Science, Technology, Education and Health News from China

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Introduction
The story of the month covers Shanghai’s grand plan to become a global innovation hub. In education, Tsinghua University works with Washington University to launch Global Innovation Exchange. China and Germany partner in the field of vocational education. In research, Alibaba and CAS will join efforts in quantum computing. CAST will play a bigger role in research management. Hebei city looks to become the robotic hub in China. Chinese researchers look to build their own collider.

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1 Please click on the blue texts to activate the hyperlinks to either email addresses or related websites.
Shanghai Aim at Global Innovation Hub

Shanghai has traditionally been perceived as China’s finance, economic and trade center. Now it wants more. In May 2015, municipal government of Shanghai has announced the city’s grand roadmap towards a global innovation hub. With the new policy framework, the government vows to ease administrative procedures and to create a better ecosystem that makes Shanghai an attractive global innovation destination for expats, domestic entrepreneurs as well as researchers currently working at state-owned enterprises and research institutes. The government also plans to become a better service provider for high-tech startups as well as a better administrator in research and innovation.

A top priority for Shanghai is to attract global talents and the municipal government is planning to simplify immigration procedures for expats. Procedures to apply for permanent residence permit, long-term residence permit and work permit application will all be simplified and shortened. With the new regulation, it is now possible for foreign students studying in Shanghai to work immediately after graduation. Domestic talents with the desired skill sets will also benefit from incentive conditions or even receive direct permanent residence permit for migrating to Shanghai. The new policy is to be piloted in the joint Reform area Shanghai Free Trade Zone – Shanghai Zhangjiang National Innovation Zone.

Benefiting from the current presence of multinational corporations in Shanghai, the city plans to aggressively lobby for more Shanghai-based R&D centers. The government promises more possibilities for international R&D centers to participate in Chinese government-funded research projects, more opportunities to work with domestic companies, research institutes and universities. Correspondingly, it also encourages domestic corporations and research centers to engage in more cross-border collaborations in the form of overseas R&D center, sister science parks, representative offices and joint VC, etc.

To further attract startups and SMEs, the city will improve both infrastructure and services. More incubators will rise with a comprehensive service package, including R&D, technology transfer, test and certification, IPR, consulting and financing. Two key markets: emerging market sectors (internet +, particularly internet finance, e-health care, e-education) and the pharmaceutical sector will be less regulated for easier market entry. The Shanghai Stock Exchange is also planning to inaugurate a new market for innovative startups called “Strategic Emerging Industry Board”, similar to the SME board in Shenzhen.

In addition to entrepreneurship and innovation, Shanghai will also prioritize basic research and scientific infrastructure which will be accessible for the SMEs in the area. Building on the basis of existing large scientific infrastructure ShanghaiFEL and the National Center for Protein Science Shanghai, the city will continue to lobby for more infrastructures including ultra-short and ultra-intense laser, live cell imaging platform and submarine observation network. On frontier basic research, the priority areas of the city will be: brain research, artificial intelligence, stem-cell and tissue function restoration, human phenomes, material gene sequencing, new generation nuclear science, quantum communication, mimic security and deep-see research.

The priorities of applied research covers information technology, bio-medicine and pharmaceutical and high-end equipment. Zhangjiang National Science Center, as part of the Zhangjiang National Innovation Demonstration Zone will be a pilot reform area for optimized research management.

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2 Previous immigration policy requires foreign students to have at least 2 years of work experience in other countries before applying for a work permit in China.
News

1. Tsinghua University and Washington University Launched Global Innovation Exchange

(UW, 18-06-2015)

The Global Innovation Exchange (GIX) is an upcoming custom-built facility that will focus on science and technology studies at a location in Bellevue's Spring District in Seattle.

Two of the world's leading research universities, the University of Washington and China's Tsinghua University, are partnering to promote education among the new generation of innovators made up of students, faculty and other professionals from the world over.

Backed by Microsoft, which provided $40 million as foundational support, the GIX will first offer a master's degree in technology innovation and will be adding more fields of study over the next decade.

Future students at GIX will have opportunities to study more important and more relevant subjects. They will become the moving force that will use science and technology in search of solutions to global issues such as healthcare, climate change, energy, and urban planning, among others.

"Our support for GIX is grounded in our mission," posted Microsoft on its blog. "Microsoft was founded on the belief that technology can empower people to do amazing things. Today, our mission is to empower every individual and every organization on the planet to achieve more. This includes helping people tackle some of the biggest challenges facing our world today."

The launch of GIX will mark the first time that a China-based research university will place a degree program in the U.S. Tsinghua is a leading university that owns a number of major technology companies. Along with Peking University, it is ranked as the best university in China and also one of the best in Asia. It also has government connections since the country's last two presidents, Hu Jintao and Xi Jinping, are notable graduates.

"In the face of global challenges related to the environment, resources and health, we need to cooperate across national boundaries to find solutions," said Tsinghua University President Qiu Yong.

The partnership will also elevate Seattle's status as a major destination for pursuits on innovation. Tom Alberg, president of Madrona Venture Group, a venture capital firm, said that the partnership is "a great deal for the Seattle area. It will help bring more tech talent here and allow the UW to educate more Washington students in technology fields."

GIX will start off with a few dozen students when it opens in the fall of 2016. It aims to grow and have as many as 3,000 students within a decade. The first batch of students will be studying the Internet of Things and other areas such as smart cities and healthcare technology.


2. “Made in China” gets German Tuneup

(China Daily, 27-07-2015)

The Chinese government announced last year that it expected to increase the number of students receiving vocational education from 29.2 million to 38.3 million by 2020.

The determination was further strengthened when the State Council, China's Cabinet, unveiled the "Made in China 2025" plan in May, laying out strategies for switching from low-end manufacturing to more value-added production.
"No matter what kind of blueprint we come up with, the talent is always the most important factor," said Li Chaoxing, director of Tianjin Municipal Industry and Information Technology Commission.

The Tianjin Sino-German Vocational Education College, established in 1985, is one of the country's first initiatives to introduce foreign knowledge and expertise to domestic vocational education. Having cooperated with foreign and domestic enterprises on several quasi-dual vocational training projects, the college, together with Bosch, started its first formal dual training program in 2011.

"The program was extremely popular. When the recruitment was announced, hundreds of students of different majors competed for about 30 places. I felt really lucky to win one spot," said Shi Jinxin, who enrolled in the program in 2012. In the past three years, he traveled between the campus in Tianjin and the plant in Beijing every one or two months during the semester, putting the theories into practice right after learning them from the teachers and textbooks.

It took the college and the enterprise a great effort to come up with the curriculum, said Zhou Hong, general director of the School-Enterprise Cooperation Office at the college. "It is not that each of the two parties do their own part separately. Instead, we have to sit down and figure out a lot of stuff together, making sure what is taught in the classroom speaks to what happens in the work plant," said Zhou.

Under the dual vocational education system, the students usually have a specially designed training center in addition to the production line where they can be observers.

"The knowledge is carried down from one generation to the next. It means that young apprentices learn from their experienced seniors and experts in their vocational families," said a spokesman for Volkswagen China of the dual vocational training system, another partner of the college in Tianjin on such programs.

In 2009, the Volkswagen, Audi and Porsche brands joined forces with BMW and Daimler to launch the Sino-German Automotive Vocational Education program. The initiative now has around 25 training centers for a total of almost 1,000 Chinese apprentices in 20 cities.

Ma Qing, head of human resources in Siemens China, said the dual system benefits companies by allowing them to recruit fully prepared staff in the timeliest fashion. "But most Chinese people think studying at a university is the top priority and appreciate knowledge much more than practical skills," she said.

Huang Bo, vice-principal of the school in Shenyang, said local enterprises have not fully understood the benefit of such programs and are unwilling to invest in the trainers and training spaces and equipment. "They would rather spend a lot of money hiring experienced staff from other companies than having long-term investment and return," he said. Compared with the fiscal concerns, the lack of quality trainers is a bigger challenge for the Chinese companies.

"An experienced worker is not necessarily a very good trainer. It takes extra training and experience to guide the students. Under the dual system, the trainers are professional rather than ordinary workers," said Zhou.

Despite all the problems, a quasi-dual system, under which the business is involved at various levels, is still preferable to an education solely delivered by the college because it responds to the demands of the best in the market, Zhou said, adding that the college has such programs with Airbus and China Aerospace Science and Technology Corporation.

While 3,265 programs were created in vocational colleges in China last year, 5,269 others were dropped or stopped recruiting students, according to a recent report by the National Joint Conference of Vocational Technical College Presidents, a nongovernmental organization linking nearly 200 vocational colleges.
"Most of those had encountered fierce competition from similar programs, couldn't meet the demands of related sectors and had very low employment rates among their graduates, such as secretarial or legal affairs programs," the report said.

Like Ma, Zhou said the most important, and probably hardest, change to achieve is people's understanding of education and professions. "Most Chinese people still consider being a public servant a much more decent and respectable job than being a blue collar worker," she said. "When they start to realize all professions should be equally respected, we will not only see the better development of vocational education, but a more civilized society."

(http://www.chinadaily.com.cn/china/2015-07/27/content_21417604.htm)

3. **Alibaba’s Cloud Unit Teams with Chinese Researchers on Quantum Computing**

(Bo
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Business Wire, 31-07-2015)

Aliyun, Alibaba Group’s cloud computing subsidiary, and the Chinese Academy of Sciences (CAS) announced that they have signed a memorandum of understanding (MoU) in Shanghai to co-found the Chinese Academy of Sciences – Alibaba Quantum Computing Laboratory (the Laboratory).

The new research facility aims to take the study and applications of quantum theory to the next level, heralding new technologies and platforms for information security, connectivity and computing.

Under the terms of the MoU, the Laboratory will conduct pioneering research in quantum theory with a view to discovering ground-breaking security techniques for e-commerce and data centers, as well as to enhancing computing performance. Both parties will jointly promote the research, development, dissemination and application of quantum computing to lay a strong and stable technical foundation for China to push the envelope on quantum computing.

“The CAS - Alibaba Quantum Computing Laboratory will undertake frontier research on systems that appear the most promising in realizing the practical applications of quantum computing. The laboratory will combine the technical advantages of Aliyun in classical calculation algorithms, structures and cloud computing with those of CAS in quantum computing, quantum analog computing and quantum artificial intelligence, so as to break the bottlenecks of Moore’s Law and classical computing," said Professor Pan. Pan is a CAS member, and spearheads a group of experts who have played a key role in enabling China to become an international research hub in the field of quantum theory.

Aliyun is committed to identifying opportunities that are special to participate in the world of advanced science and technology. Jian Wang of Alibaba Group said, "This investment in the development and application of quantum computing reflects the scale and clarity of our long-term vision to collaborate with partners in an ecosystem model towards the sustained development of the economy and society. New discoveries in information security and computing capacity based on quantum computing could be as significant in the future as big data technologies are today.”

As China’s premier scientific research institution, CAS will leverage its and USTC’s resources, including infrastructure for large-scale quantum communications, to foster innovation and build a pipeline for talent. Aliyun will bring a cutting-edge cloud computing platform and an excellent multi-disciplinary research and development team to the collaboration.

The laboratory will recruit top-notch talent to build a “dream team” for quantum computing research. The team will consist of internationally-recognized scientists who will strengthen the scientific community in China, and also put the laboratory on the world map for quantum theory with the publication of significant scientific research.

4. **CAST to Play a Bigger Role in Science and Technology**

(Gov.cn, 17-07-2015)

The China Association for Science and Technology (CAST) has been given a bigger role in managing affairs related to the country's fields of science and technology.

“As part of the country's comprehensive reform, science and technology societies should be allowed to take full advantage of their unique knowledge to take over some governmental functions in an orderly manner,” according to a government work plan released on July 16.

CAST is the largest non-governmental organization for science and technology workers in China, linking the government and the CPC to the science and technology community. It has more than 200 member societies.

The plan was jointly released by the general offices of the Communist Party of China (CPC) Central Committee and the State Council, China's cabinet, and requires that CAST members should have more say in science and technology project evaluation, engineering and technology certification, formulating industrial standards - and recommending candidates for state science and technology awards.

Following several pilot projects, the plan outlines innovative working patterns, and aims to expand working areas and strengthen system construction. Additionally, it aims to develop replicable modes, improve takeover procedures and provide examples for deepening the comprehensive reform and promoting a modern administration system.

According to the plan, science and technology societies - as independent third parties - are expected to intensify process monitoring and evaluation of results, and develop a system to pursue liability in cases of misconduct and errors, setting an example of fairness, justice and transparency for future reforms in the field.

The plan also requires that CAST and its members should coordinate market players in compiling standards for 3D printing, industrial robots, new energy vehicles and traditional Chinese medicine.

(http://english.gov.cn/policies/latest_releases/2015/07/17/content_281475148720830.htm)

5. **China's Supercomputer to Support World's Largest Radio Telescope**

(CAS, 29-07-2015)

Supercomputer Skyeye-1, capable of a quadrillion computing operations per second, will support space exploration by the world's largest radio telescope based in southwest China's Guizhou Province.

Assembly of the telescope, with a dish the size of 30 football fields and located deep in the mountains of Guizhou, has got underway, according to Dawning Information Industry Co., which participates in its construction.

When it is completed in 2016, the five hundred meter aperture spherical telescope (FAST) will be the world's largest, overtaking Puerto Rico's Arecibo Observatory, which is only 300 meters in diameter.

A radio signal as far as tens of billions of light years away could possibly be caught by the telescope, which will extend China's space tracking scope from moon's orbit to the outside edge of the solar system upon its completion next year.

As FAST needs strong computing system to support massive data storage and processing, Institute of Computing Technology under the Chinese Academy of Sciences(CASICT), Dawning Information Industry Co. and China (Guizhou) Skyeye Group signed agreement last November to jointly build a Qiannan Super Computing Center in Guizhou.
FAST daily peak demand will be above 200 teraflops per second and its first-phase storage demand will be more than 10 petabyte, said Zhang Peiheng, a researcher with the CASICT.

Skyeye-1, with its quadrillion computing operations per second and high-speed network of 100 gigabytes per second, can easily meet the demands of the telescope, said Ren Jingyang, vice president of Dawning Information Industry Corporation.

The construction of the telescope began in March 2011 in a natural, bowl-shaped valley in the southern part of Guizhou.

http://english.cas.cn/newsroom/news/201507/t20150729_150912.shtml

6. Hefei Looks to Become China’s Robotic Hub

(China Daily, 27-07-2015)

A total of 175 robot teams from 47 different countries and regions are set to compete in the 19th RoboCup World Championships as the five-day event opens in Hefei on July 26.

The ongoing event is the second one ever hosted in China, following the 12th in 2008 in Suzhou city of Jiangsu province.

"Tremendous changes have happened to the research and development of robots around the world", said Chen Xiaoping, president of RoboCup Chinese National Committee. As a professor of the University of Science and Technology of China, based in Hefei, Chen also heads a robot R&D team of the university. The team WrightEagle is a traditional global powerhouse in robot R&D.

Chen said Hefei is better prepared this time compared with the previous event hosted in China. "Many countries are now exerting efforts in the research and development of intelligent service and assistance robots, which is also expected to play an important role in upgrading China's manufacturing sector", Chen said, who also chaired the Chinese committee in 2008.

Zhang Qingjun, mayor of Hefei, said the city got the opportunity to host the event not through luck but rather because of its thorough preparation and strong position in the robot industry.

In Hefei, there are over 30 companies engaged in the R&D and manufacturing of robots or robot software design.

Hefei has a thriving scientific community, as the University of Science and Technology, one of China's top universities, and Hefei Institutes of Physical Science of the Chinese Academy of Sciences are both based in the city.

As an important manufacturing hub in China, Hefei is also home to a wide variety of robots, especially industrial robots. The city has been the country's largest manufacturing hub for refrigerators, air conditioners, washing machines and TV sets. In 2014, the city produced more than 60 million such products, or one-fifth of the whole country's total production.

The city is also known as an auto manufacturing base, and is home to Anhui Jianghuai Automobile Co, Ltd, known as JAC, being one of the largest Chinese automakers.

Hefei is also a manufacturing base for excavators, since Hitachi Construction Machinery Co, Ltd has been running a large assembly line here for 20 years.

Besides, Hefei BOE Optoelectronics, a subsidiary of BOE, is the country's largest semiconductor display manufacturing center.
“To upgrade the city’s manufacturing sector, a lot of industrial robots have already been used in the local manufacturers, while the major predicts that we are only at the beginning of robot development and application,” said Zhang.

(http://www.chinadaily.com.cn/china/2015-07/20/content_21337326.htm)

7. **Higgs Factory Proposed for Beijing**

The discovery of the Higgs boson was one of the biggest moments in the history of particle physics. It was also the discovery of one of the strangest particles ever revealed—an elementary, point-like particle with no spin, no electromagnetic charge and the ability to interact with itself.

"In this situation, you just have to put this brand new weird particle under as powerful a microscope as you can,” says Nima Arkani-Hamed, a theoretical physicist at the Institute for Advanced Study in Princeton. Physicists in China are hoping to build that powerful microscope in the form of an electron-positron collider in a ring up to 100 kilometers long just outside Beijing.

Arkani-Hamed is the first director of Beijing’s new Center for Future High Energy Physics, tasked with investigating the physics capabilities of such a machine and getting physicists around the world on board with the project.

The Large Hadron Collider, where the Higgs was discovered, produces the particle in proton-proton collisions. Experiments at the LHC will continue to study the Higgs over the next decades. But scientists around the world—including the group in China—are also planning ahead for ways to get an even closer look at the bizarre particle.

If constructed in China, the proposed Higgs-factory collider would be the biggest particle physics project ever undertaken there. “It is putting a stamp on the country’s arrival on the international stage in some sense,” says Charlie Young, a physicist at SLAC. “It’s the science, but it’s also more than just the science.” The hope is that creating a million Higgs will reveal tiny deviations from theoretical predictions about the particle’s nature, which would open up new paths to exploring science beyond the Standard Model of particle physics.

The idea for a circular Higgs factory in China first came from Yifang Wang, the director of the Institute of High Energy Physics in Beijing, who proposed it at a September 2012 meeting on the future of particle physics in China. IHEP has several successful particle physics experiments already, including the Daya Bay Neutrino Experiment, which studies neutrino oscillation. It’s also home to the Beijing Electron Positron Collider, a comparatively tiny 200-meter version of the giant collider Wang hopes to build in the next decade.

"The Circular Electron Positron Collider is actually a very natural continuation of our effort in last 30 years,” Wang says. "Without this new Higgs factory, we probably have to think about something else.”

In a proton-proton collider like the LHC, collisions that produce a Higgs also produce dozens of other particles, making it difficult to tease out which collision produced a Higgs. That's because protons are made of quarks and gluons. But electron-positron collisions are much clearer, producing only a Higgs plus the well-known Z boson. That will allow physicists to study exotic decays.

China is not alone in wanting to host a Higgs factory. The proposed International Linear Collider could be tuned to produce Higgs particles while exploring other new physics at higher energies. The idea of a circular Higgs factory actually first surfaced in 2011 as a possible reuse of the LHC tunnel at CERN.
As part of the European long-range plan, CERN has established an international collaboration to develop a design for a Future Circular Collider in a new tunnel that would accelerate protons around the town of Geneva. The FCC could go through an intermediate phase as an electron-positron collider first.

China’s government is set to award five-year funding to several national-scale projects by the end of this year, and Wang is hoping that a large investment in R&D to advance the case for the CEPC will be one of the winners.

"If they say yes to the development funding, I bet they’re going to go for the whole thing," Arkani-Hamed says. "That would be an earthquake. That would be an enormous thing."

Winning the funding this year could allow construction to begin as early as 2020, with the first data starting to come in by the early 2030s.

(http://english.cas.cn/newsroom/news/201507/t20150703_149611.shtml)

(Collaborating Opportunities)

Race for Water Expedition in Shanghai
Date: August 4
Place: Shanghai
Contact: swissnex China

Venture Leaders China
Date: October 20 – 30
Place: Beijing, Shanghai, Shenzhen
Contact: swissnex China

All Swiss University Alumni Gathering
Date: October
Place: Beijing, Shanghai
Contact: swissnex China