

# Science China Newsletter, March 2019

Trends in education, research, innovation and policy



*Yangshuo, Guangxi Province*

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## Swiss Spotlight

### ***Scientist: Sino-Swiss Robotic Fabrication***

(Philippe Block, March 31)

Philippe Block is Professor at the Institute of Technology in Architecture at ETH Zurich, where he directs the Block Research Group (BRG) together with Dr. Tom Van Mele. The BRG focuses on computational form finding, optimization and fabrication of curved surface structures, specializing in unreinforced masonry vaults and thin concrete shells. Prof. Block is also the director of the Swiss National Centre of Competence in Research (NCCR) Digital Fabrication. Within the NCCR, the BRG develops novel structural design strategies using bespoke prefabrication and pushing construction innovation. In recent years, Philippe Block has collaborated extensively with Professor Philip F. Yuan of the College of Architecture and Urban Planning at Tongji University in Shanghai, including in January 2019 co-leading a workshop on computational structural design and robotic fabrication with students from Tongji and from MIT (Massachusetts Institute of Technology). In summer 2019 Philippe Block will again visit Tongji University to deliver a keynote address and teach in the PhD program at DigitalFUTURES 2019, and with Tom Van Mele he will lead a workshop on realizing concrete shells with flexible formwork, introducing the COMPAS framework for computational research and collaboration in architecture, engineering, fabrication and construction.



<http://swissinnovation.org/newsChina/web/2019/00-190331-8a>

### ***Startup: Solar Panels With Record Efficiency***

(Insolight, March 31)

Insolight, a startup based at EPFL, is taking a whole new approach to creating high-efficiency solar modules for the rooftop market. Its patented optical system  concentrates light onto an array of tiny spacegrade multi-junction photovoltaic cells. While today's rooftop standard modules typically show an efficiency of 17-19%, Insolight's pre-production module has been validated at an impressive 29% by IES-UPM, two years after a first record on a lab prototype. The startup has taken a decisive step towards industrialization with its first pre-production full-size series, cost-effective and compatible with existing assembly equipment. In March 2019, Insolight took part in a ten-day study tour in China organized by Innosuisse and swissnex China in order to gain some insights about the Chinese market. They were also part of the Café des Sciences which was organized by swissnex China and the representatives for science from the Shanghai-based consulates of other French-speaking countries, taking place during the Semaine de la langue française et de la Francophonie.

<http://swissinnovation.org/newsChina/web/2019/00-190331-cd>

## 1. Policy

### China Will Expand International Cooperation on AI Research

(China Daily, March 08)

China will expand international cooperation in researching artificial intelligence, as well as tackling new social and ethical challenges posed by the new technology, China's top science official said on Friday. Scientists have been researching artificial intelligence for more than 60 years, but people are now concerned about the technology due to its impact on personal privacy and other social issues, Wang Zhigang, minister of science and technology, told reporters in the "minister's passage" at the Great Hall of the People in Beijing. As for AI-related ethical and social issues, China will strengthen its research in drafting new laws and regulations, and expand global cooperation in tackling the issues with other nations.

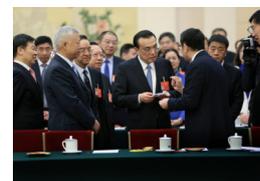


<http://swissinnovation.org/newsChina/web/2019/01-190308-74>

### Premier Li Urges Hubei to Boost Innovation

(China Daily, March 09)

Premier Li Keqiang called on Hubei province on Friday to continue kindling researchers' enthusiasm for technological and business innovation and to accelerate the transformation from old economic drivers to new ones. Hubei, in Central China, should promote innovation and entrepreneurship to cultivate new industries, especially as it is home to a large number of research institutions, universities and professionals, Li said when joining a panel discussion with National People's Congress deputies from the province. The premier urged the province to build a market-and law-based internationalized business environment, while reducing taxes, fees and institutional costs.



<http://swissinnovation.org/newsChina/web/2019/01-190309-16>

### China Strengthens IP Protection

(China Daily, March 12)

China has often been criticized internationally for a lack of intellectual property (IP) protection. This criticism is now being targeted with new legislation, which was outlined during the last annual meeting of the National People's Congress and the Chinese People's Political Consultative Conference in Beijing. Premier Li Keqiang said new legislation will strengthen IP protection and a system that allows for compensation for IP infringement. New IP protections for foreign investors will also be put in place. With China's focus on innovation to drive economic growth, these steps are urgently needed. The country has become the





top generator of patents in the world - over 1.3 million patent applications were filed in 2017. This legislation is an important political stance leading into the right direction. Without a doubt, much work remains to be done, but progress has been visible.

<http://swissinnovation.org/newsChina/web/2019/01-190312-1f>

## 2. Education

### AI Courses to be Offered at Schools

(China Daily, March 14)

China will push for Artificial Intelligence (AI) courses to be offered at primary and secondary schools and popularize programming education in steps, according to a directive issued by the Ministry of Education. This is among major actions demanded by educational authorities across the country for the cultivation and improvement of information literacy of teachers and students. Information literacy is the ability to discover and use various types of information and is an essential skill for navigating the information age. Big data, virtual reality and AI technologies should be more deeply applied to education and teaching, says the directive.



<http://swissinnovation.org/newsChina/web/2019/02-190314-4b>

### Institutions Set Up for Supervising After-school Centers

(China Daily, March 14)

Beijing will establish an institution this year to oversee after-school centers, the capital's Education Commission announced. It will be the first such institution in China. A special law enforcement team will be set up in every district of the capital to better supervise the centers and strengthen inspections, the commission said. The names of institutions that do not pass inspections will be made public, according to the commission. Xiong Bingqi, deputy director of the 21st Century Education Research Institute in Beijing, said the move will improve education. "Many requirements stipulated by the Compulsory Education Law are ignored by local education institutions and it's hard to track their responsibilities," he said. "The establishment of certain law enforcement departments will solve those problems."



<http://swissinnovation.org/newsChina/web/2019/02-190314-a7>

## Live Streaming Classes to Bridge Education Disparity

(China Daily, March 19)

The educational department in East China's Zhejiang province plans to release an online education assistance program for primary and middle schools in urban and rural areas to bridge the education disparity. The provincial educational department will introduce live streaming classes and online video courses of quality urban schools to their paired counterparts in rural areas. Teachers from the paired schools will also prepare lessons together and help correct and mark the homework of students. According to the agency, 1,000 tailored courses, mostly online videos, will be designed by quality schools in urban areas to help improve the weak subjects of the less-competitive schools.



<http://swissinnovation.org/newsChina/web/2019/02-190319-10>

## 3. Life Sciences / Health Care

### CRISPR Gene-Editing Can Cause Mutations

(China Daily, March 01)

Chinese scientists discovered that a popular gene-editing tool, the so-called CRISPR-Cas9, may potentially lead to wide off-target mutations. The recently published study showed that a type of base editor applied to convert DNA resulted in significant numbers of unwanted effects. Scientists from the Chinese Academy of Sciences created a new off-target testing method called GOT1 to test a single-base gene editor based on CRISPR-Cas9. They found the off-target mutations partially took place at cancer-inhibiting genes, previously believed highly unlikely to take place, demonstrating that the technique is inappropriate to be used clinically. Such unwanted effects are the largest source of risk for gene-editing technology and no method can accurately predict them. The researchers push for clinical standards in order to ensure safety when it comes to gene-editing techniques.



<http://swissinnovation.org/newsChina/web/2019/03-190301-fd>

### AI Support for Countryside Doctors

(China Daily, March 01)

The Chinese province of Guangdong has introduced artificial intelligence (AI) based assistants to help village doctors carry out diagnosis and treatment. Prior to this, patients could not be treated properly due to a shortage of medical resources and had to be sent to nearby counties. Thanks to the newly installed medical treatment app, villagers can get electrocardiograms at home and have no need to



go to the town hospital. Additionally, health information such as blood oxygen and pulse rates can be collected and stored electronically for a long time. The AI-device can help in diagnoses, with an accuracy rate of up to 95 percent. Should the doctor still doubt the diagnosis, the patient's descriptions, pictures, videos and other data are uploaded to a platform on which doctors from comprehensive hospitals have access to help.

<http://swissinnovation.org/newsChina/web/2019/03-190301-57>

## New Remedy for Liver Cancer

(China Daily, March 04)

By studying proteins of patients with early-stage liver cancer, Chinese researchers found that the activity of one protein, called SOAT1, can affect cholesterol stability in cancer cells - which triggers them to proliferate and migrate. From these findings, they realized that avasimibe, an inhibitor of SOAT1, shows potential as a targeted drug for liver cancer. Doctors in clinical practice often observed that even a very small liver tumor can recur and deteriorate quickly after being removed. It is suspected this does not depend on the size of the tumor but on its biological behavior. The study now confirmed this conjecture. Liver cancer is one of the most common tumors in China. Among 700,000 cases of liver cancer worldwide each year, 350,000 are in China. Now that avasimibe has been found to be effective, the researchers will focus on developing a drug using it.



<http://swissinnovation.org/newsChina/web/2019/03-190304-51>

## Swiss-Funded Breastfeeding Research Center Inaugurated

(Larsson-Rosenqvist Foundation, March 06)

This month, the first-ever center for basic research with a global focus on the epidemiology of human lactation has been opened in Shanghai. The LarssonRosenqvist Foundation Shanghai Breastfeeding Research Center (LRF SBRC) was established by Fudan University and Tongji University, both located in Shanghai, and the Family Larsson-Rosenqvist Foundation (FLRF). The center has received long-term financing, thanks in part to a 11 million USD endowment from FLRF, to accommodate internationally relevant research with long-term perspectives. Its' researchers will also focus on objectives with universal relevance such as policy formation, scaling up breastfeeding programmes, developing young, international scientific talent and improving bedside care. The partners hope to accelerate the global epidemiological understanding of human lactation to benefit all babies – healthy term-born infants and those with medical issues – and their mothers.

<http://swissinnovation.org/newsChina/web/2019/03-190306-cc>

## Gene Removal Changes Size of Mice

(Xinhuanet, March 06)

Researchers from the Nanjing Medical University found two critical genes to regulate the size of mice organs and bodies. Two genes called "Pum1" and "Pum2" in the mice's embryonic periods were removed, what resulted in integrally and proportionally smaller newborn mice bodies as compared to normal ones. The researchers can exclude the effects of other factors like feeding and growth hormones and they state that the absence of the Pum1 gene slows the growth speed of cells and reduces the cell quantity. Pum2, on the other hand, affects the mice's weight but seems to have a less significant effect than Pum1. The findings could lead to new methods of human tumor therapy. A tumor is an abnormal mass of cells that proliferate uncontrollably, with the gene technology the speed of cell proliferation could be regulated.

<http://swissinnovation.org/newsChina/web/2019/03-190306-56>

## Laser Pulses to Examine Molecules

(Xinhuanet, March 07)

In the past, examining molecular structures required molecular crystals, obtained by a very complex crystallization process. Recently, a novel method to analyze the structure of molecules has been devised by researchers from Israel and China. It allows to examine the spatial structure of molecules. By directing short and fast laser pulses at them, molecules align in a certain order and by measuring the radiation that bypasses and disperses them, the structure of the molecules can be examined. All of this happens in an instant: The time taken for molecules to line up as a result of the laser pulses is about 10 femtoseconds (10 millionths of a billionth of a second). An understanding of molecules' structure can lead to technological inventions or better medical treatment, among other things.

<http://swissinnovation.org/newsChina/web/2019/03-190307-12>

## Pesticides: Cause of Obesity

(China Daily, March 08)

Chlorpyrifos, one of the worlds' most commonly used pesticides, was identified to impair gut and gut microbiota. Prior studies on the topic have revealed that the pesticide may cause obesity and diabetes, but the underlying mechanism remained unknown. Now, Chinese researchers could show on mice that the pesticide intake can brake down the gut barrier, leading to increased toxin level and inflammation. This ultimately induces insulin resistance and obesity and is crucial to the development of diabetes. Additionally, the toxin-bearing bacteria led to an imbalance in gut microbiota, causing the mice to gain fat. Gut microbiota, containing tens of trillions of microorganisms, has important effects on immunity and body



weight. It helps digesting foods that the stomach and small intestine have not been able to. The results suggest that the pesticides contribute to the global epidemic of inflammation-related diseases.

<http://swissinnovation.org/newsChina/web/2019/03-190308-ca>

## Beijing Tops China in Medical Innovation

(China Daily, March 08)

Beijing tops Chinese cities in approvals of innovative medical equipment, said the Medical Products Administration of the municipal government on Thursday. The State Council in October 2017 issued guidelines encouraging innovation in drugs and medical equipment by intensifying reform in the medical sector. The National Medical Products Administration has since approved 54 projects, one third of which were researched and developed by enterprises in the capital city. Innovations like neurosurgery navigation and positioning systems, along with implantable, phrenic nerve-stimulator kits have not only filled gaps in their respective fields, but also cater to public demand, the municipal administration said.



<http://swissinnovation.org/newsChina/web/2019/03-190308-59>

## Ultra-Fast Drug Detection with Mass Spectrometer

(Xinhuanet, March 15)

Drugs identification is an essential part of drug policy and law enforcement and having a fast testing method is a crucial part of this. Chinese researchers have developed a mass spectrometer able to rapidly identify 27 types of drugs in less than two seconds. The device showcases a rapid on-site detection of illegal drugs in a complex matrix and the detection limit for all drugs are at the nano-gram level, meaning it even detects tiny amounts. It has been put to the test in the frontier inspection office in Yunnan Province to help fight drug trafficking.

<http://swissinnovation.org/newsChina/web/2019/03-190315-70>

## Stem Cell Research on the Rise

(Xinhuanet, March 17)

The Chinese Academy of Sciences announced the launches of three stem cell clinic research programs to treat severe eye and gynecological diseases. The three programs will focus on treating retinal pigment degeneration, ovarian dysfunction, and intrauterine adhesions that affect women's health. Human embryonic stem cells have the capacity to differentiate into a variety of cell types, which can participate in cell replacement and tissue regeneration. In recent years, stem cell research has become a key frontier area in the medical field, showing a good development prospect for the treatment of some difficult diseases. China has a total of 35 ongoing stem cell research programs.

<http://swissinnovation.org/newsChina/web/2019/03-190317-1d>

## Open Database on Circular RNA

(Xinhuanet, March 23)

Ribonucleic acid (RNA) comes in many shapes and sizes. In recent years, Circular RNAs (circRNAs), a type of RNAs beyond the textbook classics, are of huge interest to many molecular biologists. Now, Chinese researchers have built an open database on Circular RNA. Unlike linear ones, the nucleotides of circRNA are arranged in a closed loop. Previous studies found that circRNAs could play important roles in gene regulation, development and formation of cancers, but the understanding of how they participate in these biological processes is still preliminary. For this reason, the "circAtlas" database has been built by Chinese researchers. The database integrated millions of circRNAs across seven species, namely human, macaque, mouse, rat, pig, chicken and dog.

<http://swissinnovation.org/newsChina/web/2019/03-190323-a0>

## Regulator Protein for Male Sterility Found

(Xinhuanet, March 27)

Chinese scientists have discovered a certain protein that is essential in mammals' sperm development. The research team found that the DAZL protein is a master translational regulator for spermatogenesis and a lack of this protein can lead to male sterility. The team has removed the DAZL in different phases of mice's development and concluded that it leads to a sperm development block and complete male sterility. DAZL is involved in the entire process of sperm development, meaning that if it is lacking, the special proteins required cannot be met, and mature sperm is not produced. The new discovery offers a theoretical foundation for future clinical treatment of male sterility.

<http://swissinnovation.org/newsChina/web/2019/03-190327-39>

## 4. Engineering / IT / Computer Science

### China's Future Space Plans

(Xinhuanet, March 03)

In the beginning of the year, China's Chang'e-4 probe made the first-ever soft landing on the far side of the moon. An Academician of the Chinese Academy of Engineering now said that both the lander and the rover have been woken up from a "sleep mode" and are collecting new data. The country plans on gradually open the data collection to the world. When it comes to space, China has other plans, too. Later this year, the Chang'e-5 probe will be launched in order to collect samples from the moon and bring them back to earth. A further goal is to launch a probe next year which should orbit, land and rove on Mars.



<http://swissinnovation.org/newsChina/web/2019/04-190303-42>

## 5G Smartphones Expected This Year

(China Daily, March 03)

China expects smartphones capable of delivering 5G speeds to enter the market in the second half of this year. Mass production is projected to hit in early 2020, according to the president of the China Unicom Research Institute, the research facility of China's second biggest mobile service provider. 5G smartphones offer download speeds considerably faster than 4G devices. The new network is at least ten times faster than the 4G network and can, for example, download a 1GB movie in three seconds. Pilot projects on the new network have been launched in 25 provinces across China. In the 5G era, increased reliability and lower latency are to be expected, opening up new possibilities in IoT and autonomous driving.

<http://swissinnovation.org/newsChina/web/2019/04-190303-7f>



## AI-Based News Anchor

(South China Morning Post, March 04)

China's Xinhua state news agency used a lifelike robotic news anchor that mimics human facial expressions and mannerisms to present a story about delegates attending an annual parliament meeting arriving in Beijing. The artificial intelligence (AI) robot named "Xin Xiaomeng" sported a short haircut and wore a pink blouse and earrings in a one-minute video presentation by Xinhua. The robot was modelled after the real-life Xinhua news anchor named Qu Meng, and was developed by Xinhua in partnership with the technology company Sogou. China is home to more than half of the world's top AI unicorns and is further pushing to advance its prowess in AI technology, from surveillance equipment to self-driving cars.

<http://swissinnovation.org/newsChina/web/2019/04-190304-dc>



## China's First Regional Airline Prototype

(China Daily, March 11)

Aviation Industry Corp (AVIC) of China declared that their first MA-700 turboprop airliner should roll off the assembly line and make its maiden flight before the end of this year. A spokesman of the state-owned aviation conglomerate, which is the developer and producer of the plane, announced that the subcontractors started manufacturing late last year and that the delivery of major parts has recently begun. So far, AVIC has received 285 orders from various airlines in China but also other Asian countries like Nepal and Cambodia. The plane was developed in 2013 and should replace the type MA-60 and its variants produced during the 1990s. The aviation company additionally announced that



the construction of four additional prototypes of the world's largest amphibious aircraft, the AG600, are soon to begin. Two AG600 prototypes are currently undergoing tests.

<http://swissinnovation.org/newsChina/web/2019/04-190311-af>

## AI Defeats Humans in Comprehension Test

(China Daily, March 12)

For the first time ever, a computer program developed in China has outscored humans in a reading test. This is a major artificial intelligence (AI) breakthrough, according to its developers from the Chinese unicorn tech company CloudWalk Technology and Shanghai Jiaotong University. The program has managed to increase machines' accuracy to 69.8 percent in high school reading tests, beating humans' score of 69.4 percent by a margin of 0.4. This, however, does not imply a decisive victory for machine over man as the developer state. They suggest that the technology could be applied in the service industry and help humans deal with paperwork. For example, it can support clients read through files, search for information, and review words on social networking platforms and search engines.



<http://swissinnovation.org/newsChina/web/2019/04-190312-1a>

## New Solar Cell Retains 95% of Power Conversion Efficiency

(Xinhuanet, March 15)

In recent years, perovskite solar cells (PSCs) are of huge interest to the academic community and the photovoltaics industry due to their potential of achieving higher efficiency and low production costs compared to traditional silicon solar cells. Chinese researchers have now found that PSCs can retain most of their power conversion efficiency in near space, providing perspectives on the new solar cells' future application in space. According to the findings, one type of PCS used in the study retained more than 95 percent of its initial power conversion efficiency during the test. Over the past few years, the improvements of perovskite formulations and fabrication routines have led to significant increases in power conversion efficiency, exceeding the maximum efficiency achieved in some silicon solar cells.

<http://swissinnovation.org/newsChina/web/2019/04-190315-db>

## Drone Technology Provides Internet Access to Remote Areas

(Xinhuanet, March 18)

China has made progress in a solar-powered drone technology that will eventually become a vast network facilitating emergency communications and ground observation. The Aerospace Science and Industry Corp has carried out over 100 test flights with such unmanned, solar-powered aircraft. The advantage is that the drone is able to undertake several tasks traditionally performed by satellites, but at a much lower cost. When carrying internet-connected devices, the drone-based network will be

able to link users in remote, mountainous areas and small islands via the internet, and can also provide telephonic services. Once it has been finalized, the system will be able to maintain at least one week of emergency communication services in case of failure in ground-based communications. Starting from 2020, a drone network to display and promote the use in remote sensing and telecommunications will be set up.

<http://swissinnovation.org/newsChina/web/2019/04-190318-c3>

## Nanorobots for In-Body Diagnosis

(Xinhuanet, March 21)

Chinese scientists developed a robotic system inspired by a colony of ants that can collectively achieve complex tasks like gathering large prey. The nanorobots have demonstrated potential for in-body diagnosis and treatment at the cellular or even molecular level because they are so small. One robot is two micrometers in its diameter, which is 40 times smaller than a hair, thus capable of running through blood capillaries. They can be energized by an alternating magnetic field, offering high flexibility to collectively performing multiple tasks in a confined environment. By tuning the frequency of the rotating magnetic field and its polarization in three-dimensional space, the researchers obtained a series of well-controlled, fast, and reversible transformations. The swarm might be used to identify and attack pathological cells or even stay inside the body for health monitoring in the future.

<http://swissinnovation.org/newsChina/web/2019/04-190321-34>

## Huge Revenues for IoT Industry

(China Daily, March 26)

Over the past couple of years, the Chinese IoT industry has flourished with its revenue rising over 70% between 2017 and 2018. The country's three major telecom service operators - China Telecom, China Mobile and China Unicom - saw their IoT users increase by 400 million last year, bringing the total number to 671 million at the end of last year. Tech and internet giants such as Huawei and Alibaba also entered the industry, which made IoT part of ordinary people's lives. The fast growth of this market in China is also due to a rise in use of smartphones, widespread usage of the internet, cost reduction, infrastructural advantage and supply and demand drive.



<http://swissinnovation.org/newsChina/web/2019/04-190326-bc>

## E-Vehicle Manufacturer and Smartphone Giant Cooperate

(China Daily, March 27)

The Chinese smartphone giant and BYD, the country's leading electric vehicle maker have signed an agreement to promote a comprehensive strategic cooperation. With years of technological accumulation in new energy vehicles and rail transport systems, BYD will collaborate with Huawei, a

leader in AI, 5G, cloud computing and big data, to forge ahead with the transformation and upgrading of mobility services. The two parties will seek in-depth exchanges and collaborations on the internet of vehicles, intelligent driving, and smart monorail solutions. Joining hands with big players in the internet and telecommunication industries has become a trend for traditional automakers. SAIC Motor and Alibaba reached an agreement five years ago and also Ford and Baidu work closely together.

<http://swissinnovation.org/newsChina/web/2019/04-190327-12>

## Simulator to Improve Self-Driving Vehicles

(Xinhuanet, March 28)

Researchers from China and the US developed a simulation system for improving self-driving vehicle safety. The new photo-realistic system provided a richer, more authentic simulation than current systems that use game engines or high-fidelity computer graphics. The new system could make self-driving technology easier to evaluate in the lab and ensure more reliable safety before expensive road testing. In the conventional simulator technologies, the perception module of the self-driving car receives input from computer-generated imagery and mathematically modeled movement patterns for pedestrians, bicycles, and other cars. This is a rather crude and time-consuming representation. The new system, however, combines photos, videos and lidar point clouds with real-world trajectory data. Thanks to the realism of the simulator, navigation strategies of an autonomous driving system can be evaluated better.

<http://swissinnovation.org/newsChina/web/2019/04-190328-db>

## 5. Energy / Environment

### Accurate Weather Prediction

(Xinhuanet, March 07)

A novel urban meteorological system with high resolution has been introduced in Beijing to forecast weather more accurately. The rapid-fresh multi-scale analysis and prediction system uses data on the city's urban buildings, urban land use and meteorological observation. The system's prediction accuracy was tested with weather data from summer 2017 to the beginning of 2018 in order to have summer and winter included in the analysis. It was found that the system accurately forecasts the evolution of the near-surface meteorological elements including temperature, humidity, wind and rainfall. Furthermore, it is able to predict the energy consumption of buildings including air-conditioning load, and estimate the changes of indoor temperature and humidity of each floor over time. The system will support



Beijing's weather forecast and warning, city planning and safe operation, and disaster prevention and alleviation.

<http://swissinnovation.org/newsChina/web/2019/05-190307-ea>

## Past 30 Years, the Warmest in Past 2000 Years

(Xinhua, March 15)

Chinese and American scientists in joint research found that the past 30 years are the warmest time in the past 2,000-year period, due to the effect of anthropogenic greenhouse gas. The scientists were able to read the well-dated and quantitative air temperature record through the research on a sediment core collected at a small alpine lake in subtropical southwest China's Yunnan Province. The report on the research was published on the March issue of the international journal of Earth and Planetary Science Letters. The research was carried out by the State Key Laboratory of Lake Science and Environment under the Chinese Academy of Sciences and Columbia University.

<http://swissinnovation.org/newsChina/web/2019/05-190315-61>

## Carbon Dioxide Impairs Grain Quality

(Xinhuanet, March 19)

A research group in which Chinese scientists participated, found that long-term exposure to carbon dioxide can enhance grain yield, while reducing the quality of the grain. The wheat experienced one generation which grew in elevated carbon dioxide concentration and was harvested in 2014 and four generations which were harvested in 2017. The grain yield was enhanced by carbon dioxide concentration, while the exposure to carbon dioxide concentration over four generations caused a larger reduction in grain nitrogen, potassium, calcium, protein, and total amino acid concentrations, the study states. The results indicated that the exposure to carbon dioxide concentration in multiple generations could enhance grain yield but exacerbate grain quality reduction in wheat.



<http://swissinnovation.org/newsChina/web/2019/05-190319-ec>

## From Plant Waste to Jet Fuel

(Xinhuanet, March 21)

Chinese scientists developed a process which converts plant scraps from agriculture and timber harvesting into quality jet fuel. A certain renewable and abundant polymer found in the cell walls of plants, can produce high-density aviation fuel. According to the scientists, the novel fuel is able to mitigate CO<sub>2</sub> emissions because it is derived from biomass. Additionally, the use of such high-density fuel can remarkably increase the range of an aircraft without requiring a bigger volume of oil in the tank. The research team used wheatgrass cellulose in the lab to create a mixture of chemicals with low

freezing point and 10% higher density than conventional aviation fuels. It can be used as a wholesale replacement or as additive to achieve a higher efficiency in combination with other jet fuels.

<http://swissinnovation.org/newsChina/web/2019/05-190321-ef>

## **Fossil Discovery May Improve Understanding of Faunal Evolution**

(Xinhuanet, March 22)

Paleontologists have discovered a trove of well-preserved fossils in China from 518 million years ago, representing more than 50 previously unknown animal species, including jellyfish, arthropods and algae. The finding appears to contain a high proportion of jellyfish and comb jellies, which are extremely rare at other sites. This new fossil assemblage with a high abundance and diversity of species might rival previously described Cambrian sites. About 542 million years ago, life on earth diversified at extremely rapid speed, which is known as the Cambrian explosion. Almost all present animal phyla appeared at that time. Researchers from China's Northwest University have collected over 4,300 specimens at the newly discovered site in central China's Hubei Province. The newly-found fossils have the potential to greatly improve the understanding of early animal evolution.

<http://swissinnovation.org/newsChina/web/2019/05-190322-77>

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

### **China Develops Novel Method to Purify Water**

(Xinhuanet, March 04)

Chinese scientists have developed a new material that can use light to efficiently and safely purify water. Photocatalytic methods offer environmentally safe water purification, but the catalysts required in the process are usually metal-based, which can cause second pollution. A Chinese research team has now designed an efficient metal-free catalyst for photocatalytic water purification. They utilize nanosheets of graphitic carbon nitride, an ultra-thin two-dimensional material with the right electronic properties to absorb the light and generate reactive oxygen. Its structure helps to facilitate the reaction by generating plenty of hydrogen peroxide, which efficiently kills bacteria. Results showed that with this catalyst, water can be rapidly purified in 30 minutes with a disinfection efficiency of over 99 percent. It also avoids secondary pollution or heavy metal ion residues. The research team intends to improve the material before it is ready for commercial use.

<http://swissinnovation.org/newsChina/web/2019/06-190304-01>

## Scientists Give Mice Infrared Vision

(China Daily, March 08)

Scientists in China used a new nanotechnology to give mice infrared vision. The research group stated that the mice were capable of perceiving infrared waves for approximately 10 weeks without any obvious side-effects. The novel nanotechnology method works with the existing structure of the eye. It was observed that the mice injected with nano-particles were able to receive real image information in the dark as well as in daylight. Humans and other mammals can only see light waves within a very small range of the electromagnetic spectrum. Infrared wavelengths, which are emitted by people, animals and objects as they give off heat, are too large for the normal eye to detect. The researchers believe that the application has a wide array of applications, like allowing people to see in the dark and cure eye diseases by injecting the nano-particles with drugs.



<http://swissinnovation.org/newsChina/web/2019/06-190308-a5>

## Calcium-Ion Batteries' Performance Improved

(South China Morning Post, March 09)

Calcium-ion batteries have long attracted attention as replacement for lithium-ion batteries as they have larger capacity and provide twice the number of electrons. Additionally, calcium is 2500 times as abundant as lithium, making the technology a high-performance, low-cost candidate for future batteries.



The problem, however, was the unsatisfactory performance caused by inappropriate combinations of electrode materials and electrolytes. Chinese scientists have now overcome this obstacle with a new hybrid device. It uses activated carbon and tin as a positive and negative electrode, respectively. It successfully retained 84 percent of its initial capacity after 1,000 cycles at room temperature, which is the best electrochemical performance ever achieved by calcium-ion based energy storage devices. Given the low cost and simple manufacturing technique, this is a significant progress in terms of energy storage.

<http://swissinnovation.org/newsChina/web/2019/06-190309-5d>

## Aerial Vehicle Powered by Hydrogen Fuel Battery

(Xinhuanet, March 22)

An unmanned aerial vehicle (UVA) that is battery-powered and was developed by Chinese engineers recently conducted its successful maiden flight from Zhengzhou airport. The UVA's name is LQ-H and was engineered by Commercial Aircraft Corporation of China (COMAC). It uses a hydrogen fuel battery for its main power and a lithium battery as a supplementary power source. The aerial vehicle has a wingspan of 6 meters and exhibits the use of multiple new technologies, such as 3D printing and

compound materials to lower its weight. The plane shall be a leader for further engineering projects with new-technology applications.

<http://swissinnovation.org/newsChina/web/2019/06-190322-77>

## 7. Economy, Social Sciences & Humanities

### Visa and Mastercard Might Finally Enter China

(South China Morning Post, March 05)

For the past two decades, Mastercard and Visa have sought to enter China's market, but Beijing has been reluctant. Now, the long wait might end: The two world-leading credit card companies - accepted in over 200 countries - may enter China as part of a US-China trade deal. However, China has transitioned towards a cashless and cardless society, with 90% of internet users already paying for things with smartphones. Alipay and WeChat Pay are by far the dominant players, with one billion and 900 million users, respectively. The market entry of the Mastercard and Visa is not going to change the payment culture in China. This means the card giants will likely look to work with the country's dominant mobile payments providers and particularly focus on tapping those within China who travel overseas frequently.



<http://swissinnovation.org/newsChina/web/2019/07-190305-b2>

### 2.5% of GDP for Science and Technology

(South China Morning Post, March 10)

During the party congress, it was announced that the national research and development spending would hit 2.5% of GDP this year. This goal was set out in the 2006-2020 plan and thus, the target will be reached one year ahead of plan. The spending rose significantly from 2000 and 2017 - from 0.89% to 2.13% of GDP. Last year's spending amounted to 292 USD billion. China has made clear its ambition to become a global tech superpower and break the reliance on foreign countries in sectors like robotics or aerospace. However, Chinese scientist still criticize that not enough funding is targeted for basic research and too much money is poured into applied research. They hope for more freedom in exploring new things instead of focusing on quick results, with the government setting the direction.

<http://swissinnovation.org/newsChina/web/2019/07-190310-8b>



## 8. Corporates / Startups / Technology Transfer

### Tech Giant Request Ethical Standards

(China Daily, March 10)

Robin Li, the CEO of Chinese multinational tech company Baidu, has called the government to action on conducting research about ethical issues concerning artificial intelligence (AI). He held a speech about the opportunities and possible dangers of AI technology during the party congress meeting. According to him, the integration of personal information and behavior data with AI technology could provide people with better service in the daily life, but if improperly used, it could lead to leakage of privacy and personal data. It is important to intensify research to identify the ethical principles in AI development, strengthen the responsibilities of leading enterprises in the business to accelerate the implementation of the principles, and enhance international exchanges to seek consensus.



<http://swissinnovation.org/newsChina/web/2019/08-190310-79>

### Huawei Smartphone With Terrific Camera to Target European Markets

(China Daily, March 28)

Huawei Technologies Co is targeting the European consumers once again. They unveiled a new flagship phone in Paris, in its latest push to attract European consumers with optimized photo-shooting capabilities. The Huawei P30 Pro comes with four rear cameras and is part of the Chinese smartphone vendor's broader push to compete with Apple and Samsung Electronics in the global smartphone arena. An analyst from global market research company Canalys, said good photo-taking features play an important part in attracting consumers. By leveraging artificial intelligence and a new light sensors, the new model significantly boosts light absorption to create better photos, even in near darkness. Huawei's move shows that the smartphone giant is consistently experimenting with new hardware and software solutions to bring better experiences. Few rival products can match the smartphone's photography capacity.



<http://swissinnovation.org/newsChina/web/2019/08-190328-2d>

## Upcoming Science and Technology Related Events

### **Fashion Design Inspired by Architecture, Physics and Mathematics**

April 18, 2019

<https://is.gd/Gk8hDJ>

Fashion, Science, Architecture

Shanghai

### **SEMINAR: Towards a “New Innovation” – For a more Sustainable Society**

April 18, 2019

<https://is.gd/hpUPsd>

Societal Sustainability, Innovation

Guangdong

### **Future of Money 2019: Brilliance in Fintech**

April 23, 2019

<https://is.gd/IS44jG>

Fintech, Sino-Swiss Synergies

Shanghai

### **Digital Global Governance**

April 29, 2019

<https://is.gd/eA0yn9>

Digital Policy, Data Protection, AI

Shanghai

### **Exhibition: VR\_I**

May 9-12, 2019

<https://is.gd/y11yn9>

Dance, Virtual Reality

Shanghai

### **SWISS ALUMNI CHINA 2019**

May 24, 2019

<https://is.gd/N1YgQa>

Alumni, Swiss Community

Shanghai

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