

Science China Newsletter, July 2018

Trends in education, research, innovation and policy



Beijing, China

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Swiss Spotlight

Scientist: Realizing Biosensors in Yeast

(Mario Andrea Marchisio, July 31)

Currently, Mario Andrea Marchisio is an Associate Professor in Synthetic Biology at Tianjin University. Previously, he held the same position, for about five years, at the Harbin Institute of Technology. He did his studies in Italy and got a PhD in Physics at the University of Trento. After working at the CILEA supercomputing center near Milan, he moved to ETH Zurich, where he spent six years as a Post Doc both in computational and experimental Synthetic Biology. This has permitted him to get a professorship in China. Mario Andrea Marchisio strongly wanted to have a working experience in Asia since he has always been very attracted by the culture and the art of far Eastern countries. His research field, Synthetic Biology, is a new discipline sometimes referred to as life engineering. The main goal of Synthetic Biology is to modify cells with the insertion of circuits, made of DNA, that carry out specific functions. Mario Andrea Marchisio is particularly interested in realizing biosensors in *S. cerevisiae* (the baker yeast). These circuits can be used to detect and deal with specific substances. For instance, a pollutant could be sensed and degraded by living cells hosting a synthetic biosensing device.



<http://swissinnovation.org/newsChina/web/2018/00-180731-d6>

Startup: New Modern Way to Track Women's Health

(Ava, July 31)

Ava is a medical data technology company focused on innovations in women's reproductive health. Its first product—the Ava bracelet, is a cycle and fertility tracking wearable that uses the newest technology to monitor nine physiological parameters in real-time. Each night, Ava's sensors collect three million data points around physiological parameters including pulse rate, breathing rate, sleep quality, heart rate variability, temperature, and more, that correlate with the rise in reproductive hormones estradiol and progesterone. With this information, Ava is able to detect a woman's entire fertile window of 5.3 fertile days per cycle at 89% accuracy. The user simply wears the Ava bracelet while sleeping and syncs it with the Ava app in the morning. Founded in Switzerland in 2014 by industry leaders in wearable technology, women's health, and data science, Ava was clinically tested in a year-long study at the University Hospital of Zurich, and is an FDA registered device and CE certified. Ava is currently seeking Chinese regulatory approvals in preparation for its launch in China.



<http://swissinnovation.org/newsChina/web/2018/00-180731-81>

1. Policy

Guidelines to Help Farmers Use Internet

(China Daily, July 03)

China will roll out guidelines for the standardization of packaging, transport logistics and quality of farm produce as part of its Internet Plus Agriculture strategy aimed at boosting the rural economy, a senior official said on Monday.



Qu Dongyu, vice-minister of agriculture and rural affairs, said the move aims to boost sales of farm produce and enrich farmers by developing stable industries. China released a guideline in 2015 calling for integrating the internet with sectors including government services, advanced manufacturing, agriculture and healthcare. To bring more business opportunities to rural residents, the central government decided in June to improve rural internet services and IT infrastructure, and to promote the integrated development of three industries.

<http://swissinnovation.org/newsChina/web/2018/01-180703-57>

China Streamlines Evaluation of Scientific Research

(China Daily, July 03)

China will streamline the mechanisms of evaluating research programs and academic performance of researchers and research institutes. The country aims to reduce the number of assessments and improve the methods and efficiency of Chinese research by 2020 so that resources will be better allocated and researchers will be more motivated with enhanced innovation ability, according to the guideline issued jointly by the General Offices of the Communist Party of China Central Committee and the State Council. The administration will carefully design goals, criteria and methods to appraise academic progress of research programs and performance of researchers and research institutes and simplify procedures, the document said.

<http://swissinnovation.org/newsChina/web/2018/01-180703-a9>

China Breaks into Top 20 Innovative Economies

(China Daily, July 11)

China was among the top 20 most-innovative economies in the annual Global Innovation Index (GII) ranking published by Cornell University and the World Intellectual Property Organization (WIPO). GI ranked 126 economies based on 80 indicators, ranging from intellectual property filing rates to mobile-application creation, education spending and scientific and technical publications. Switzerland retained its top place this year, followed by the Netherlands and Sweden. China climbed to 17th from 22nd place last year. The United States came second after China in the volume of researchers, patents and scientific



and technical publications. Switzerland, Luxembourg and China ranked top three in terms of translating investments in education, research and R&D expenditures into high-quality innovation outputs. A survey of "top science and technology clusters" around the world put the areas around Tokyo-Yokohama and Shenzhen-Hong Kong atop the list.

<http://swissinnovation.org/newsChina/web/2018/01-180711-cc>

Greater Autonomy for Researchers

(China Daily, July 11)

The State Council's decision to give greater autonomy to researchers has been widely hailed as the country seeks breakthroughs in key technologies. According to a decision at a State Council executive meeting chaired by Premier Li Keqiang, researchers will be given greater control over their personnel, finance and other resources to boost enthusiasm and inject greater vitality into innovation. It was decided at the meeting that government management of scientific research will be reformed so that no repeated filing of materials is required in the national scientific and technological management information system. Examinations, evaluations and audits of various kinds will be reduced, and researchers will be allowed to purchase professional services, such as accounting, to free them from tedious chores. The measures came as Chinese leaders made repeated calls for the country to achieve innovative breakthroughs.



<http://swissinnovation.org/newsChina/web/2018/01-180711-06>

2. Education

China Strengthens Education Cooperation with New Zealand

(China Daily, July 11)

New Zealand Minister of Education Chris Hipkins is travelling to China at the weekend for a four-day visit that includes meeting his counterpart Education Minister Chen Baosheng in Beijing. The visit is aimed at reaffirming New Zealand's strategic education partnership with China, including the formal education initiatives between the two countries as well as New Zealand's commitment to being a quality and safe destination for Chinese students. In particular, Hipkins will discuss New Zealand's quality education offerings in the field of entrepreneurship and how these are empowering Chinese graduates of New Zealand institutions to succeed in their chosen fields of endeavor.

<http://swissinnovation.org/newsChina/web/2018/02-180711-40>

Psychological Health Education Becomes Compulsory in College

(China Daily, July 15)

The Ministry of Education has asked universities to offer a compulsory course on psychological health to all students in their freshmen year. The course should be allocated two credits and about 32 to 36 class hours, according to a guideline on promoting psychological health among college students published on the ministry's website Sunday. It asked for the development of online courses and the use of new media platforms in promoting psychological health knowledge. There should be at least two qualified full-time psychologists at each higher education institution, said the guideline, which also applies to private universities. Besides training, it also required universities to improve on-campus psychological consulting services and to put in place a sound mechanism to protect students' privacy.

<http://swissinnovation.org/newsChina/web/2018/02-180715-30>

Engineering Education Contributes to China's Economic Takeoff

(China Daily, July 16)

Engineering education in China has made a "significant contribution" to the country's economic takeoff, and online courses in the field are benefiting engineering students around the world, the head of UNESCO's International Center for Engineering Education said on Sunday. According to the Ministry of Education, more than 1,100 Chinese universities - about 94 percent - offered engineering majors at the undergraduate level this year, with engineering students accounting for about one third of all undergraduates. China is also the biggest contributor of engineering graduates worldwide, with 38 percent of the world total in 2012, according to a 2016 report by the National Science Board in the United States.

<http://swissinnovation.org/newsChina/web/2018/02-180716-36>

3. Life Sciences / Health Care

Reducing the Prices of Cancer Drugs

(China Daily, July 02)

China is working to reduce the prices of cancer drugs and the financial burden on patients. Prices of cancer drugs will be reduced through centralized negotiations and procurement, Zeng Yixin, vice director of the National Health Commission, said at a press conference. The government will work to include more antineoplastic drugs into the country's catalogue of medical insurance reimbursement, which already incorporates most of the relevant drugs. Moreover, efforts have been made in accelerating the review and approval procedures



for new medicines, reducing circulation costs and improving diagnosis to reduce the burden on patients and their families.

<http://swissinnovation.org/newsChina/web/2018/03-180702-23>

New Diagnostic Method for Liver Cancer

(Xinhua, July 06)

Liver cancer is one of the most common and lethal diseases in the world and most cases are already at an advanced stage by the time they are diagnosed. Therefore, early diagnosis of liver cancer is important for prolonging patients' lives. As early cancer can be detected by observing DNA methylation alteration in the blood, scientists from Shanghai Institute of Nutrition and Health, CAS systematically analyzed the DNA methylation characteristics of 375 samples from liver cancer patients, 50 normal liver samples and 3,780 samples from patients with other cancers. They selected potential diagnostic biomarkers of liver cancer and established a prediction model. The results showed that the model had a 92% success rate in predicting liver cancer. The research provides a new solution for early diagnosis of liver cancer in the future.

<http://swissinnovation.org/newsChina/web/2018/03-180706-62>

New AI Wave for Medical Field

(China Daily, July 09)

A large number of applications to get market approval for medical devices that employ deep learning, a subset of AI, are expected to be filed next year, but full commercialization of the products is not necessarily within easy reach. Based on communications with AI companies and conventional medical companies that



are charging into the AI field, it is predicted that applications for such devices will soar next year, said Sun Lei, head of the Center for Medical Device Evaluation. However, there's still a long way to go for AI systems to be legitimately used in the country's healthcare system since it usually takes a year to get market approval for a new medical device. It is expected that the market value for AI medical devices will exceed 20 billion yuan by the end of 2018 (roughly one-fifth of the AI industry).

<http://swissinnovation.org/newsChina/web/2018/03-180709-1b>

Large-scale Gene Loss in Evolution of Parasitic Plants

(China Daily, July 13)

Researchers with the Chinese Academy of Sciences have found large-scale gene losses in parasitic plants such as dodders, or *Cuscuta australis*. Most plants absorb sunlight and CO₂ through their leaves, taking in water and minerals from the soil through their roots. However, parasitic plants are a particular class of plants that extract water and nutrients from other plants, said Wu Jianqiang, who led the

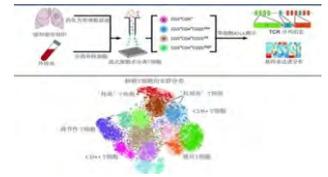
research in Kunming Institute of Botany, Chinese Academy of Sciences. Wu's team spent a year and a half to map out the genome of the dodder *Cuscuta australis*. "We found the *Cuscuta* and *Ipomoea* had a common ancestor about 33 million years ago. The *Cuscuta* genome then rapidly evolved, and many genes were lost during evolution," he said.

<http://swissinnovation.org/newsChina/web/2018/03-180713-63>

Inter-Tissue Effector T Cells Provide Information for New Immunotherapy

(Peking University, July 13)

Researchers at Peking University Third Hospital, Peking University and PKU-Tsinghua Center for Life Sciences collaborated on a lung cancer research project. They performed deep single-cell RNA sequencing for T cells from fourteen non-small-cell lung cancer patients, and observed the cell subsets in non-small-cell lung cancer. The study revealed two clusters of inter-tissue effector T cells with a highly migratory nature, which provides information for the development of new immunotherapy. Besides exhausted cells, two clusters of tumor-infiltrating CD8⁺ T cells were observed to exhibit states preceding exhaustion that might transit into exhausted T cells, which provides new clinical marker for lung adenocarcinoma. They also found a cluster of activated tumor regulatory T cells (Tregs) within the lung tumor-infiltrated Tregs, based on the bimodal distribution of TNFRSF9. Those Tregs exhibited a higher level of suppression-related gene expression, which can be used as another reliable clinical marker.



<http://swissinnovation.org/newsChina/web/2018/03-180713-59>

Dietary Fat, not Sugar or Protein, Causes Obesity in Mice

(Xinhua, July 16)

Researchers from Chinese Academy of Sciences claim that eating too much fat is the only cause of obesity in mice. The researchers exposed mice to 29 different diets varying from 8.3 percent to 80 percent fat, 10 percent to 80 percent carbohydrates, 5 percent to 30 percent protein, and 5 percent to 30 percent sucrose. The experiment, involving five groups of 100,000 mice, lasted for three months, equivalent to nine years of human life. They found that only increased dietary fat led to high energy intake and weight gains. Furthermore, food with high sugar content did not cause an increase in body weight, and low protein did not result in excessive energy intake, either. "The shortcoming of the research is that the experiment only used mice rather than humans. However, they have many similarities in physiology and metabolism, [...]," said John Speakman, leading researcher.

<http://swissinnovation.org/newsChina/web/2018/03-180716-91>

New Brain Disease Research Base

(China Daily, July 19)

A new research base in Shanghai will be dedicated to monkey cloning and neuroscience studies with results to advance the research of human brain diseases, according to a report of Science and Technology Daily. In January, scientists from the Institute of Neuroscience (ION) under the Chinese Academy of Sciences (CAS) successfully cloned two macaques from somatic cells, regarded as a breakthrough in neuroscience and a great opportunity for brain disease research. Based on monkey cloning technology, the CAS Center for Excellence in Brain Science and Intelligence Technology (CEBSIT) launched the base in Songjiang district of Shanghai, with plans to develop and eventually commercialize key neuroscience technologies. It also aims to create leading enterprises in neuroscience and artificial intelligence.



<http://swissinnovation.org/newsChina/web/2018/03-180719-b5>

Breakthrough in Gene Editing Mechanisms

(Shanghai Jiao Tong University, July 20)

Researchers at Shanghai Jiao Tong University made innovative progress in gene editing mechanisms and subverted existing understanding about gene editing. Chromosomal rearrangements including large DNA-fragment inversions, deletions, and duplications by Cas9 with paired sgRNAs are important to investigate genome structural variations and developmental gene regulation, but little is known about the underlying mechanisms. The researchers reported that disrupting CtIP or FANCD2, which have roles in alternative non-homologous end joining, enhances precise DNA-fragment deletion. By analyzing the inserted nucleotides at the junctions of DNA-fragment editing of deletions, inversions, and duplications and characterizing the cleaved products, they found that Cas9 endonucleolytically cleaves the noncomplementary strand with a flexible scissile profile upstream of the -3 position of the PAM site in vivo and in vitro, generating double-strand break ends with 5' overhangs of 1-3 nucleotides.

<http://swissinnovation.org/newsChina/web/2018/03-180720-72>

Xi Demands Thorough Probe Into Vaccine Scandal

(China Daily, July 23)

President Xi Jinping has demanded immediate and thorough investigation into the country's latest vaccine scandal and severely punish those responsible, while improving the country's vaccine management system to safeguard the bottom line of people's safety. Xi said in an instruction that the illegal production of vaccines by Changchun Changsheng Bio-tech Company is vile in nature and shocking. He urged related departments and local governments to pay high attention to the incident and immediately carry out thorough investigation into the facts and ensure those responsible face full force of law. He demanded



the authorities to improve the national vaccine management system with the determination of scraping the poison off the bone and hold the bottom line of safety, sparing no effort to guarantee the vital interests of the public as well as social security and stability.

<http://swissinnovation.org/newsChina/web/2018/03-180723-67>

Helmet to Improve Brain's Ability to Perform Complex Tasks

(Xinhua, July 24)

Researchers at the Shenzhen Institute of Advanced Technology of the Chinese Academy of Sciences, are developing a brain function enhancement system with the goal of improving the brain's ability to perform complex tasks and regulate abnormal emotions. The helmet could be applied in the training of special personnel to speed up an increase in memory and skills and to alleviate anxiety caused by tension. The technology is also expected to help treat children with attention deficit hyperactivity disorder (ADHD) and people suffering depression, Alzheimer's disease, aphasia and Parkinson's disease. The helmet is based on non-invasive brain stimulation and regulation technology. It uses flexible electrode sensors to identify brain waves when the brain is performing different tasks. Electrodes then release weak current pulses that can reach specific areas of the brain, altering brain waves, and regulating the active state of its neurons.

<http://swissinnovation.org/newsChina/web/2018/03-180724-c7>

Vitamin C Revealed as Potential Small Molecule for Kidney Cancer's Treatment

(Chinese Academy of Sciences, July 30)

Vitamin C, also known as Ascorbic acid (AsA), is one of the important water soluble vitamins in daily life. It plays essential role in collagen synthesis, carnitine and neurotransmitters biosynthesis. Researchers from Beijing Institute of Genomics of Chinese Academy of Sciences and Peking University first hospital showed that AsA and AsA's derivative, 2-phosphate sesquimagnesium (APM), can significantly increase 5hmC's level at physiological concentrations, and can also inhibit the malignant phenotype of clear-cell renal cell carcinoma (ccRCC) cells in vitro and in vivo. Their study demonstrated epigenetic differentiation therapy with both AsA and its derivative APM at physiological concentrations by 5hmC reprogramming in ccRCC. It also showed that vitamin C treatment inhibited the growth of ccRCC cells at least partially by regulating ten-eleven translocation enzymes (TET) activity. The study may initiate new clinical trials for kidney cancer, especially using oxidation-resistant vitamin C derivatives.

<http://swissinnovation.org/newsChina/web/2018/03-180730-84>



4. Engineering / IT / Computer Science

Sensor to Understand Subtle Expressions

(Xinhua, July 04)

Scientists have developed a sensor which could improve wearable device performance and accurately capture the subtle changes in people's expressions, according to the Science and Technology Daily. The sensor has very high response sensitivity in deformation conditions, said the newspaper. The scientists applied nano-materials to help enhance the sensor's flexibility. The scientists from Nankai University in Tianjin put the wearable sensor on different parts of the human body and captured tiny skin motions caused by pulse beats on the wrists. Put on the throat, the sensor also monitored the sound of vocal cords and identified syllable changes, according to the newspaper. The new sensor is not hard to produce, and the scientists are pushing forward the sensor's application in wearable devices for human health monitoring and movement detection.

<http://swissinnovation.org/newsChina/web/2018/04-180704-1b>

Baidu Releases Its First AI Chip

(MIT Technology Review, July 04)

Baidu unveiled an artificial-intelligence chip called Kunlun during its annual Baidu Create event recently. Kunlun is optimized for various AI tasks, including voice recognition, natural-language processing, image recognition, and autonomous driving. Baidu first started making customized AI processors using FPGAs (a kind of chip that can be reconfigured on the fly) in 2011. The new design is 30 times faster than the original FPGA-based processor, but the company says it's not ready to begin mass-producing it yet. Customized hardware will help Baidu scale up its AI capabilities at lower cost.



<http://swissinnovation.org/newsChina/web/2018/04-180704-b1>

China Launches New Space Science Program

(China Daily, July 05)

China Wednesday launched a new space science program focusing on the origin and evolution of the universe, black holes, gravitational waves and relationship between the solar system and human. The Chinese Academy of Sciences (CAS) announced to develop a group of four satellites in the program. The program includes a satellite named "Einstein-Probe (EP)", which is tasked with discovering celestial bodies that emit X-rays during fierce changes as well as quiescent black holes with transient high-energy radiation. Over the past few years, China has launched a series of space science satellites, including the Dark



Matter Particle Explorer (DAMPE), the Quantum Experiments at Space Scale (QUESS) and the Hard X-ray Modulation Telescope (HXMT).

<http://swissinnovation.org/newsChina/web/2018/04-180705-17>

Didi to Help Solve Traffic Jams

(South China Morning Post, July 09)

One year after forming a smart traffic unit, Didi Chuxing is in talks to export this know-how to Brazil and Australia. "The Brazil government wants us to help them optimize their traffic lights. Traffic jams there are even worse than in Beijing," said Bob Zhang Bo, Didi's co-founder and chief technology officer. The city of Melbourne asked for the same, but Zhang admits that Didi will not be in a position to implement a full operational system until it builds up its fleet of cars in those locations. Consulting with city authorities on traffic management is happening in China. The company is a partner in a project that uses AI to manage over 1,300 traffic lights in 20 Chinese cities. The latest version of the system can optimize traffic conditions in a neighborhood instead of just an intersection.



<http://swissinnovation.org/newsChina/web/2018/04-180709-8b>

Cutting-Edge Fast Computer Chip

(China Daily, July 11)

A test production line is expected to be completed this year following breakthroughs in the development of a new type of computer chip - one that replaces electrons with light, making it incomparably faster than current chips. The production line will put China among a handful of countries in the world capable of manufacturing integral silicon photonics chips, which will clear the bottleneck created by the physical limits of conventional chips. The chips are seen as particularly useful in fields relating to information transmission, such as smartphones, computers, autonomous vehicles and ultra high-definition TV. Processing speeds are dramatically improved while energy consumption is reduced. The Shanghai Municipal Science and Technology Commission said research on the chips became a major city-level science and technology project last year. The city wants to be a world-class base for the novel technology.

<http://swissinnovation.org/newsChina/web/2018/04-180711-b6>

3D Millimeter Wave Scanner for Security Check

(Xinhua, July 11)

An academy affiliated to the China Aerospace Science and Industry Corp developed a 3D millimeter wave scanner for airport security checks. It is a whole body imaging device that uses a form of electromagnetic radiation to detect objects concealed beneath a person's clothing. The scanner is

capable of detecting as many as 89 dangerous/risky items within one second, including corrosive or flammable liquids that are invisible to existing body-screening devices. The device has a 95-percent accuracy rate and its radiation on a human body is one thousandth that of a mobile phone signal. As for privacy concerns, Hu Lin, one of the designers, said the scanner shows a human figure on the display at the checkpoint rather than an actual image of passenger's body. Security examiners will be able to see the actual image but the passenger's face and groin will be blurred.

<http://swissinnovation.org/newsChina/web/2018/04-180711-d2>

China's AI Industry Attracts the Most Funding

(South China Morning Post, July 17)

China's artificial intelligence industry has attracted the most funding, accounting for 60 per cent of all global investment from 2013 to the first quarter of 2018, but still lags behind the US in terms of AI talent, according to a new study. By the end of 2017 China had amassed an AI talent pool of 18,232 people, accounting for 8.9 per cent of the world's total talent and well behind the 13.9 per cent share held by the US. The top 10 countries accounted for 60 per cent of AI talent. China's AI market was worth 23.74 billion (US\$3.55 billion) yuan in 2017, up 67 per cent from the year before, with computer vision, voice, and natural language processing accounting for most the market. The report estimates China's AI market will grow 75 per cent in 2018.

<http://swissinnovation.org/newsChina/web/2018/04-180717-3a>

Flexible Micro-Batteries for Smart Wearable Electronics

(Xinhua, July 19)

Scientists have developed flexible micro-batteries with high energy density and steady performance under extraordinary high-temperature. The research group at Chinese Academy of Sciences Dalian Institute of Chemical Physics reported the development of a prototype of all-solid-state planar lithium ion micro-batteries (LIMBs). The rapid boom in smart wearable and integrated electronic devices has stimulated the demand for advanced intelligent energy storage systems with high performance, micro size, mechanical flexibility, and high-temperature stability. The micro-batteries have long-term stability without capacity loss after 3,300 charge cycles at room temperature and maintain high flexibility without capacity decay under repeated bending. They also have remarkable high-temperature performance of up to 1,000 charge cycles at 100 degrees Celsius.

<http://swissinnovation.org/newsChina/web/2018/04-180719-ad>

World's Largest Container Vessels Under Construction

(China Daily, July 27)

Construction of two container ships with the carrying capacity of 22,000 TEUs, which would make them the largest container vessels in the world, began recently. Built by Shanghai-based Jiangnan Shipyard and Hudong-Zhonghua Shipbuilding, the two container vessels measure 400 meters in length, 61.3 meters in breadth and 33.5 meters in depth.. The deadweight of the box ship is 220,000 DWT, which can contain 1,000,000,000 iPhoneX (with standard packing box). Moreover, it can still hold 2,200 4-foot refrigerated containers, accounting 20 percent of the whole TEU. Besides, they are also the world's first giant container ships propelling with engines burning liquefied natural gas. They have distinctive advantages compared to the current ships using heavy fuel oil: Up to 25 percent less CO₂, 99 percent less sulphur emissions, 99 percent less fine particles and 85 percent nitrogen oxides emissions.



<http://swissinnovation.org/newsChina/web/2018/04-180727-5d>

5. Energy / Environment

9-Day Clean Energy Trial in Qinghai Sets Record

(China Daily, July 02)

China has set a world record in Qinghai province, where 6 million people used nothing but clean energy for nine consecutive days - a testament to China's commitment to a low-carbon future. The trial lasted from June 20 to midnight on June 28 in the province. During the 216-hour trial, the province ran solely on electricity generated from wind, solar and hydropower stations. In February, the National Energy Administration approved six provincial-level regions - Qinghai, Zhejiang, Sichuan, Tibet, Gansu and the Ningxia Hui autonomous region - to spearhead clean energy development. Qinghai plans to expand its solar and wind capacity to 20 million kilowatts by 2020.



<http://swissinnovation.org/newsChina/web/2018/05-180702-65>

Massive Synthesis of Liquid Solar Fuel

(Xinhua, July 06)

Liquid solar fuel is transformed and synthesized from carbon dioxide and water, using solar energy as the sole energy supply. The synthesis process provides clean fuel, as well as utilizing greenhouse gases. Researchers with the Dalian Institute of Chemical Physics under CAS have now successfully increased the scale of synthesizing liquid solar fuel, taking a step forward to boost the use and output of

renewable energy in the country. They divided the synthesis process of the liquid solar fuel into two steps: generating hydrogen decomposed from water by solar energy and making liquid fuel via carbon dioxide hydrogenation. A 1,000-tonne industrialization of liquid solar fuel synthesis project has been launched in Lanzhou, capital city of Gansu Province.

<http://swissinnovation.org/newsChina/web/2018/05-180706-1f>

App to Assist River Management

(Global Times, July 09)

A mobile phone application assisting river management has been recently launched in Hunan Province to help supervise river resources and make their administration more efficient. The application can not only record in real time the working process of hezhang (officials in charge of protection and administration of river reaches), but also provide updated information about the water levels and flow of rivers. Supervisors can inspect and confirm if the reported problems were properly handled via the app and residents can follow the WeChat public account of the Hunan river administration to inspect and report river problems. "The hezhang system is an effective method of river administration, but there are not enough officials to find every potential pollution source, such as drain outlets and storage stations for contaminants," said Zhang Boju, secretary-general of Friends of Nature, an environment protection NGO.

<http://swissinnovation.org/newsChina/web/2018/05-180709-30>

Queen Bees Have Exceptional Memory and Learning Abilities

(China Daily, July 24)

Chinese researchers have found that honey bee queens have exceptional memory and learning abilities. Ken Tan, a researcher at Xishuangbanna Tropical Botanical Garden under the Chinese Academy of Sciences, said different foods eaten by bee larvae lead to differences in DNA methylation, mechanisms used by cells to control gene expression, between queens and workers. Queens exclusively feed royal jelly, while workers only eat the jelly for the first three days and then mainly feed on pollen and honey. The researcher used olfactory learning experiments to test queens and workers and found queens showed excellent learning and memory abilities. At five days old, queens have a memory and learning level that is equivalent to workers at 20 to 25 days of age, he said. The proportion of queens that exhibited learning was five-fold that of workers at every tested age.



<http://swissinnovation.org/newsChina/web/2018/05-180724-ec>

Genomic Key to Plateau Adaptation

(Chinese Academy of Sciences, July 31)

Scientists from the Chengdu Institute of Biology of the Chinese Academy of Sciences have discovered the genetic mechanism for ectothermic animals' adaptation to high-elevation extreme environments by studying genomic data of hot-spring snakes. The snakes live in one of the world's highest habitats, in the Qinghai-Tibet Plateau. The researchers found 27 unique amino acid replacements in 27 different proteins of *Thermophis*. These mutations were predicted to impact function in the three species of *Thermophis*. "They were mainly associated with functions such as immunity, the adaptive response to hypoxia and DNA repair," said Li Jiatang. Mutation of the EPAS1 gene of the hot-spring snake attenuates its ability to respond to hypoxia. Functional assays of EPAS1 alleles suggest that the *Thermophis* protein has lower transactivation activity than low-elevation forms. That is an important reason for the hot-spring snake's adaptation to hypoxic conditions.



<http://swissinnovation.org/newsChina/web/2018/05-180731-cd>

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

China Develops Micro Flexible Capacitors with High Performance

(China Daily, July 02)

Chinese researchers have developed new micro capacitors with high energy storage density and excellent thermal stability, according to Dalian Institute of Chemical Physics, Chinese Academy of Sciences. The lithium ion micro-capacitors (LIMCs) are mechanically flexible without performance degradation under repeated bending, and can operate safely even at temperatures of 80 degrees Celsius. The ever-increasing boom in smart, miniaturized electronics has led to an urgent need for on-chip energy storage systems that exhibit high performance, safety, flexibility and robust integration. The solid-state planar LIMCs can boost high voltage and capacitance and their high cycling stability allows them to maintain almost 99 percent of their capacitance after 6,000 electric cycles. The micro devices are expected to be commercially available in 2022.

<http://swissinnovation.org/newsChina/web/2018/06-180702-0b>

Diatom-Like Nanostructures

(Xinhua, July 17)

Diatoms are tiny, unicellular creatures, inhabiting oceans, lakes, rivers, and soils. Through their respiration, they produce close to a quarter of the oxygen on earth, nearly as much as the world's tropical forests. In addition to their ecological success across the planet, they have a number of

remarkable properties. To achieve a range of diatom-like nanostructures, researchers from Arizona State University in collaboration with researchers from the Shanghai Institute of Applied Physics of the Chinese Academy of Sciences and Shanghai Jiaotong University borrowed techniques used by naturally-occurring diatoms to deposit layers of silica, the primary constituent in glass, in order to grow their intricate shells. They designed nano-scale platforms of various shapes to which particles of silica, drawn by an electrical charge, could stick. Their research demonstrates that silica deposition can be effectively applied to synthetic, DNA-based architectures, improving their elasticity and durability.

<http://swissinnovation.org/newsChina/web/2018/06-180717-38>

Use of Ice to Develop 3D Nanofabrication Method

(Xinhua, July 24)

Researchers at Zhejiang University have created a 3D nanofabrication method by using ice and fabricated 3D nanostructures. The entire 3D nanofabrication process is realized in a vacuum. A pattern resolution of 20 nanometers and an alignment error below 100 nanometers can be steadily achieved. In a vacuum of minus 130 degrees Celsius, water vapor transformed into extremely smooth thin ice. The researchers constructed 3D metal structures from this kind of ice. The development needs far fewer processing steps and is contamination-free compared with conventional electron-beam lithography methods. The techniques of 3D nanofabrication are important in nanoscience and nanotechnology because they are prerequisites to realizing complex, compact and functional 3D nanodevices.

<http://swissinnovation.org/newsChina/web/2018/06-180724-8e>

Photocatalyst to Purify Water

(Xinhua, July 24)

A photocatalyst is a substance that can help cause a light-catalyzed reaction, such as chlorophyll capturing sunlight to turn water and carbon dioxide into oxygen and glucose in photosynthesis. Ordinary photocatalysts can decompose organic pollutants in sewage under ultraviolet light, which, however, only accounts for four percent of the solar spectrum, making this type of sewage treatment costly and preventing it from widespread application. A research team from Southwest Petroleum University has developed a low-cost, high-efficiency photocatalyst that uses visible light to purify water. They turned to visible light, a spectrum accounting for 43 percent of sunlight. After four months of research, they developed a new photocatalyst Reac-O₂ with good visible light absorption performance. Reac-O₂ can produce reactive oxygen species, purifying water by degrading organic pollutants into non- or low-toxic small-molecule substances. In experiments, the new photocatalyst performed more efficiently than traditional sewage treatment agents.

<http://swissinnovation.org/newsChina/web/2018/06-180724-e8>

7. Economy, Social Sciences & Humanities

Private Firms Race to Build Carrier Rockets

(China Daily, July 16)

The research and development of carrier rockets is a major sign of a space-faring nation's capability and had been long dominated by government-backed giants around the world. However, in the wake of emerging business opportunities, the United States and China have realized that it is necessary to introduce new players to stimulate innovation and competition and to fill in market gaps left by established contractors. As an important part of his endeavor to strengthen China's space industry, President Xi Jinping has requested that the long insulated industry should open its doors to private enterprises and take advantage of their participation to boost sustainable growth. Meanwhile, several government departments have published policies and guidelines that encourage private businesses to take part in space-related businesses. As a result, nearly 10 private rocket firms have been launched in China over the past three years.



<http://swissinnovation.org/newsChina/web/2018/07-180716-03>

Beijing-Tianjin-Hebei to Get Intelligent Boost

(China Daily, July 27)

Beijing-Tianjin-Hebei enterprises plan to step up their efforts to contribute more to the region's coordinated development. "The significance of the efforts lies in the fact that the enterprises not only enhance the growth efficiency and effectiveness of related cities, but also share growing business and networks to better shake off cities' burdens," said Wang Guofeng, chairman of Sunlon Group, a leading State-owned enterprise focused on agriculture. Enterprises from neighboring provinces or cities are expected to unite to promote the interconnection of the technology resources with a hope of injecting energy to the region, said a leading Chinese property developer from Hebei.



<http://swissinnovation.org/newsChina/web/2018/07-180727-cd>

8. Corporates / Startups / Technology Transfer

Volume Production of China's First Fully Autonomous Bus

(China Daily, July 04)

Chinese tech giant Baidu announced Wednesday that it has begun volume production of China's first commercially deployed fully-autonomous bus. Powered by Apollo 3.0, the latest version of Baidu's

open autonomous driving platform, autonomous bus "Apolong" will take to roads in China and abroad, Baidu's Chairman and CEO Robin Li said at Baidu Create 2018, the company's annual AI developer conference. Apolong can complete driverless operations such as obstacle avoidance, swerving and automatic transshipment. The bus will initially be put to use in last-mile travel scenarios in tourist spots, airports and other enclosed areas.

<http://swissinnovation.org/newsChina/web/2018/08-180704-9d>

Daimler Permitted to Public Testing of Self-Driving Cars

(MIT Technology Review, July 09)

Autonomous-car testing in China is dominated by Baidu, the giant Chinese search firm, which has been developing robotic cars for about five years and testing its Apollo self-driving software since 2017. Daimler, the parent company of German car maker Mercedes Benz, announced recently that it is the first foreign company to receive permission to test its cars in Beijing. To get the permit, the company's vehicles—equipped with some of Baidu's Apollo tech—went through extensive closed-course testing. By getting into China early, Daimler will get firsthand experience of what it's like to operate on the country's roadways. It also gives Baidu a powerful vehicle partner, allowing it to focus on further refining Apollo.



<http://swissinnovation.org/newsChina/web/2018/08-180709-ce>

Superfast Hyperloop

(China Daily, July 20)

When the hyperloop frenzy started in 2013, it was just tech magnate Elon Musk's wild idea about the next-generation of travel. Five years later, the superfast vacuum-tube transportation system is taking shape in Southwestern China's Guizhou province. Hyperloop Transportation Technologies Inc, a company based in the United States working on the concept of an ultra-high-speed hyperloop, signed a deal with State-owned Tongren Transport, Tourism and Investment Group, to build a superfast track in Tongren. The route will cover an initial distance of 10 kilometers from the city to Tongren Fenghuang Airport, with an estimated investment of 2 billion yuan (\$295 million). During the second phase, the project will extend 50 km from the city to Mount Fanjing in Tongren. And the investment in time will add up to more than 10 billion yuan.



<http://swissinnovation.org/newsChina/web/2018/08-180720-c2>

Facebook's Comeback in China

(Techinasia, July 25)

Facebook has just set up a subsidiary in China, where its social media service has been banned since 2009. Registered with capital worth US\$4.4 million, the entity is wholly owned by Facebook Hong Kong, according to a filing on the Chinese government's enterprise database. It's registered in Hangzhou.



The business filing, however, has been taken down from the government website. The approval was withdrawn due to a disagreement between Zhejiang officials and China's central internet regulator, a source told The New York Times. The Facebook subsidiary is not setting its sights on social media – a market dominated by Tencent's WeChat. Instead, it's looking to bring its innovation know-how to China and tap into local businesses' growing demand for overseas advertising. "We are interested in setting up an innovation hub in Zhejiang to support Chinese developers, innovators and startups," a Facebook representative told Reuters.

<http://swissinnovation.org/newsChina/web/2018/08-180725-4c>

9. Bilateral News

Swiss Accreditation for CEIBS Global EMBA

(CEIBS, July 01)

CEIBS Global EMBA has joined an elite group of programmes that have earned a seal of approval from the Swiss Agency of Accreditation and Quality Assurance (AAQ). CEIBS GEMBA is now one of only 18 programmes fully evaluated by AAQ in Switzerland. The AAQ label is perceived as a guarantee



of quality and it contributes to quality development in higher education. The CEIBS Global EMBA is a part-time 20-month programme for high-potential, upper-level executives and entrepreneurs. With modules available in 11 cities worldwide, a diverse student body from more than 20 countries, and two integrated cohorts running between China, Europe and Africa, CEIBS Global EMBA provides in-depth China knowledge within a global context. It also provides unparalleled opportunities for participants to expand their global network, while plugging into China's largest business school alumni network.

<http://swissinnovation.org/newsChina/web/2018/09-180701-67>

Upcoming Science and Technology Related Events

AIAAT 2018

August 8-10, 2018

<http://www.aiaat.org/>

AI Applications and Technologies

Shanghai

World Robot Conference

August 15-19, 2018

<http://en.worldrobotconference.com/>

AI, Innovation, Robotics Industry

Beijing

1st CTAD Asia-China Conference

September 1-2, 2018

<https://www.ctad-asia.com/>

Alzheimer's Disease, Clinical Trials

Shanghai

Swiss-Chinese Life Sciences Forum 2018

September 13, 2018

<http://www.swiss-chinese-life-sciences-forum.ch/>

Health Sector, Life Sciences, Collaboration

Basel

Swiss Pavilion, China International Import Expo CIIE

November 5-10, 2018

<http://www.shanghaiexpo.org.cn/zbh/en/>

International Import Exhibition

Shanghai

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