum states from one place to another, grabbed global attention in recent years after the discovery of quantum cryptography, which is described as a way of creating "unbreakable" messages.

China will achieve Asia-Europe intercontinental quantum key distribution in 2020 and build a global quantum communication network in 2030, said Pan at the 2014 International Conference on Quantum Communication, Measurement and Computing, which opened November 2 in east China's Hefei city.

In 2011, China initiated a program to launch a satellite for quantum information and technology experiments in 2016, according to the Chinese Academy of Sciences.

The program is going smoothly and major technological breakthroughs have been achieved, according to Pan, who won the International Quantum Communication Award in 2012.

"The technology of metropolitan quantum communication is basically mature, but if we want to achieve worldwide communication, we need the help of satellites," he said.

This is the first time that China hosts the world's most influential biannual quantum conference, which will last until November 6.

More than 400 experts from 28 countries and regions will discuss research, achievements and industrialization in the quantum information field during the meeting.

([http://english.cas.cn/Ne/CASE/201411/t20141103\\_130416.shtml](http://english.cas.cn/Ne/CASE/201411/t20141103_130416.shtml))

### (Collaborating Opportunities)

#### **Call for demonstrations and projects:**

##### **Swiss Week 2015**

Deadline: March 1<sup>st</sup> 2015

Place: Shanghai

Contact: [info@swissnexchina.org](mailto:info@swissnexchina.org)

#### **Call for participants: APAIE 2015**

Date: March 23<sup>rd</sup> – 26<sup>th</sup> 2015

Place: Beijing

Contact: [fabio.molo@eda.admin.ch](mailto:fabio.molo@eda.admin.ch)