Science, Technology, Education and Health News from China

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Introduction

Story of the month covers the new round of government subsidy policy on electric vehicle purchase. In science, Chinese researchers have developed genetically modified rice plants that could yield up to 25% more grains than normal rice plants. New nano-technology could alleviate China's lake pollution. The development of industrial robots working in factories may revolutionize China's electronic manufacturing. China's ambitious space station plan is underlined again at the International Astronautical Congress in Beijing. In education, Duke University's China campus has finally been approved by the Ministry of Education; it is to be opened in 2014. MooC courses provided by Tsinghua University and Peking University will be launched online soon.

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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

China Renews Electric Vehicle Subsidy Plan

A new round of electric vehicle subsidy plan for the period of 2013 to 2015 has been unveiled by the Ministry of Finance, Ministry of Science and Technology, Ministry of Industry and Information Technology and the National Development and Reform Commission in mid-September. The goal is to stimulate sector growth, facilitate emission reduction and to curb air pollution.

The plan consists of a model city/area program and a consumer subsidy program.

Pure electric vehicles, plug-in electric hybrid vehicles and fuel-cell battery vehicles are covered by the subsidies program. The subsidies amount to 60'000 yuan ($9'800) for pure electric autos with a range over 250 km (155 miles), and 50'000 yuan ($8'200) and 35'000 yuan ($5'700) for EVs with range over 150 km (93 mi) and 80 km (50 mi), respectively. Fuel-cell battery vehicles were included for the first time in the subsidy plan, and purchasers will receive 500'000 yuan ($ 81'700) rebates for commercial vehicles (above 9 seats) and 250'000 yuan ($4'000) for passenger cars (minors 9 seats).

Electric and Plug-in hybrid electric buses also received subsidies, depending on length. For buses over 50 m in length, EVs will receive 500,000 yuan ($81,700), and PHEVs will receive 250,000 yuan ($40,800). Shorter PHEV buses do not receive a subsidy, by EV buses over 8 m and 6 m will receive 400,000 and 300,000 yuan respectively.

The more conventional gasoline-electric hybrid vehicle is not part of the subsidy plan, under the ground that the market has been relatively matured compared to other models of new energy vehicles. Government subsidy will be deducted directly from the effective payment at the point of purchase, and the manufacturers will be refunded by the end of each quarter. Subsidy for electric and plug-in electric passenger vehicles will drop by 10% and 20% respectively in the 2014-2015 year cycle in order to push manufacturers to advance technologies and lower price on a long-term range. Subsidies for buses, however, will remain at the same amount.

According to the new plan, a few "demonstration cities or regions" will be selected with a special priority on mega cities and areas with particularly challenging pollution problem, such as Beijing, Tianjin, Hebei, the Yangtze River Delta and the Pearl River Delta. Demonstration cities / regions selected by the program are required to meet the quota of at least 5'000 new energy vehicle purchases per year. The plans also include a provision requiring that fuel-efficient vehicles account for at least 30% of new purchases by government agencies and public institutions, especially vehicles to be used in public transportation, mail services and other logistics, sanitation services and official missions.

New energy vehicle is one of China's "strategic emerging industries" and has been supported by the government, especially the Ministry of Science and Technology with close attention. In implementation, however, China has lagged behind its own target to have 5 million electric automobiles by 2020 because of high prices of battery-powered models, public concerns over safety and technology reliability and a lack of charging stations. By the end of 2012, when the previous round of subsidies lapsed, there were only 27,800 EVs in use, prompting Industry and Information Technology Minister Miao Wei to suggest in March 2013 that the government should consider stepping up its promotion of hybrids and other fuel-efficient vehicles which led to the emergence of this new plan.

News

1. Genetic engineering: Rice on steroids

(Nature China, 04-09-2013)

China consumes nearly a third of the world's rice, which is more than what the country currently produces. As its demand for rice continues to increase, crop breeders must come up with new ways to improve grain yield — and genetic modification is undoubtedly the most promising route.

Yueqin Chen at Sun Yat-sen University in Guangzhou and co-workers have now developed genetically modified rice plants that could yield up to 25% more grains than normal rice plants.

The researchers initially studied OsmiR397, a microRNA that is highly expressed in rice seeds but not during development. They found that OsmiR397 downregulates the gene OsLAC, whose product increases the sensitivity of plants to to growth-promoting hormones called brassinosteroids. This led them to believe that the expression of OsmiR397 may affect grain yield.

The researchers therefore developed transgenic rice plants with varying levels of OsmiR397 expression. They found that rice plants with overexpression of OsmiR397 produce larger grains, more grain-bearing branches, and more grains per branch than wild-type rice plants. Prior to this study, microRNA had never been used to control grain size or grain yield.

The researchers have yet to determine how OsLAC affects the sensitivity of plants to brassinosteroids. They are hopeful that the manipulation of OsmiR397, which is highly conserved across plant species, will help boost the yield of other crops, such as wheat and corn.

(http://www.nature.com/nchina/2013/130904/full/nchina.2013.77.html)

2. New nano-tech could treat China's lake pollution

(Xinhua, 09-09-2013)

Chinese scientists announced on September 9th that they have developed a type of nanomaterial which can catalyze algae masses growing on water surfaces into inorganic earth.

Chinese lakes are often plagued by catastrophic outbreaks of blue-green algae. Triggered by vast amounts of sewage water drained into rivers and lakes, it can exude an unusually bad odor, suffocate fishery stocks and turn water into a milky green shade. Algae pollution has been a particular problem in three of China's major freshwater lakes -- Chaohu, Taihu and Dianchi.

Chinese governments at multiple levels have invested billions of yuan in recent years to treat the pollution. But large blooms of algae, although reduced in density, still persist in times of sufficient heat and sunshine, conditions that are favorable for its growth.

Scientists with the Chinese University of Science and Technology said on September 9th that their laboratory tests had showed a single gram of the new nanomaterial that can kill algae floating in an area equal in size to a basketball court.

Fan Chongzheng, who led the research, said that the catalyzer leads to a biodegradation of the algae into an inorganic earthenlike substance.

He added that lab tests were conducted on water covered with a density of algae of over 100 million particles per liter. The water of Chaoku Lake, home to the most serious algae pollution among China's major lakes, is covered with a density of algae of over 5 million particles per liter.

The 13,000-square km lake, located in east China's Anhui Province, is surrounded by fast-growing cities. Heavy use and local industrial development in recent years have made it one of the country's most polluted lakes.

Sewage discharge has brought excessive amounts of nitrogen and phosphorus to the lake, incurring eutrophication of water, fueling the algae outbreak.

The development and reform commission in the provincial capital of Hefei pledged last year that facilities that can handle 5,000 to 10,000 tonnes of wastewater per day will be built in every township surrounding Chaohu Lake by 2015.

Fan said that the biological treatment, along with the government's measures to intercept sewage from urban areas, can together solve the algae pollution conundrum.

He said the project team will conduct field studies at the lake, before reporting the research results to concerned central government departments for the application.

(http://news.xinhuanet.com/english/china/2013-09/09/c_132704850.htm)

3. Duke University's China Campus to Open in 2014

(Newsobserver, 16-09-2013)

After three years of planning, Duke University has received the green light from the Chinese government to open its new campus in China.

The first students will start in the fall of 2014 at Duke Kunshan University, the university in Durham announced Monday. The venture has received formal approval from China's Ministry of Education.

The five-building campus, under construction near Shanghai, has been plagued with controversy and delays for a few years. Some Duke faculty had raised concerns about academic freedom and fears that the Chinese campus would suck resources from the campus in Durham. Others have said Duke is making a smart strategic move to plant a flag in China.

A partnership between Duke and Wuhan University in China, the campus will offer master's degree programs in global health and management studies, as well as undergraduate courses in global health, the humanities, physical and natural sciences and social sciences. Other graduate programs are being planned, including a medical physics degree that awaits approval from Duke.

The programs are aimed at Chinese and international students from around the world. Duke will award the graduate degrees. Instruction will be in English, and the university expects more than 50 Duke faculty members to teach in China during DKU's first two years of operation.

Duke President Richard Brodhead said in a news release Monday that DKU "will be a vibrant place of inquiry where Duke faculty and students can have a deeper level of engagement with China, a part of the world that is rapidly increasing in significance."

Approval from the Chinese Ministry of Education took longer than expected, but Provost Peter Lange said in the Duke announcement that "the thorough process helped strengthen our academic programs, deepen our faculty support and broadened our engagement in China."

Duke said the campus will operate under a set of guiding principles that include academic freedom and open access to information.

DKU will be governed by a separate board of trustees with representatives from both universities. The chancellor of DKU will be Liu Jingnan, a former president of Wuhan University and scientist who is a

member of the Chinese Academy of Engineering. The executive vice chancellor is Mary Brown Bullock, a scholar of U.S.-China relations and former president of Agnes Scott College in Atlanta.

China currently has 1,979 approved Sino-foreign joint education projects but only a handful of offshore campus from foreign universities, among them the New York University Shanghai, the Ningbo campus of Nottingham University and the Xi'an Jiaotong – Liverpool University in Suzhou.

(http://www.newsobserver.com/2013/09/16/3201826/duke-universitys-chinese-campus.html)

4. Peking and Tsinghua Universities to Offer Free Courses Online

(SCMP, 19-09-2013)

Two of the mainland's most prestigious institutions of higher learning, Peking and Tsinghua universities, will start offering free online courses in partnership with EdX, a major open-course provider.

Peking University announced earlier this week it would make four courses, including electronic circuits and the study of folklore, available to students around the world through the EdX web platform starting on Monday. Tsinghua University will make available two courses - the history of Chinese architecture and principles of electric circuits, starting on October 18, according to an EdX schedule.

The introduction of Chinese-language courses from Peking and Tsinghua comes after the two universities signed a deal with EdX in May and spent subsequent months preparing the courses.

Li Xiaoming, an online and information systems professor overseeing the web offerings at Peking University, was previously quoted by mainland media as saying the university planned to offer about 100 courses through EdX within five years. EdX, a major provider of massive online open courses, or Mooc, was founded by Harvard University and the Massachusetts Institute of Technology (MIT) in the United States. It has signed up 29 global universities - including Harvard, MIT and the Hong Kong University of Science and Technology - as partners.

Its competitor Coursera, which was founded in April last year by two computer science professors at Stanford University and which has more than 60 partner schools, signed up two additional mainland institutions, Fudan University and Shanghai Jiao Tong University, in July. But neither institution has announced plans about which courses it would offer or when their programme would begin.

Cheng Fangping, a professor at Renmin University who specialises in tertiary education, said Chinese universities could not afford to be left out of the online education trend in an increasingly globalised world of higher learning.

Traditional universities should not regard such online courses as a challenge but an opportunity to boost their global competitiveness by devising courses that met international standards and by further diversifying and broadening their curriculum.

Cheng said that as the nation rose to prominence on the economic and political global stage, studying topics that focused on Chinese issues such as the environment, could become highly prized by people in many other countries."Chinese universities would no doubt benefit from the explosion in the number of courses available online," he said. "They could certainly contribute their own unique perspectives and methodology used in fields of study such as traditional architecture, medicine and even mathematics."

(http://www.scmp.com/news/china/article/1312546/peking-and-tsinghua-universities-offer-free-courses-online)

5. China to build 4,500-meter manned submersible

(Global Times, 17-09-2013)

Chinese scientists have launched a program to build a new manned submersible expected to dive as deep as 4,500 meters and capable of carrying out scientific research on a majority of the earth's seabeds.

The program was revealed by Hu Zhen with China Shipbuilding Industry Corporation, who is in charge of the technology development of the submersible program under the Ministry of Science and Technology, in an interview on board the Xiangyanghong 09, carrier boat of the Jiaolong submersible. The Jiaolong has dived successfully to a depth of 7,062 meters, ranking China among the world's most advanced countries in the deep-sea submersible field.

Upon completing overall maintenance of the Jiaolong, Hu and his colleagues are scheduled to undertake study on developing a second deep-sea diving vehicle for the country's seabed research.

The country's first submersible, Jiaolong, has successfully carried out 73 deep-sea dives so far, Hu said, noting that its operations have become easier over time as the submersible has grown more reliable and stable.

The Jiaolong will soon be handed over to the China Ocean Mineral Resources Research and Development Association, and at that time study will focus on key technologies involved in the 4,500-meter submersible, the scientist told Xinhua.

According to Hu, the key parts of the new submersible, such as robotic arms and a high-pressure crew-compartment made of titanium alloy, will be developed independently by Chinese scientists.

The Jiaolong can reach as many as 99.8 percent of all seabeds on Earth, and the new submersible is expected to be able to patrol most seabeds, including those in the South China Sea, Hu said.

The second submersible will have a number of new features compared to the older Jiaolong. It will have five windows for observing the seabed from different angles, and its manned capsule will have three seats and a ladder.

The new submersible will be easier and more comfortable for the crew to operate. Additionally, the new craft will be flat-bottomed, making it easier for the vehicle to be moved on board its carrier.

The new research program was recently inaugurated by the Ministry of Science and Technology, and the China Shipbuilding Industry Corporation will be responsible for development of the new submersible, Hu said.

(http://www.globaltimes.cn/content/812067.shtml)

6. Robots May Revolutionize China's Electronics Manufacturing

(Wall Street Journal, 24-09-2013)

A new worker's revolution is rising in China and it doesn't involve humans. With soaring wages and an aging population, electronics factory managers say the day is approaching when robotic workers will replace people on the Chinese factory floor.

A new wave of industrial robots is in development, ranging from high-end humanoid machines with vision, touch and even learning capabilities, to low-cost robots vying to undercut China's minimum wage.

[...] It's not just traditional robot makers like Zurich-based ABB Group and Germany's Kuka AG pushing forward. Electronics suppliers in Asia such as Delta Electronics Inc. and Foxconn Technology Group are also seeking to build a better robot, along with smaller players like Denmark's Universal Robots A/S. [...]

One of the newest companies in this field, Taiwanese firm Delta, has long made power adapters for brands like Apple Inc., but last year it began a more ambitious project: to build robots cheap enough to replace human workers in China's electronics factories. "It's clear that automation is the future trend in China, but the big question is how to bring down the costs for robots," said Delta Chairman Yancey Hai in an interview. "We believe we can do that because we manufacture two-thirds of the components ourselves."

Delta is testing a one-armed, four-jointed robot that can move objects, join components and complete similar tasks. By 2016, Delta hopes to sell a version for as little as $10,000, which would be less than half the cost of current mainstream robots. That price is also cheaper than the salary of a Chinese worker, and the robot can work around the clock. [...]

Outside Taiwan, there are also more futuristic robots in the works designed to be easily reprogrammable and smart enough to work alongside humans without risk of injury. For instance, ABB's concept humanoid robot has two 7-jointed arms that perform precise tasks and halt when touched by a person. These robots are more expensive than factory workers, but the cost gap is shrinking, with China's wages rising by a double-digit percentage annually.

The advancements in robotics has led to hopes that electronics firms will bring some manufacturing back to the U.S. But industry followers say electronics assembly is likely to stay in China even as automation becomes easier because the larger component supply chain is in the country.

To be sure, robots have long been technically capable of the tasks required for final assembly: placing components on circuit boards, affixing circuit boards into casings, screwing together the casings and cleaning off the devices.

But human hands are still considerably cheaper for such jobs in China. People are also better at switching tasks than a robot, which requires reprogramming.

There are also logistical obstacles to automation. Because of the short sales cycle of electronic devices, products are only in production for around 9 to 18 months, with production settings requiring change afterward, said ABB China Senior Vice President Chun-yuan Gu. [...]

Automation would help companies like Foxconn that are continually beset by criticism over worker conditions. Indeed, Pegatron Corp., another Apple supplier that makes iPhones, was recently accused by New York-based nonprofit organization China Labor Watch for alleged labor rights violations.

The Taiwanese company is focusing its automation efforts on the most dangerous and laborious tasks, said Chief Financial Officer Charles Lin. Pegatron has invested around $100 million in the past year to automate production of electronic device casings, which involves harsh chemicals. [...]

For robot makers like Kuka, that spells opportunity. "Twenty percent of our business is in China and we see that rising," said Kuka Chief Executive Till Reuter. He said Kuka is investing in a new Chinese factory that can churn out at least 5,000 more robots a year from 1,500 to 2,000 currently.

Universal Robots and ABB also said they're boosting their China investment, and with good cause: China's industrial robot shipments will rise to 35,000 units in 2015 from 26,000 in 2012, the largest increase of any country, according to estimates from the International Federation of Robotics. While robots are used in many different types of factories in China, analysts and robotics companies point out growing demand to automate the electronics supply chain is giving demand a decided boost.

Kuka's Mr. Reuter says it's easy to see how robots can give factories a helping hand. "We have industrial robots…which we work 24 hours a day, seven days a week for seven to 10 years," he said.

(http://online.wsj.com/article/SB10001424052702303759604579093122607195610.html#)

7. China expects to complete space station by 2023

(China Daily, 25-09-2013)

China will complete its first space station within 10 years and be able to send crews of up to six people for short-term missions, according to the 64th International Astronautical Congress.
At the congress, which has been held annually since 1950, China released a host of details about its space station to around 3,600 delegates from all over the world.

"Room in the station will be no less than 60 square meters, which is enough for astronauts to move freely," said Xu Dazhe, general manager of China Aerospace Science and Technology Corp, at the five-day event that began on September 23th in Beijing. He said the station will also be able to support three astronauts on long-term missions.

China Aerospace Science and Technology Corp is the main contractor for the Chinese space program.

According to China Manned Space Engineering Office, the space station will consist of three capsules with a cargo shuttle to transport supplies. The station's core module will be 18.1 meters in length and will weigh 20 to 22 metric tons. The space station will also consist of two self-contained laboratories.

Wang Zhaoyao, director of China Manned Space Agency, said astronauts will be able to make long-term missions in orbit and conduct technical tests. But more research and development will be needed to complete the space station, Zhou Jianping, chief designer of the manned space program, told Chinanews on September 23th. He said China will be able to launch the planned space station in 10 years.

On September 24th, Liu Yang, China's first female astronaut, said the nation is also willing to accept foreign astronauts for future missions. Xu said that China will launch the Tiangong-2 space laboratory in around two years to test technologies in renewable life support and in-orbit refueling, adding that perfecting the technologies will be essential for the planned space station. He said one cargo shuttle and several manned spaceships will be launched to dock with the Tiangong-2.

The country successfully carried out its first manual space docking, another essential step in building a space station, in June 2012 when three Chinese astronauts — Liu, Jing Haipeng and Liu Wang — piloted Shenzhou IX to link up with Tiangong-1. China became the third country to launch a human into space in 2003 and has been rapidly expanding its space program.

Berndt Feuerbacher, former president of the International Astronautical Federation, said at the congress that China's space program is not only becoming more successful and advanced, it is looking for cooperation opportunities. "The congress should help strengthen international cooperation with China," he said.

(http://www.china.org.cn/china/2013-09/25/content_30124172.htm)

Events (October – November 2013)

Science, Technology and Education-related Events in China

Annual International Conference on Co-Development And Open Innovation
Date: October 15nd to October 16th
Place: Beijing
Contact: http://cii-innovation.com/index.php?controller=CiiCoDev&action=LoadCoDevHome

International Congress on Learning Cities
Date: October 21st to 23rd
Place: Beijing
Contact: UNESCO

EU – China Business and Technology Cooperation Fair
Date: October 21st to 24th
Place: Chengdu
Contact: http://www.eu-china.org.cn/en/

Electric Vehicle Technology and Innovation Forum
Date: October 24th to 25th
Place: Beijing
Contact: http://www.autotecshow.com/pop/evtif2013.html

Urban Environmental Pollution 2013 - Asian Edition
Date: November 17th to 20th
Place: Beijing
Contact: http://www.uepconference.com/

China Automotive Engineering and Manufacturing Expo
Date: November 26th to 28th
Place: Beijing
Contact: www.caemex.cn

Swiss-related S&T, Education and Health Events and Announcements

Swissnex China Innovation & Entrepreneurship working meeting
Date: October 9th
Place: Shanghai
Contact: Swissnex China

"Act Like You Mean It"
Date: October 11th (Shanghai), October 17th to 18th (Beijing)
Place: Shanghai/ Beijing
Contact: Swissnex China/ Embassy of Switzerland in China

China International Education Expo
Date: November 1st to November 3th
Place: Beijing
Contact: Embassy of Switzerland in China