



Science-Switzerland

February – March 2017

News on Swiss science, technology, education and innovation



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Further Swiss-Russian Cooperation in Research and Innovation

(admin.ch, March 15, 2017)

The 2012 signed Agreement on Scientific and Technological Cooperation between Switzerland and Russia takes shape. Recently, the two delegations – consisting of governmental and academic representatives – had their third meeting discussing the current state and potential deepening of the cooperation. By now, there are 25 ongoing joint research projects which were launched by the end of 2015. In the five-year period between 2011 and 2016, Switzerland promoted around 130 direct collaborations summing up to CHF 14 million and 120 research projects financed by the Swiss National Science Foundation involved Russian scientists. The two parties showed interest in fostering their partnership within the framework of the EUREKA initiative.



<http://swissinnovation.org/news/web/2017/00-170315-49>

1. Policy

Switzerland is Part of Horizon 2020 Again

(SRF News, March 14, 2017)

Switzerland is a full member of the EU research collaboration "Horizon 2020" again. After the approval of the mass immigration initiative in February 2014 and the following cease of the extension of the Agreement on the Free Movement of Persons to Croatia, the EU stopped the research funding program's cooperation with Switzerland. Responsible persons from universities and the administration highlight the importance of the resumption. Within the last two and a half years, Swiss researchers participated in about a third of the EU research projects only, received substantially less money and faced more problems acquiring scientists from abroad than before. Now, the access to EU funding is ensured again. The European Union emphasizes its satisfaction too, as Switzerland's strength in research and innovation is great as it states.



<http://swissinnovation.org/news/web/2017/01-170314-31>

Startup Visa for Foreign Talents

(SRF News, March 06, 2017)

Two motions by parliament members aim to reinforce Switzerland as an innovation and research location by facilitating visa requirements for staff needed from outside of Europe. Switzerland, because of its membership of the Schengen Agreement, has to give other member countries' citizens full access to the Swiss job market. Whereas, the country has restrictive contingents for the other non-European countries. Hence, one motion claims for special residence permits for startup founders or investors from these restricted countries. Another one calls for working permits for foreign graduates from master and doctoral programs of Swiss higher education institutions. This measure should make the state's investment in education pay in the country itself and should help overcoming the existing specialists shortcut.



<http://swissinnovation.org/news/web/2017/01-170306-db>



2. Education

Swiss National Science Foundation Promotes 42 Professorships

(University of Zurich, March 02, 2017)

Since 2000 the Swiss National Science Foundation (SNSF) awards professorships to emerging researchers with excellent scientific performance and a promising research project. These grants cover salaries, and research as well as infrastructure contributions of about CHF 1.5 million each over a four years period. Four out of five promoted researchers later get a position as a full professor. The 42 promoted professorships spread over ten Swiss higher education institutions. University of Zurich received 13 grants, making up almost a one third share. The 13 professors cover a wide range of disciplines ranging from history, political science and psychology to physics, chemistry and neurology. University of Basel (7) and University of Bern (5) received the second respectively third most awarded professorships.



<http://swissinnovation.org/news/web/2017/02-170302-59>

New Study Program on "Sustainable Tourism" with UN

(Bündner Tagblatt, March 07, 2017)

The University of Applied Sciences HTW Chur is the first educational institution worldwide to cooperate with the United Nations during the intergovernmental organization's "International Year of Sustainable Tourism for Development" 2017. HTW Chur newly offers a major specializing in "Sustainable Tourism and International Development" within its Bachelor program in Tourism. In 2017, the UN specifically focuses on sustainable touristic development, which should have a positive impact in developing countries especially. It should contribute to the population's well-being. Therein, HTW Chur gets involved and aims to prepare its students to take positions in eco-lodges or sustainable destination development, for example.



<http://swissinnovation.org/news/web/2017/02-170307-69>

Development of Industry 4.0 in Switzerland

(ETH, March 09, 2017)

In its strategy for 2017 until 2020, the Swiss ETH Board champions future-oriented fields of research. Digitalization, in particular, is confronting industry with great challenges. Through close cooperation with companies, the ETH Domain makes an important contribution towards the development of Industry 4.0 in Switzerland. Strategic focus areas include "Advanced Manufacturing", "Data Science", "Energy" and "Personalised Health". In view of the inflation adjustment and the cost-cutting programs announced by the Federal Council, it is of concern to the ETH Board to emphasize that investments in the ETH Domain generate significant value creation in the Swiss economy.



<http://swissinnovation.org/news/web/2017/02-170309-e1>

3. Life Sciences / Health Care

New Algorithm to Digitally Reconstruct Teeth

(ETH Zurich, February 17, 2017)

Researchers at ETH Zurich and the Max-Planck Institute with Disney Research have produced a new algorithm that allows non-invasive reconstruction of the teeth and gums from digital photos. To display facial expressions realistically in films or games, teeth need to be rendered accurately. Researchers typically rely on handmade plaster casts of teeth for this purpose. The new method could also be used in the entertainment industry – to extend traditional photogrammetric face-capture systems using multiple





cameras – as well as in medical dentistry. Instead of using special scanners to capture images of the patient's mouth and teeth and making plaster casts, dentists could, for example, use the ETH Zurich software to show a patient how replacement teeth would look like – a simpler, faster and cheaper procedure.

<http://swissinnovation.org/news/web/2017/03-170217-b4>

Cellular Jetlag May Affect Development of Diabetes

(University of Geneva, March 20, 2017)

Like almost all light-sensitive living beings, human beings follow biological rhythms set on a period of about 24 hours. Specialists from the University of Geneva and the University Hospitals of Geneva studied pancreatic α - and β - cells that are in charge of the production of insulin and glucagon, two hormones that regulate glucose levels in the blood. They discovered that already at cellular levels, these internal clocks orchestrate the timing of proper hormone secretion, thus optimizing body metabolism by anticipating the rest-activity and feeding-fasting cycles. Their misalignment would thus favor the occurrence of metabolic diseases. The researchers' discovery highlights an essential factor, which may explain diabetes development as a consequence of circadian misalignments of these cellular clocks.

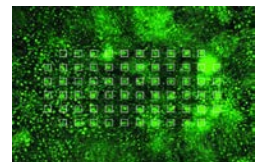


<http://swissinnovation.org/news/web/2017/03-170320-ba>

Stem Cells Derived Neuronal Networks on a Chip as Animal Testing Alternative

(University of Bern, March 01, 2017)

Scientists at the Institute for Infectious Diseases of the University of Bern have developed an in vitro stem cell-based bioassay grown on multi-electrode arrays (MEA) capable of detecting the biological activity of Clostridium Botulinum neurotoxins. Their assay could serve in minimizing animal experiments. Further, MEA recording techniques allow for a continuous non-invasive monitoring of neuronal activity and this approach can be easily up-scaled to meet the requirements for a prospective high-throughput screening of neuroactive compounds. In addition, the usage of commercially available MEA systems do not require highly trained staff. The study has been published in Frontiers in Pharmacology.



<http://swissinnovation.org/news/web/2017/03-170301-fe>

Genome-engineering Tools to Edit and Delete DNA Sequence

(University of Bern, March 02, 2017)

Genomics studies how our genome – or an entire DNA sequence – specifies a human being, and how errors in this sequence may cause diseases. Until recently, researchers could read genomes' sequence but neither edit nor delete DNA for basic research or potential therapies. However, scientists at the University of Bern and the Centre for Genomic Regulation in Barcelona have now developed the simple, effective DECKO tool to delete any desired piece of non-coding DNA – the 99 percent of our DNA that does not encode any protein but may contribute to disease. Their CRISPETA software pipeline aids the design of DNA deletion projects and may lead to the discovery of new disease-causing genes and potential new drugs. The findings were published in PLOS Computational Biology.



<http://swissinnovation.org/news/web/2017/03-170302-92>

Mobile Application for Precise Diagnose on Pneumonia

(ETH Zurich, March 07, 2017)

Scientists from ETH Zurich, in collaboration with the Swiss Tropical and Public Health Institute and a local university, are developing a mobile application which should identify pneumonia in patients. Research assistants are conducting a study in the Peruvian Andes observing around 300 families with children. They determine the breathing rate by tapping on the display whenever they see the kid breathing. The





mobile application is helping them to do so, as it corrects wrong counting and identifies an accurate average value. Via a infrared light sensor attached to the finger the oxygen saturation in the blood is measured too. After collecting enough data, the application should be able to detect a critical value, as it varies between individuals and depending on the altitude. The inclusion of other indicators is planned. In the end, the app is foreseen to be used in places far off in order to make a more precise diagnose and take patients to the hospital on time. According to the World Health Organization, lung inflammation is responsible for the death of not less than two million children a year.

<http://swissinnovation.org/news/web/2017/03-170307-65>

Proteins that Domesticated our Genomes

(EPFL, March 08, 2017)

EPFL scientists have taken the first extensive look at a family of approximately 350 human proteins, showing that they establish a complex interplay with transposable elements to create largely human-specific gene regulatory networks. The scientists combined phylogenetics – the study of evolutionary relationships between different species, with genomics – the study of how the genome of an organism conditions its biology. Published in Nature, the work reveals the largely species-specific gene-regulatory networks that impact all of human biology and offers a remarkable tool to examine how disturbances of this system might result in diseases such as cancer.



<http://swissinnovation.org/news/web/2017/03-170308-a3>

Mechanism for Recycling Junk DNA

(University of Bern, March 20, 2017)

A species of unicellular ciliate has found a special trick to make use of the cellular machinery in seemingly impossible ways. Researchers from the University of Bern have for the first time described a mechanism in detail how so called “junk”-DNA is transcribed before being degraded. They found out that there seems to be a feedback loop in the deletion of DNA segments. These, previously thought to be useless pieces of DNA (also called “junk DNA”), are cut out of the genome and then degraded by the cell machinery. However, before degradation, they serve as templates for small RNAs which in turn help with cutting out more of these DNA pieces. Once started, this pyramid system keeps reinforcing itself via the production of RNA.



<http://swissinnovation.org/news/web/2017/03-170320-ac>

Human's Physical and Mental Adaptation Measured

(CSEM, March 20, 2017)

Equipped with a system measuring the vital functions, the Swiss explorer Christian Clot completed four solo expeditions in different, life endangering climatic regions (dry desert, sea-channels in Patagonia, humid Amazon jungle and icy-cold Siberia). The discoverer and the examining research team's goal is to study the adaptability of the human brain and body, also as the climate gets more unstable and challenging. In a second stage of the project, Christian Clot is going to return and repeat the expeditions in a group of about twenty people in order to investigate the impact of social interaction and leadership, for example. The resistant, compact and wireless monitoring system was developed by the “Centre Suisse d'Electronique et de Microtechnique” (CSEM). The obtained data is currently being analyzed.



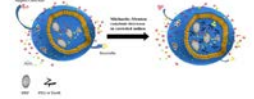
<http://swissinnovation.org/news/web/2017/03-170320-1b>



Imitating Molecular Crowding in Cells

(University of Basel, March 01, 2017)

Enzymes behave differently in a test tube compared with the molecular scrum of a living cell. Chemists from the University of Basel have now been able to simulate these confined natural conditions in artificial vesicles for the first time. As reported in the academic journal *Small*, the results are offering better insight into the development of nanoreactors and artificial organelles.



<http://swissinnovation.org/news/web/2017/03-170301-94>

How the Brain Adapts to Hearing Loss

(University of Geneva, March 27, 2017)

Deaf people have the chance to communicate orally with the help of cochlear implants that stimulate nerve endings and re-enable the carrier to hear. Success, however, is not guaranteed as there are up to 10 percent of the patients for whom this technique is ineffective. In order to better understand cochlear implants, Anne-Lise Giraud from the University of Geneva has analyzed brain activity imaging data. Together with a French surgeon, they managed to understand brain reorganization processes that occur when people lose hearing abilities. They found that most deaf people still relate to orality and the phonological organization of their brains is similar to hearing peoples' brain circuits. But some brains reorganize and patients are able to handle written words quicker, which is associated with the activation of the right brain hemisphere. Those results do not only explain why implants do not always work, but also why congenitally-deaf children should be equipped early to train the ability to access orality.



<http://swissinnovation.org/news/web/2017/03-170327-ff>

Inflammation Strengthens Salmonella Pathogen

(ETH Zurich, March 28, 2017)

The inflammatory response which is supposed to ward off pathogens that cause intestinal disease makes this even worse. This is because special viruses integrate their genome into Salmonella. Researchers led by ETH Professor Wolf-Dietrich Hardt have now shown that the body's own inflammatory response actually promotes the transfer of phage genes to the bacteria, thus increasing the pathogenicity of Salmonella. Salmonella triggered an inflammation in the animals' intestine, which led to a major change in the Salmonella strain carrying phage genes: the phage genes were expressed, the phage multiplied and ultimately free phage particles were released, killing the Salmonella cell. Free phages swarmed out and entered the second Salmonella strain to further increase there. In this way, the phages transferred their genes to almost all Salmonella cells of any strain that had previously been free of phage genes.

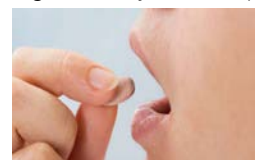


<http://swissinnovation.org/news/web/2017/03-170328-11>

New Swiss Center on "Fighting Antibiotic Resistance"

(University of Fribourg, February 17, 2017)

Under the lead of the Swiss Federal Bureau of Public Health, a National Reference Center aiming to fight antibiotic resistance has been opened at University of Fribourg. Even though Switzerland was less exposed to incidents with multi-resistant bacteria than other countries so far, the federal government decided to increase capacities to detect new forms early, give advice on treatments and help managing potential epidemics. Furthermore, the center is supposed to invent a new fast diagnosis method delivering results within two hours and to evaluate any upcoming diagnostic methods and give recommendations. It works closely with other national laboratories as well as hospitals and the French National Institute of Health and Medical Research in Paris.



<http://swissinnovation.org/news/web/2017/03-170217-41>



4. Nano / Micro Technology / Material Science

Storing Data in Single-Atom Magnets

(EPFL, March 09, 2017)

Scientists at IBM and EPFL have shown for the first time that it is possible to store and retrieve information from single-atom magnets. Writing on holmium atoms was accomplished with the scanning tunneling microscope using pulses of electrical current to allow electrons to tunnel through the tip and to reverse the magnetization of the atoms. To read the data, the scientists relied on a phenomenon called “tunnel magnetoresistance”, which enabled them to see the direction of the holmium atom’s magnetization. The new technique, published in Nature, can have significant implications for the miniaturization of magnetic memory devices.

<http://swissinnovation.org/news/web/2017/04-170309-58>

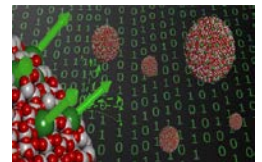


Single Atom Data Storage

(ETH Zurich, March 30, 2017)

The most compact data storage can be achieved by using only a single atom to store a binary bit. In other words, a single magnetic atom that is magnetized at either spin up or spin down. Researchers at ETH Zurich have developed a method for creating a nanoparticle with single magnetic atoms distributed on its surface. Specifically, they deposited dysprosium atoms onto silica nanoparticles by transporting them with a sacrificial molecular structure and then fusing them through annealing. The magnetization is currently limited to operating at minus 270 degrees Celsius and holds information for 90 seconds. Further research will extend these limits.

<http://swissinnovation.org/news/web/2017/04-170330-fd>

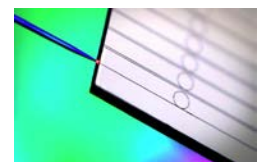


On-Chip Frequency Comb

(EPFL, February 14, 2017)

Researchers at EPFL are developing an on-chip frequency comb. A frequency comb is used to measure the frequencies in an optical signal by linking it to the radio frequency domain. Previous designs required bulky optical setups, but this new design uses optical microresonators to achieve the same result in a much smaller form factor. Additionally, the device is self-referencing, which also contributes to the smaller size. Accuracy was compared to a traditional frequency comb and found to be accurate to twelve digits. Such a device could lead to more accurate atomic clocks and measurement devices.

<http://swissinnovation.org/news/web/2017/04-170214-5f>



Material Scientist Wins Women in Science Award

(ETH Zurich, March 23, 2017)

Recently, the L'Oreal-Unesco For Women in Science awards were handed over for the 19th time. ETH professor and material scientist Nicola Spaldin received the one for the Europe region. Her research focuses on so-called multiferroic materials whose characteristic is being both magnetic and electric at the same time. She pioneered the field by providing the basis of understanding and built upon that allowing the development of these materials. The prize is prestigious and includes a prize money of €100,000. It is awarded to outstanding female researchers in Africa, Europe, Latin America, North America and Asia and aims to promote women in science.

<http://swissinnovation.org/news/web/2017/04-170323-e8>





5. Information & Communications Technology

Multi-Channel Digital Storytelling

(startupticker.ch, March 30, 2017)

Out of the problem faced when wanting to publish content on different digital channels, the Swiss startup Newsroom Communication derived its duty to facilitate digital communication through various means. Its product is called "Storyshaker" and combines publishing on homepages, apps, social media and screens. Their single platform allows to feed all these channels and there is no need for separate publishing tools. Founded in summer 2016, the startup has well-known customers such as Swiss Olympic, the Swiss party FDP, Messe Schweiz, Swiss Marketing Forum, Swiss Economic Forum, the Swiss soccer club BSC Young Boys and the German VfB Stuttgart already.



<http://swissinnovation.org/news/web/2017/05-170330-63>

At Detecting an Unknown Boundary

(ETH Zurich, February 14, 2017)

Some artificial intelligence algorithms that classify data use a known boundary between sets during algorithm training. However, the correct boundary is not always known. A new algorithmic approach from researchers at ETH Zurich overcomes this problem by using algorithm sorting performance to determine the correct boundary. The algorithm is trained with multiple arbitrary boundaries and then the performance under each scenario is analyzed. The best performance determines the correct classification boundary. There are wide-ranging applications to this approach.



<http://swissinnovation.org/news/web/2017/05-170214-c9>

6. Energy / Environment

Explosion in Species Diversity Due to Hybridization

(University of Bern, February 10, 2017)

In Lake Victoria (East Africa), 500 new species of cichlids, brightly colored perch-like fish, evolved over the past 15,000 years – a record in the animal and plant world. Scientists from Eawag and the University of Bern have now solved this evolutionary puzzle. In a study published in Nature Communications, they demonstrate that this rapid evolution was facilitated by earlier hybridization between two distantly related cichlid species from the Upper Nile and Congo drainage systems. This enabled genetic variants to be recombined on a scale that would be impossible in a single population. However, hybridization has two sides: where new niches are available for occupation, increased genetic diversity can lead to new adaptations and new species; where niches disappear, it can mean the loss of diversity.



<http://swissinnovation.org/news/web/2017/06-170210-82>

Successful Reforestation Requires Active Planting

(ETH Zurich, February 15, 2017)

ETH Zurich researchers examined a fragmented area of rainforest in Western India with a size of 216 square kilometers. Focusing on trees with large fruits and seeds, they found that protection, which means leaving the area to nature only, is not enough to make the rainforest recover vastly. The seeds of these trees are distributed through birds. By means of genetic maternity testing the scientists found that the young trees grow within a maximum distance of about 200 meters of the mother tree only though. Therefore, they expect the birds to spit the seeds out pretty soon, because of the seeds' big size. Hence, the team





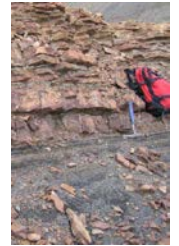
concludes that effective reforestation of these mostly endangered tree types requires active planting, and natural recovery through protection is not sufficient.

<http://swissinnovation.org/news/web/2017/06-170215-0a>

Cold May Have Contributed to Mass Extinctions

(University of Geneva, March 06, 2017)

The Earth has experienced several mass extinctions. A major one occurred at the Permian-Triassic boundary 250 million years ago. Over 95 percent of marine species disappeared, and scientists previously linked this extinction to a significant rise in Earth's temperature. However, researchers from the University of Geneva and the University of Zurich have discovered that this extinction took place during a short ice age that preceded the global climate warming. The stages of a mass extinction are now better understood and scientists can assess the major role played by volcanic explosions in these climate processes. This research, published in Scientific Reports, shows that climate warming is not the only explanation for global ecological disasters and that ancient marine sediments require further analysis to better understand the Earth's climate system.



<http://swissinnovation.org/news/web/2017/06-170306-c2>

Random Asteroid Bombardment

(ETH Zurich, March 06, 2017)

Researchers at ETH Zurich have shown, through new statistical analysis, that Earth is bombarded by asteroid at random, not periodically, as hypothesized by precedent research. Previous studies used crater age data to show a periodicity of 26 million years. However, the researchers of the new study corrected some of the data about the age of craters. They then used circular spectral analysis to show that there is no clustering of impacts around 26 million years.



<http://swissinnovation.org/news/web/2017/06-170306-43>

Collaboration For Solar R&D

(CSEM, March 15, 2017)

The "Centre Suisse d'Electronique et de Microtechnique" and the University of Applied Sciences and Arts of Southern Switzerland have decided to expand their collaboration in photovoltaic-related activities. With this intensified cooperation, the two Swiss R&D institutes intend to reinforce and integrate their competencies in research, development and testing with regard to photovoltaic modules and power plants. The goal is to respond to the increasing demand for innovative solar products and to the need for testing and accreditation of commercial solar systems, offering solutions right along the value chain of solar modules and power plants.



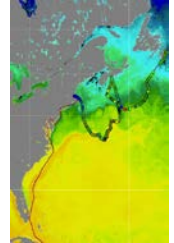
<http://swissinnovation.org/news/web/2017/06-170315-c6>



Ocean Waters Characterize Aerosols

(University of Geneva, March 29, 2017)

Physicists from the University of Geneva discovered that biological aerosols are related to the characteristics of the sea below them. Playing a major role in cloud formation, aerosols have a strong impact on climate models. Aerosols can take many different forms and therefore measuring them is difficult. A new approach offers opportunities to gain data about those fine particles via ocean data retrieved by satellites. By comparing data obtained by a fluorescence detector that analyzes individual aerosol particles in the air, with data on salinity, temperature, oxygen and microalgae of the water – collected by the Swiss solar-powered boat PlanetSolar – the team found a strong relation of biological aerosols and the temperature and salinity of the sea. This justifies using ocean data to simulate aerosols without actually measuring the aerosols themselves.



<http://swissinnovation.org/news/web/2017/06-170329-ec>

7. Engineering / Robotics / Space

Robotic Cochlear Implant Device

(University of Bern, March 15, 2017)

Researchers at the University Hospital of Bern and the University of Bern are developing a robot to assist in performing cochlear implant surgery. This operation implants a device in the inner ear to help deaf patients regain hearing. The challenge is gaining access to the inner ear through a carefully drilled hole without damaging nerves. The new robot uses several safety devices to assure proper surgery, including an optical tracking system, a resistance sensor that can feel the texture of the bone being drilled, and a nerve stimulation probe that checks the track of the drill. This robot enables minimally invasive operation.



<http://swissinnovation.org/news/web/2017/07-170315-62>

European Space Agency Collaborates on Swiss Nano-Satellites

(startupticker.ch, March 24, 2017)

The Swiss-based startup ELSE pushes its core project called ASTROCAST forward. The company intends to launch a network of 64 nano-satellites in the Low-Earth Orbit to offer global Machine-to-Machine communication on a low-price level. Up until now, the startup has successfully carried out several high-end projects with renowned partners in the space industry. They were also involved in the invention of the first Swiss satellite. The latest project on nano-satellites is being undertaken with expertise and a €2 million financial support from the European Space Agency. Until 2019 eight of the small satellites shall be brought to the orbit in order to launch commercial service. ASTROCAST attracted a large number of customers and makes the startup ELSE a leading innovator in the space field.



<http://swissinnovation.org/news/web/2017/07-170324-c6>

Supporting Space Innovation Startups

(ETH Zurich, March 24, 2017)

The European Space Agency's "Business Incubation Centre" (BIC) Switzerland program started its second round by choosing seven additional startups. Aimed at promoting space technologies and applications, the program is part of the BIC initiative launched in 2003 by the European Space Agency. The newly selected startups which will profit from one of Switzerland's most attractive startup programs are Pristem from EPFL, Skypull from Ticino, as well as the ETH companies IRsweep, Anybotics, Diramics, Embotech and Fixposition. Since its launch in November 2016, ESA BIC Switzerland has in total selected





ten startups. In a first phase, all companies will benefit from €50,000 of funding. In a second phase, they can access up to €450,000 of further financial support and they will receive technological coaching and get access to ESA's Europe-wide network in industry and research.

<http://swissinnovation.org/news/web/2017/07-170324-bf>

Birth of the Universe's First Galaxies Revealed

(University of Geneva, March 16, 2017)

An international team of astronomers, including two researchers from the University of Geneva, has discovered a group of small galaxies in the process of forming at a distance of more than 11 billion light years away. Although rare, they are revealing in unprecedented detail the extreme physical conditions that existed when the first galaxies were formed just after the Big Bang, shedding new light on this previously unknown process. The first galaxies emit little light and lay hidden in a gas fog. Since it is almost impossible to observe them using the currently available means, their birth and early evolutionary phases have never been observed in detail. The research, based on in-depth observations of more than 2,000 galaxies, has been published in Nature Astronomy.

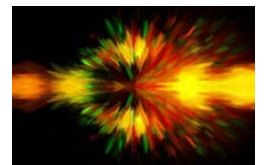


<http://swissinnovation.org/news/web/2017/07-170316-d5>

Peak Signals from the Newborn Universe

(University of Basel, February 10, 2017)

In the newborn universe, the one dominating particle, called inflaton, oscillated and created standing waves in certain regions of space. Those standing waves, referred to as oscillons, do not exist anymore, but the gravitational waves they once emitted can theoretically be measured today. All accelerating masses emit gravitational waves, changing the geometry of space as they travel through the universe. Professor Stefan Antusch from the University of Basel and his team used numerical simulations to calculate the shape of those oscillon signals, which produced a peak in the broad spectrum of gravitational waves. They succeeded in predicting frequency ranges and intensities that were emitted shortly after the Big Bang. The postulated waves – signals from the earliest universe – need to be measured and confirmed by experimentalists.



<http://swissinnovation.org/news/web/2017/07-170210-00>

8. Physics / Chemistry / Maths

Simplifying Quantum System Computing

(ETH Zurich, February 10, 2017)

Studying quantum behavior of particles is a challenge, particularly if the observed system is made of several particles. The complexity increases exponentially with each additional particle and even the fastest supercomputers cannot handle systems with more than 50 particles. However, many physical applications require precise simulations of quantum systems. Members of the Institute for Theoretical Physics at ETH Zurich have found a way to simplify such computations. By measuring different energy levels they recently succeeded in training an artificial neural network to find out which parameters in a quantum system are most important, and which can be ignored. This simplification makes solving quantum based equations much easier, and understanding larger systems of up to 100 particles could become possible.



<http://swissinnovation.org/news/web/2017/08-170210-c8>



Mathematics as a Key Competency

(ETH Zurich, March 03, 2017)

The importance of mathematics, statistics and data processing for developing and emerging countries was highlighted at this year's Science and Development Forum, which was held by the Department of Mathematics and ETH Global. Many African countries lack basic data, such as information on population development or school education. That is why mathematical education in these countries is in urgent need of improvement. The African Institute for Mathematical Sciences (AIMS) aims to improve the situation. Students at AIMS receive an in-depth mathematical education over two years. They are taught by professors from Europe, including professors from ETH, North America and Asia, who come on a voluntary basis for three weeks to offer courses in their subject area.

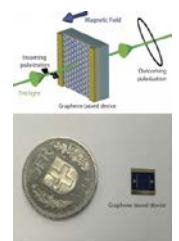


<http://swissinnovation.org/news/web/2017/08-170303-1a>

Tapping the Potential of Terahertz Waves

(University of Geneva, March 07, 2017)

As all electromagnetic waves, terahertz waves can detect certain materials that others cannot. But for terahertz frequencies, lying between the infrared and microwaves, suitable devices still need to be developed. Scientists from University of Geneva and ETH Zurich, together with Spanish colleagues, have now mastered a quick control technique for terahertz waves using graphene, a layer made of single carbon atoms that proves to strongly interact with terahertz radiation. The team combined the electrical field, which controls the number of electrons in graphene and regulates the amount of light passing through, with the magnetic field that bends the electronic orbits. This allows for controlling the intensity and the polarization of terahertz waves. Possible applications of the new transistor are ultra-fast safe telecommunication or medical and pharmaceutical uses, since terahertz waves do not alter the DNA.



<http://swissinnovation.org/news/web/2017/08-170307-a7>

9. Architecture / Design

Modeling Weather on City Buildings

(EPFL, March 16, 2017)

A new model developed at EPFL can help engineers and meteorologists to quickly calculate the effect that city buildings have on local weather patterns. Instead of modeling an entire city, a group of buildings that can represent it are chosen, and the construction density of the neighborhood, the average height, length and width of its buildings. This gives a "standard building" which is divided into "bricks" akin to floors, and stacked these bricks on top of each other. Then meteorological data such as wind speed and direction, temperature and humidity are incorporated into the model. The resulting algorithm lets one generate precise estimates of the weather phenomena occurring at each brick. Engineers could use these types of calculations, for example, to optimize a building's energy consumption by choosing the best facade for each floor.



<http://swissinnovation.org/news/web/2017/09-170316-e4>

Experimental Module Building NEST Awarded

(admin.ch, March 23, 2017)

The Swiss Society of Engineers and Architects (SIA) awarded NEST, a experimental module building in Dübendorf which should help increasing innovation in the fields of energy and construction. At NEST, new technologies, materials and systems can be examined and improved under

sia

schweizerischer ingenieur- und architektenverein
société suisse des ingénieurs et des architectes
società svizzera degli ingegneri e degli architetti
swiss society of engineers and architects



realistic conditions. The jury named it a "globally unique experiment" as it is based on an interdisciplinary approach and includes strong research-industry cooperation. Foremost, they highlighted the chance for material and ecological progress in construction processes by offering living labs. Other reasons were the design and the social relevance of the project. Some of the modules at NEST are still under construction and new ones – on energy production in facades and on digital fabrication for example – are planned or in design stage.

<http://swissinnovation.org/news/web/2017/09-170323-6d>

10. Economy, Social Sciences & Humanities

Cars Are Positively Perceived among Europe's Youth

(EPFL, March 17, 2017)

A new study, carried out by EPFL researchers, shows that European adolescents have a very positive perception of cars. "They're fast, practical, comfortable and safe", the investigation comes up with. The research team focused on 14 to 17 years old young people and surveyed their transportation and mobility stances by analyzing a big number of tweets combined with questionnaires spread via Facebook. The aim was to investigate young people's attitudes as long as they are mostly dependent mobility-wise. Aware of environmental topics, more than four out of five respondents want to get a driver's license still. Public transport is less convenient to them. Girls are even more positive about autos than boys, they feel safe in particular. But the researchers point out, how changeable attitudes towards cars are and how strongly they are influenced by the family.



<http://swissinnovation.org/news/web/2017/10-170317-71>

Trust in Medical Personnel Favors Subjective Well-Being of Patients

(University of Basel, March 09, 2017)

Psychologists from University of Basel, in cooperation with Harvard Medical School, investigated whether trust in medical personnel, as a given ethical standard, actually shows clinical effects in patients. They carried out a meta-analysis of almost fifty studies from four continents. Whereas objective clinical impact such as test parameters and the assessment of state of health by doctors could not be proven, subjective factors were positively influenced if the patient has trust in the staff doing the treatment. Increased trust leads to increased subjectively perceived complaints, quality of life, satisfaction and health-related behavior. Earlier research tried to determine what the mechanism behind this could be, such as greater honesty from patients or compliance with doctors' advice. However, further research is needed in order to clearly understand the causality.



<http://swissinnovation.org/news/web/2017/10-170309-e2>

11. Startups / Technology Transfer / IPR / Patents

Cell Biologists Win ETH's Spark Award

(ETH Zurich, March 30, 2017)

With its Spark Award ETH Zurich awards a prize to the most promising invention of its school in the past year registered for a patent. For 2016, a research group of cell biologists conducting fundamental research on the combat of viral diseases won it. Professor Sabine Werner and her colleagues determined a biological mechanism which enables the treatment of infections containing numerous viruses. Whereas so far,





most drugs counteracted one virus and were comparatively efficient only, this mechanism mobilizes the immune system rather than combating individual viruses. The scientists expect this attempt to have less side effects and to be especially useful in handling epidemics. This social, but also scientific and economic significance justified the prize for outstanding technological transfer. The team's invention is one out of 109 newly registered patents by ETH in 2016.

<http://swissinnovation.org/news/web/2017/11-170330-da>

venture leaders China Startups Are Selected

(venturelab.ch, March 31, 2017)

For the fourth time, ten Swiss startups were chosen to participate in a structured program which aims at helping them to start their business in China. The companies cover a wide spectrum of fields such as cleantech, ICT, mobility or medical technology. They will have the chance to meet potential investors, get expertise on the Chinese market and profit from high level visibility and networking opportunities. The 10-day program – made possible by venturelab, the Swiss Embassy in Beijing, swissnex China and Chinese entrepreneurs – will bring the upcoming companies to Beijing, Shanghai, Shenzhen, Hong Kong and Dalian, where the World Economic Forum takes place. There, the startups will display their work and promote Swiss innovation.

<http://swissinnovation.org/news/web/2017/11-170331-50>



450 Applications to MassChallenge Switzerland in Lausanne

(masschallenge.org, March 31, 2017)

MassChallenges' second edition in Switzerland started in the beginning of February 2017. It is based in Renens, close to Lausanne where the Swiss Federal Institute of Technology has its location. The newly launched accelerator program received 450 applications until now. More than half of the applicants are from outside of Switzerland. The biggest share of the applying startups – namely 43 percent – may be attributed to the field of High Tech. 16 percent of them cover the Healthcare/Life Sciences, 10 percent the Social Impact, and about 5 percent the Energy/Clean Tech sector, whereas the rest is categorized generally. The selected startups will undergo a four months acceleration program including workshops, mentoring and networking sessions.

<http://swissinnovation.org/news/web/2017/11-170331-3d>



12. General Interest

Application for Continuous Employee Evaluation and Feedback

(startupticker.ch, March 14, 2017)

The Swiss-based startup Quercus intends to replace the classic yearly employee feedback and provides companies with an App which allows more regular evaluation. Evaluators do the assessment independent from time and place. This makes employees receiving feedback from colleagues and managers about 90 times a year on average. Hence, they can identify their weaknesses and strengths earlier and improve their performance steadily. Likewise, the company can keep track of personal and team developments continuously, in comparison to the usual yearly meeting for which months pass without any assessment. By now, twenty companies in the Netherlands, England, Germany, Finland and Switzerland are using the application.

<http://swissinnovation.org/news/web/2017/10-170314-e9>





13. Calls for Grants/Awards

Call: Startups in Flavor and Fragrances Industry

(givaudan.com, March 01, 2017)

Givaudan, a global leader in the creation of flavors and fragrances, calls for startups in the wider field of taste, smell and beauty to work from their offices and laboratories in its "Zurich Innovation Centre". Planned to open in 2019, the company develops an innovation hub in Kempththal close to Zurich. It is intended to be an inspiring ecosystem to foster science and innovation in the above-mentioned fields. Selected young entrepreneurs and companies offering innovative technologies, products and services in the flavor and fragrances industry will be provided workspace, basic innovation services and access to Givaudan's expertise and network.



Call deadline: April 30, 2017

<http://swissinnovation.org/news/web/2017/13-170301-5c>

Call: Kickstart Accelerator 2017

(kickstart-accelerator.com, March 01, 2017)

Kickstart – The Swiss Accelerator, is calling for international startups in the sectors including FinTech, Food, Robotics & Intelligent Systems, Smart Cities, Healthcare for their 2017 program. Once selected, the startup will have direct access to over 15 leading corporate partners, top-level mentors, and experts, and will get the chance to win up to CHF 25,000. In 2016, the Chinese startup SuRong 360 won the first prize in the category FinTech.



Application deadline: April 30, 2017

<http://swissinnovation.org/news/web/2017/13-170301-36>

Call: venture leaders Fintech, New York

(venturelab.ch, March 01, 2017)

For the 17th year, the venture leaders' startup development program will offer 10 selected Swiss based Fintech startups the opportunity to grow their business in the US and to conquer the global markets. The selected startups called "venture leaders" – members of the Swiss national startup team – will spend a week in NYC in September 2017. There, they will have the chance to network with and pitch their business ideas to top Fintech investors, experts and industry leaders, review and discuss US market penetration, financing strategies and internationalization with experts, as well as meet with other Fintech startups from Switzerland and from the Big Apple.



venture leaders

Application deadline: May 14, 2017

<http://swissinnovation.org/newsUS/web/2017/13-170301-86>



Upcoming Science and Technology Related Events

Swiss Biotech Day 2017

May 4, 2017

<http://swissbiotechday.ch/home/>

Biotech, Pharma
Basel

25th ESACT Meeting

May 14-17, 2017

<http://www.esact2017.com/>

Animal Cell Technology
Lausanne

8th SCTO Symposium

June 1, 2017

<http://ow.ly/Y69G30aNCcB>

Clinical Research
Basel

2nd Swiss Medtech Day

June 13, 2017

<http://www.swissmedtechday.ch/home.html>

Medtech Industry, Innovation
Bern

Swiss Biotech @ BIO Convention 2017

June 19-22, 2017

<http://ow.ly/PxL030aNyww>

Biotech
San Diego, USA

Swiss Diagnostics Start-Up Day

June 29, 2017

<http://ow.ly/ggpM30aNAbf>

Diagnostics Industry, Startups
Olten

Top 100 Swiss Startup Award 2017

September 6, 2017

<http://ow.ly/LzqZ308SFHm>

Innovation, Entrepreneurship, Startup
Zurich-Schlieren

Swiss startups @ Medtech and Healthcare Startup Tour India

October 3-8, 2017

<http://ow.ly/Pclh30aNzGz>

Medtech, Healthcare
Bangalore/Mumbai

Life Sciences Symposium

October 24-26, 2017

<https://lss2017.epfl.ch/>

Metabolism, Cell Biology, Physiology, Genetics
Lausanne

22nd International Transport and Air Pollution Conference (TAP2017)

November 15-16, 2017

<http://tapconference.org/>

Air Pollution, Mobility, Emission, Policies
Zurich

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