Science China Newsletter, February 2018
Trends in education, research, innovation and policy

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Swiss Spotlight

**Scientist: Exploring the Potential of Nanocages** (Simon Duttwyler, February 28)

Simon Duttwyler is a full-time chemistry professor at Zhejiang University in Hangzhou. He obtained his PhD training at the University of Zurich in Switzerland and did postdoctoral studies at Yale University in the US. In 2013 he moved to China to start his independent career. His research focuses on cage-like structures based on the chemical element boron. This element has the peculiar tendency to form highly symmetrical molecular clusters which possess exceptional stability. In addition, they are relatively cheap to make and exhibit low toxicity. For these reasons, there is great potential for applications of such boron compounds. Currently, Simon Duttwyler is exploring new ways to produce tailor-made boron cages for the use as antibiotics, light-emitting materials and biosensors. He is collaborating with research groups from China, Switzerland, the US, UK and France. He came to China because of its excellent and emerging scientific community and his fascination for the country's rich history and culture.

http://swissinnovation.org/newsChina/web/2018/00-180228-46

**Startup: Safe Drone for Inaccessible Places** (Flyability, February 28)

Flyability is a spin-off from EPFL founded by the alumni Adrien Briod and Patrick Thévoz and currently employs over 40 employees. It is a company focusing on building safe drones for operating indoors, in complex and confined spaces and in contact with people. Their drone Elios is the first collision-tolerant drone, designed for the inspection and exploration of the most inaccessible places. Thanks to its protective frame, it allows for the first time to fly in complex, cluttered or indoor spaces. Elios unleashes the potential of UAVs in numerous applications where their use was previously too dangerous or simply impossible. To expand its business to the quickly growing Chinese market, Flyability is currently working with Chinese distributors.

http://swissinnovation.org/newsChina/web/2018/00-180228-8d
1. Policy

**Autonomous Vehicles Due for Policy Boost**

(China Daily, February 08)

China is formulating technology standards for self-driving vehicles to promote technology research into autonomous vehicles. Minister of Transport said that China is setting up test bases and conducting research into policy guidelines for road tests with relevant departments. The next step is to cooperate with other departments and promote the technology actively and steadily. In December, Beijing released China's first guidelines for road tests of self-driving vehicles. The guidelines apply to independent entities registered in China.


**Basic Science Research Funding Doubles in 5 Years**

(China.org.cn, February 12)

The Ministry of Science and Technology says China's financial input in R&D in basic sciences doubled in the past five years. Vice-Minister of Science and Technology Huang Wei says the country has issued proposals on strengthening all basic science research, with the aim to make China a global innovation leader in science and technology. "The proposals have set the goal of making China an important science center and an innovation highland in the world by the middle of this century and bringing forth international top-level science masters, who have a large number of major original science achievements to their credit." Zhang Xiaoyuan, an official overseeing resource allocation and management at the ministry, says the government currently supports basic science research by either directly giving money to research institutions or allowing them to bid for projects.


**R&D Spending up 11.6% in 2017**

(Xinhua, February 13)

China's spending on research and development (R&D) grew faster in 2017 as the country continued to push for innovation-driven development. Preliminary calculations showed that R&D spending rose 11.6 percent year-on-year to 1.75 trillion yuan (about 280 billion US dollars) in 2017, 1 percentage point higher than in 2016, the National Bureau of Statistics said. The spending accounted for 2.12 percent of China's gross domestic product, 0.01 percentage points higher than the previous year.

http://swissinnovation.org/newsChina/web/2018/01-180213-0f
Change on Chinese President's Term

(Xinhua, February 25)

The Communist Party of China Central Committee proposed to remove the expression that the President and Vice-President of the People’s Republic of China “shall serve no more than two consecutive terms” from the country’s Constitution.

http://swissinnovation.org/newsChina/web/2018/01-180225-d8

2. Education

Chinese Graduates Reap Rewards

(China Daily, February 01)

China is forecast to produce 8.2 million fresh graduates this year, and many will struggle to find work — unless they majored in a subject related to artificial intelligence. Recruitment website Zhaopin’s big data analysis shows that there is a 179 percent increase in the demand for AI expertise in the third quarter of last year compared with the first quarter of 2016, which is when AlphaGo recorded a shock 4-1 victory over 18-time Go champion Lee Se-dol, one of the ancient Chinese board game’s all-time masters. The demand has also made those with majors loosely related to AI popular.

http://swissinnovation.org/newsChina/web/2018/02-180201-db

China-Britain JV University Announces New Campus Plan

(Xinhua, February 03)

Xi’an Jiaotong-Liverpool University (XJTLU), a Chinese-British joint venture university, plans to build a new campus in east China’s Jiangsu Province. […] The new campus of XJTLU, a partnership between China’s Xi’an Jiaotong University and the University of Liverpool, will be constructed in Taicang City, not far from the school’s base in Suzhou City, also in Jiangsu. […] The campus will foster graduates in science and technology with expertise in AI and robotics. It will provide opportunities for students to work with and within the city’s expanding industrial base.

http://swissinnovation.org/newsChina/web/2018/02-180203-9c

From 985 to World Class 2.0: China’s Strategic Move in Higher Education

(Inside Higher ED, February 07)

Under the background of global competition in science and technology, the pace of developing world-class universities in China is accelerating. The Chinese government released the World-Class 2.0 project, replacing the 211 and 985 projects, and aiming to become a global higher education center.
Institutional autonomy, academic freedom, academic corruption and the dominant Western academic system remain critical challenges.


**Olympic Education Entering Chinese Schools**

(China Daily, February 28, 2018)

A plan was released on 27 February to introduce Winter Olympics education into China's primary and secondary school syllabuses for the upcoming 2022 Beijing Winter Olympics. The plan - co-issued by the Ministry of Education, the General Administration of Sport and Beijing Organizing Committee for the 2022 Olympic and Paralympic Winter Games - will mainly be conducted by practical activities, physical education courses, moral education activities and other routine school activities. Winter sports special schools are encouraged by the plan, and the number of special schools is expected to reach 2,000 in 2020 and 5,000 in 2025. Over 700 Olympic model schools will be named, including 200 in Beijing, 200 in Hebei province and other 10 around China.

http://swissinnovation.org/newsChina/web/2018/02-180228-5a

**3. Life Sciences / Health Care**

**Driving China's Healthcare to the Next Level**

(China Daily, February 08)

Given the imminent struggle to contain rising healthcare costs while meeting the 19th Congress' "Healthy China" strategy, much focus will be placed on delivery of primary care and health promotion to seniors. Seeing how quickly China has adopted technological solutions in other industries, the fewer regulations in China compared to developed countries; shortages in the healthcare workforce; and the large aging population make the country a compelling business environment for healthcare—technology innovations. Developing standards for China's healthcare industry will support the use of health technologies and vice versa. Together they can drive toward the next stage of healthcare reform in China — a sustainable healthcare industry and, more importantly, a healthier society.

http://swissinnovation.org/newsChina/web/2018/03-180208-eb

**Ketamine as New Antidepressant**

(Xinhua, February 15)

Scientists discovered how the anaesthetic painkiller ketamine worked to block the neuronal activity that drives depression-like behavior. It may help scientists develop new and much safer
antidepressants. "Doctors often use a low dose of ketamine to treat depression patients, which have showed curative effects on 70 percent of the patients," said Hu Hailan, who led the research on ketamine blocking bursting in the lateral habenula to rapidly relieve depression. His team has found where the drug works in brain neurons to induce the antidepressant effect in lab rat experiments. The neuroscientist at the Zhejiang University School of Medicine (Hangzhou), said that although ketamine had a curative effect, it was still an anaesthetic substance used as a narcotic. The molecular targets the team found could help develop more effective and safer antidepressants.


Scientists Regenerate Lung with Stem Cells

(Xinhua, February 23)

Regenerative medicine specialists at Tongji University and doctors at the university’s affiliated Shanghai Oriental Hospital have successfully transplanted adult stem cells to reconstitute a patient's injured lung. The stem cells are taken from the patient's airway and expanded millions of times in vivo before the transplantation. After three to six months, they grow new alveoli and bronchi that improve lung function. This was the achievement of the research team led by Professor Zuo Wei. Pulmonary fibrosis is characterized by irreversible and progressive damage to lung tissue, said Zuo. "Drugs have little effect and lung transplants used to be the only solution." Zuo compares the stem cells to "seeds". "We sow the 'seeds' to the injury site, allow them to grow for a few months and gradually to rehabilitate the damaged organs."

http://swissinnovation.org/newsChina/web/2018/03-180223-84

AI System to Diagnose Human Diseases

(Xinhua, February 24)

A scientific research team at Guangzhou Women and Children's Medical Center has developed an artificial intelligence system for the classification and diagnosis of treatable human diseases. They applied a deep-learning framework to develop a diagnostic tool for the diagnosis of pediatric pneumonia and common treatable blinding retinal diseases. The team said the AI system had demonstrated performance comparable to that of human experts in classifying and diagnosing diseases. The tool may ultimately aid in expediting the diagnosis and referral of these treatable conditions, thereby facilitating earlier treatment and resulting in improved clinical outcomes, according to the research team.

http://swissinnovation.org/newsChina/web/2018/03-180224-21
Drug to Suppress Superbugs

(Xinhua, February 27, 2018)

Antimicrobial resistance posed by superbugs has been a major public health issue of global concern. Drug-resistant infections kill around 700,000 people worldwide each year, and the figure could increase up to 10 million by 2050, according to figures of the World Health Organization. Researchers from University of Hong Kong have now discovered that colloidal bismuth subcitrate (CBS), an antimicrobial drug against Helicobacter pylori-related ulcer, can effectively paralyze multidrug-resistant superbugs. The research team revealed that CBS can "tame" the superbug by reducing it to almost sensitive strain which can be easily killed by commonly used Carbapenem antibiotics. The brand-new therapy allows the dose of antibiotics to be reduced by 90 percent to attain the same level of effectiveness. 


4. Engineering / IT / Computer Science

Reusable Rocket with Landing Test

(Global Times, February 01)

Chinese private space company Linkspace has taken a step in its development of a reusable orbital rocket with a successful vertical takeoff, vertical landing (VTVL) test. VTVL has allowed US company SpaceX to launch, land, and reuse its Falcon 9 rocket first stages. The breakthrough by Linkspace will be used for its own, much smaller rockets which will aim to provide low-cost access to space for clients looking to launch small satellites. The NewLine-1 rocket, with a reusable first stage, will be capable of carrying 200 kg of micro and nanosats to Sun-synchronous orbit up to an altitude of 500 kilometers. Linkspace is aiming for the maiden flight to take place in 2020.


Simulated Mars Landing for 2020 Mission

(Global Times, February 09)

China has provided a rare update on the progress of its 2020 mission to send an orbiter, lander, and rover to Mars, stating that simulated landing tests have taken place as part of preparations. The tests were carried out recently by the Beijing Institute of Space Mechanics and Electricity, which focuses on landing technology among other specialized fields. The 2020 mission will be China's first independent interplanetary mission, and while the country successfully soft-landed the Chang'e-3 on the Moon in
2013, some of the challenges posed by touching down safely on Mars are greater, requiring new technology.


**Big Earth Data Project**

(Xinhua, February 13)

China has launched a scientific project on big Earth data, according to the Chinese Academy of Sciences (CAS). The project of cloud service platform aims to establish an open international center for big Earth data. It is one of the 19 A-class strategic high-tech research project launched by the CAS since 2011. Guo Huadong, academician with the CAS Institute of Remote Sensing and Digital Earth, and head of the project, said that the project will integrate science and technology infrastructure with research into resources, environment, biodiversity, and ecosystems. The project strives to make breakthroughs in Earth system sciences, life sciences, and associated disciplines.


**Test Site for Unmanned Ships**

(The Straits Times, February 13)

China has started building the world’s largest test site for unmanned ships--a technology with both civilian and military applications--off a port in the disputed South China Sea, state media said Feb. 13. The test area is being constructed off the southern port city of Zhuhai bordering Macau, the state Xinhua news agency said.


**World's Largest Radio Telescope**

(Financial Times, February 15)

A research institute linked to the Chinese military has manufactured the first prototype dish for what will be the world's largest radio telescope, with vast fields of antennas picking up radio signals from space in remote regions of South Africa and Australia. The Square Kilometer Array’s 15-meter prototype dish was built by the 54th Research Institute of CETC, a state-owned company that specializes in producing hardware and electronic communications systems for China's People's Liberation Army. Once it is finished in the mid 2020s, the SKA will consist of about 200 dishes similar to the Chinese prototype stationed in South Africa and 130,000 much smaller antennas operating at a different radio frequency in Australia.

Huawei AI Smartphone Drives a Car

(SCMP, February 28)

Shenzhen-based Huawei Technologies said it is the first mobile device manufacturer in the world to use an artificial intelligence (AI) powered smartphone to drive a car. Not just any car – a Porsche Panamera that is autonomously operated by its Mate 10 Pro handset. The car is able to identify objects on the road using big data and algorithms and will choose to either hit the brakes or swerve to avoid the object, depending on what instructions were pre-loaded by the passenger. For Huawei, the world’s third-largest smartphone vendor, the test is not about autonomous driving. Rather, the company wanted an opportunity to prove the AI capability of its self-made mobile chip the Kirin 970 which was launched six months ago.


5. Energy / Environment

1st Homegrown Nuclear Fuel Container Passes Tests

(Global Times, February 08)

A prototype nuclear fuel container made from Chinese indigenous materials has passed tests, symbolizing China’s ability to localize the storage and transport of nuclear fuel. The container, made of the B4C/Al neutron absorbing materials for storing and transporting nuclear fuel and spent nuclear fuel, was developed by the Chinese Academy of Sciences’ Institute of Metal Research. Tests show that the quality of China-made neutron absorbing materials can compete with foreign-developed counterparts. The Institute of Metal Research said China has been late in developing nuclear energy as well as in developing neutron absorbing materials, which severely constrains China’s nuclear energy from being independently developed and exported, China News Service reported.


City to Make all Buses Electric by 2020

(Xinhua, February 24)

Wang Tianshan, an official with Yinchuan’s transport bureau, said the city plans to put 2,000 electric buses on roads and set up 3,800 bus charging facilities by the end of 2020. Last year, Yinchuan purchased 600 electric buses, 230 of which are currently running. To ensure their smooth operation, the city has built 80 bus charging facilities, and more are planned. According to the city’s bus operator, the electric buses can save operating costs and reduce exhaust emissions compared with natural gas-powered buses. Many Chinese cities are encouraging clean energy transport as part of the country’s
efforts to protect the environment. Shenzhen has put more than 16,000 purely electric buses on its roads. Taiyuan has made all of its cabs electric, and the city plans to add 1,000 electric buses in 2018.


**Oil Spill Clean-up Technology**

(Xinhua, February 28)

China plans to build a laboratory to work on emergency treatment of oceanic oil spills in north China's Tianjin Municipality, local authorities said Wednesday. The lab will be located in the Sino-Singapore Tianjin Eco-City in Binhai New Area on Bohai Bay, according to the administrative committee of the Eco-City. Funded by the Ministry of Transport waterborne transport research institute, the lab will be a testing field for research on oceanic ecological protection. China spends about 200 million yuan (29.8 million Swiss francs) each year on research into emergency treatment of oil spills but the technology has not been widely used due to a lack of proper testing field. Only the United States and France have labs specializing in ocean oil spills.


**Targeting Irregular Enterprises in Nationwide Pollution Control**

(Xinhua, February 28)

A pollution control campaign targeting enterprises that are not in line with local land and industrial planning, and violate environment protection rules or operation regulations will be spread to more areas of the country as it has proven effective in 28 pollution-heavy cities, according to Liu Bingjiang, an official with the Ministry of Environmental Protection. The ministry launched a pollution control campaign targeting about 62,000 irregular enterprises in the Beijing-Tianjin-Hebei region and surrounding cities last year, whose efforts were estimated to have contributed to about 30 percent of the fall in PM 2.5 density in the region. The country is working on a three-year plan to win the battle for cleaner air, focusing on eliminating outdated production capacity, controlling coal consumption and encouraging more railway transport in logistics, according to Liu.


**6. Physics / Chemistry / Material Science / Nano- & Micro Technology**

**First Shared Education Satellite Launched**

(Global Times, February 02)

China's first shared education satellite, Young Pioneer 1, carried by the Long March-2D rocket, was launched into space from Jiuquan Satellite Launch Center on Feb 2. It will perform wireless storage
and transmission of radio waves at UV frequency, space imaging and the verification of user links to the Internet of Things. After in-orbit tests, Young Pioneer 1 will share its data resources with primary and secondary schools and other education institutions equipped with sub-stations in China. It will provide students with experiences like wireless communication and space photography, Xie said.


**Brightest Synchrotron Light Source**

(Xinhua, February 09)

China will start building the world’s brightest synchrotron radiation light source, to help scientists better study the structure of microscopic particles. The High Energy Photon Source (HEPS) is expected to produce X-rays up to 300 keV in photon energy. A synchrotron radiation light source is a source of electronmagnetic radiation usually produced by a storage ring. To generate light of extreme brilliance, electrons will be accelerated nearly to the speed of light in several stages and forced to travel in a closed path. Bending magnets and insertion devices in the storage ring will supply the strong magnetic fields to help convert high energy electrons into photons with high brilliance. HEPS will serve as a research platform for material science, chemical engineering, biomedicine and other fields.


**7. Economy, Social Sciences & Humanities**

**AI Software to Help Suicidal People**

(Global Times, February 08)

"The software can identify those who have suicide ideation expressed in their microblog posts, and then send out a private message providing the necessary support and help," Zhu Tingshao, a research fellow at the Institute of Psychology of Chinese Academy of Sciences. The messages contain comforting words, links to professional websites and hotline numbers they can turn to. The software has been in use on Weibo since July 2017 and has sent messages to over 20'000 people. The team’s data indicates that 30 to 40 percent did go to the provided websites, but few of them responded to private messages. "It is still very difficult for AI to replace the help provided by real people, but it works well as a supplementary tool and it can promptly identify people in need," Zhu said.

Sustainable Growth through Reform  
(Xinhua, February 22, 2018)

China can achieve more inclusive and sustainable development with coordinated reforms that maximize development impact and address its development challenges, according to a report from the World Bank Group. China's growth has been slowing to a "new normal" and economic rebalancing is underway. Managing this transition in a sustainable manner will be critical to achieving the country’s development goals, the report "Towards a More Inclusive and Sustainable Development" said. The official said the World Bank Group will continue to support China's goals to eliminate extreme poverty and ensure inclusive and sustainable growth. The challenge for China will be to target assistance to the remaining poor while paying attention to those who are vulnerable to falling into poverty, the report said, adding further improvements to the social security net would help.  

8. Corporates / Startups / Technology Transfer

Boost of Intellectual Property Protection for Domestic Technology  
(SCMP, February 06)

China's military has raised the alarm about the country's cutting-edge tech falling into foreign hands--as Beijing continues to come under fire from the West for forcing firms to hand over the keys to their intellectual property. The fears were highlighted in a comment piece in the People's Liberation Army's China National Defense News, which suggested that China needed to erect intellectual property rights barriers around its advances, just as the West had long done so against China. It said that over several generations China had made many breakthroughs in scientific research but those gains could end up in foreign hands and threaten national security if they were not protected. "We must work on protecting technology as much as we have on researching and developing it," the commentary said.  

Samsung Electronics in Deal for Chip Cooperation  
(Reuters, February 06, 2018)

China's state planner and South Korea's Samsung Electronics Co Ltd have signed a memorandum of understanding for further cooperation on semiconductors, state media China Daily reported. The agreement between China's National Development and Reform Commission (NDRC) and the world's top memory chip
maker focuses on chipmaking, artificial intelligence and semiconductor manufacturing, the China Daily report cited an unidentified NDRC official as saying.


Tier III Modular Data System Made

(Xinhua, February 13, 2018)

Dubai Airports, the holding company of Dubai International Airport said recently that ICT giant Huawei has successfully completed the world's first Tier III certified Modular Data Centre Complex (MDCC) for the world's third busiest airport. The project, led by Dubai Airports, was delivered in just more than 400 days, to coincide with UAE's month of innovation being observed during February, said state news agency WAM. The complex is equipped with "next generation technologies" to ensure the highest levels of availability, maintainability, resilience and seamless business continuity to support DXB's growing and complex operation, added WAM. Dubai Airports worked closely with Huawei to design and build the Tier III pre-fabricated data centre incorporating smart operations and intelligent management platforms to host critical IT systems.


R&D Input '2nd-Highest in the World'

(china.org.cn, February 20, 2018)

China has been the world leader in patent applications on inventions for seven consecutive years, said Wan Gang, president of the China Association for Science and Technology. The Chinese mainland issued about 1.36 million patents on inventions by the end of last year, working out to about 9.8 patents per 10,000 people, according to the State Intellectual Property Office. "China's input on research and development rose to the second-highest in the world in 2017," said Wan, adding that the number of full-time R&D personnel in China is the highest in the world.


9. Bilateral News

Largest Swiss Retailer Expands in China

(NZZ, February 21)

The production facilities of M-Industry point the way out of the stagnating domestic market and they further strengthened their engagement abroad. M-Industry has acquired a formula for success; products are nationally researched, developed and introduced to the market. If they subsequently
prove to be suitable, they are going to be exported. This formula works for cosmetics just as well as for coffee or chocolate. In a bold move M-Industry now also tries getting a foothold in China. The company entered a partnership with the online retailer Tmall, which belongs to the Alibaba group. Under the name «Orange Garten» it sells original Migros products: Among other things coffee, nuts, drinks, and detergents. Trustworthy Swiss brands are appreciated in a country in which imitations contribute to the uncertainty of the consumers.

http://swissinnovation.org/newsChina/web/2018/09-180221-a1

Upcoming Science and Technology Related Events

Swiss Ball Après Ski
March 17, 2018
https://goo.gl/GBY9sD
Ball, Dress up
Shanghai

Swiss Pavilion, China International Import Expo CIIE
November 5-10, 2018
International Import Exhibition
Shanghai

CES Asia
June 13-15, 2018
http://www.cesasia.cn/
Consumer Technology, Innovation
Shanghai

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