Science China Newsletter, December 2018

Trends in education, research, innovation and policy

Harbin, China

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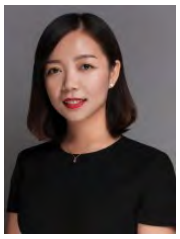
Swiss Spotlight

Scientist: Financial Market Structure

(Ying Liu, December 31)



Ying Liu is an Assistant Professor in Finance at the Shanghai University of Finance and Economics. She obtained her PhD at the University of Lausanne and Swiss Finance Institute in Switzerland, then she moved to Shanghai to start her new job at SHUFE in 2018. Her research studies the activities of institutional players and their impacts on financial market structure. More specifically, her work has been trying to explain how informed investors, such as hedge fund or mutual fund managers, strategically use their private information to gain profits. And how institutional investors choose trading venues between centralized exchanges and decentralized Over-the-Counter markets. Her recent study focuses on Entrusted Loans: a non-financial firm functioning as a bank to issue loans to other firms, which is a dominant form of China's Shadow Banking sector. She explains the reason of the rapid growth of entrusted loans ever since the financial crisis, and also provides policy suggestions to regulators. Ying is teaching Corporate Finance to both undergraduate and graduate students in SHUFE.

http://swissinnovation.org/newsChina/web/2018/00-181231-77

Startup: Removing Past, Present and Future CO2 Emissions

(Climeworks, December 31**)**

CLIMEWORKS
Capturing CO_2 from air

CO2 removal is not only needed to enable negative emissions but also to achieve zero CO2 emissions globally. Sectors such as shipping and aviation do not yet have viable alternatives to fossil fuels. Traditional mitigation measures such as renewable energies can – even in the optimum scenario – only reduce CO2 emissions by around 80%. The rest must come from removing carbon dioxide from the air. Climeworks has therefore developed the first commercial carbon dioxide removal technology on the market today, allowing to physically remove any organization's or individual's past, present and future CO2 emissions. The first system concepts and working prototypes were developed in the laboratories of ETH Zurich two years before the official establishment of Climeworks in 2009. In 2017, which was also the year when the startup participated in the Venture Leaders China Program, Climeworks commissioned the world's first commercial-scale direct air capture plant.

http://swissinnovation.org/newsChina/web/2018/00-181231-77

1. Policy

Self-driving Testing Ground in Beijing

(China Daily, December 03)

Beijing is expanding its lead in the development of China's self-driving technology with a plan to build a 200,000-square-meter testing ground for self-driving vehicles in its suburb, the Beijing Daily reported Monday. The enclosed testing ground is expected to open by 2020 in Shunyi District, about 30 km northeast of downtown Beijing. It will require an investment of 480 million yuan (about $69.7 million), said the paper. Many cities in China, including Beijing, Shanghai, and Chongqing, have issued self-driving car licenses for public road testing this year. Beijing has renovated and reopened 105 km of roads and highways this year mainly located in the suburbs, such as the economic development zone in Yizhuang, Shunyi District and Haidian District.

http://swissinnovation.org/newsChina/web/2018/01-181203-e9

Premier Urges Ethical Approach to Research

(China Daily, December 07)

Premier Li Keqiang urged scientists and research institutes to exercise more integrity and professionalism and to achieve excellence. Misconduct, he said, including ethical violations, should be seriously investigated and punished. Li also encouraged the promotion of a scientific spirit, urged research professionals to concentrate on their studies and called for more opportunities for young people to develop their talents. The premier made the remarks as he presided over the first plenary meeting of the National Science and Technology Leading Group-revamped in August from the previous National Science, Technology and Education Leading Group-which oversees China's science and technology sector.

http://swissinnovation.org/newsChina/web/2018/01-181207-46

Intellectual Property Court to Safeguard Tech Innovation

(China Daily, December 29)

A national-level Intellectual Property Court is expected to open as another effective step to safeguard IP rights. The IP Court, as a division under the Supreme People's Court, is responsible for handling civil and administrative patent-related appeal cases, according to the country's top court. It means litigants who disagree with patent-related rulings made by intermediate courts at city and prefecture levels or made by IP-dedicated courts could appeal to the top court directly instead of going to provincial high courts, it added. "Such a change in the patent-related litigation procedures is to help prevent

inconsistency of legal application and improve the quality and efficiency of trials," said Luo Dongchuan, chief judge of the IP Court.
http://swissinnovation.org/newsChina/web/2018/01-181229-f3

2. Education

Tibet's First Technical College Under Construction

(China Daily, December 12)

Construction on the first technical college in Tibet autonomous region started in Lhasa, the region's capital, on Tuesday, according to the regional human resources and social security department. With an investment of 1 billion yuan (about $145 million), the college is expected to be built and put into use in 2020. Covering about 25.3 hectares, the college is scheduled to enroll 5,000 students and have over 10,000 people trained in the short and medium terms annually. The college will provide more than 20 technical majors including vehicle repair, computer network technology, architectural engineering technology and ethnic art, to cultivate technical professionals at different levels.
http://swissinnovation.org/newsChina/web/2018/02-181212-94

Shanghai Vocational College Collaborated with British Counterpart

(China Daily, December 20)

The Shanghai Urban Construction Vocational College has collaborated with the NPTC Group of Colleges in United Kingdom to boost international cooperation in higher vocational education. The cooperation is currently limited to four majors: architectural engineering technology, architectural design, computer application technology and construction cost. China has been striving to improve its vocational education since 2012 when the first International Congress on Technical and Vocational Education and Training was held in Shanghai. The country is now home to more than 12,000 vocational schools with over 26 million students and an annual enrollment of more than 9 million, according to the Ministry of Education.
http://swissinnovation.org/newsChina/web/2018/02-181220-9b

Ministry Demands Intensified Protection of Children from Sexual Assault

(China Daily, December 23, 2018)

China's Ministry of Education has ordered intensified protection of kindergarteners and school students from sexual assault, stressing education on sexual assault prevention should be taken as a "top priority." The ministry has issued a circular urging local education administrations and schools to

promote sex education and teach children how to prevent sexual assault in class, through pamphlets or via other possible channels. Schools should do better background checks on candidates concerning their conduct and psychological status while recruiting teachers, the circular said, adding that a database on sexual-assault-related crimes should be set up with coordination by public security departments.

http://swissinnovation.org/newsChina/web/2018/02-181223-c2

3. Life Sciences / Health Care

Painless Method to Evaluate Tumor Progression

(China Daily, December 02)

Doctors usually use the biological characteristics of tumors to observe the progress and response to treatment, such as if there are gene mutations or malignant features. Previous studies have shown that identifying the biological characteristics may contribute to better treatment and may increase survival rates. Traditional methods to get tumor tissue include surgery and puncture, which are invasive, painful and costly. Researchers from the Chinese Academy of Sciences, along with doctors from the Sixth Affiliated Hospital of Sun Yat-sen University, have built a computer model to make assessments based on tumor tissue characteristics captured by a medical imaging technique. Their research focused on rectal tumors and involved 345 patients with rectal tumor cells who underwent multiparametric magnetic resonance imaging. "The evaluation results of the model are more than 60% similar with that of traditional methods," said Gao Xin from the Chinese Academy of Sciences.

http://swissinnovation.org/newsChina/web/2018/03-181202-68

World's Most Detailed 3D Map of Human Brain

(China Daily, December 06)

Chinese scientists are planning to draw the clearest yet three-dimensional map of the intricate neurons and blood vessels in the human brain. This ambitious project is like taking 3D photos of a huge forest of nearly 100 billion trees, seeing not only the whole forest, but also every twig and leaf on each tree. Luo, president of Hainan University and chief scientist of the Suzhou Institute for Brainsmatics of the Huazhong University of Science and Technology (HUST), in East China's Jiangsu province, said the research will help in analyzing the mechanisms of brain diseases, and promote the development of artificial intelligence.

http://swissinnovation.org/newsChina/web/2018/03-181206-ca

Bioactive Material for Skin Regeneration

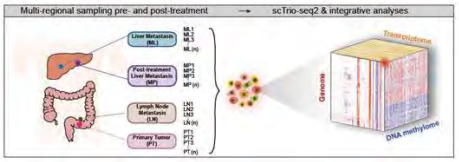
(Xinhua, December 07)

It is difficult for skin wounds to completely heal in cases of large-area burns, severe microbial infections and diabetes. Chronic wounds greatly increase the pain and medical costs of patients. There is therefore a great need for biomedical materials that can facilitate wound-healing and efficient anti-infection capacities. Researchers with Xi'an Jiaotong University have now designed a kind of biomimetic antibacterial material that can facilitate skin regeneration. It has skin-like elasticity and good biocompatibility, and can help prevent multidrug-resistant bacterial infection. In experiments conducted on mice, the material enhanced the wound-healing and regeneration of skin appendages such as hair follicles, and finally lead to skin tissue regeneration. The designed biomaterial could become a competitive multifunctional dressing for bacteria-infected wound-healing and skin regeneration. The research provides a new strategy for the design of biomedical materials for regenerative medicines.

http://swissinnovation.org/newsChina/web/2018/03-181207-b9

Single-Cell Multiomics Sequencing and Analyses of Human Colorectal Cancer

(Peking University, December 11)



Researchers at Peking University have been dedicated to using single-cell sequencing to explore the epigenetic modifications of germ cells and embryos and the molecular mechanism of gene expression regulation during human early development so as to provide important data for understanding the characteristics of human early embryonic development. In their current project the researchers made an in-depth analysis of gene copy number variation, DNA methylation heterogeneity, features of gene expression changes, and their interrelationship during the onset and metastasis of human colorectal cancer (CRC) at the level of single-cell resolution and multi-omics. It pointed out a new direction for the study of the CRC metastasis mechanism and provided new theoretical evidence for the clinical treatment of metastatic CRC.

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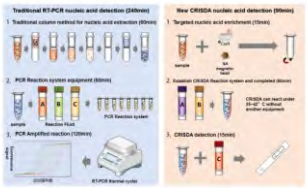
Novel CRISPR-Cas-Triggered Isothermal Amplification Method for Ultrasensitive DNA Detection

(Chinese Academy of Sciences, December 12)



Polymerase chain reactions (PCR) is a technique generally used in molecular biology to make copies of a specific DNA segment. However, due to its limitation of power-hungry thermocycling and operational complexity,

efficient isothermal DNA amplification tools are of great importance to basic research as well as diagnostic/monitoring applications. A true isothermal DNA amplification/detection method with attomolar sensitivity, single-base specificity and simple reaction scheme is highly desirable. Now, researchers at the Shenzhen Institutes of Advanced Technology of the Chinese Academy of Sciences reported a novel isothermal approach for amplifying and detecting dsDNA based on a CRISPR/Cas9 (clustered regularly interspaced short palindromic repeat, and CRISPR-associated protein 9)-triggered nicking endonuclease-mediated Strand Displacement Amplification method (namely CRISDA) with attomolar sensitivity and single nucleotide specificity.
http://swissinnovation.org/newsChina/web/2018/03-181212-c9

Identification of Brain Cells Gating Itch-scratching Cycle

(Chinese Academy of Sciences, December 14)

Researchers at the Institute of Neuroscience of the Chinese Academy of Sciences demonstrated that tachykinin 1 (Tac1)-expressing neurons in the periaqueductal gray (PAG) facilitate the itch-scratching cycle via descending regulation. The researchers investigated the cellular and circuit mechanisms underlying the top-down modulation of itch by the PAG through examining the neural dynamics of PAG neurons and the behavioral responses after pharmacogenetic and optogenetic manipulation of different subtypes of PAG neurons. They explored the activity of PAG neurons during itch-induced scratching behavior, and found that some PAG neurons exhibited scratching behavior-related neural activity. The results further showed that Tac1-expressing glutamatergic neurons in the PAG exhibited itch-selective activity, and that ablating or suppressing the activity of these Tac1-expressing neurons decreased itch-induced scratching behavior. Importantly, activation of Tac1-expressing neurons induced robust spontaneous scratching behavior, which was suppressed by ablation of spinal GRPR neurons, the key relay neurons for itch.
http://swissinnovation.org/newsChina/web/2018/03-181214-41

Higher Bone Density Found in Women with Long-Term Habit of Drinking Tea

(Peking University, December 14)

Based on the study of the bone density data of over twenty thousand people, researchers at Peking University found a higher bone density in women with a long-term habit of drinking tea. But such correlation was not found in men. At the same time, according to the long-term follow-up data of over 450 thousand people, drinking tea on a daily basis could reduce the risk of hospitalization caused by any fractures, and the risk of fracture of innominate bone was also reduced in individuals who drank green tea and

who had a tea drinking history of over 30 years. Lv Yun from Peking University said that while revealing the possible impact of long-term tea drinking on the bone density, the study did not eliminate another possibility that tea drinking could improve an individual's attention and alertness so as to reduce the risk of severe injuries.
http://swissinnovation.org/newsChina/web/2018/03-181214-08

Neoadjuvant Chemoradiotherapy Prior to Rectal Cancer Surgery

(Peking University, December 14)

Researchers at Peking University found that for rectal cancer, especially in the treatment of the locally advanced mid/low rectal cancer, chemoradiotherapy prior to the surgery could increase the chances of retaining the anus and the rate of local control. The researchers believed that neoadjuvant chemoradiotherapy (nCRT) activated somatic tumor specific immunity by inducing the tumor cell mutation and the increase of neoantigens, which made nCRT patients potential candidates for CPI therapy. In future research, they will study the tumor mutation burden and CD8 expression in order to stratify patients responding to chemo-and immunotherapy.
http://swissinnovation.org/newsChina/web/2018/03-181214-51

Tsinghua University Unveils Two New Laboratories

(Tsinghua University, December 15)

On December 15th, the Tsinghua Laboratory of Brain and Intelligence (THBI) and the Future Laboratory, Tsinghua University (THFL), were officially unveiled. The main research area of the THBI will be the interaction of systems and computational neuroscience, and artificial intelligence. The main research directions of the THBI are: 1) to develop the next generation of key neuro-technologies in brain-computer interface, human-computer interaction and neural modulation; 2) to use engineering techniques and computational models to explore complex problems in the forefront of brain science, especially in frontier areas such as the neural mechanisms of speech and language, music perception and social interaction, the neural circuits of emotion and decision-making, and neuro-aesthetics; 3) to develop brain-inspired devices and systems and conduct theoretical work on general artificial intelligence systems.
http://swissinnovation.org/newsChina/web/2018/03-181215-cc

Researchers Discover Brain Functions of Autism Risk Gene in Mice

(Chinese Academy of Sciences, December 17)

Autism spectrum disorder has been recognized as a highly heritable brain developmental disorder. Sh3rf2 is a protein coding gene. Previous studies showed that it is often expressed at high levels in

tumor cells. Deletion mutation of Sh3rf2, which has lost one copy and is left with a single functional copy of the gene, has been detected in autistic patients. However, the role of Sh3rf2 in brain function and the underlying mechanism of its functions remains unknown. In experiments on mice, researchers from the Chinese Academy of Sciences and the Beijing Normal University deleted one copy of the Sh3rf2 and found that the mutation led to typical autism-related behaviors. Further study showed that the Sh3rf2 mutant could cause disturbances, abnormal neuronal structures and functions in the left-brain hemisphere, which is typically lateralized to the left hemisphere. Failure to develop normal language comprehension is an early sign of autism. Accordingly, left hemisphere dysfunction is often seen in autistic patients.

http://swissinnovation.org/newsChina/web/2018/03-181217-37

Lawmakers Suggest Publicizing Vaccine Examination Reports

(China Daily, December 29)

Chinese lawmakers have called for the publication of examination reports on vaccines after they are approved by authorities. The suggestion was raised Friday at a penal deliberation on a draft law on vaccine management, which was submitted to the ongoing session of the National People's Congress Standing Committee for its first reading. Other suggestions at the deliberation included toughening the examination and inspection of imported vaccines and making a more specific guideline for vaccine pricing.

http://swissinnovation.org/newsChina/web/2018/03-181229-42

4. Engineering / IT / Computer Science

Low-earth Orbit Satellite Project Launched in Chongqing

(China Daily, December 01)

China's first global mobile satellite communication and internet space project via low earth orbit (LEO) satellites has been launched in southwest China's Chongqing Municipality. The project has drawn an investment of about 20 billion yuan (about $2.9 billion) for its first phase, making it the largest investment for a single commercial aerospace program in China, according to the China Aerospace Science and Technology Corporation, which co-founded a company in charge of the project. The project is expected to boost development of other sectors, including chips, terminals, system integration, operations and training of talent, said a source of China Aerospace Science and Technology Corporation.

http://swissinnovation.org/newsChina/web/2018/04-181201-11

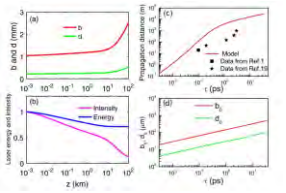
Alibaba Voice Assistant Better than Google

(MIT Technology Review, December 04)

In May, Google made quite the splash when it unveiled Duplex, its eerily humanlike voice assistant capable of making restaurant reservations and salon appointments. It seemed to mark a new milestone in speech generation and natural-language understanding, and it pulled back the curtain on what the future of human-AI interaction might look like. But while Google slowly rolls out the feature in a limited public launch, Alibaba's own voice assistant has already been clocking overtime. At the 2018 Neural Information Processing Systems conference, one of the largest annual gatherings for AI research, Alibaba demoed the AI customer service agent for its logistics company Cainiao. Jin Rong, dean of Alibaba's Machine Intelligence and Technology Lab, said the agent is already servicing millions of customer requests a day. In the pre-recorded demo call, the agent successfully navigated several conversational elements that demonstrated the breadth of its natural-language capabilities.
http://swissinnovation.org/newsChina/web/2018/04-181204-70

Long-Pulse Lasers Propagation in Air

(Chinese Academy of Sciences, December 06)



A research team at Shanghai Institute of Optics and Fine Mechanics of the Chinese Academy of Sciences, collaborating with Helmholtz Institute Jena, established a simple physical model to deal with the long-pulse lasers propagation in air. Their model is based on the observation that it is mainly the peak-intensity region of the focused laser pulse that interacts with and ionizes the air molecules. Starting from the wave equation under the paraxial approximation, the model introduces the dielectric properties of air by taking into account Kerr focusing, multi-photon ionization and dissipative effects. More importantly, the model reveals the relationship between the laser duration and the propagation distance. It was surprisingly found that a high-energy laser pulse with suitable spot radius, suitable intensity, and tens of picosecond duration can propagate tens of kilometers through the atmosphere at relatively low altitudes with a significant amount of energy to spare.
http://swissinnovation.org/newsChina/web/2018/04-181206-de

Prediction of Nearsightedness

(China Daily, December 07)

If nearsightedness could be predicted, medical professionals could intervene with appropriate treatments to help reduce the risk of high myopia. After analyzing 1.25 million eyesight records, researchers at Sun Yat-sen University have identified myopia development rules, and built an AI model to predict the

condition in children and teenagers. They discovered that nearsightedness usually occurs at age 7, and rapidly develops before age 10. It can grow to -3 diopters during the teenage years and up to -6 diopters in the 20s. The researchers used age, the diopter and annual myopia progression rates as the main variables to develop an algorithm to predict degrees of myopia over 10 years and the possibility of high myopia before 18 years. The diagnostic accuracy was 90% within three years, and 80% within 10 years. It can also predict high myopia eight years in advance, providing a scientific basis for intervention.

http://swissinnovation.org/newsChina/web/2018/04-181207-5e

Launch of New-Generation Retrievable Satellite in 2019

(China Daily, December 10)

A reusable retrievable satellite will be launched in China next year, with its recoverable module able to be used 15 times over the next decade. The new-generation retrievable satellite, being developed by China Aerospace Science & Technology Corp, is a reusable satellite which allows experiments and other payloads to be sent to space and later recovered. The 3,500-kilogram satellite will be offered in short-term and long-term configurations, with the former running on battery power alone and the later carrying solar arrays. It will be capable of carrying up to 500 to 600 kilograms of recoverable payload. According to Zhao Huiguang, chief architect of the new satellite, the first satellite has been delivered and is undergoing testing, integration and assembly. It will be launched aboard a Long March 2D rocket from the Jiuquan Satellite Launch Center in April and is expected to be recovered by May.

http://swissinnovation.org/newsChina/web/2018/04-181210-5e

High-Tech Mother Ship to Strengthen Deep-Sea Ambitions

(China Daily, December 11)

The Deep Sea 1 will enter service in the first half of 2019 and along with China's manned submersible Jiaolong will make a global deep-sea scientific voyage, the first of its kind by China, starting in 2020, according to China Ocean Mineral Resources Research and Development Association, the operator of the ship. The new vessel will become the country's first dedicated mother ship for submersibles and will service the nation's major deep-sea submersibles, including the manned Jiaolong and the robotic Hailong series. The ship will be able to sail more than 22,000 kilometers in a single mission and sustain a 60-day operation in any area of ocean. Deep Sea 1 is 90.2 meters long, 16.8 meters wide and displaces about 4,500 metric tons.

http://swissinnovation.org/newsChina/web/2018/04-181211-8b

35 Successful Rockets Launched in 2018

(MIT Technology Review, December 19)

As American and Russian space programs struggle with uncertain budgets, China is expanding its efforts on every front: communications and reconnaissance satellites; a navigation and positioning constellation to rival America's GPS; a human spaceflight program; and ambitious space-science and robotic exploration projects. All of these are enabled by a menagerie of new rockets with advanced capabilities. 2018 is shaping up to be the first year in which more rockets reach Earth orbit from China than from any other country. As of mid-December, China had made 35 successful launches, as against 30 for the US.

http://swissinnovation.org/newsChina/web/2018/04-181219-0a

AI Easily Breaks Text CAPTCHA

(China Daily, December 24)

Text-based CAPTCHA uses a jumble of distorted or blurred letters, characters and numbers to distinguish humans from computer programs, to block the latter from accessing polls and auctions disguised as a human user. This reverse Turing test builds on the belief that people are more adept at recognizing these symbols than machines. But researchers from China's Northwest University, Peking University, and Lancaster University said they developed a new algorithm, based on machine learning, that can break most text-based CAPTCHAs within 0.05 seconds. The program had been tested on CAPTCHA schemes used by 50 popular websites including those operated by Google, Wikipedia, Microsoft, Baidu, Alibaba, and Tencent. Overall, the program had a success rate of over 50% of decoding CAPTCHAs on most websites within 0.05 seconds.

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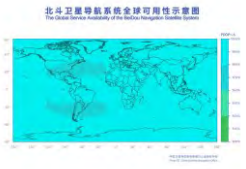
BeiDou Navigation Satellite System Launches Global Service

(China Daily, December 27)

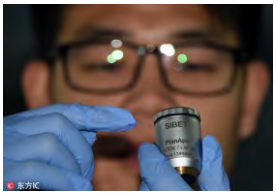


The Beidou Navigation Satellite System recently started providing global services. Speaking on the developments of Beidou, Ran Chengqi, director of the navigation office, said the pillar system's construction of Beidou's third generation constellation has finished, enabling the space based network to provide reliable global positioning, navigation, and timing services with high accuracy. Beidou is one of the four space based navigation networks along with the United States' GPS, Russia's GLONASS and European Union's Galileo. To date, there are 33 satellites — 18 in Beidou-3 series and 15 in Beidou-2 — that are

operational in several orbits. These satellites offer a global positioning service with 10-meter accuracy and an Asia-Pacific regional service with 5-meter accuracy.
http://swissinnovation.org/newsChina/web/2018/04-181227-de

Ultra-Strong Optical Microscopes

(China Daily, December 28)



Traditional light microscopes are useful for investigating small objects and structures, but they lack precision when the space between objects is smaller than half the wavelength of light used to view them, at which point the two objects can blur into one. This issue is called the diffraction limit. Since 2000, this challenge has been gradually solved with the advent of super-resolution microscopy, which allows scientists to see and track molecules in action within a living cell. Now, the Suzhou Institute of Biomedical Engineering and Technology under the Chinese Academy of Sciences said that it has made breakthroughs in advanced optical microscopes, including the highly sophisticated stimulated emission depletion microscopy. The institute introduced special lighting, fluorescent technology and a specialized lens - all of which are key components for producing high-resolution images and visualizing small structures with high clarity.
http://swissinnovation.org/newsChina/web/2018/04-181228-20

Intelligent Driving Bus Line in Trial Operation

(China Daily, December 29)

The first route for intelligent driving buses on open roads was recently put into trial operation in Changsha. The demonstration bus line measures 7.8 km with a total of 22 stations on the two-way journey in the city's Xiangjiang New Area. During the trial operation, four electric intelligent driving buses will be put into use, according to sources with the management committee of the area. Passing through traffic lights, making turns and stopping at the stations, one of the intelligent driving buses successfully finished the whole journey along the scheduled route without a driver. The Xiangjiang New Area aims to build national smart bus demonstration lines to promote the establishment of professional standards for intelligent driving buses, which can be promoted in the domestic market.
http://swissinnovation.org/newsChina/web/2018/04-181229-ed

5. Energy / Environment

Ultrahigh-voltage Integrated Micro-supercapacitors with Superior Flexibility

(China Daily, December 18)

Chinese researchers have developed high voltage planar integrated micro-supercapacitors with superior flexibility. The ultrahigh-voltage micro-supercapacitors were developed by a research group made up of scientists from the Dalian Institute of Chemical Physics of the Chinese Academy of Sciences (CAS) and the Institute of Metal Research of the CAS. This work holds great potential for scalable fabrication and fast integration of other planar microscale energy storage devices, such as hybrid micro-supercapacitors and micro-batteries.

http://swissinnovation.org/newsChina/web/2018/05-181218-4d

Better Balance Environment Protection and Economic Development

(China Daily, December 30)

China has pledged to coordinate its efforts of environmental protection and economic development in 2019, an important year for winning the tough battle against pollution. At the annual Central Economic Work Conference earlier this month, authorities called for building on this year's achievement in pollution control, making more efforts and input in 2019. Since the turn of this year, China has made solid efforts to combat pollution and seen constant improvement of the environment. However, the challenges of pollution remained as some local governments paid less attention to environmental protection amid downward pressure in the economy.

http://swissinnovation.org/newsChina/web/2018/05-181230-08

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

Breakthroughs in Nuclear Safety and Quantum Computing

(China Daily, December 07)

China National Nuclear Corporation issued China's first nuclear safety-class DCS system platform ("Nuclear Advanced Safety Platform of I&C") with completely independent intellectual property rights. The NASPIC, or Longlin system, has the ability to stop nuclear reactors and activate safety functions if accidents occur, protecting the reactor and personnel and limiting losses, an important safety aspect for the nuclear power station. Origin Quantum Computing in Hefei also launched the country's first quantum computer operation and control system recently - also with completely independent intellectual

property rights. Guo Guangcan, director of the CAS Key Laboratory of Quantum Information said the control system is perhaps the most important part of the quantum computer, excepting the core chips. The new system, OriginQ Quantum AIO, will integrate control functions into a machine that can maintain complete control of the chips, making it simple and efficient to control the quantum computer.

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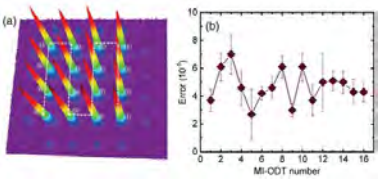
High-Fidelity Single-Qubit Gates on Neutral Atoms

(Chinese Academy of Sciences, December 14)



A group from Wuhan Institute of Physics and Mathematics of Chinese Academy of Sciences recently made progress in quantum information processing with optically trapped neutral atoms. Utilizing the magic-intensity optical trapping technique, they constructed a novel atomic quantum register, in which the fidelity of global single-qubit gates was achieved higher than 99.99% for the first time. This fidelity surpasses the commonly accepted error threshold per gate (10-4) for quantum fault tolerance computation. This study represents key steps towards a scalable quantum computer with neutral atoms trapped in MI-ODT arrays.

http://swissinnovation.org/newsChina/web/2018/06-181214-22

New Type of Quantum Hall Effect in Semimetal

(China Daily, December 18)

Researchers from Fudan University in Shanghai and Cornell University have found evidence of a new type of quantum Hall effect existent in nanostructures of three-dimensional topological semimetal. The research represents a breakthrough in the research of the quantum Hall effect, which, discovered decades ago, remains one of the most studied phenomena in condensed matter physics. Studies of the quantum Hall effect is relevant to research areas such as topological phases, strong electron correlations and quantum computing. Before the recent discovery, the quantum Hall effect was observed and investigated only in two-dimensional electron systems when subjected to low temperatures and strong magnetic fields.

http://swissinnovation.org/newsChina/web/2018/06-181218-62

7. Economy, Social Sciences & Humanities

How China Is Dominating Artificial Intelligence

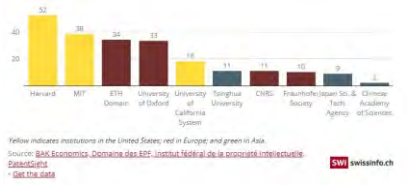
(Forbes, December 16)

The study "Mind the (AI) Gap: Leadership Makes the Difference" conducted by the Boston Consulting Group (BCG) found that there is a strong connection between bold, disruption-friendly management styles including actively putting AI high on the agenda, encouraging rapid development and piloting, and fostering cross-functional, agile R&D, all leading to AI industry leadership. Chinese organizations are beginning to dominate AI due to these factors combined with their shorter innovation cycles than their peer organizations. BCG found that structural improvements at the national level do play an important role in laying the foundations for AI growth—investments in data infrastructure, in research hubs and networks, and higher education for IT and data-related fields.
http://swissinnovation.org/newsChina/web/2018/07-181216-7b

8. Corporates / Startups / Technology Transfer

China Overtakes Europe in Many Technological Domains in Patents

(swissinfo.ch, December 10)



An analysis of world-class patents, which was commissioned by the Domain of the Swiss Federal Institutes of Technology (ETH Domain) and carried out by BAK Economics, revealed that China has overtaken Europe in many technological domains when it comes to patents. This result is very noteworthy given that China filed its first patents in these sectors less than ten years ago.
http://swissinnovation.org/newsChina/web/2018/08-181210-89

Boeing 737 Plant Opens in China

(Bloomberg, December 14)

Boeing Co. is poised to open its first 737 finishing plant in China, underscoring the company's commitment to the world's largest aircraft market amid simmering trade tension. The Chicago-based planemaker inaugurated its completion and delivery center in Zhoushan, 90 miles southeast of Shanghai after more than a year of construction. The facility marks a rare industrial foray outside of the U.S. for Boeing and a joint venture with state-owned planemaker Commercial Aircraft Corp. of China Ltd. The Zhoushan facility, with roots on both sides of the Pacific, is emblematic of the balancing act for Boeing

in China. The planemaker's ties date to President Richard Nixon's 1972 arrival in China aboard a Boeing 707. Chinese workers at the new plant will put the finishing touches on U.S.-built planes flown over from a Seattle-area factory, before delivering them to local customers.
http://swissinnovation.org/newsChina/web/2018/08-181214-61

Investment in Mini-Program Development

(TechNode, December 14)

Baidu has launched an RMB 1 billion (around $140 million) mini-program fund targeting startups and developers to accelerate the construction of its mini-program ecosystem. The innovation fund will be used to design and host open online courses and seminars, as well as offline workshops catering to developers. The company plans to assemble a team of mentors that will coach budding mini-program developers, said Shen Dou, vice president of Baidu. Initially created for WeChat, mini-programs are lightweight alternatives to apps, though they run inside existing applications on a user's mobile phone. They are not required to be downloaded. Baidu launched its Smart Mini Programs initiative in July and began accepting applications in September, allowing developers to create their own mini-app and submit it through the platform's official web portal.
http://swissinnovation.org/newsChina/web/2018/08-181214-cd

First Mass-Produced Autonomous Cars

(TechNode, December 26)

The autonomous driving company AutoBrain and the auto manufacturer Great Wall Motors have developed a prototype Level 3 (L3) self-driving car, which they plan to release on the market by 2020, reports 36Kr. L3 autonomous vehicles are able to take full control of driving and operate when certain conditions are met—for example when driving on freeways. AutoBrain says its L3 vehicle will be the first to be mass-produced in China. According to AutoBrain, the vehicle's L3 system is capable of staying in one lane, overtaking other cars, and avoiding obstacles at speeds of up to 100 kilometers per hour. AutoBrain claims to have driven for nearly 1 million kilometers without accidents.
http://swissinnovation.org/newsChina/web/2018/08-181226-2c

9. Bilateral News

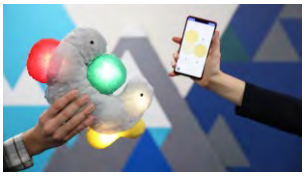
Leading Swiss University Seeks Closer Ties with China's Academia

(Xinhua, December 16)

The University of Zurich is seeking a greater presence in China's academic community. University of Zurich's Vice President Christian Schwarzenegger said in an interview with Xinhua that having a climate such as some countries speaking of visa restrictions on Chinese scientists may not be wise "because science is an international-oriented branch of activity." He noted that the Chinese government has invested in educational infrastructure and developing universities that are making gains with better positions in world rankings and academic associations. "One of my tasks is to set up good partnerships including closer partnerships, not only student exchanges but also scientific cooperation and maybe making a step forward doing joint research projects," he said. Schwarzenegger said that Chinese students at the university are regarded highly. University of Zurich currently has about 350 Chinese students, and it could certainly increase that number, he said.
http://swissinnovation.org/newsChina/web/2018/09-181216-0c

China Hardware Innovation Camp for Swiss Students

(EPFL, December 18)



For the China Hardware Innovation Camp (CHIC), EPFL Master's students spend 14 months sketching out an idea for a connected device, then travel to China to manufacture a prototype. This gives them a chance not only to experience the entire product development process from design to production, but also to discover the Hong Kong and Shenzhen innovation hub, one of the world's most vibrant technology and prototyping ecosystems. The program brings together students from EPFL, HEC Lausanne and ECAL, who team up to design original connected devices that could be of genuine interest to consumers. The three prototypes developed during the 2018 CHIC were presented in Renens in mid-December at an event open to the public.
http://swissinnovation.org/newsChina/web/2018/09-181218-7d

Startup Cellestia Biotech AG Secures CHF 20 Million in Series A funding

(Cellestia, December 19)

Cellestia Biotech AG announced the closing of a CHF 20 million Series A financing round. The new funds will be added to the previous CHF 8 million SEED financing and CHF 1 million non-dilutive research grants, bringing the

total capital raised to CHF 29 million (USD 29 million). Upon closing of the Series A financing, FC Capital and PPF/Sotio will become major shareholders of Cellestia Biotech AG. FC Capital is a China-based private equity firm specializing in healthcare investments in the Greater China region, the US and the European countries. PPF Group invests into multiple market segments such as banking, financial services, telecommunications, insurance, real estate, agriculture and biotechnology. Cellestia was founded in 2014 as a spin-off from EPFL. The lead development compound of Cellestia is CB-103, a novel, first-in-class oral pan-NOTCH inhibitor indicated for treatment of patients with NOTCH-dependent leukemias, lymphomas and solid tumors.
http://swissinnovation.org/newsChina/web/2018/09-181219-f7

Upcoming Science and Technology Related Events

Recycle for a Better Tomorrow
January 17, 2019
https://is.gd/05BzUd
Recycling Factory, Asset Recovery
Shanghai

Shadow Banking in China
January 23, 2019
https://is.gd/fgmdYX
Chinese Banking Environment
Shanghai

AI in Healthcare Summit
March 7-8, 2019
https://is.gd/ytSBVl
Deep Learning, Personalized Medicine
Beijing

ICSREE
May 11-13, 2019
http://www.icsree.com/
Sustainable, Renewable Energy Engineering
Beijing

Swiss Startup Pavilion @ CES Asia 2019
June 11-13, 2019
http://www.cesasia.cn/
Consumer Technology, Innovation
Shanghai

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