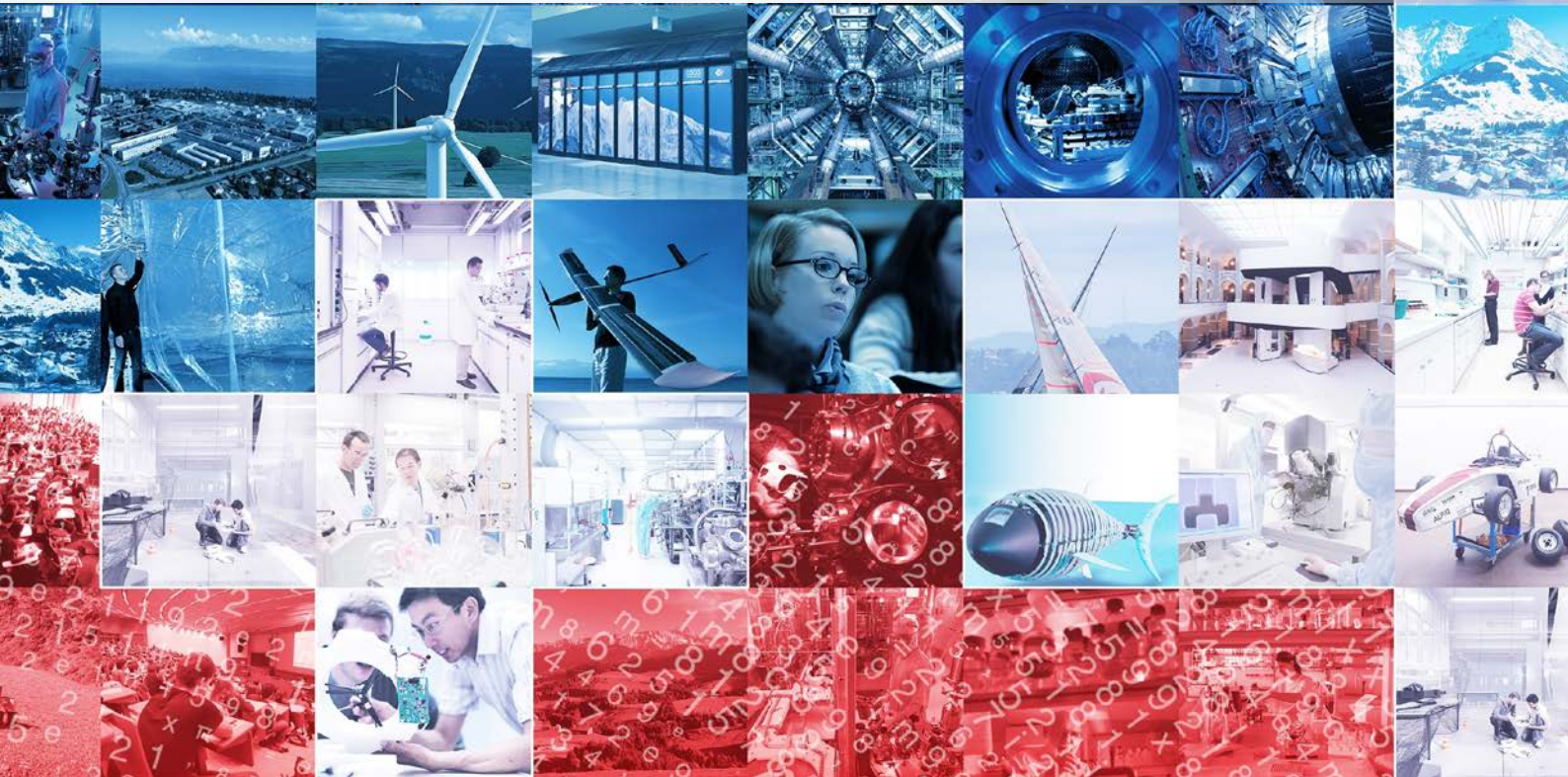




# Science-Switzerland, June – July 2017

News on Swiss science, technology, education and innovation



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## Switzerland and the European Research Council

(admin.ch, July 06, 2017)

In 2017, the European Research Council (ERC) turned ten years old. The EU's program aims at reinforcing basic research by awarding grants to excellent researchers in all disciplines doing research in an EU member or associated state. Scientists being based in Switzerland have been particularly successful in receiving funds. Swiss applications have had an approval rate of 24 percent, compared to an 11 percent European average. In total, Switzerland received 520 ERC grants and total funding of about EUR 900 million since 2007. This makes the country being ranked number five behind the UK, Germany, France, and the Netherlands. In its anniversary plenary meeting held at CERN in Geneva, the ERC grants' importance for researchers' scientific career, the quality and the quantity of groundbreaking research projects were highlighted by various guests.



<http://swissinnovation.org/news/web/2017/00-170706-09>

## Thomson Reuters Labs – a New Fintech Startup Incubator in Zurich

(Switzerland Global Enterprise, July 07, 2017)

In order to promote Swiss startups in fintech, artificial intelligence, advanced analytics, and machine learning, Thomson Reuters has launched an incubator in Zurich. At Thomson Reuters Labs, the selected startups will receive access to Thomson Reuters' data and content sets. They will also be mentored and get valuable networking opportunities to find investors. Måns Olof-Ors, Head of Thomson Reuters Labs Zurich Region, said the goal of the incubator is to “[...] gain valuable insight, [work] with creative disruptors to identify new opportunities and ensure [it is] providing [its] clients with the most up to date trends impacting their professional markets”. Further labs are located in Singapore, Cape Town, London, Boston and Waterloo.



<http://swissinnovation.org/news/web/2017/00-170707-dd>

## 1. Policy

### Swiss Masterplan for the Promotion of Biomedical Research

(admin.ch, June 21, 2017)

The Masterplan for the Promotion of Biomedical Research was launched by the Federal Council with the aim of boosting Switzerland as a center of research and technology, and assuring the population affordable access to new products developed in biomedicine. The masterplan is being implemented in close collaboration with partners in research, industry and healthcare. The masterplan comprises 23 measures covering education/training and continuing education, the framework for research involving humans, health data, rare (orphan) diseases, market access and reimbursement. Some of these measures have already been implemented, and major progress has been made on others. The current areas of focus include young research talent, promoting research, medical device safety and the security of drug supply.



<http://swissinnovation.org/news/web/2017/01-170621-ee>



## Digitalization: Strengthening Education and Research

(admin.ch, July 05, 2017)

The Swiss Federal Council approved an action plan to strengthen education and research in the course of digitalization. In the education field, the MINT subjects should be promoted, the vocational training should be made more flexible in order to be able to adapt it to new developments, and continuing education should help preparing employees for the demands in the digital age. In research, interdisciplinary national research programs on "Digital Transformations in Economy and Society" are going to be launched. Informatics and Computer Science as basic sciences should be promoted crossdisciplinarily, and new professorships should be created. In order to prepare the industry, impulse programs and a national association of technology transfer centers for production technologies will be established. The Federal Council will approve the exact budget, considering other expenses, in the fall 2017.

<http://swissinnovation.org/news/web/2017/01-170705-df>



## 2. Education

### Four New Tech-driven Master Degree Programs at USI

(USI, June 06, 2017)

All having a critical focus on human thought and technological developments, the Università della Svizzera italiana (USI) launches four new Master degree programs starting in fall 2017. The university in Lugano newly offers the first Master in Artificial Intelligence. As AI is becoming ubiquitous and all important players in the technology sector are making massive investments into it, USI decided to build on its thirty years of experience in AI research, and create the first Swiss graduate program solely focusing on AI. The new Master in Financial Technology and Computing, also the first of its kind in the country, aims at combining Finance with programming, in a world in which major financial activities are handled by digital technologies. Through digitalization processes, software and data processing are infiltrating all sectors. Hence, USI is offering a new degree in Software & Data Engineering. The last Master program is in Philosophy, focusing on either Mind, Language, and Society, or Mind, History, and Literature.

<http://swissinnovation.org/news/web/2017/02-170606-f2>



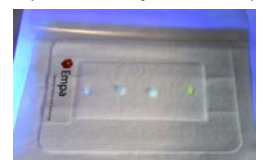
## 3. Life Sciences / Health Care

### Smart Bandage Visualizing Wound's Status

(EMPA, July 04, 2017)

The idea of being able to see through a wound dressing gave rise to the project Flusitex, which is being funded by the Swiss initiative Nano-Tera. Researchers from Empa teamed up with ETH Zurich, Centre Suisse d'Electronique et de Microtechnique (CSEM) and University Hospital Zurich to develop a high-tech system that is supposed to supply the nursing staff with relevant data about the condition of a wound. At the moment, color changes caused by pH variation can be visualized with simple UV lamps. One day, it might even be possible to read the signals with the aid of a smartphone camera. This would enable nursing staff and doctors to easily and conveniently read the wound status, even without a UV lamp.

<http://swissinnovation.org/news/web/2017/03-170704-b0>

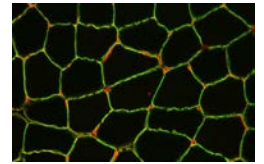




## Treating Muscular Dystrophy

(University of Basel, June 29, 2017)

Muscular dystrophy is a term used to describe many different muscular diseases caused by genetic defects. To date, there are no treatments available to stop disease progression. A research team at the Biozentrum of the University of Basel, has now designed two proteins that not only recover muscle force and increase body weight in the sick animals but also significantly prolong survival. Both of the designed proteins may possibly be used in the future as a gene therapy treatment for congenital muscular dystrophy. The study is a nice example of how the understanding of a disease on the molecular and cellular level results in new therapeutic options.



<http://swissinnovation.org/news/web/2017/03-170629-14>

## 3D Printed Soft Artificial Heart

(ETH Zurich, July 13, 2017)

ETH researchers have developed a silicone heart that beats almost like a human heart. Currently used blood pumps have many disadvantages: their mechanical parts are susceptible to complications while the patient lacks a physiological pulse. The soft artificial heart was created from silicone, using a 3D-printing, lost-wax casting technique; it weighs 390 grams and has a volume of 679 cm<sup>3</sup>. This artificial heart has a right and a left ventricle, just like a real human heart. However, they are not separated by a septum but by an additional chamber. This chamber is in- and deflated by pressurized air and is required to pump fluid from the blood chambers, thus replacing the muscle contraction of the human heart. Currently, the artificial heart lasts for about 3,000 beats only, afterwards the material can no longer withstand the strain.

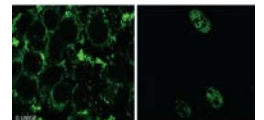


<http://swissinnovation.org/news/web/2017/03-170713-5d>

## How Healthy Cells Stimulate the Migration of Tumor Cells

(University of Geneva, June 15, 2017)

Estrogens act as a driving force of both healthy and cancerous mammary cell growth by binding to receptors that include a type named GPER – usually located in cell membranes. Recent studies have revealed the unusual presence of this receptor in the nuclei of fibroblasts – cells of the connective tissue – surrounding mammary tumor cells. Researchers at the University of Geneva have discovered that this is another version of GPER, a nuclear variant of this receptor, with different properties. The fibroblasts carrying this variant promote the migration of neighboring malignant cells, thus participating in the process of tumor metastasis. The genetic variant of GPER could therefore predispose to breast cancer. These findings, which may lead to a novel therapeutic strategy, are published in *Oncotarget*.

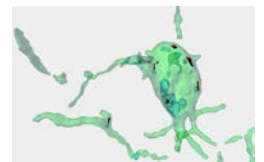


<http://swissinnovation.org/news/web/2017/03-170615-23>

## Overactive Scavenger Cells May Cause Neurodegeneration in Alzheimer's

(University of Zurich, June 29, 2017)

For the first time, researchers from the University of Zurich demonstrated a surprising effect of microglia, the scavenger cells of the brain: If these cells lack the TDP-43 protein, they not only remove Alzheimer's plaques, but also synapses. This removal of synapses by the scavenger cells presumably leads to neurodegeneration observed in Alzheimer's and other neurodegenerative diseases.



<http://swissinnovation.org/news/web/2017/03-170629-dd>

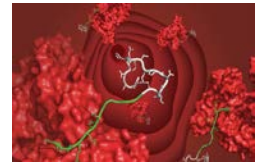


## New Ligand Extends the Half-life of Peptides from Minutes to Days

(EPFL, July 17, 2017)

Peptides are biological molecules, made up of short sequences of amino acids. Because they are easy to synthesize, show low toxicity and high efficacy, peptides – such as insulin and other hormones – can be used as drugs. However, peptide drugs are quickly cleared by the kidneys, so only those that act within minutes can be used. This problem can be overcome by connecting peptides to ligands that bind blood-serum proteins such as albumin, allowing the peptide to linger in the bloodstream longer. EPFL scientists have developed a ligand that connects peptide drugs to blood-serum albumin and keeps them from being cleared by the kidneys too soon. As reported in Nature Communications, the ligand can extend the half-life of therapeutic peptides from minutes to several days.

<http://swissinnovation.org/news/web/2017/03-170717-4e>

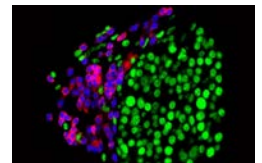


## Cause of Resistance to Tumor Immunotherapy

(University of Zurich, July 25, 2017)

In tumor immunotherapy, the body's own defense system is activated against the tumor cells. However, for the majority of patients, the tumor cells become resistant to the treatments used. Researchers at the University of Zurich and the University Hospital Zurich have now found in skin cutaneous melanoma that an epigenetic control protein is key to the development of this resistance.

<http://swissinnovation.org/news/web/2017/03-170725-37>



## 4. Nano / Micro Technology / Material Science

### Novel Catalyst for Energy Storage

(Empa, July 18, 2017)

A promising way to store energy is the hydrogen storage technique. In this process, electricity from solar or wind is used to split water into oxygen and hydrogen, which can then be stored and later converted into electrical energy using fuel cells. Researchers at the Paul Scherrer Institute and Empa have now developed a new catalyst material that promises to be cheaper and more efficient than conventional catalysts. The novel material – a perovskite, which contains barium, strontium, cobalt, iron and oxygen – accelerates the cleavage of water molecules. This new nano-perovskite is more efficient because of the increased surface area on which the electrochemical reactions happen. It is also cheaper than comparable materials because it does not require precious metals, and the team is convinced that can be easily scaled up to industrial volume.

<http://swissinnovation.org/news/web/2017/04-170718-e7>



### Investigating Microplastics with Methods Used in Nanoparticle Studies

(EMPA, June 26, 2017)

The presence of microplastics in our wastewater can be attributed primarily to two factors. Firstly, many cosmetic products, such as toothpaste, creams, shower gels, and peelings, contain tiny pieces of plastic in order to achieve a mechanical cleaning effect. Secondly, microplastics are washed out in the process of washing polymer textile clothing, and thus they enter our environment via wastewater. On the basis of their nanoparticle research, a team of researchers from the EMPA published a first quantitative investigation of the release of microfibrils from polyester textiles during washing. In this study, the Empa team primarily





investigated the ways in which washing agents, water temperature, and the number and length of wash cycles affect the release of microfibers.

<http://swissinnovation.org/news/web/2017/04-170626-0c>

## Combining Concrete and Wood

(SNSF, July 05, 2017)

Swiss researchers have now developed a radical approach to combining wood and concrete: they are fabricating a load-bearing concrete which itself consists largely of wood. In many blends, the volume fraction of the wood is over 50 percent. The main difference from classical concrete is that the gravel and sand content is replaced with finely ground wood. In other words, sawdust rather than small stones is mixed in with the cement. Thanks to the high wood content, the new building materials show good flame retardance and act as thermal insulation. They weigh at most half of what normal concrete weighs – the lightest of them even float. Moreover, as the materials are based largely on renewable resources, after dismantling they can be reused as a source of heat and electricity. The wood content can be burnt in waste incineration, although for everyday use it conforms to fire protection standards.

<http://swissinnovation.org/news/web/2017/04-170705-a8>

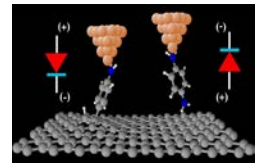


## Graphene Electrodes Improve Efficiency of Molecular Electronic Nanodevices

(University of Bern, June 09, 2017)

The field of nanoscale molecular electronics aims to exploit individual molecules as the building blocks for electronic devices, to improve functionality and aid device miniaturization as well as control. One challenge is to ensure stable contacts between the molecules and metals used, that can operate at room temperature and provide reproducible results. Graphene possesses excellent mechanical stability, plus exceptionally high electronic and thermal conductive properties, making it attractive for use in molecular electronics. As reported in *Science Advances*, an international team of researchers led by the University of Bern and the National Physical Laboratory (NPL) has demonstrated how to improve the functionality of next-generation molecular electronic devices using graphene. This could lead to smaller, higher-performance devices for diverse applications, including molecular sensing, flexible electronics, and energy conversion and storage.

<http://swissinnovation.org/news/web/2017/04-170609-56>



## Ultra-thin, Flexible Conductive Layers on Silicone Rubber Developed

(University of Basel, June 13, 2017)

Flexible electronic parts could significantly improve medical implants. However, electroconductive gold atoms usually hardly bind to silicones. Researchers from the University of Basel have now been able to modify short-chain silicones in a way, that they build strong bonds to gold atoms. The team has developed a procedure that allows binding single gold atoms to the ends of polymer chains. This procedure makes it possible to form stable and homogeneous two-dimensional gold films on silicone membranes. Thus, for the first time, ultra-thin conductive layers on silicone rubber can be built.

<http://swissinnovation.org/news/web/2017/04-170613-df>





## 5. Information & Communications Technology

### digital.swiss Platform on Digitalization

(ICTswitzerland, June 28, 2017)

“Inform, involve, initiate” is the motto of digital.swiss. This interactive platform for the digitalization of Switzerland was created in 2016 by ICTswitzerland and today is a joint project of ICTswitzerland, economiesuisse and digitalswitzerland. The platform visualizes and addresses digitalization opportunities and challenges for Switzerland. The current status of digitalization is measured by using 15 thematic categories and mapping their progress. A comprehensive update is now available with new indicators, parameters and all the databases and calculations, including freely available downloads. The indicators have been made more intuitive and understandable, e.g. showing where improvement is urgent. A lot of the data has also been updated, revealing the first emerging trends. The index shows a positive trend, and Switzerland appears well-positioned to master the challenges of digitalization.



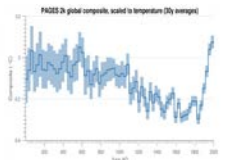
<http://swissinnovation.org/news/web/2017/05-170628-b1>

## 6. Energy / Environment

### Launch of Most Comprehensive Database on Past Global Temperature Changes

(University of Bern, July 11, 2017)

Past Global Changes (PAGES), an international climate change research organization affiliated to and having its main office at the University of Bern, recently made its database on past global temperature through climate reconstructions available online. Temperature estimations based on the analysis of biological and geological sources, such as tree rings, corals, glacier ice, or sediments, help to indirectly approach past temperatures before routine measurements were made. The database is the most comprehensive one on past global temperature patterns and allows to investigate the development as well as the causes of temperature changes in the past, also in order to predict the future. It is publicly available to anybody. In this international effort, the University of Bern was one of a few institutions being involved in all steps from the data collection to editing and the work coordination. Furthermore, the database was initiated by six climate researchers in Bern whose main contribution also was to include data on the Southern hemisphere, as a lot of their projects are undertaken there.



<http://swissinnovation.org/news/web/2017/06-170711-ef>

### Swiss Landscape Under Ongoing Deterioration

(admin.ch, June 01, 2017)

The Swiss Government's environment agencies monitor landscape changes and the population's perception of it. The Landscape Monitoring Switzerland (LABES) program's latest report states that the landscape remains under substantial pressure. The observed 34 indicators show an ongoing deterioration, although having slowed down, of the Swiss landscape and only occasional improvements – such as in the revitalization of rivers and streams – could be found. Furthermore, LABES assesses the population's perception of the landscape. Generally, the people like the communes in which they live, with people residing in areas with a high share of protected landscape evaluating the landscape as being more beautiful and authentic than its suburban or urban counterparts. Especially the Central Plateau is affected by urbanization. The growth rate in built-up area there is twice as high as the national average. The report sees





actors on the communal, cantonal and federal level in charge of strengthening the commitment to protect or even enhance landscape quality.

<http://swissinnovation.org/news/web/2017/06-170601-a9>

## Method to Foresee Animals' Population Collapse

(University of Zurich, June 19, 2017)

Researchers from the University of Zurich and the University of Tasmania analyzed data on the commercial whale fishing in the 20th century which led to collapses in the population through overharvesting. The team was the first to show in a wild population that extreme changes in the average body size together with fluctuations in the number of individuals in a population give indications for a collapse, as earlier experimental research showed already. Investigating historic data on blue, fin, sei and sperm whales, they found a remarkable decrease in the physical size. An average sperm whale was four meters shorter in the 1980s than it was in 1905. The results indicate that monitoring the average body size in populations could help predicting a potential collapse. This method could also be used for other species, as the growing human population is endangering animals' population.



<http://swissinnovation.org/news/web/2017/06-170619-0b>

## Wastewater Treatment Plant Upgrade Improves Ecosystems

(Eawag, June 01, 2017)

A research project launched by Eawag aimed to analyze the effect of a planned upgrade of selected wastewater treatment plants (WWTPs) to reduce micropollutant loads. Micropollutants enter rivers and streams in effluents discharged from WWTPs. Between 2013 and 2014, regular sampling was carried out in reaches upstream and downstream of 24 WWTPs and identified the substances present. The analyses demonstrate that numerous micropollutants enter rivers in treated wastewater. Particularly striking was the increase in medicines and household chemicals. In the case of medicines, concentrations were 30 times higher downstream than upstream of WWTPs. Downstream organisms showed various symptoms of stress exerted by micropollutants. But effects of the introduction of an additional treatment step were seen: algae lost their increased tolerance to micropollutants relatively rapidly, and the induced expression of detoxification genes was likewise lost in brown trout living downstream.



<http://swissinnovation.org/news/web/2017/06-170601-b6>

## Examining Compound Climate Extremes

(ETH Zurich, June 30, 2017)

Since the co-occurrence of severe heat and drought generally depends on the correlation between temperature and precipitation in the summer, ETH researchers have calculated the probability of compound climate extremes. Calculating the probability of these two extremes separately and then combining them is not the same as establishing the likelihood of their co-occurrence. The calculations clearly show that compound climate extremes occur much more frequently than previously expected. In terms of health risks, an intense heatwave can lead to dehydration and even premature death in the elderly and very young population. In agriculture, severe drought can ruin crops or lead to escalating irrigation costs. This new study helps to prepare us for what might be in store.



<http://swissinnovation.org/news/web/2017/06-170630-41>





## Effects of Ozone Depletion Found in Tropics

(University of Bern, June 13, 2017)

A study by climate researchers in Bern has now shown that the hole in the ozone layer above Antarctica even affects precipitation in the tropical regions of the Pacific, 10 000 kilometers away. Simulations with a range of different climate models and statistical analyses of observed data from the past 60 years show that the hole in the ozone layer causes a ridge to the east of New Zealand. From that point, a wavy circulation pattern extends over the South Pacific and causes an increase in precipitation in the heart of the South Pacific Convergence Zone, one of the most intense rain belts on earth. The study shows that ozone depletion was in the past a key driver of climate change in the tropical regions of the Pacific, and in the same way, the recovery of the ozone layer will also affect the climate in the future.

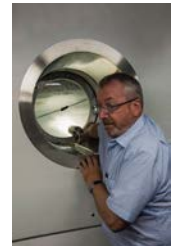


<http://swissinnovation.org/news/web/2017/06-170613-4d>

## Using an Ice Block to Heat and Cool Office Buildings

(Luzerner Zeitung, June 20, 2017)

In two office buildings, ice is being used as a storage for heat. Both buildings connect to a 360 cubic meter ice block. On their roofs, there is a 16 kilometers long solar absorber. A heat pump transfers heat to the ice block during the summer months, and in the winter it works in reverse, returning the stored heat to the building. The two buildings use several heat pumps to cool and warm different zones. The cost of the system is around the same as of a traditional geothermal heat pump.



<http://swissinnovation.org/news/web/2017/06-170620-ae>

## Solar Lanterns with Positive Impact on Health and Environment

(ETH Zurich, July 06, 2017)

As electricity grids are expensive to build and maintain, as the widely-used kerosene lamps have a negative impact on global warming and the indoor air quality, and as solar photovoltaic and battery prices are dropping, compact solar products have received increasing attention to solve energy poverty and sustainability problems. Therefore, ETH researchers conducted a policy field experiment in rural Kenya to investigate the implications of off-grid energy access on poverty. Surveying households which use kerosene lights for lighting, they found that the shift to use solar lanterns has limited financial effects in the way that the families save money substantially. However, the team observed a cut in kerosene consumption by half, which is beneficial for the environment, and less air pollution-related health issues, such as respiratory infections.



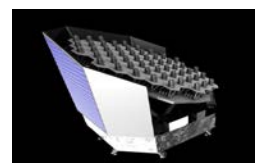
<http://swissinnovation.org/news/web/2017/06-170706-27>

## 7. Engineering / Robotics / Space

### Switzerland's Leading Role in ESA's Exoplanet Mission

(University of Geneva, June 20, 2017)

The European Space Agency launches Europe's largest exoplanet research mission, dubbed PLATO, with major contributions from the Universities of Geneva and Bern. The mission's goal is to discover and characterize planets the size of the Earth and bigger that orbit around solar type stars in the so-called habitable zone. To this end, twenty-six small telescopes of 12 centimeters diameter will be mounted on a satellite to scrutinize about a million stars. The University of Bern is commissioned to design the mechanical structure, which will support the telescopes of PLATO. At the University of Geneva, scientists will work on





recognizing and eliminating “false planets”. They will also determine the masses of the planets using radial velocities, a method the University of Geneva has been renowned for since the first discovery in 1995.

<http://swissinnovation.org/news/web/2017/07-170620-3e>

## Swiss Hyperloop Pod

(ETH Zurich, July 28, 2017)

A Swiss team from several universities, including ETH Zurich, has been working on an entry to the Hyperloop pod competition. The Hyperloop is a new transportation concept proposed by Elon Musk, and a competition is carried out for the first step in developing the transportation pod that runs in the system. The Swiss system will use magnetic levitation and cold gas thrusters to achieve a planned speed of over 400 kilometers per hour. The prototype will be tested at the competition in Los Angeles by the end of August.



<http://swissinnovation.org/news/web/2017/07-170728-e0>

## New Method for Rehabilitation Training

(EPFL, July 19, 2017)

When training to regain movement after stroke or spinal cord injuries, patients must once again learn how to keep their balance during walking movements. Current clinical methods consist of supporting the weight of the patient during movement, which sets the body off balance and makes it hard to re-train the body to balance against gravity later on. In an effort to reduce the limitations of the current therapy, a research team at EPFL developed a multi-directional gravity assist mechanism, which supports patients not only in remaining upright, but also in moving forward. This individually tailored support allows patients to walk in a natural and comfortable way, training the body how to counterbalance against gravity and repositioning the torso in a natural position for walking.



<http://swissinnovation.org/news/web/2017/07-170719-8f>

## Maxon Motor Heads for Mars in 2020

(20 Minuten, July 04, 2017)

The Swiss company Maxon Motor is producing the actuation systems for NASA's Rover Mars 2020 mission. Weighting 816 kilograms, the robot is designed to look for forms of life on Mars, just like its predecessor Curiosity, which is celebrating its five years on Mars this August. Rover Mars will collect samples and prepare them for future missions to be brought back to Earth. On top of that, the robot will be equipped with a tool to find out whether or not oxygen could be produced from the Martian atmosphere. Rover Mars 2020 is not the only project relying on Maxon Motor's technology. NASA's seismic activity instrument called “Mission Insight Lander”, to be launched in 2018, as well as a ESA rover sent to Mars will integrate the company's actuation systems.



<http://swissinnovation.org/news/web/2017/07-170704-d2>

## Autonomous Bus at the Rhine Falls

(20 Minuten, July 04, 2017)

Currently still being tested on the company's testing area, Trapeze's driverless bus is planned to bring up to eleven tourists from the town center of Neuhausen to the Rhine Falls. The bus is driving autonomously controlled by a computer, and automatically stops when approaching an obstacle. Technology allows it to react faster than a human. The company is working together with the public transport operators from the cantons of Zurich and Schaffhausen. Zurich's director Guido Schoch says they are evaluating how and where such a pilotless bus would be applicable in the city of Zurich. In the South-eastern city of Sitten, a similar small self-driving bus has been connecting the train station and the city center for more than a year





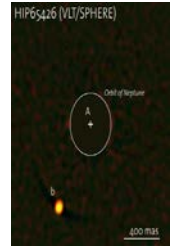
already. Sitten's offer is famous and attracted 21,500 passengers already. However, in Sitten and also at the Rhine Falls, the self-driving buses in these pilot projects still have to be accompanied by an attendant. <http://swissinnovation.org/news/web/2017/07-170704-b1>

## First Exoplanet Discovery with SPHERE

(University of Geneva, July 06, 2017)

Most exoplanets are discovered by detecting attenuations of starlight (transit method) or via the gravitational forces acting on its host star (radial velocity method). Thus, most known exoplanets have never actually been seen. To take pictures of planets outside our solar system, very sensitive telescopes have been built in recent years. For more precise imaging, a deformable mirror – SPHERE – was developed by twelve European institutes, including the Observatory of the University of Geneva. The mirror, mounted at the Very Large Telescope in Chile, has now for the first time discovered a planet. SPHERE corrects the terrestrial atmospheric turbulences, occults the light of the star, and is able to detect the signal of a planet a million times lower than the one of its host star.

<http://swissinnovation.org/news/web/2017/07-170706-6f>



## Measuring Minute Gestures to Control Robots

(Empa, July 10, 2017)

Researchers at Empa, Swiss Federal Laboratories for Materials Science and Technology, have applied piezoresistive fibers to the application of sensing minute hand gestures. They implanted the fibers in the band of a wristwatch using additive manufacturing. An algorithm interprets the signals from these fibers as gestures, such as waves and clenches of the fist. These gestures, in turn, can be used to control robotic systems, such as unmanned aircrafts or ground vehicles.

<http://swissinnovation.org/news/web/2017/07-170710-0e>



## 8. Physics / Chemistry / Maths

### Proton Movement Model in Crystals

(EMPA, June 21, 2017)

Researchers from Empa have shown experimentally that the polaron model of electron movement in crystal lattices also applies to hydrogen ions, or protons. The polaron model hypothesizes that protons jump from one location in the crystal lattice to the next. The experiment used barium ceric oxide crystal, which is non-conductive in a dry environment but becomes conductive when exposed to a steam environment. The experiment characterized conductivity at temperatures between 220 and 520 degrees Celsius and at a range of pressures. The results of this research will help choose materials for fuel cells and characterize the effectiveness of ceramic insulators.

<http://swissinnovation.org/news/web/2017/08-170621-5f>



### High-Sensitivity Force Sensor

(ETH Zurich, June 28, 2017)

Researchers at ETH Zurich have developed a new, high-sensitivity force sensor by levitating a silica nanoparticle in a laser beam. Precise control of the nanoparticle using laser light inside a vacuum minimizes the effect of environmental forces on the particle. Additionally, a high voltage circuit is used to zero the electrical charge on the particle to further reduce its sensitivity to disturbing electrical fields. Once this is done, the





particle can be used to measure very weak forces, such as gravity and those generated by quantum phenomena.

<http://swissinnovation.org/news/web/2017/08-170628-6e>

## 9. Architecture / Design

### House Building with Robots and 3D Printers

(ETH Zurich, June 29, 2017)

At the NEST building in Dübendorf, four construction methods are for the first time being transferred from research to architectural applications, in the DFAB House. Construction work began with the Mesh Mould technology. A construction robot called “In situ Fabricator” moves autonomously on caterpillar tracks even in a constantly changing environment. A steel wire mesh, fabricated by the robot, serves both as a formwork and as a reinforcement for the concrete. A Smart Slab will then be installed – a statically optimized and functionally integrated ceiling slab, the formwork of which was manufactured using a large-scale 3D sand printer. Smart Dynamic Casting technology is being used for the facade on the ground floor: the automated robotic slip-forming process can produce bespoke concrete facade mullions. The two upper floors, with individual rooms, are being prefabricated at ETH Zurich’s Robotic Fabrication Laboratory using Spatial Timber Assemblies; cooperating robots will assemble the timber construction elements.



<http://swissinnovation.org/news/web/2017/09-170629-07>

## 10. Economy, Social Sciences & Humanities

### Trade Liberalization's Benefit for Border Regions

(University of Geneva, June 22, 2017)

University of Geneva and University of Lausanne researchers investigated the impact of open borders on border regions' employment and wages situation. The team compared Austria before and after the fall of the Iron Curtain. This happening represents a natural development, hence was not anticipated by businesses and politicians, and represents an ideal case to examine the consequences of opening up borders to international trade. The researchers compared municipalities on the Eastern frontier bordering Hungary and Czechoslovakia to similar communes further inside the country. In the timespan from 1990 until 2002, the border municipalities had a four percent higher wage growth and a 14 percent higher cumulative employment growth than the communes further inside the country. These results, however, show the overall picture and some economic sectors may also show job loss. Another study from the University of Lausanne, approaching a region's economic activity by measuring the average brightness of night light, seems to back the finding that border regions benefit more from the liberalization of international trade.



<http://swissinnovation.org/news/web/2017/10-170622-41>



## Social Rank Affects Vulnerability to Stress

(EPFL, July 13, 2017)

With the help of a mouse model, EPFL scientists have identified rank in social hierarchies as a major determining factor for vulnerability to chronic stress. Applying an in vivo neuroimaging technique, they have also shown that energy metabolism in the brain is a predictive biomarker for social status as well as stress vulnerability and resilience. These findings reinforce the view that losing status is more pertinent to depression than social subordination. In the future, it will be important to study whether social status can also predict depression or anxiety when individuals are chronically exposed to stressors of a non-social nature.



<http://swissinnovation.org/news/web/2017/10-170713-cc>

## 11. Startups / Technology Transfer / IPR / Patents

### Fusion's LifeTech Accelerator in Geneva

(startupticker.ch, July 05, 2017)

Fusion, operating Switzerland's first Fintech startup accelerator, will open its first LifeTech Accelerator in Geneva in September 2017. It will focus on personalized medicine – specifically technologies that bring innovations in the areas of digital health, IOT, wearables, personal data analysis and management, biometrics, machine learning, genomics and nanotech. La Mobiliere will join as first founding partner, with support from the Federal Institute of Technology in Lausanne (EPFL) as academic partner, and digitalswitzerland, as ecosystem enabler. With the launch of the new LifeTech accelerator, Fusion is moving strongly towards its goal of becoming a global platform that supercharges innovation. International and Swiss startups with a strong product and early customers (B2B, B2B2C & B2C) within LifeTech were able to apply for it.



<http://swissinnovation.org/news/web/2017/11-170705-52>

### Swiss Manufacturing Firms Innovate and Thrive

(University of St. Gallen, July 20, 2017)

The 2017 Swiss Manufacturing Survey study examines the competitiveness, innovative capacity, opportunities and challenges of Swiss manufacturing companies. Researchers at the University of St. Gallen's Institute of Technology Management (ITEM-HSG), with the help of Raiffeisen and Swissmem, evaluated data on 247 firms from 14 industries ranging from machine-building to textiles. About 80 percent of the firms interviewed were small and medium-sized enterprises (SMEs); 44 percent operate internationally. The report reflects the latest trends, opportunities and obstacles faced by Switzerland's manufacturing companies. Despite the unfavorable exchange rate and high labor costs, the Swiss production landscape has good prospects thanks to its sound economic basis. Moreover, products from Switzerland are still considered superior to their foreign competitors' in terms of quality, reliable delivery and innovation.



<http://swissinnovation.org/news/web/2017/11-170720-0a>

### Field-specialized Training for Young Entrepreneurs

(admin.ch, June 23, 2017)

From 2018 on, the Swiss Innovation Promotion authority Innosuisse – formerly known as the Commission for Technology and Innovation – will offer adapted training courses for young entrepreneurs. Newly, the two five-day classes on both business creation and development are going to be split up between and focused on ICT, Advanced Engineering, Biotechnology/Pharmaceuticals, Medical Technology, and Social





Entrepreneurship, instead of being jointly offered to startups from all fields. The public call for bids was won by the IFJ Institut für Jungunternehmen AG, which carries out the first four training courses, and the ZHAW School of Management and Law, which offers the class on Social Entrepreneurship. Each startup will also receive a coaching of three hours. The business creation and development training courses are completed by around 450 entrepreneurs each year.

<http://swissinnovation.org/news/web/2017/11-170623-fe>

## 12. General Interest

### Traceable Bacteria to Prove Cheese's Swiss Origin

(House of Switzerland, July 19, 2017)

For more than a century, Agroscope – the Swiss center of excellence for agricultural research – has been providing Swiss cheesemakers with specific bacteria cultures. The specialty of these exclusive cultures is that they are traceable and allow to assure the "protected designation of origin" (known as AOP) for Swiss cheese. Agroscope now offers around 40 different strains of bacteria cultures. The majority are lactic acid bacteria which make the milk curdle, and impedes undesired germs from flourishing.



<http://swissinnovation.org/news/web/2017/12-170719-f2>

## 13. Calls for Grants/Awards

### Call: Swiss Startups Able to Apply for Horizon 2020 SME Instrument

(startupticker.ch, July 01, 2017)

Since the beginning of 2017, the European Union's Horizon 2020 SME (Small-to-Medium Enterprise) instrument allows Swiss SME and startups to apply too. The program has funds over EUR 3 billion with each chosen project to receive EUR 50'000. The SME instrument aims at supporting small-to-medium enterprises having a high potential with innovative ideas being prepared to enter the global market competition.



Beginning of July 2017, the first Swiss companies to receive funding were announced: AMPHIRO (cleantech, shower consumption trackers), Daedalean (ICT, autonomous flight control for future personal electrically driven aircrafts), DEPsys (cleantech, platform for smart grid optimizing), and SENSARS NEUROPROSTHETICS (Medtech, neuroprosthesis allowing to feel missing limb again). The money the companies receive is intended to carry out a feasibility study, business support services, and three days of coaching. In the Phase 2, the firms may apply for further funding to bring the ideas to industrial maturity and prepare to enter the market.

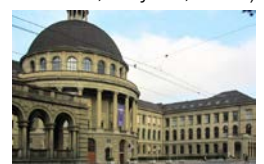
For further information and application, contact the Euresearch SME Contact Points.

<http://swissinnovation.org/news/web/2017/13-170701-9d>

### Call: ETH Zurich Postdoctoral Fellowships

(ETH Zurich, July 01, 2017)

The "ETH Zurich Postdoctoral Fellowship Program" supports incoming fellowships for postdoctoral researchers at the ETH Zurich. The program is intended to foster high-potential, young researchers who have already demonstrated excellence in terms of internationally competitive achievements in the early stages of their professional careers. Applications have to be made jointly by the candidate and their host who





must be an ETH Zurich Professor and who will act as a mentor of the fellow. The duration of an ETH Fellowship is two years and cannot be prolonged. It is assumed that ETH Fellows are primarily interested in following an academic career.

Submission deadline: September 1, 2017

<http://swissinnovation.org/news/web/2017/13-170701-14>

## Upcoming Science and Technology Related Events

### Swiss Future Technology Forum

September 1, 2017

<http://www.sftf.ch/2017/>

Technology

Dübendorf, Zurich

### 13<sup>th</sup> Symposium of the Zurich Center for Integrative Human Physiology

September 1, 2017

<http://ow.ly/crKY30ctbT2>

Human Physiology

Zurich

### The Economics of Innovation: from Basic research to the Market

September 4-6, 2017

<https://theeconomicsofinnovation.org>

Innovation Theory and Process

Geneva

### Top 100 Swiss Startup Award 2017

September 6, 2017

<http://ow.ly/LzgZ308SFHm>

Innovation, Entrepreneurship, Startup

Zurich-Schlieren

### Bio Tech 2017: Sensor Technology and Online Analytics

September 7-8, 2017

<https://biotech2017.ch/>

Bio Processing, Sensor Technology, Online

Analytics

Wädenswil, Zurich

### Design Biennale Zürich

September 7-10, 2017

<http://www.designbiennalezurich.ch/>

Design, Discipline

Zurich

### Basel Life

September 10-13, 2017

<https://www.baselife.org/>

Life Sciences, Technology, Application, Business

Basel

### 9<sup>th</sup> International Conference on Structural Biology

September 18-20, 2017

<http://structuralbiology.conferenceseries.com/>

Structural Biology

Zurich

### 17<sup>th</sup> Annual Biotech in Europe Forum

September 26-27, 2017

<http://www.sachsforum.com/17bef-about.html>

Biotech, Life Sciences, Industry

Basel

### 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

### 22<sup>nd</sup> International Transport and Air Pollution Conference (TAP2017)

November 15-16, 2017

<http://tapconference.org/>

Air Pollution, Mobility, Emission, Policies

Zurich



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