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Trends in education, research, innovation and policy



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Swiss Spotlight

Geometry as the bridge between mathematics and applied sciences

(Tudor Stefan Ratiu, April 30)

Since 2016, Tudor S. Ratiu is Chair Professor of Mathematics and Vice Dean of Network of International Centers of Education in China at the School of Mathematical Sciences, Shanghai Jiao Tong University. His 1980 Ph.D. is from the University of California at Berkeley. After a full career in the USA (University of Michigan at Ann Arbor, University of Arizona in Tucson, University of California at Santa Cruz), he moved to the Swiss Federal Institute of Technology in Lausanne in 1998, where he held the chair of Geometric Analysis till 2015. He was the founding director of the Bernoulli Center, a mathematics research institute, since its creation in 2002, till 2014. He has been visiting professor at more than 45 research institutes and universities worldwide. Broadly viewed, Tudor Ratiu is an expert in applied geometry, dynamics, and mathematical physics. He is interested in geometric aspects appearing in both mathematics and applied sciences. Mathematical aspects of symmetry and dynamics have deep implications in hydrodynamics, elasticity, plasma physics, quantum mechanics, imaging science, computational anatomy, robotics, and control theory. He considers the geometric point of view as a unifying force bringing different areas of research together. This enables mathematical ideas and techniques to be successfully applied elsewhere and, conversely, questions appearing in other sciences to become a driving force for new mathematical developments.



<http://swissinnovation.org/newsChina/web/2019/00-190430-ba>

Start-Up: Protecting Financial Assets in the Swiss Banking Infrastructure

(Securosys SA, April 30)

Securosys SA was founded by Andreas Curiger and Robert Rogenmoser in 2014. The company puts its focus on protecting financial assets in blockchain and crypto systems **securosys** as well as legacy finance systems because secure management and storage of private keys for crypto assets and blockchain systems is paramount. The company started out with the development, production and delivery of the Primus S500 HSM to protect the Swiss banking infrastructure. They are used in the Swiss interbank clearing and settlement system SIC operated by SIX Group. All banks in Switzerland process their financial transactions – with a daily amount of over 100 Billion USD – on this system. Securosys' success is based on products for hardware, software, and related services that are technically superior, security-wise most trusted, and financially competitive. In June 2016, the company was chosen as a finalist for the high-tech/biotech innovation award at the Swiss Economic Forum and was later granted the SEF.High-Potential quality label, exclusively reserved



to SMEs with proven growth potential. Plans to extend to Asia have been realized in early 2019, when Securosys opened an office in Hong Kong.

<http://swissinnovation.org/newsChina/web/2019/00-190430-2c>

1. Policy

State Council Pledges More Fee Reduction

(China Daily, April 04)

China will take measures to reduce government fees and operating service charges in order to further reduce burdens on businesses and individuals, it was decided on Wednesday at a State Council executive meeting chaired by Premier Li Keqiang. Starting from July 1, charges on real estate registrations will be cut or canceled outright. The eligibility for fee reductions on patent applications will be broadened. Charges on exit and entry travel documents such as passports, registrations of some trademarks, and usage of various radio frequencies will be further reduced.



<http://swissinnovation.org/newsChina/web/2019/01-190404-25>

Cybercourts as an Efficient Alternative

(China Daily, April 08)

The Beijing Internet Court was opened as the third court of this kind and has ever since improved efficiency and shortened hearing times. All procedures such as case filing, evidence exchange, hearings and delivery of verdicts are conducted online. Also, the plaintiff and defendant do not need to show up in person but do so electronically - through screens. With more than 800 million internet users nationwide, e-commerce disputes and online infringements have clogged China's courts in recent years. Liu Shuhan, a judge in the Internet Court, managed to conclude a case in just 40 minutes. According to him, this new form of jurisdiction can save time while improving efficiency and transparency. A recent guideline from the Supreme People's Court stipulated that online courts would be responsible for hearing internet-related disputes. However, concerns revolve around handling of judicial data.



<http://swissinnovation.org/newsChina/web/2019/01-190408-d1>

International Space Exploration Program

(Xinhuanet, April 17)

China will promote aerospace development, strengthen international cooperation and contribute Chinese wisdom, plans and strength in man's peaceful utilization of outer space. Since 2016, China

has set April 24 as the country's Space Day to mark the launch of its first satellite into space on April 24, 1970. About 200 space officials, engineers and scientists from nearly 50 countries will participate in activities for Space Day in China this year. The theme is to "pursue space dream for win-win cooperation". China has conducted space cooperation with various countries such as Italy, France, Russia, Brazil or Germany. China's Chang'e-4 mission, which made the first-ever soft landing on the far side of the moon earlier this year, embodies China's hope to further develop its wisdom in space exploration.

<http://swissinnovation.org/newsChina/web/2019/01-190417-20>

Draft Laws for Ethical Science Handed Up

(China Daily, April 22)

China will improve its oversight of human related scientific research and medical tests under draft laws and amendments submitted to China's top legislature for review on Saturday. Medical and scientific research related to human genes and embryos might present risks to health or violate ethics, and they must be strictly regulated therefore, said Shen Chunyao, senior legislator of the Constitution and Law Committee of the National People's Congress. A new item has been added to the country's draft civil law, requiring that all medical and scientific research related to human genes and embryos must follow strict rules, laws and regulations, and should not pose a threat to people's health or violate moral or ethical codes.



<http://swissinnovation.org/newsChina/web/2019/02-190422-38>

China to Further Refine Intellectual Property Laws

(China Daily, April 25)

China will continue to refine its intellectual property laws and improve its punitive damages system, said Shen Changyu, head of the National Intellectual Property Administration. He made the remarks Wednesday at the High-Level Forum on China IP Protection in Beijing. The Standing Committee of the National People's Congress on Tuesday passed a proposal to amend China's trademark law. The proposal outlined that the amount of compensation for malicious infringement of trademarks should be up to five times the amount of actual losses, compared with three times before the amendment. It also said the compensation upper limit should be raised from 3 million yuan (\$446,000) to 5 million yuan. These revisions will take effect Nov 1.



<http://swissinnovation.org/newsChina/web/2019/01-190425-bf>

2. Education

Beijing to Support 100 AI Talents Each Year

(China Daily, April 18)

Beijing Academy of Artificial Intelligence (BAAI) has announced it will support 100 outstanding AI scientists each year till 2021 to serve the city's AI development, Beijing Daily reported on Thursday. Each scholar will receive more than 500,000 yuan (about 74,800 US dollars) each year, said the newspaper.

Established in November 2018, the BAAI aims to absorb and cultivate top talents, build joint laboratories with enterprises and universities, push forward cooperation among industries, universities and research institutes, as well as constructing open service platforms for the public and the AI community. A joint laboratory of intelligent model design and image perception under the BAAI was unveiled on Wednesday.

<http://swissinnovation.org/newsChina/web/2019/02-190418-99>



AI Offered as Undergraduate Major

(Xinhuanet, April 23)

In recent years, Artificial Intelligence (AI) has become a significant topic in Chinese academia, which was also highlighted when the Ministry of Education issued an action plan on the topic last year. Starting in September 2019, 35 Chinese universities will offer AI as an undergraduate major in an attempt to strengthen the national talent pool. Among the trial batch are prestigious institutions such as Beijing Jiaotong University and Zhejiang University. According to the AI institute director of Zhejiang University, the courses were designed considering current talent and demand as well as the local advantages in the discipline. Topics that were formerly taught in one single course like probability, statistics and optimization methods will now be split up in single courses as all these fields are relevant for AI. The academia as well as the industry in China expect AI to become one of the most popular majors in universities in the coming years.

<http://swissinnovation.org/newsChina/web/2019/02-190423-05>



Reform Plans for College Entrance Exam

(Xinhuanet, April 23)

Eight provincial-level regions announced plans for comprehensive reform of the college entrance exam Tuesday, marking the third batch of pilot regions in China to launch the reform. The change will cover the first graders who entered high schools in fall 2018 and later in Hebei, Liaoning, Jiangsu, Fujian, Hubei, Hunan, Guangdong and Chongqing. The reform allows the students to have more choices -- up to 12 combinations of subjects instead of the current two choices between arts and science -- for



their exams in accordance with their hobbies, interests and specialties, according to the education authority in Hebei. The reform is also expected to prompt innovation from teachers.

<http://swissinnovation.org/newsChina/web/2019/02-190423-58>

Biomedical Synthetic Biology Gains Momentum

(China Daily, April 24)

On April 20, the East China Normal University launched a biomedical synthetic biology research center for mammalian and medical synthetic biology. Synthetic biology, an interdisciplinary subject combining engineering principles and biology, can be applied to medicine, material science and environmental science. It allows, for example, the redesign of existing biological systems or enzymes. The principal of the university expects the center to be a key determinant in enhancing biomedical education at East China Normal University. The center will focus on treatment of diseases through approaches such as AI cells, gene and cell therapy or tumor intelligent immunotherapy. Other cities like Beijing and Shenzhen have already founded research institutes for synthetic biology. The goal is to further develop and strengthen this field of research.



<http://swissinnovation.org/newsChina/web/2019/02-190424-79>

3. Life Sciences / Health Care

Human Digestion May Help in Autism Therapy

(Xinhuanet, April 01)

A Chinese research team has possibly found a new treatment for autism. The researchers found that the absence of a specific protein in vinegar flies caused their intestinal flora to be unbalanced and brought about symptoms similar to autism in humans. This led to a new theoretical treatment path of treating autism through digestion and immune activities. Former research mainly focused on genetics and it is a fairly new approach to focus on intestinal flora imbalances. According to the researchers, many people with autism suffer from serious intestinal illnesses like diarrhea or irritable bowel syndrome. Other research into the matter has showed that treatment with antibiotics can improve social behavior and the lifespan of vinegar flies. Even though, a lot more insight will be needed, the findings allow for a possibly promising new perspective on human autism therapy.

<http://swissinnovation.org/newsChina/web/2019/03-190401-53>



Gene Mutations of Female Infertility Identified

(China Daily, April 02)

Many women are unable to conceive and deliver a baby due to genetic problems caused by inherited chromosome abnormalities or single-gene defects. Chinese researchers have recently made a breakthrough in discovering the phenotypes and genes responsible for female infertility. Phenotypes are the observable properties of the human body. Researchers from Fudan University in Shanghai and Shanghai Jiao Tong University identified four Chinese families with inherited female infertility and found a similar phenotype that their oocytes, or female reproductive cells, died before fertilization or within 20 to 30 hours after fertilization with sperm. The findings were published in the journal Science Translational Medicine.



<http://swissinnovation.org/newsChina/web/2019/03-190402-b8>

China Set Rules for Stem Cell Products

(China Daily, April 11)

China plans to set a dozen quality-control standards for stem cell therapies to encourage innovation in the booming sector, medical researchers and health authorities said. In February, the Chinese Society for Cell Biology issued a new set of standards explaining the basic qualities of human embryonic stem cells - which can develop into a variety of tissue types - laying out technical guidelines for quality control and the requirements for product use. This is the second standard of its kind, following the introduction of the general requirements related to stem cells in late 2017, according to Zhou Qi, director of the Institute of Zoology at the Chinese Academy of Sciences.



<http://swissinnovation.org/newsChina/web/2019/03-190411-e9>

DNA Robots with a Metabolism

(Xinhuanet, April 11)

American and Chinese engineers have created simple machines using DNA molecules, which are capable of metabolism, self-assembly and organization, three key traits of life. The biomaterial used can autonomously emerge from its nanoscale building blocks and arrange itself into chains of repeating DNA. It is a brand-new, lifelike material concept powered by its own artificial metabolism. Starting from a 55-nucleotide base seed sequence, the DNA molecules were multiplied hundreds of thousands times. The designs are still primitive, but the system is a first step of building lifelike robots by artificial metabolism. In addition, the use of DNA gives the system a self-evolutionary potential. In the future, the system could be used as a biosensor to detect the presence of any DNA and RNA and the concept also could be used to create a dynamic template for making proteins without living cells.

<http://swissinnovation.org/newsChina/web/2019/03-190411-e7>



China to Tighten Supervision of Medical Insurance Funds

(China Daily, April 13)

Chinese authorities will tighten the supervision of the use of the country's medical insurance funds to ensure the safety and efficiency of the funds, according to the National Healthcare Security Administration. According to a draft regulation issued by the administration to solicit public opinions, the use of such funds must be put under strict supervision to protect the legitimate rights and interests of relevant parties. The draft asked relevant authorities to exercise supervision over hospitals, pharmacies, doctors, pharmacists and beneficiaries under the insurance program and stipulated methods and content of the supervision. Violators will be subjected to punishments ranging from a warning, confiscation of illegal gains and fines to suspension or termination of service qualifications or contracts as well as placing them on a credit blacklist.



<http://swissinnovation.org/newsChina/web/2019/03-190413-24>

Virtual Reality to Train Heart Surgeons

(Xinhuanet, April 14)

A hospital in Beijing is pioneering the use of virtual reality (VR) technology to help train doctors to perform heart surgeries. The Chinese Academy of Medical Sciences has helped building a 3D heart model with typical CT-images of heart disease patients. Through VR software, the researchers routed the model to a head-mounted display. With the right equipment - a headset and a motion controller - it is not only possible to get a 360-degree view of the anatomic structure of a patient's heart but also to interact with some virtual features. In 2018, 18 doctors participated in the VR training program and the response was positive. Compared to pictures on paper, the VR technology is more vivid and allowed the doctors to cut virtually. The goal is to further enhance the technology, enrich training courses and establish a VR-assisted surgery platform.

<http://swissinnovation.org/newsChina/web/2019/03-190414-55>

New Insights to Help in Development of Osteoporosis Drugs

(China Daily, April 16)

According to statistics of the World Health Organization around 200 million people suffer from osteoporosis. In China alone, almost 20% of people over the age of 50 suffer from the disease and nearly half the population above 50 showcased low bone mass. For the first time, scientists have seen the molecular structure where a hormone related to osteoporosis attaches to the body, providing valuable insight into potential therapies. So far, developing oral medicines has been prevented in part by uncertainties on how drugs target the receptor and what reactions it will have. The successful viewing at near-atomic level resolution enabled them to see the exact position of the hormone as it



attaches to the receptor, as well as the corresponding reactions. These findings will allow scientists to screen small-molecule compounds that fit this exact position and could help in the development of oral drugs.

<http://swissinnovation.org/newsChina/web/2019/03-190416-11>

3D Printing to Make Bone Tissue

(China Daily, April 17)

In a Chinese hospital, surgeons succeeded in performing an implant surgery to replace bone tissue using 3D printing technology. The patient who suffered from second phase femoral head necrosis, did not want his hip joint to be replaced. However, the beam of the bone, the so-called trabecula, was damaged and a new beam needed. Respecting the patient's wish, the doctors decided to make a porous 3D printed bone tissue to support the damaged head of the femur in order to save the hip joint. The surgeon's team used imaging data of the patient and built a computer model based on it. It was the first successful operation of the team who has worked on the clinical use of 3D printed parts for four years. In the past years, many hospitals in China have embraced the technology as it can dramatically improve surgery precision.



<http://swissinnovation.org/newsChina/web/2019/03-190417-aa>

New Bone Marrow Cancer Therapy

(China Daily, April 20)

Multiple myeloma, a cancer that accumulates in the bone marrow, is the second most common malignant tumor in the blood system. A new therapy developed by Chinese researchers to treat bone marrow cancer has completed its first phase of clinical trials with a response rate of 90 percent. The high response rate suggests the therapy, which used a CAR-T therapy, might significantly raise the five-year survival rate of patients with multiple myeloma, which currently stands at 50.7 percent. CAR-T therapy has received a lot of attention in tackling tumors, but its applications in treating this cancer are still at the trial stage. Phase I clinical trials have been concluded, resulting in over 70 percent of the participants being "completely relieved from the illness". The therapy entered its Phase II clinical trial, which will include 60 patients in 8 hospitals.



<http://swissinnovation.org/newsChina/web/2019/03-190420-69>



Battery-Free Heart Pacemakers

(South China Morning Post, April 24)

Millions of patients rely on pacemakers – small electrical implants in the chest or abdomen – to help regulate their heartbeats after chronic or acute illness. Even with recent technological advances, pacemaker batteries can be rigid or bulky, and may need replacing several times over the lifespan of a device. Chinese and US scientists have unveiled a battery-free pacemaker that generates its energy from the heartbeats of pigs in what could pave the way for an “implant for life” in humans suffering from heart defects. The energy retained from every heartbeat turned out to be higher than the energy demands of most current pacemakers in humans, opening the door to someday giving patients a permanent power source for their implants. The team stressed however that more work was needed to determine the long-term safety before human versions could be developed.

<http://swissinnovation.org/newsChina/web/2019/03-190424-0b>

4. Engineering / IT / Computer Science

Shanghai's 5G District Undergoes Trial Run

(China Daily, April 01)

Shanghai has taken a fresh step in leading the 5G pack by constructing what it says is the world's first district boasting both the coverage of a fifth generation mobile network and a gigabit broadband network. The latest prototype, which serves as a precursor to larger-scale 5G commercial use versions set to be unveiled this year, underscores how China is determined to be a world leader in digital technology, experts said. A trial run of the 5G network, backed by the country's top telecom carrier China Mobile, officially began on Saturday in Shanghai's Hongkou district, where 5G base stations have been deployed to ensure full coverage.



<http://swissinnovation.org/newsChina/web/2019/04-190401-90>

China Leads World in Blockchain Projects

(China Daily, April 02)

Industries are stepping up efforts in blockchain technology to serve the real economy, even though the global cryptocurrency market could be facing tough times. As of November, China led the world in new blockchain projects, with 263 in progress. The figure accounted for about 25 percent of such projects globally, according to data service provider Blockdata in Beijing. In Deloitte's 2018 global blockchain survey,





nearly 50 percent of respondents in China said the technology was already being used in their organization, compared with only 14 percent in the United States.

<http://swissinnovation.org/newsChina/web/2019/04-190402-78>

World's Most Sensitive Radio Telescope

(Xinhuanet, April 03)

An international team of astronomers are making observation plans for the Five-hundred-meter Aperture Spherical Radio Telescope (FAST), by far the largest telescope ever built, expecting discoveries to change human understanding of the universe. The telescope, located in a naturally deep and round karst depression in southwest China, was completed 3 years ago and will start normal operation later in 2019. During testing phases, the telescope started making astronomical discoveries, particularly of pulsars of various kinds, including millisecond pulsars, binaries and gamma-ray pulsars. Scientists have proposed ambitious observational objectives through FAST, such as gravitational waves, exoplanets, ultra-high energy cosmic rays and interstellar matter, to advance human knowledge of astronomy, astrophysics and fundamental physics.

<http://swissinnovation.org/newsChina/web/2019/04-190403-9a>

Firefighting Drones

(Xinhuanet, April 09)

During the China Henan International Investment and Trade Fair, a firefighting drone was introduced. The Predator-100, as it is called, showcases a maximum load of 100 kg and four-hour run-time. It comes with a supporting vehicle which can store 2,000 liters of high-efficient liquid fire extinguishing chemicals. The pair could perfectly used for firefighting and rescue tasks for tall buildings. The equipment has already passed a three-month experimental trial period.

<http://swissinnovation.org/newsChina/web/2019/04-190409-d9>

Moon May Originate from Earth

(Xinhuanet, April 10)

Chinese researchers who looked into lunar meteorites for 8 years have found evidence supporting the giant-impact theory, which states that the moon was formed after a Mars-sized body impacted Earth around 4.5 billion years ago. The team examined three lunar meteorites from NASA and found chlorine isotopic fractionation. This only occurs in ultra-high-temperature and ultra-high-energy conditions, such as a giant collision between astronomical bodies. Besides, the lunar rocks have the same oxygen isotope ratio as the Earth, meaning the two bodies share the same set of DNA. These findings indicate that the moon originated from a giant impact and this gives rise to the giant-impact hypothesis, which suggests the collision between the Earth and a Mars-sized body created a large debris disk that

eventually formed the moon. This hypothesis may provide insights in questions related to the moon's rotation speed or it's relatively large size.

<http://swissinnovation.org/newsChina/web/2019/04-190410-26>

Flexible and Efficient Solar Cells

(China Daily, April 12)

Perovskite solar cell (PSC) has been widely used to manufacture flexible batteries because it is highly efficient, cheap, and easy to use. However, current PSCs are mainly made of a polymer substrate, which has been proven fragile, unstable and is not adequately waterproof. A Chinese research team has developed a novel type of highly flexible and stable solar cell which could be applied in wearable electronics. They built a new type of PSC based on an inorganic mica substrate, which could reduce the strain in the device even under large bending deformation. The new PSC exhibits high-efficiency conversion of sunlight into electricity, namely a photovoltaic conversion efficiency of 18%. Additionally, it can retain over 90% of the original conversion efficiency after 5,000 cycles of large deformation bending.

<http://swissinnovation.org/newsChina/web/2019/04-190412-89>

Satellite Helps in Laying Railway Tracks

(China Daily, April 17)

The BeiDou satellite navigation system is currently being applied to help laying tracks for an intercity railway linking Beijing with Xiongan New Area. An intelligent control platform was established for transportation and scheduling of laying tracks to monitor machines running in real time and manage construction safety systematically. The designed highest speed of the intercity rail link ranges from 250 km to 350 km per hour and will cut the commuting time between urban areas of Beijing and Xiongan from two hours to 30 minutes. China's BeiDou navigation system began providing global services in December 2018. The positioning accuracy of the system has reached 10 meters globally and five meters in the Asia-Pacific region. Its velocity accuracy is 0.2 meters per second, while its timing accuracy stands at 20 nanoseconds.



<http://swissinnovation.org/newsChina/web/2019/04-190417-fc>



Air Rail Train System in China

(China Daily, April 18)

Whether under or over ground, rail networks are an integral part of major cities worldwide. Airborne trains suspended from a rail in the sky, however, are not. This will probably change in the future. Air rail refers to a single-rail transportation system similar to current urban railway systems with the major difference that its cars hang under the rails. Compared with other transportation systems, it is considered safer, more energy-efficient, as well as more cost productive. Additionally - and most importantly - it doesn't rely on particular landscapes and can be constructed anywhere in a given city. A high-tech company in China, BCAR has so far registered 167 national patents related to its air rail system, as well as 72 exclusive technologies. In tests conducted in Kaifeng, air rail cars registered speeds as high as 80 km/h. Air rail is expected to serve Chinese medium-sized cities in the future.



<http://swissinnovation.org/newsChina/web/2019/04-190418-c4>

China Launches New Navigation Satellite

(China Daily, April 21)

China sent a new satellite of the BeiDou Navigation Satellite System (BDS) into space from Sichuan Province in late April. Launched on a Long March-3B carrier rocket, it is the 44th satellite of the BDS satellite family. After in-orbit tests, the satellite will work with 18 other BDS-3 satellites in intermediate circular orbit and one in geosynchronous Earth orbit. The chief designer of the BeiDou system mentioned that the hybrid constellation design, where three groups of satellites at different orbital regimes work in concert, was an exclusive BDS innovation and a world's first. The project will increase the number of visible satellites in the Asian-Pacific Region, providing better service for the region and China is willing to share the achievements of the BDS with other countries.



<http://swissinnovation.org/newsChina/web/2019/04-190421-c8>

Needle Sensor to Detect Heavy Metal in Water

(China Daily, April 22)

Heavy metals in seawater are harmful pollutants to human health and the ecological environment. Anodic stripping voltammetry (ASV) is the most simple and effective technique for the analysis of metals, however, the sensitivity of the sensor in this method needs improvement. Novel sensors with high sensitivity for analysis of active heavy metals in seawater are needed. Chinese scientists have now developed a novel sensor by combining stainless steel acupuncture needles and nanomaterials to detect active heavy metals with high sensitivity. The sensor was tested in detecting the heavy metal copper in seawater. Its performance was excellent and it



showcased ultra-high sensitivity for the detection of different forms of copper by ASV. The needle sensor showed advantages of high hardness and easy integration of sensors, and it has great potential in marine electrochemistry.

<http://swissinnovation.org/newsChina/web/2019/04-190422-9c>

Reusable Rocket Launched

(China Daily, April 24)

The Xiamen University in China launched and recovered its first reusable rocket this month. The rocket, which was jointly developed by Xiamen University and Beijing-based company Space Transportation, has a total length of 8.7 meters, a wingspan of 2.5 meters and a take-off mass of 3,700 kg. It traveled at a maximum altitude of 26.2 km and could be recovered at the foreseen landing destination. The aim was to test the performance of the dual waverider forebody configuration, an aerodynamic system for hypersonic airplanes, and to verify the rocket recovery and reuse technology. This test was part of the university's project to significantly increase the civil aircraft speed and achieve global direct access within two hours.



<http://swissinnovation.org/newsChina/web/2019/04-190424-45>

5. Energy / Environment

High-Yield and Disease Resistant Rice Strain

(Xinhuanet, April 01)

Chinese scientists have bred a new strain of rice with both high disease resistance and high yield. The team utilized a high-yield gene, coded Ideal Plant Architecture1 (IPA1), to enhance the plant's disease resistance against the bacterial blight of rice without undermining yields. In their research, they found that downregulation of microRNA-156 (miR-156) and overexpression of IPA1, a target gene of miR-156 that has access to the regulation of multiple processes in the grain's growth and development, would improve disease resistance but reduce rice yield. To deal with this dilemma, the scientists set an "alarm" on the new strain of rice to signal bacterial blight invasion and thus raised expression of IPA1 to enhance disease resistance. Further research showed that without pathogenic infection, IPA1 expression only increases slightly, which enhances yield-related traits including fewer tiller buds, larger spikes and thick stems.

<http://swissinnovation.org/newsChina/web/2019/05-190401-71>

Transgenic Monkeys with Human Genes

(Xinhuanet, April 02)

Chinese and US researchers have identified several genes that are linked to primate brain size. One of them is MCPH1, a gene that is expressed during fetal brain development. Mutations in this gene can lead to a developmental disorder characterized by a small brain. The researchers have created 11 transgenic rhesus monkeys carrying human copies of MCPH1, which is important for brain development. The brain imaging and tissue section analysis of the monkeys showed an altered pattern of neuron differentiation and a delayed maturation of the neural system, which is similar to the developmental delay in humans. It was also found that the transgenic monkeys exhibited better short-term memory and shorter reaction time compared to wild ones in the control group. In future studies, transgenic primates might provide important insights into basic questions of what makes humans unique.



<http://swissinnovation.org/newsChina/web/2019/05-190402-db>

China's Extreme Weather Events on the Rise

(China Daily, April 07)

China's extreme weather events are on the rise and becoming increasingly severe as the climate risk level edges up, China Meteorological Administration said in a report. The country saw a marked increase of extreme rainfall and a reduction of extreme low-temperature events during the 1961-2018 period, according to the report. Comprehensive monitoring and key indicators show that the global climate continues to be warmer. The temperature picked up faster in north China than in south China during the period. West China posted a faster temperature rise than east China, with the Qinghai-Tibet region recording the quickest temperature growth. The country's climate risk index has been generally on the rise from 1961 to 2018, and the growth during the 1991-2018 period outpaced that during the 1961-1990 period.

<http://swissinnovation.org/newsChina/web/2019/05-190407-d4>

Death Switch Found in Plants

(Xinhuanet, April 07)

Plants have an innate immune system like animals or humans. They can detect and respond to pathogens through a group of proteins called NLR. Although scientists have identified hundreds of these proteins, their exact functioning has been a matter of speculation for two decades. Chinese researchers have now discovered a "death switch" in plant's immune systems that can activate cell death to limit the spreading of microbial pathogens and provide resistance within the plant. The assembly of a pentangular wheel-like structure called "resistosome" plays a role in converting inactive NLR proteins into active complexes that lead to cell death and immune signaling in plants. The



resistosome sends a self-destruction order, triggering the infected cell to kill itself along with the invading pathogens. These findings will enhance the understanding of plant immunity largely and offers new perspectives of developing disease-resistant crops which need less pesticides.

<http://swissinnovation.org/newsChina/web/2019/05-190407-d2>

Efforts on Garbage Disposal Through Internet

(China Daily, April 08)

China, long haunted with a garbage headache, resorted to the internet to get its people engaged in the protracted war against trash, as the country moves toward "Beautiful China" by 2035. By challenging people to post before pictures of areas in need of cleaning or maintenance and after pictures when they have the work done, the viral trend "Trashtag Challenge" on social media, sweeping at home and abroad, has successfully motivated Chinese citizens to pick up trash along city streets, highways, mountains and seas. The challenge trend allows participants to not only gain a fulfilling experience but also profoundly understand the hard work of sanitation workers, so as to further reflect on how to preserve the environment fundamentally.



<http://swissinnovation.org/newsChina/web/2019/05-190408-ca>

Rare Bird Population Increases in Yellow River Wetlands

(Xinhuanet, April 10)

The heron is a long-legged wading bird with a gray body and wings, featuring black stripes extending along the long neck. It is included as a threatened species. Over 300 grey herons have migrated to the Yellow River wetlands in Pingluo County, north China's Shanxi Province, to nest and breed. According to the chief of the wildlife protection station, the ecological environment improved in recent years. Additionally, 20 hectares of land have been designated as protection zone for grey herons, which are regularly patrolled by two staff members to protect the birds. The rare bird tends to nest on cliffs and many ornithologists came by the area to take pictures recently. The Yellow River is China's second longest river. With a temperate climate and abundant food, wetlands along the river are paradises for migratory birds.



<http://swissinnovation.org/newsChina/web/2019/05-190410-f4>



Pest Control Thanks to Wax Moths and Honeybees

(Xinhuanet, April 12)

Wax moths are a common problem for beekeepers. They eat the comb in beehives and lay eggs in the wax. Their larvae then burrow through the frame of comb as they eat whatever is in their path. A Chinese study examined whether female greater wax moths could sense honeybee alarm pheromones - chemical substances that animals release as a warning signal to threats - to find a safer place to lay eggs. It was found that the wax moth shows physiological responses to four alarm pheromones. However, the wax moths showed no significant avoidance in selection of sites to lay eggs. Thus, the moths can sense the alarm signals but ignore them. Meanwhile, honeybees cannot expel them from the hive and lose the showdown. These findings offer insights into theoretical foundations for developing new pest control technologies.



<http://swissinnovation.org/newsChina/web/2019/05-190412-0a>

China Banned Chemical Compounds

(China Daily, April 16)

China has banned or restricted certain chemicals that have been identified as persistent organic pollutants in order to fulfill its international obligations. Most of perfluorooctane sulfonic acid, or PFOS, which is used to protect fabrics from stains, were restricted. Along with it, the pesticides lindane and endosulfan were banned. PFOS will still be tolerated in certain manufacturing sectors like semiconductors, photo imaging or in medical devices. The two pesticides lindane and ednosulfan are used as insecticides for vegetables, trees and soil treatment and tend to accumulate along the food chain. Alternatives are available and should not bring major changes to agricultural processes. According to the Ministry of Ecology and Environment, any breach of the ban will be severely punished. This was an urgent move as the chemicals pose a danger to soil and underground water quality and thus, to people's health.

<http://swissinnovation.org/newsChina/web/2019/05-190416-c5>

Electromobility on the Rise in Guangdong

(China Daily, April 17)

In the first quarter of 2019, the Chinese province of Guangdong has experienced a surge in electric vehicle charging services. Over 1 million instances of charging services for electric vehicles have been provided, which is equivalent to a year-on-year increase of over 450%. Electric vehicles charged a total amount of 30.3 kWh of power in the first three months through the charging facilities, which is a growth of over 840% compared to the values of the same period last year. These growth rates are probably caused by an increase of electric vehicles including buses, taxis, and cars which offer online



ride-hailing services. The surge in power consumption from electric vehicles not only reflects the vigorous growth of electric vehicles in Guangdong but also shows the province's pursuit of green development.

<http://swissinnovation.org/newsChina/web/2019/05-190417-dc>

Air Quality Improved in China

(China Daily, April 22)

In 2018, air quality in China continued to improve with a reduction in pollution. Out of 338 cities, 121 met the air quality standards last year. In key regions, air quality improved significantly, even though in the autumn and winter months the pollution levels were high. The average density of PM2.5, a key indicator of pollution, dropped 11.8 percent year on year in 2018 in the Beijing-Tianjin-Hebei region and its surrounding area. On average, the cities saw more days with good air than the year before.



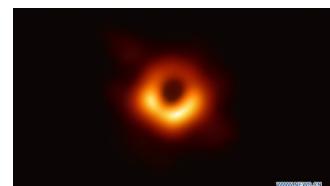
<http://swissinnovation.org/newsChina/web/2019/05-190422-8b>

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

Chinese Involvement in Black Hole Image

(China Daily, April 10)

In the first half of April, the very first image of a black hole was captured. It was the first visible representation of what are considered the most extreme objects in the universe. The image depicts the black hole at the heart of Messier 87, a massive, distant galaxy in the Virgo galaxy cluster. It resides 55 million light-years from Earth and has a mass 6.5 billion times that of the sun. To this effort, over 200 astronomers worldwide have contributed, among them were 16 Chinese astronomers. The Event Horizon Telescope, a globe-spanning array of eight ground-based radio telescopes, was used to observe the black hole. One Chinese researcher involved in the project and affiliated with the Shanghai Astronomical Observatory said that the international group has plans for observations of black holes and other objects in the universe with a yet higher resolution.



<http://swissinnovation.org/newsChina/web/2019/06-190410-98>

Novel X-Ray Signal Emitted by Magnetic Star

(Xinhuanet, April 11)

A joint team of researchers from China and the United States have picked up a special X-ray signal that lasted for around seven hours powered by a magnetar, or magnetic star, 6.6 billion light years

away. The signal, picked up at NASA's Chandra X-ray Observatory, offers proof that the direct result of the mergers of neutron stars can be a magnetar, rather than just a black hole as believed by many scientists. A magnetar is a neutron star that spins rapidly with a magnetic field hundreds of millions of times stronger than the strongest magnetic field humans can create in a lab environment. The rapid rotation of the magnetar creates a strong centrifugal force, offsetting the gravitational force that makes it collapse into a black hole. The X-ray signal has never been encountered before and only existed in theoretical hypothesis previously.

<http://swissinnovation.org/newsChina/web/2019/06-190411-7e>

Rice Straw and Solar Steam to Desalinate Seawater

(Xinhuanet, April 18)

As fresh water scarcity is one of the most compelling global concerns, scientists are exploring innovative desalination technologies to increase water productivity. Solar steam generation is considered a promising strategy for purification of wastewater and seawater. Chinese scientists have developed an innovative desalination technology that uses wasted rice straw and sunlight for clean water production. The device is composed of a photothermal membrane and water pumps. Rice straw leaves are carbonized and composited with bacterial cellulose to function as a photothermal membrane and the lower culms of straw are designed as water pumps. In tests of the device, water yielded reached safe drinking water standards with over 99.9 percent of saline ions removed. Other than seawater desalination, it can furthermore be used for extracting clean water from water-bearing areas such as tidal flats, wetlands and marshes.

<http://swissinnovation.org/newsChina/web/2019/06-190418-b1>

New Cheaper Way to Produce Hydrogen Fuel

(China Daily, April 21)

Hydrogen has huge potential as clean energy in various industries including new energy vehicles and electricity generation. Now, Chinese scientists have found a cheaper way to produce hydrogen energy by developing a new catalyst. The new catalyst can greatly cut the cost of hydrogen production through electrolysis of water compared with Iridium dioxide, a catalyst that is widely used in production. The catalyst was developed by scientists from the University of Science and Technology of China, who used an alloy to improve the activity and stability of a kind of precious metal catalyst. The research on the catalyst provides a new direction for other similar scientific issues, according to the head of the research team.



<http://swissinnovation.org/newsChina/web/2019/06-190421-9b>

Astrophysicist Honored by Naming Asteroid After Him

(Xinhuanet, April 22)

Asteroids are the only celestial bodies that can be named by their discoverers. Recently, an asteroid has been named after leading Chinese astrophysicist Zhou Youyuan, with approval from the International Astronomical Union (IAU). Said asteroid was discovered in 1997 by astronomers with the Beijing Schmidt CCD Asteroid Program in the north of China. Zhou, born in 1938, is an astrophysicist and an academician of the Chinese Academy of Sciences. He has made outstanding contributions to research in the fields of quasars and active galaxies, nuclear and cosmology, and large-scale structures of the universe. The scientist has also been engaged in education, with more than 50 years of teaching experience in Chinese universities.

<http://swissinnovation.org/newsChina/web/2019/06-190422-0b>

Space Station to Support Hundreds of Experiments

(Xinhuanet, April 24)

Science facilities on China's planned Tiangong space station could support hundreds of space research projects after it's completed in 2022. Sixteen experiment racks will be installed in the core module and two lab capsules of the space station, and an extravehicular experiment platform will be built. Each rack is regarded as a lab that can support various space experiments, and astronauts can upgrade and replace the facilities. In addition, a capsule holding a large optical telescope will fly in the same orbit as the station, according to the Technology and Engineering Center for Space Utilization (CSU) of the Chinese Academy of Sciences. The facilities will support a large number of research projects in fields such as astronomy, space life science, biotechnology, microgravity basic physics and space materials science.

<http://swissinnovation.org/newsChina/web/2019/06-190424-d6>

7. Economy, Social Sciences & Humanities

China is Catching Up in All Innovation Indicators

(China Daily, April 11)

China is catching up with the United States in innovation, according to the indicators shown in an American think tank report released Monday. China during the past decade has been closing gaps with the United States rapidly and now even leads the latter in some indicators, says the report published by Information Technology and Innovation Foundation (ITIF). The report concludes that considering China a copier is misconception and China can and does innovate. The report's co-author



Robert Atkinson, ITIF president, calls for an American national innovation and competitiveness strategy to maintain the country's leadership.

<http://swissinnovation.org/newsChina/web/2019/07-190411-ce>

Aerospace Progress Promotes Economic Development in China

(Xinhuanet, April 17)

China's aerospace progress has a close connection with the country's economic and social development and helps improve people's lives, according to a representative of the China National Space Administration (CNSA). Every day, over 1 billion people check the weather forecast based on data sent back by a Chinese meteorological satellite every day. This geostationary satellite, which is able to generate a regional image every minute, plays an important role in weather forecasts and early warning and monitoring of natural disasters. Additionally, statistics have shown that approximately 80% of the nearly 2,000 new materials developed in China in recent years were driven by space technologies. The representative believes that the rapid integration of space information with big data, cloud computing and the internet will greatly improve the information development.

<http://swissinnovation.org/newsChina/web/2019/07-190417-6e>

AI Robot Creates Chinese Ink Art

(China Daily, April 24)

Hong Kong artist and inventor Victor Wong is responsible for the latest Chinese ink artwork which was created by an artificial intelligence robot. The art piece drawn by the robot Gemini - an invention of Victor Wong - is now on display in London. Gemini has an "arm" that dips a brush into ink and water before sweeping across xuan paper to create Chinese shuimo artwork. The AI features random algorithms meaning Wong does not know how the paintings of the robot will turn out. Each landscape painting can take around 60 hours to create. Victor Wong spent around three years to build and then train Gemini in mastering simple brush strokes. The inventor programmed to robot to develop its own style rather than simply copy the work of masters and fed him with images of the Chang'e 4 drone as well as observation data from NASA.



<http://swissinnovation.org/newsChina/web/2019/07-190424-bf>

8. Corporates / Startups / Technology Transfer

Amazon Makes Adjustments in China

(Global Times, April 18)

US-based Amazon.com, the world's largest e-commerce business by revenue and market capitalization, said it will close its marketplace in China by July 18. Amazon is notifying sellers that it will no longer operate a marketplace nor provide seller services on its Chinese website Amazon.cn from July 18, the company said in a statement sent to the Global Times on Thursday. Amazon is making operational adjustments to focus on efforts on cross-border sales in China and to keep improving the experience for both Chinese customers and its global selling partners, according to the statement.



<http://swissinnovation.org/newsChina/web/2019/08-190418-d5>

Huawei Posts Strong Q1 Revenue Growth

(Global Times, April 22)

Huawei Technologies, the world's largest telecom equipment provider, announced 39 percent year-on-year revenue growth for the first quarter and a slight gain in its net profit margin, amid escalating pressure from the US. Revenue reached 179.7 billion yuan (\$26.8 billion) as it kept its focus on ICT infrastructure and smart devices, the company said in its financial results released on Monday. Its net profit margin was about 8 percent, slightly higher than the same period last year, the company said. It was the first time the private company released quarterly results, in line with its strategy of becoming more open and transparent, and the result beat market expectations amid growing external challenges, industry analysts said.



<http://swissinnovation.org/newsChina/web/2019/08-190422-52>

9. Bilateral News

Swiss President Pledges to Strengthen Bilateral Relations

(China Daily, April 23)

Visiting Swiss President Ueli Maurer pledged on Tuesday to strengthen the "already-very-good" bilateral relations between Bern and Beijing and further deepen collaboration in trade and finance. Maurer, who embarked on a weeklong trip in China on Tuesday, told a media conference in Shanghai that he hopes his country can act as a 'pioneer' and 'test field' for China to enter the Western market. During his visit, the Shanghai Stock



Exchange and its counterpart, SIX Swiss Exchange, agreed to assess the feasibility of listing securities, such as depository receipts, on their respective markets in the near future under a renewed Memorandum of Understanding.

<http://swissinnovation.org/newsChina/web/2019/09-190423-47>

Baidu launched the “Switzerland” Mini Program

(GLOBE NEWSWIRE, April 25)

Baidu signed a Joint Letter of Intent for strategic cooperation with the Embassy of Switzerland in China. Ueli Maurer, President of the Swiss Confederation, and Robin Li, Chairman and CEO of Baidu, attended the signing ceremony in Beijing. The “Switzerland” Mini Program, the first of its kind, officially launched on the Baidu App. In addition, Baidu and the Embassy of Switzerland in China will collaborate on Baidu platforms including Baidu Encyclopedia and Baidu Data Insight. The Switzerland Mini Program on Baidu App will serve as a repository of official introduction to the country and local insights about tourist attractions, and provide visa information and other travel related services. More functions and services are expected to be added later.



<http://swissinnovation.org/newsChina/web/2019/09-190425-74>

BRI Deal to be Signed Between Switzerland and China

(China Daily, April 27)

Swiss President Ueli Maurer is on a week-long trip to China together with a business and finance delegation, taking part in the second Belt and Road Forum for International Cooperation in Beijing. Switzerland supports the Belt and Road Initiative (BRI) and a memorandum of understanding (MoU), to intensify cooperation on trade, investment and project financing in third markets along the routes of the BRI, is set to be signed during his visit, said Maurer on April 25 during a press conference at the Swiss embassy in Beijing. After Italy and Luxembourg signed a MoU in March, Switzerland's signing makes it be the latest central European country to have a BRI deal with China.



<http://swissinnovation.org/newsChina/web/2019/09-190427-28>

Investment High on Sino-Swiss Agenda

(China Daily, April 30)

China and Switzerland should make joint building of the Belt and Road into a new highlight of bilateral cooperation and firmly safeguard economic globalization and trade liberalization, President Xi Jinping said on Monday. Xi spoke during a meeting with Swiss Confederation President Ueli Maurer, who is



to conclude his eight-day state visit to China on Tuesday. Noting that China's establishment of a bilateral innovative strategic partnership in 2016 with Switzerland was the first ever created with another country, Xi said that China is ready to work with the European country to further strategic cooperation.

<http://swissinnovation.org/newsChina/web/2019/09-190430-97>

Upcoming Science and Technology Related Events

EXHIBITION: VR_I

May 9 -12 / 15-18, 2019

<https://is.gd/y11yn9>

Virtual Reality, Dance
Shanghai

LECTURE: Passenger Republic

May 15, 2019

<https://is.gd/woPK2K>

Mobility, Science Talk
Tongji University, Jiading

Café des Sciences: Exploring Virtual Reality

May 16, 2019

<https://is.gd/1C4XB2>

Virtual Reality, Dance
Shanghai

Swiss Alumni China

May 24, 2019

<https://is.gd/N1YgQa>

Networking, China, Switzerland
Shanghai

Fireside Chat: Opportunities and Challenges in the Chinese MedTech Landscape

June 4, 2019

<https://is.gd/xVBYui>

Medtech, Dental Industry
Shanghai

CES ASIA: #SWISSTECH Pavilion with 21 Swiss Start-Ups

June 11-13

<https://is.gd/M84EjX>

AI, IoT, Robotics, Blockchain
Shanghai New International Expo Center



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