



## Science-Switzerland, August – September 2015

*News on Swiss science, technology, education and innovation*

### Table of Contents

1. Policy.....	2
2. Education .....	3
3. Life Science.....	3
4. Nano / Micro Technology / Material Science .....	10
5. Information & Communications Technology .....	12
6. Energy / Environment.....	12
7. Engineering / Robotics / Space .....	17
8. Physics / Chemistry / Math.....	19
9. Architecture / Design.....	21
10. Economy, Social Sciences & Humanities.....	21
11. Technology Transfer / IPR / Patents .....	23
12. Calls for Grants/Awards .....	24
Upcoming Science and Technology Related Events .....	24

## Rankings

### Four Swiss Universities in Top 100 of Shanghai Ranking 2015

(Academic Ranking of World Universities, August 18, 2015)

Together with the QS World University Rankings and the Times Higher Education World University Rankings, Shanghai Ranking is one of three main ranking lists used to compare higher education institutions worldwide. Harvard University remains the number one in the world for the 13th year. Other Top 10 universities are: Stanford, MIT, Berkeley, Cambridge, Princeton, Caltech, Columbia, Chicago and Oxford. In Continental Europe, ETH Zurich (20th) in Switzerland takes first place. University of Tokyo (21st) and Kyoto University (26th) keep their leading positions in Asia. University of Melbourne (44th) tops other universities in Oceania. Besides ETH Zurich, University of Zurich (54th, 2), University of Geneva (58th, 8) and University of Basel (87th, 3) are also in the Top 100. Federal Institute of Technology Lausanne (EPFL) is ranked between 101-150. University of Bern is ranked between 151-200 and University of Lausanne between 201-300.

<http://swissinnovation.org/news/web/2015/00-150819-c7>

### ETH Zurich Also Made it into the Top Ten of the Renown THE Ranking

(ETH Zurich, September 27, 2015)

The Times Higher Education World University Rankings list MIT as number 5 and Harvard slipped from second to sixth place. Caltech tops the list, before University of Oxford. ETH Zurich has secured its first ever top-ten spot in the latest Times Higher Education World University Rankings (THE rankings). The ninth-place ranking is an improvement of four positions on last year. The QS rankings published a few weeks ago also put ETH in ninth position. Compared with last year, ETH Zurich scored relatively higher across all indicators except for the score teaching.

<http://swissinnovation.org/news/web/2015/00-150928-34>

### Switzerland Topps Global Innovation Index

(SBFI, September 30, 2015)

For the fifth year in a row, Switzerland has topped the Global Innovation Index (GII), ahead of the United Kingdom, Sweden, the Netherlands and the United States. These last two countries have improved their rankings, while Finland and Denmark are both ranked lower than they were in 2014. Ireland has returned to the top 10. Political stability, environmental performance, the number of patents per capita and collaboration between universities and businesses are the strong points that distinguish Switzerland. Despite Switzerland's position as innovation leader, there remains some room for improvement, particularly when in the following areas: ease of protecting investors (72nd place), the government's online service index (64th), ease of starting a business (59th) and number of graduates in science and engineering (50th). The GI uses 79 individual indicators to assess 141 countries' capacity for innovation.



## Switzerland is 7th in Soft Power Index

(Portland Communications, September 30, 2015)

The Soft Power 30, which uses a composite index to examine the strength of soft power assets at the disposal of countries, puts the UK above Germany, the United States, France and Canada, which occupy the next four places in the global league table. It is the first index to include the rising importance of digital assets and to use international polling to gauge national reputations across the world. Overall Switzerland is ranked 7th, heading the list in the field enterprise and government.

<http://swissinnovation.org/news/web/2015/00-150930-58>

## 1. Policy

### swissnex Singapore Closes its Doors, New Education and Science Office at Embassy Opens

(SERI, September 28, 2015)

For eleven years, swissnex Singapore shaped and sustainably strengthened relations between Switzerland and Singapore in the fields of education, research and innovation. Today the SERI outpost responsible for fostering exchange in those fields will close. Concurrently, continued support to Swiss ERI stakeholders will be guaranteed by the opening of the new Education and Science Office at the Swiss Embassy. As one of the first swissnex locations, swissnex Singapore made a significant contribution to developing Switzerland's strong presence in Singapore and to establishing a close network of researchers and entrepreneurs of both countries. These solid relations with this important partner country will continue to generate numerous cooperation projects in the future. swissnex Singapore has thus more than fulfilled its tasks and achieved its goals.

<http://swissinnovation.org/news/web/2015/01-150929-e9>

### 22 ERC Advanced Grants Awarded to Switzerland

(ERC, August 08, 2015)

The European Research Council (ERC) has announced the award of its prestigious Advanced Grants to 190 senior researchers. The funding, worth in total €445 million, will enable them to pursue ground-breaking ideas. These are the first ERC Advanced Grants awarded under the 'excellent science' pillar of Horizon 2020, the EU's research and innovation programme launched in 2014. The new ERC projects will be hosted in 17 countries across Europe, with the United Kingdom (45 grants), Germany (29) and France (23) as top locations. Switzerland, which was excluded from the Starting Grants and Consolidator Grants in 2014, was reintegrated into the programmes and ranks 4th, obtaining 22 grants or 12% of the total value of grants awarded. The Advanced Grants were awarded to the following higher education institutions: University of Bern 1, Università della Svizzera italiana 1, University of Zurich 3, EPFL 4, ETH Zurich 7, CERN 1, Friedrich Miescher Institute for Biomedical Research 4, Institute for Research in Biomedicine 1.

<http://swissinnovation.org/news/web/2015/01-150809-92>

### Switzerland's Dual-Track System Exported to the US

(admin.ch, August 29, 2015)

For a number of years now, Switzerland has conducted a dialogue with the United States on vocational education and training (VET), called apprenticeships. VET is a core element of the Swiss educational system and a key reason why young people in Switzerland receive an excellent education and training, providing them with strong career prospects. It also ensures that businesses have access to well-qualified workers. There is increasing international interest in the Swiss model. US Secretary of Labor Thomas Perez paid a visit to Switzerland to get a first-hand look at the advantages and importance of this dual-track system. He and Federal Councillor Johann Schneider-Ammann signed a declaration of intent on intensifying cooperation in vocational education and training.

<http://swissinnovation.org/news/web/2015/01-150830-12>

### Switzerland Cooperating with EU to Build GPS Alternative Galileo

(Aargauer Zeitung, August 13, 2015)

The European Union plans to deploy an alternative for the proprietary US localization service GPS. This system will be called Galileo, and current plans see the system deployed by 2020. There are already 8 Galileo satellites deployed, and before the system goes live, 22 additional satellites will be sent to space and provide their localization services to smartphones and navigation devices. Switzerland is currently planning to participate with



more than 300 Million Euros with the EU-Programme. One of the reasons for participating is to become independent from the more accurate military US GPS system, which is secured by a security code and creates a dependency on the US for the European countries.

<http://swissinnovation.org/news/web/2015/01-150813-9b>

## Government Support for the Swiss Export Industry

(CASH, August 13, 2015)

Federal Councillor and Head of the Federal Department of Economic Affairs, Education and Research, Johann Schneider Ammann has held out the prospect of new grants for export oriented small and medium sized enterprises. These new aid measures are intended to raise the spirits of businesses hit hard by the strong Swiss Franc. While Schneider-Ammann concedes that the low unemployment rate of 3.1% will probably rise, he doesn't expect large-scale layoffs. Further the Federal Councillor warned of the 'dangers of deindustrialization' saying the Swiss economy must guard itself of becoming only service sector oriented and instead support companies in the secondary sector of the economy that provide jobs and perspectives to the people of Switzerland.

<http://swissinnovation.org/news/web/2015/01-150814-d3>

## 2. Education

### A Wave of Mergers Among European Universities and Technical Colleges

(NZZ Campus, August 14, 2015)

A novel study conducted by the European University Association has found that the number of mergers between academic institutions in Europe has risen dramatically in recent years. The reasons for such mergers can be manifold, in some cases the goal is simply to become more cost-effective by consolidating redundant infrastructures. In other cases the focus is on elevating the quality of teaching and research by becoming a larger institution more able to attract private funds and ultimately more students. While many university-level institutions in Switzerland might seem to have reasons to go down the same route, mergers among colleges are virtually non-existent in Switzerland partly due to the political peculiarities of the education system. However cooperation networks among universities and technical colleges, which can be seen as an alternative to straight out mergers, have been on the rise in Switzerland.



<http://swissinnovation.org/news/web/2015/02-150815-19>

### Swiss Universities Cost Over CHF 7.6 Billion in 2014

(SBFI, September 09, 2015)

In 2014, Swiss universities incurred a total cost of over CHF 7.6 billion, which is an increase of 1.8% from 2013. Staff costs rose to over CHF 4.8 billion, while material costs (including infrastructure) reached nearly CHF 2.8 billion. Universities' core business is research and development, which consequently makes up the largest share of the cost, followed by teaching. Universities of applied sciences incurred total costs of over CHF 2.5 billion (including infrastructure), which is an increase of 4% from 2013. Teaching is the main activity and accounts for 65% of the cost, followed by applied research and development (24%). In terms of financing, it is the cantons that cover the largest share of the total costs (over 52%). Universities of teacher education generated total costs of approximately CHF 644 million in 2014. Spending on teaching, which is their main activity, accounts for 66% of the cost. The cantons bear over 83% of the total cost, the rest is financed privately.

<http://swissinnovation.org/news/web/2015/02-150910-ff>

## 3. Life Science

### 3D Visualization of the Evolution of Living Cells

(EPFL, August 02, 2015)

By combining two cutting edge microscopy techniques into one instrument, researchers at EPFL's bioengineering institute have captured images of living cells with unprecedented resolution and have even been able to observe the evolution of their structure and molecular characteristics. The device the researchers developed is composed of a high-speed atomic force microscope (AFM) — an instrument that "feels" the surface being observed using a tiny force sensitive needle — and a single molecule localization microscope. The scientists developed special software that assembles the images from the two instruments and gives a precise, 3D visualization of the observed sample.

<http://swissinnovation.org/news/web/2015/03-150802-16>



## Biosensor Shows how Malignant Cells Produce Energy

(Université de Genève, August 02, 2015)

To enable cells to function properly, mitochondria bring "fuel" using a transporter, the Mitochondrial Pyruvate Carrier (MPC). To determine whether the MPC is still functional in malignant cells, researchers at the University of Geneva have developed a biosensor to measure the carrier's activity in real time. The MPC was found to have far lower activity in tumor cell lines than in normal cells. It appears that MPC activity is affected by a lack of fuel, rather than transporter dysfunction. The researchers restored MPC's normal activity by administering a new type of anti-tumor compound. The findings are published in *Molecular Cell*. The biosensor developed by the team can help identify other compounds capable of modulating MPC activity, which may lead to new treatments.

<http://swissinnovation.org/news/web/2015/03-150802-4c>

## Why Evolutionary Medicine Matters

(University of Zurich, August 05, 2015)

Infections and diseases of civilization, like back pain or obesity, are closely related to our evolutionary history. Successful treatment therefore relies on relevant knowledge. The International Congress on Evolutionary Medicine held at the University of Zurich explored how evolutionary processes shape our body. Professionals from all over the world attended, from varied fields including anthropology, evolutionary biology, clinical medicine and social science. Evolutionary medicine underlies the whole of modern medicine and is essential to understanding how diseases develop, e.g. how environmental conditions help new pathogens emerge. It also helps understand individual differences, which are key to developing personalized medicine. Medical students need to cultivate an awareness of variability and change, plus critical thinking, which can be gained through studying evolutionary medicine.



<http://swissinnovation.org/news/web/2015/03-150805-8f>

## Discovery of Substance that Blocks Prions

(University of Zurich, August 05, 2015)

Researchers at the Institute of Neuropathology of the University Hospital Zurich have discovered and improved a substance that can block prions. The BSE crisis of the 1990s was contained i.a. by taking rigorous measures in slaughterhouses. Since then, the number of people affected by variants of Creutzfeldt-Jakob Disease (vCJD) has remained low. Nevertheless, prion diseases still cannot be treated and still pose a threat. Infectious prions could potentially trigger other neurodegenerative diseases like Alzheimer's, Parkinson's and multiple sclerosis. As reported in *Science Translational Medicine*, the researchers tested polythiophenes and improved one able to block infectious prions in rodent brains, prolonging survival by over 80%. Further research should show whether it could be used to treat prion diseases that until now have remained incurable.

<http://swissinnovation.org/news/web/2015/03-150805-4d>

## Improved Photodynamic Therapy as Cancer Treatment

(University of Zurich, August 06, 2015)

Chemotherapy is still a crude way of treating cancer: besides the reputed bad side effects healthy body cells can also be inadvertently afflicted in addition to the targeted cancerous cells. Photodynamic therapy (PDT) is an alternative which targets cells that have been injected with a light-active substance. These cells are then irradiated with light, causing singlet oxygen to be released that attacks the tumor cells. However, PDT is also not perfect: treated patients can remain sensitive to light for weeks. Chemists at the University of Zurich led by Prof. Gilles Gasser are developing new drug molecules that therefore do not require oxygen. Some success has been achieved, but is limited to the treatment of small tumours. The scientists expect that their treatment will take years to develop before they will be used in humans, but are optimistic about this big step towards better cancer therapy.

<http://swissinnovation.org/news/web/2015/03-150806-1b>

## Better Preparation Methods with Cryofixation for Brain Imaging

(EPFL, August 08, 2015)

Scientists at EPF Lausanne have successfully developed a new technique to prepare brain tissue for studies using electron microscopy. Their method, 'cryofixation', involves rapidly freezing the tissue before embedding it in resin. This is one step ahead of typical methods that use stabilizing agents which cause the brain to shrink, thereby distorting its anatomical structure in the form of changing the actual proximity of neurons, the structures of blood vessels etc. Measurements of brain samples prepared using their method were compared to those calculated in



functional studies, confirming that cryofixation is able to preserve the brain's three-dimensional structure. Their work has been published in the journal eLife.

<http://swissinnovation.org/news/web/2015/03-150809-a6>

## Basic and Clinical Research Come Together on Treatment for Incontinence

(University of Zurich, August 09, 2015)

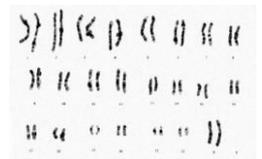
The Molecular Imaging Network Zurich (MINZ) of the University of Zurich features a unique collaboration between a radiologist and stem cell researcher, whose work in tandem has been in efforts to improve diagnostics and therapeutic imaging techniques. Currently, Andrea Boss and Daniel Eberli are developing a treatment for incontinence, a condition suffered by 20% of women over 50. Although still far from clinical trials, they are confident that their knowledge of culturing stem cells to regenerate weakened pelvic floor muscle tissue in mice will help the development of clinical therapies immensely. This constant knowledge feedback between basic research and clinical practice is a hallmark of the MINZ, and both parties have and will continue to benefit immensely from such collaboration.

<http://swissinnovation.org/news/web/2015/03-150810-0e>

## How a Female X Chromosome is Inactivated

(ETH Zurich, August 09, 2015)

In female mammals, one of the two X chromosomes is inactivated. The mechanism responsible for this inactivation is not yet fully understood. However, research into mice has shown that a ribonucleic acid (RNA) molecule called Xist plays a pivotal role in the process. Several hundred copies of this molecule attach themselves to one of the two X chromosomes. Scientists believe that these RNA molecules dock onto other molecules which then inactivate the chromosome. A team of researchers led by Anton Wutz, Professor of Genetics at ETH Zurich, have now discovered several of these inactivation molecules. The genes for Xist are found in humans as well. Thus, as Wutz points out, this research offers us some insight into the human system – at least at the theoretical level, as mouse genetics cannot be mapped directly to humans.



<http://swissinnovation.org/news/web/2015/03-150809-bb>

## Positive Results for Chronic Lymphocytic Leukemia Phase II Drug Study

(myScience, August 09, 2015)

Venetoclax an investigational drug developed by Roche and AbbVie for treatment of patients suffering from chronic lymphocytic leukemia (CLL) has shown positive results in its Phase II Study. The drug, treating a slowly progressing but so-far incurable form of CLL connected to the loss of the tumor suppressor gene p53, has recently been designated a breakthrough therapy by the FDA. Venetoclax works by blocking the protein BCL-2, which is thought to inhibit the healthy signaling pathway leading to programmed cell death in cancer cells. The data from the study will be presented at an upcoming medical conference after which AbbVie will file for applications to the FDA, EMA and health administrations in other countries.

<http://swissinnovation.org/news/web/2015/03-150810-88>

## Structure of Lipid Flippase at High Resolution

(ETH Zurich, August 11, 2015)

A team of researchers, including structural biologists, chemists and microbiologists from ETH Zurich and the University of Bern has succeeded in determining the structure of a lipid flippase at high resolution. Flippases transport lipids from one side of the membrane bilayer to the other. Scientists determined three distinct structures that corresponded to different states of the flippase during the reaction. The newly-discovered mechanism fundamentally differs from previously known transport processes that catalyze import or export of soluble substrates. The study has been published in the journal Nature. Although the present work constitutes basic research, the results might enable further insight into diseases associated with mutations in a human flippase.



<http://swissinnovation.org/news/web/2015/03-150812-6f>

## Antibiotic Technology Firm Takeover for Identification of Multi Drug Resistant Organisms

(myScience, August 11, 2015)

Roche is buying US firm GeneWEAVE BioSciences. The deal gives Roche access to GeneWEAVE's "Smarticles" technology, which allows for the rapid identification of multi drug-resistant organisms straight from clinical samples,



without the need for traditional sample preparation processes. Quicker identification of the right antibiotic should allow doctors to make faster and more accurate diagnoses. Many antibiotics used today are broad spectrum, which can lead to resistant bacteria and kill gut flora. Pharmaceutical companies are looking again at antibiotics, given increased emphasis by governments on the problem of drug resistance.

<http://swissinnovation.org/news/web/2015/03-150812-a8>

### **Beneficial & Malicious Use of Gene Drives in Mosquitos**

(NZZ, August 11, 2015)

A gene drive is a genetic technology that allows researchers to insert a new or modified gene into DNA and have that gene get carried over to successive generations. It has enormous potential for solving epidemics, such as malaria, by modifying mosquitos to not transmit the disease. However, one scientist warns that the same technology could be used for terrorism. He proposes a scenario where terrorists use a gene drive to create a mosquito that injects poison when it bites. However, such an attack could not be targeted easily and creating the modification would require lots of resources and patience.

<http://swissinnovation.org/news/web/2015/03-150812-f3>

### **Highly Specialized Microbes Colonize Humans**

(University of Basel, August 11, 2015)

Humans and animals are never alone. Everyone is host to over two thousand different species of microbes, of which most colonize our bodies only after we are born. One would assume that the generalists among them have an advantage. Zoologists from the Department of Environmental Sciences at the University of Basel have now shown that the opposite is the case. Microbial communities living on humans and animals are mostly dominated by specialists.

<http://swissinnovation.org/news/web/2015/03-150811-8a>

### **Biological Basis for Language Simplification**

(myScience, August 12, 2015)

Language and grammar have been simplified over time, and researchers at the University of Zurich believe that there is a biological basis for this. They statistically analyzed the complexity of grammar in over 600 languages, and then experimentally tested their findings. They measured brain activity in test subjects as they used various grammatical case constructions. What the researchers found is that brain activity is higher when more complex constructions are used. They hypothesize that complex constructions are simplified over time to reduce the difficulty of processing language.

<http://swissinnovation.org/news/web/2015/03-150813-ff>

### **Monitoring Tuberculosis in Wild Animals**

(myScience, August 13, 2015)

As hunting season is upon us, the issue of tuberculosis remains on the mind of hunters and gamekeepers throughout Switzerland, especially considering the infected Hirschhund feral pig population found on the borders of Switzerland. Switzerland and Liechtenstein do not currently have any reported cases of tuberculosis, but bovine tuberculosis persists in regions such as Western Austria, Southern Bavaria, France, and Italy. To combat the possible spread of TB, intense cooperation between administrators at the Federal Offices of Food Safety and Environment, hunters, and veterinary services in Switzerland is important. Screening programs conducted in Switzerland in 2014 detected no cases of TB in hundreds of wild animals in East Switzerland where the risk is the highest. The screening program will continue throughout 2015.

<http://swissinnovation.org/news/web/2015/03-150813-ab>

### **Potential New Cancer Treatment from Roche**

(myScience, August 14, 2015)

Atezolizumab is an investigational monoclonal antibody designed to interfere with a protein called PD-L1. Atezolizumab is designed to target PD-L1 expressed on tumour cells and tumour-infiltrating immune cells, preventing it from binding to PD-1 and B7.1 on the surface of T cells. By inhibiting PD-L1, atezolizumab may enable the activation of T cells. In a phase II study, Roche showed that atezolizumab shrank tumours in people with locally advanced or metastatic non-small cell lung cancer. Furthermore, Roche has seven Phase III studies evaluating atezolizumab alone or in combination with other medicines as a potential new treatment for people with early or advanced stages of lung cancer.

<http://swissinnovation.org/news/web/2015/03-150815-e7>



## Toxin-antitoxin System Induces Sleep Mode in Bacteria

(University of Basel, August 17, 2015)

One way of self-preservation amongst bacteria is to enter a state of dormancy; in this way, they protect themselves from the action of antibiotics. Research conducted at the Biozentrum of the University of Basel has now uncovered how toxins induce this 'hibernation' in bacteria. FicT toxins are essentially a group of proteins in the FIC domain that modify bacterial DNA structure by shutting down topoisomerases, leading to massive changes in cellular DNA topology and thereby 'turning off' the bacteria. The researchers' findings which were published in 'Cell Reports' will likely lead to a deeper understanding of how pathogens such as these toxins function and how their tools have evolved over time.

<http://swissinnovation.org/news/web/2015/03-150817-dc>

## Differentiated Next-generation Sequencing

(myScience, August 18, 2015)

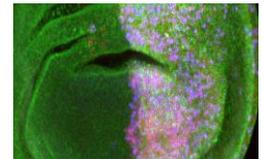
Roche has recently acquired the privately-held company Kapa Biosystems Inc. headquartered in Massachusetts, USA, living up to its commitment of developing its portfolio of differentiated Next-generation Sequencing (NGS) products. This will allow Roche to provide its customers with comprehensive genetic analyses, according to COO of Roche Diagnostics Roland Diggelmann. Kapa's proprietary technologies include optimised enzymes for NGS with applications in polymerase chain reaction (PCR) and novel DNA polymerases which can potentially improve overall workflow performance.

<http://swissinnovation.org/news/web/2015/03-150818-d3>

## Cancer Formation Mechanism Discovered

(SNF, August 18, 2015)

Researchers have discovered a new mechanism by which tumors spread in the body. They modified fruit fly pupas to develop tumors and observed them under a microscope. What they discovered is that tumor cells have special properties that allow them to squeeze between normal cells in order to surround and kill them in a divide-and-conquer strategy. This allows the tumor cells to gain the upper hand and avoid normal regulation from other cells. The genetic modification that was induced for this study is present in a majority of cancers, making this discovery widely applicable in cancer research.



<http://swissinnovation.org/news/web/2015/03-150819-c1>

## Necessary Disease Research in Africa

(University of Zurich, August 18, 2015)

According to Coutinho, an Ugandan physician, the North-South cooperation is not just about the transfer of knowledge from the North to the South. There are now diseases that cannot be beaten without research in Africa. Tuberculosis is one of the diseases for which there is no good solution neither in the North nor the South. It is still a major cause of death worldwide, especially in case of people infected with HIV. The therapy has many side-effects and it repeatedly results in treatment failure. Researchers at the University of Zurich and Makerere University in Uganda are therefore carrying out a large-scale study in Kampala. The first findings have been produced and will be used for new therapeutic approaches.

<http://swissinnovation.org/news/web/2015/03-150819-09>

## Human Genome Similar to an Orchestra

(EPFL, August 18, 2015)

Geneticists from the Universities of Geneva, Lausanne, and the EPFL recently published a study in the important journal 'Cell', highlighting their findings which have allowed them to make an analogy out of an orchestra to describe human genome activity. Using the cell lines of 47 individuals, all of whose genomes were completely sequenced, the researchers discovered that genetic variation at a single position in the genome affects three gene regulatory elements at the same time: transcription factor-DNA interactions, chromatin states, and gene expression levels. In other words, the genetic variant 'conducts' these three 'performers' to orchestrate a certain gene expression. This harmonised behaviour is contrary to the traditional model in which regulatory elements are believed to impact gene expression quasi-independently. For now, the applications of this finding remain far from medical applications, but this deepened understanding has nevertheless shed some light on a very fundamental aspect of genome biology.

<http://swissinnovation.org/news/web/2015/03-150818-fa>



## Treating Intestinal Inflammation with Flu Medicine

(University of Zurich, August 21, 2015)

The human gut flora is a major topic of research, as the complex equilibrium between the trillions of bacteria in our gut seems to play a significant role in many diseases. Researchers from the University of Zurich have now shown how intestinal mucosa helps the growth of certain E.coli strains leading, in some cases, to intestinal inflammations. The cause for the additional growth was shown to be due to the carbohydrate sialic acid, which becomes useful to E.coli after conversion by the enzyme sialidase produced by a non-pathogenic type of gut bacteria. Known flu agents already contain sialidase inhibitors and could therefore play a role in the development of future treatments of intestinal inflammations.

<http://swissinnovation.org/news/web/2015/03-150822-c6>

## How We Distinguish Odors and Learn

(Université de Genève, August 23, 2015)

A study published in Nature Neuroscience describes research undertaken at the University of Geneva's faculties of medicine and science into how the olfactory bulb enables the mammalian brain to distinguish odors. Researchers investigated the role of an active neural network that processes the sequence of electrical impulses triggered by data being sent from the nose. These impulses are interpreted at the level of the cortex, thus enabling the brain to distinguish among different smells. However, this step is greatly facilitated by the work of neurons in the olfactory bulb. These neurons format information so that it can be interpreted. From a behavioral perspective, the learning cycle is involved, because the brain learns and retains better when it can distinguish clearly among different things.

<http://swissinnovation.org/news/web/2015/03-150823-d1>

## Calcium Genes and Memory Performance in Alzheimer's

(University of Basel, August 30, 2015)

Alzheimer's disease is the most common cause of age-associated memory disorders and is on the rise due to increasing life expectancies worldwide. However, no treatment to slow down or cure Alzheimer's has been found. Recently, the Transfaculty Research Platform for Molecular and Cognitive Neurosciences at the University of Basel has come one step closer to understanding the processes that lead to memory disorders such as Alzheimer's, publishing a study showing the direct link between a group of genes responsible for calcium concentrations in brain cells and memory performance. The large-scale study involved over 57,000 participants, and has identified a correlation between calcium genes in the brain and the risk of developing Alzheimer's disease. This research is part of the Basel Genetics Memory Project.

<http://swissinnovation.org/news/web/2015/03-150830-2d>

## Increasing Drug Solubility by Preventing Crystallisation

(EPFL, August 31, 2015)

Publishing in the journal 'Science', Esther Amstad of EPFL and colleagues have developed a technique using a microfluidic nebuliser to prevent drugs from crystallising, thereby increasing their solubility and the efficiency of their uptake in the body. In a nutshell, the nebuliser essentially suppresses the process of crystallisation by producing amorphous particles that have no time to arrange themselves into ordered crystal structures. This process may solve the problem of pharmaceutical companies being forced to reject many drugs in the early stages of their development because of solubility issues. Other beneficial side effects would be decreased water pollution, as increased bodily uptake of drugs means fewer active ingredients are excreted in urine, and the prospect of smaller doses necessary to achieve the same effect.

<http://swissinnovation.org/news/web/2015/03-150831-ad>

## New Study Shows MicroRNAs Are Digested, Not Absorbed

(ETH Zurich, September 03, 2015)

For many years, scientists have therefore been investigating the possibility that microRNA may naturally modify the metabolism, and especially the immune system of infants. The idea of using microRNAs as a functional food ingredient was supported by some researchers who, in a study published last year, concluded that microRNAs ingested from cow's milk is absorbed and can pass into the human bloodstream. A new study by researchers at ETH settle the issue of whether exogenous microRNA molecules can be absorbed from food and even have a physiological effect. Experiments using mouse models show that the dietary uptake of microRNAs is





barely significant, and certainly insufficient to affect physiological functions. Moreover, the microRNA molecules are broken down in the small intestine. This effectively dampens the enthusiasm for functional foods based on microRNAs.

<http://swissinnovation.org/news/web/2015/03-150903-49>

### Chaperone Roles in Membrane Protein Folding and Insertion Elucidated

(University of Basel, September 05, 2015)

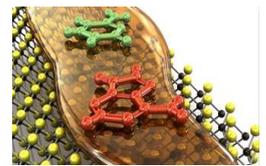
FhuA is a barrel-shaped membrane transport protein embedded in the outer membranes of bacteria. It is responsible for the uptake of iron and, importantly for drug development purposes, antibiotics. But how does the protein in its unfolded state reach the correct part of the membrane in a completely folded state? The researchers based at the University of Basel and the ETH Zurich have now shown how 'molecular bodyguards', better known as chaperones, achieve this by stabilising the unfolded protein as it alternates between different structures and explores which conformation is most energetically favourable to prevent misfolding. These processes enable the eventual insertion of the protein into the membrane, at which point FhuA would have acquired its mature and functional barrel structure. These new findings have great consequences for treating diseases caused by misfolded proteins such as Alzheimer's and Parkinson's.

<http://swissinnovation.org/news/web/2015/03-150905-c5>

### Nanopores for Cheaper DNA Sequencing

(EPFL, September 18, 2015)

EPFL scientists have developed a method that improves the accuracy of DNA sequencing up to a thousand times. DNA sequencing is a technique that can determine exact sequence of a DNA molecule. The method, which uses nanopores to read individual nucleotides, paves the way for better – and cheaper – DNA sequencing. Reading the exact make-up of genes, scientists can detect mutations, or even identify different organisms. A powerful DNA sequencing method uses tiny, nano-sized pores that read DNA as it passes through. However, "nanopore sequencing" is prone to high inaccuracy because DNA usually passes through very fast. EPFL scientists have now discovered a viscous liquid that slows down the process up to a thousand times, vastly improving the method's resolution and accuracy.



<http://swissinnovation.org/news/web/2015/03-150919-17>

### Antidepressants Plus Blood-thinners Slow Down Brain Cancer

(EPFL, September 21, 2015)

Gliomas are aggressive brain tumors arising from the brain's supporting glial cells. They account for about a third of all brain tumors, and hold the highest incidence and mortality rate among primary brain cancer patients, creating an urgent need for effective treatments. Certain antidepressants already in the market could lower the risk of gliomas, but there has been little evidence to support their use in patients. Now, scientists at EPFL have discovered that tricyclic antidepressants combined with anticoagulant drugs can actually slow down gliomas by causing the cancer cells to eat themselves. Gliomas arise from the supportive cells of the brain, called "glial cells" when they begin to grow uncontrollably. The normal function of glial cells are to keep the brain's neurons in place and help them function properly. There are three types of glial cells, and glioma tumors often contain a mix of these.

<http://swissinnovation.org/news/web/2015/03-150922-37>

### Biomimetic Dental Prosthesis

(ETH Zurich, September 28, 2015)

There are few tougher, more durable structures in nature than teeth or seashells. The secret of these materials lies in their unique fine structure: they are composed of different layers in which numerous micro-platelets are joined together, aligned in identical orientation in each layer. Now a group of researchers led by André Studart, Professor of Complex Materials, has developed a new procedure that mimics the natural model almost perfectly. The scientists were able to produce a tough, multi-layered material based on the construction principle of teeth or seashells. The researchers managed, for the first time, to re-create in a single complex piece the multiple layers of micro-platelets with identical orientation in each layer. It is a procedure the ETH researchers call magnetically assisted slip casting (MASC).



<http://swissinnovation.org/news/web/2015/03-150928-a4>



## Metabolism Research on Cellular Level Food Absorption

(EPFL, September 29, 2015)

EPFL and the Kristian Gerhard Jebsen Foundation – a Swiss philanthropic foundation – are pooling their strength and knowledge in the field of metabolism. With a total engagement of CHF 9.5 M, this new partnership will enable EPFL to reinforce its position in the area of metabolic issues. The first axis will focus on research in metabolism and nutrition, and the second on dissemination of nutrition and health, scientifically validated information to the public. A new research chair in “Metabolism in the context of nutrition, human health and disease” will open at EPFL in 2016 in partnership with the Kristian Gerhard Jebsen Foundation. To better document recommendations on food it is necessary to understand the mechanisms involved in food absorption on a cellular level.

<http://swissinnovation.org/news/web/2015/03-150929-e4>

## Real-time Analysis of Metabolic Products

(ETH Zurich, September 30, 2015)

Biologists at ETH Zurich have developed a method that, for the first time, makes it possible to measure concentration changes of several hundred metabolic products simultaneously and almost in real time. The technique could inspire basic biological research and the search for new pharmaceutical agents. The analysis of all metabolites in one go is not particularly easy since metabolites are a very diverse class of biological substances. Identification of 300 to 800 different metabolites in a sample takes only a minute, which means that analysis of thousands of samples in one day has now become a reality.



<http://swissinnovation.org/news/web/2015/03-150930-71>

## 4. Nano / Micro Technology / Material Science

### Fiber Production From Carrot Waste

(Empa, August 05, 2015)

Motorcycle helmets consist of fiber-reinforced synthetic material. Instead of glass fibers however, a biological alternative is now also possible: plant fibers from the production of carrot juice. With the help of a multi-perspective application selection (MPAS) method developed at Empa, researchers are now able to analyze whether this kind of production is ecologically and economically viable – before money is actually invested in production plants. The MPAS approach enables individual scenarios for a future production to be calculated with an extremely high degree of accuracy. Moreover, for fiber production from carrot waste, the MPAS analysis identified six possible customer segments.

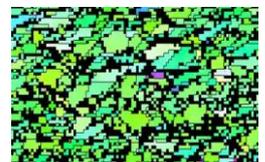


<http://swissinnovation.org/news/web/2015/04-150806-83>

### High-entropy Alloy

(ETH Zurich, August 07, 2015)

For more than 4,000 years, humans have been making metal alloys in order to obtain materials with desirable properties. Traditionally, these alloys consist of a main metal with smaller quantities of one or a few other elements combined during a smelting process. In high-entropy alloys, however, the composition is different. This new class of alloys has been high on the agenda for materials scientists for the past few years, as it offers high strength combined with temperature- and corrosion-resistance. Researchers led by Ralph Spolenak, Professor of Nanometallurgy, have now used a high-entropy alloy to create a film just 3 micrometres thick, into which they milled a structure consisting of pillars with a diameter ranging from 100 nanometers to 1 micrometer. The material is resistant to extreme pressures and temperatures.



<http://swissinnovation.org/news/web/2015/04-150807-6e>

### Building the Ultimate Light Detector on Graphene and Perovskite

(EPFL, August 07, 2015)

A summer project in the laboratory of Laszlo Forro at EPFL involves the creation of photodetectors for use in low-light conditions. Graphene and perovskite are combined to create devices that are ten million times more sensitive to light than regular silicon photodetectors which is the standard technology used today. Such ultra-sensitive photodetectors have multiple applications, including night-vision systems, CT scanners, detectors used in particle



accelerator experiments and even light-based quantum computing systems. Even more exotically, the detectors can be used in space telescopes which detect signals from galaxies across the entire electromagnetic spectrum.

<http://swissinnovation.org/news/web/2015/04-150808-7a>

### Feedback Cooling a String to Almost Absolute Zero

(EPFL, August 08, 2015)

EPFL scientists have used feedback to cool the motion of a micron-sized glass string to near absolute zero. This required building a sensor capable of resolving the smallest vibration allowed by quantum mechanics. It was done by coupling the micrometer-sized glass string to a very precise, optical displacement sensor. The sensor is so precise that it can, in principle, resolve the string's zero-point fluctuations before they are obscured by thermal vibrations. Combining this low-noise readout with a feedback force, the scientists were able to suppress the string's thermal vibrations to a magnitude only 10 times larger than their zero-point value – in effect realizing an extreme version of a noise cancellation headphone.

<http://swissinnovation.org/news/web/2015/04-150809-90>



### Turing Nanostructures Found in Insect Eyes

(myScience, August 11, 2015)

A team of researchers, led by Vladimir Katanaev at the University of Lausanne, has revealed the ubiquity and diversity of bionanostructures in the cornea of insects and other arthropods. Nipple-like nanostructures covering the corneal surfaces of moths, butterflies, and *Drosophila* were studied by electron and atomic force microscopy, and their antireflective properties described. Remarkably, the unexpectedly diverse range of corneal nanostructures observed replicates the complete set of Turing patterns. Alan Turing, one of the founding fathers of computer theory, described how complex behaviors could emerge from simple mathematical equations. The observed diversity probably results from processes similar to those modeled by Turing in his famous reaction-diffusion system. The study findings may be the first biological example of Turing patterns on the nanoscale.

<http://swissinnovation.org/news/web/2015/04-150811-ee>



### Information Storage and Retrieval in a Levitating Particle

(myScience, August 17, 2015)

For the first time ever, researchers have succeeded in creating arrangements of colloids – tiny particles suspended in a solution – and, importantly, they have managed to control their motion with high precision and speed. Colloidal nanoparticles may play a role in digital technologies of the future. Nanoparticles can be rapidly displaced, require little energy and their small footprint offers large storage capacity – all these attributes make them well suited to new data storage applications or high-resolution displays. The researchers have developed a method that makes it possible to create nanostructures and manipulate them in a flexible way, through the interaction with electrical and optical fields. The new technology also offers extremely fast and low-friction operation. This technique for arranging and manipulating colloid motion makes it possible to develop completely new materials and devices.

<http://swissinnovation.org/news/web/2015/04-150818-c0>

### Improved Stability and Performance of Perovskite Solar Cells through Crystal Crosslinking

(nanotechweg.org, August 19, 2015)

In the past few years, perovskites have rapidly emerged as promising materials for photovoltaic applications. However, achieving both high performance and long-term stability has proved challenging. A team of researchers from Switzerland and China have found a simple solution-processing step using phosphonic acid ammonium additives that results in efficient perovskite solar cells with enhanced stability. The additives facilitate the incorporation of the perovskite within a mesoporous TiO<sub>2</sub> scaffold, as well as the growth of a uniform perovskite layer at the surface, enhancing the material's photovoltaic performance from 8.8 to 16.7% as well as its resistance to moisture.

<http://swissinnovation.org/news/web/2015/04-150819-4b>

### Graphene Nanoribbons Able to Detect Greenhouse Gases

(University of Basel, August 23, 2015)

In a significant development in graphene physics, physicists from the University of Basel have successfully conducted boron doping of graphene nanoribbons. Graphene hailed by many as the future in many research areas is especially interesting as a material for electronic devices due to its unique electronic properties. However regular



graphene is a zero band gap semiconductor and can therefore not be switched on and off. The researchers from Basel have solved this problem by constructing so called 'graphene nanoribbons' of various widths that have a band gap and can be doped with boron allowing the modification of their electronic properties. Potential applications include a highly sensitive sensor for gaseous nitrogen oxide, a powerful greenhouse gas.

<http://swissinnovation.org/news/web/2015/04-150824-74>

## 5. Information & Communications Technology

### Creating an Avatar from a 3D Selfie

(EPFL, August 05, 2015)

Generating a 3D duplicate of someone without the aid of a Hollywood studio: this is the challenge taken up by EPFL researchers, who have successfully condensed an expensive and complex process to use only a smartphone camera. The program's designers see a number of possible uses in the near future: gaming, virtual reality, online discussions with other avatars, embedding in films, video conferences, and even avatar therapy for people suffering from schizophrenia. Creating an avatar is simple for the user, but the underlying algorithms are not. Using a smartphone to replace studio conditions – which include proper lighting and numerous cameras – was a real challenge. In the future, the EPFL researchers hope to further refine their process, including getting past the limits they currently face.

<http://swissinnovation.org/news/web/2015/05-150805-f3>

### Sound-Proof: Using Ambient Noise to Secure Two-Factor Authentication

(20min, August 17, 2015)

One of the most secure methods to protect online accounts against hacking is Two-Factor authentication. However, most users prefer password-only authentication because of the extra steps required to log into a service. Researchers from the ETH Zurich propose a novel way of easing the log-in with added security: their system, 'Sound-Proof', uses both the microphone of the users laptop and the users mobile phone to record ambient noise and thereby ensuring that both devices are in close proximity in order to authenticate the user.

<http://swissinnovation.org/news/web/2015/05-150817-21>

### \$22 Million EU Award for Idiap Research Institute

(Idiap, August 17, 2015)

The Idiap Research Institute has been awarded three new projects with the European Horizon 2020. These three projects include: SUMMA – Scalable Understanding of Multilingual Media (2016-2018) (Total budget 9.8 million with 1.8 million for Idiap). MUMMER – MultiModal Mall Entertainment Robot (2016-2019) (Total budget 5.3 million with 1 million for Idiap). TESLA – An Adaptive Trust-based e-assessment System for Learning (2016-2018) (Total budget 7.4 million with 800,000 for Idiap). Idiap was founded in 1991 by the Town of Martigny, the State of Valais, EPFL, the University of Geneva and Swisscom. Since 2008, Idiap has reinforced its connection with EPFL through a joint development plan and a strategic alliance with the "ETH Domain". Several of Idiap's scientists hold an EPFL academic title and are teaching graduate and undergraduate courses. They also supervise students who pursue their doctoral thesis research at Idiap.

<http://swissinnovation.org/news/web/2015/05-150818-8a>

## 6. Energy / Environment

### Novel Toxicity Testing Approach Predicts Fish Growth

(Eawag, August 06, 2015)

Before new chemicals can be approved, environmental risk assessments have to be undertaken. Conventional toxicity testing involves fish, which are particularly sensitive to contaminants in water at early developmental stages. However, testing with live fish is complex, costly, time-consuming and ethically questionable, so new substances continue to be produced without being adequately assessed. Scientists, regulators and industry are therefore looking for alternative approaches. An Eawag-led research team, in collaboration with the ETH Zurich, the EPFL and the University of York, UK, has demonstrated a novel approach that avoids the need for experiments with juvenile fish. The study, published in Science Advances, shows that growth of cultured gill cells, combined with modeling, can be used to predict the growth of whole organisms.

<http://swissinnovation.org/news/web/2015/06-150806-d1>



## Extremely Hot Water for Geothermal Electricity

(ETH Zurich, August 08, 2015)

Scientists in Iceland have drilled into a reservoir of extremely hot water that has the potential to greatly expand geothermal electricity output. ETH geoscientists simulated this unusual geothermal system using a new computer model and they understood how it occurs, under what conditions it can arise, and where to look for other such systems. Their results and the associated modelling have just been published in Nature Communications. They predict that these natural phenomena are widespread in volcanic areas, such as Iceland, New Zealand or Japan. Based on the new simulation system, further national and international projects have been launched.

<http://swissinnovation.org/news/web/2015/06-150809-b8>

## Scientific Support for Organic Farmers

(myScience, August 12, 2015)

The Research Institute of Organic Agriculture (FiBL) and Agroscope have signed a memorandum of understanding to strengthen their partnership. Now organic farmers can expect even more support through research. The goal of the agreement is to extend and intensify the cooperative partnership between the two institutes. The intention is to intensify the cooperation in all areas of agricultural and food technology research in such a way that Swiss practices are strengthened ecologically and economically. FiBL and Agroscope support agriculture and processing of agricultural raw materials that are both productive and resource-friendly, and that create public goods and services. The partnership should help to ensure critical mass for research in organic agriculture and animal welfare. This strengthens Switzerland's standing as a centre of research.

<http://swissinnovation.org/news/web/2015/06-150812-c1>

## Transforming Agricultural Waste into Biofuels

(EPFL, August 14, 2015)

Biofuels still have a long way to go to become sustainable substitutes for fossil fuels. Crucially, their price has to come down to make them competitive. Researchers from EPFL present how one such source of biomass can be used to produce bioethanol and two additional end products: furfural, a much-used industrial compound, and lignin, a solid fuel that can be used in the biorefinery. Oil palm dates grow in bunches, which are harvested and pressed to extract oil. The left over fibrous residues are typically discarded as waste. "If all you do with the empty fruit bunches is produce bioethanol, it will be too expensive to compete with fossil fuels," they say. "But adopt a biorefinery approach to produce additional compounds that you can sell for a profit, such as furfural, which has many applications in the chemical industry, such as fungicides, special adhesives, flavor compounds and solvents, and you can lower the price of biofuel."

<http://swissinnovation.org/news/web/2015/06-150814-d0>

## Glaciers Receding at Record Pace

(Sonntagszeitung, August 15, 2015)

Glaciers have been receding at a record pace in the last decade due to global warming, and this has wide-ranging consequences. Slopes are becoming less stable, endangering populations living below the glaciers, and the effects of dry periods will be more pronounced, despite the temporary increase in water flow seen from glaciers now. The World Glacier Monitoring Service based at the University of Zurich has been measuring glacier change for over 100 years. They are turning to new technology, such as three-dimensional mapping of glaciers using drones, to perform their research. This allows them to measure not only length, but also thickness and width, which are important dimensions for understanding glacier recession and growth.

<http://swissinnovation.org/news/web/2015/06-150816-a6>

## Computer Programme for Mosquito Control

(EPFL, August 16, 2015)

Two Master's students studying Environmental Engineering at the EPFL have developed a programme that tracks the development of mosquito larvae around Lake Gruyere. By modelling the altitude of the lake surface, water temperature, and other parameters, their programme is able to determine when the best time would be for the authorities to intervene with helicopter-dispersed insecticide to kill the larvae at their weakest. Lake Gruyere is typically infested with mosquitoes in the summer time because of the favourable conditions for mosquito reproduction - heat and rain - and application of the natural insecticide occurs typically only once a year. Their project is a part of swissrivers.ch, a website that provides free forecasting information for rivers throughout Switzerland.

<http://swissinnovation.org/news/web/2015/06-150816-d8>



## Anesthetic Gases Measured in Antarctica

(myScience, August 17, 2015)

A team of Empa researchers analyzed air samples from various stations in the global AGAGE measuring network for traces of inhalation anesthetics from medical interventions and used the results to calculate the global production quantity – which turned out to be equivalent to around three million tons of CO<sub>2</sub>. While that might sound like a lot, Switzerland's public transport system alone produces around three times as much every year. Indeed, a comparatively low amount of greenhouse gas actually gets into our atmosphere via operating theaters. Nonetheless, especially desflurane is thought to have an impact on the climate and, with a half-life of around 14 years, is extremely long-lived. By comparison, sevoflurane and isoflurane break down in only one to three years.



<http://swissinnovation.org/news/web/2015/06-150817-e9>

## Banning Oil Heat to Meet Climate Targets

(Tages Anzeiger, August 21, 2015)

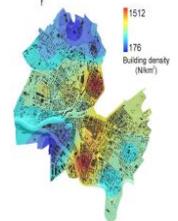
A group of professors from ETH Zurich are proposing to ban oil heat for buildings as a way of meeting climate targets. Half of Swiss buildings still use oil for heat. Banning oil would force buildings to switch to other sources that can draw energy from sustainable sources, such as renewable electricity or geothermal heat pumps. Since oil heaters need to be replaced occasionally, and this presents an opportunity to replace them with a renewable technology. The group of professors believe there is a political possibility for such a change in the law to pass through the legislature and through a popular vote.

<http://swissinnovation.org/news/web/2015/06-150822-77>

## Modelling a City's Thermodynamical Growth

(EPFL, August 22, 2015)

An EPFL researcher is modeling cities in order to understand their metabolism and determine their ecological impact when they grow and change. Her research is aimed at identifying the urban form that is most efficient and consumes the least amount of natural resources. In order to model a city's evolution over time, Nahid Mohajeri, an urban architect and geographer at EPFL, came up with the idea of combining two different scientific approaches: statistical thermodynamics – comparing cities to large ecosystems that change and produce waste and CO<sub>2</sub> emissions – and information theory. Preliminary results, published in *Ecological Modelling*, indicate that cities in general – and Geneva in particular – grow by virtue of two very different processes: they spread out and/or become denser. Dr. Mohajeri also observed that large cities are proportionally more energy efficient and have a lower specific ecological footprint per resident than small towns.



<http://swissinnovation.org/news/web/2015/06-150822-f3>

## Virtually Experiencing Wind Farms Before Construction

(ETH Zurich, August 23, 2015)

In discussions regarding the expansion of electricity production from renewable sources, the construction of wind farms is often a controversial topic. Due to the concerns regarding the intrusion in the natural landscape and noise pollution that the construction of wind turbines necessarily bring about, the public is generally skeptical of wind farms. "VisAsim" a project developed at the ETH Zurich aims to give a visually and acoustically accurate simulation of wind farm projects. Based on Crytek's CryENGINE3 developed for video game development, topological data from swisstopo can be visualized and wind flow can be simulated. The additional introduction of realistic wind turbine noise could allow politicians and citizens to experience how a wind farm would really look, feel and sound like before a project is greenlighted.

<http://swissinnovation.org/news/web/2015/06-150824-04>

## More Efficient Harvesting of Microalgae for Biofuels with Fungi

(EPFL, August 24, 2015)

Biofuels produced using microalgae could play an important role in the transition from a fossil fuel-based to a sustainable economy. While researchers have optimized the transformation of microalgae into biogas, harvesting and drying the algae continue to consume too much energy, accounting for 20-30% of the cost of biofuel production. Now, scientists from EPFL and the Universities of the Western Cape and Stellenbosch in South Africa have come across a filamentous fungus that could cut the cost of biomass harvesting. When testing different types of microalgae, the researchers noticed that in one of their samples, the algae lumped together into little pellets: a



filamentous fungus, *Isaria fumosorosea* that had contaminated their samples. The pellets that they observed were in fact lichens, hybrid structures made up of algae and fungi. A few millimeters in diameter, the pellets are large enough to be harvested from the water with a simple filter, with much lower energy expenditure than conventional approaches such as drying and dewatering.

<http://swissinnovation.org/news/web/2015/06-150824-5d>

### BICAR - New Solution for Urban Mobility

(ZHAW, August 24, 2015)

In its functions, degree of comfort and investments costs, BICAR is positioned between the conventional universal vehicle – the car, and the good weather option – the (e-) bike. Protected from the weather and electrically powered, BICAR meets the requirements of typical urban transport, while saving on space. BICAR has been designed from the start for use in a vehicle sharing scheme. Now, ZHAW plans to build a test fleet of at least 20 vehicles. Technology providers, researchers, town planners, investors and mobility enthusiasts are invited to give their support to this exciting enterprise.

<http://swissinnovation.org/news/web/2015/06-150825-06>

### Construction of Agricultural and Veterinary Center

(University of Zurich, August 28, 2015)

ETH Zurich and the University of Zurich launched the construction of a new research center that encompasses agricultural and veterinary research. The center, which will open in 2017, aims to perform comprehensive research on sustainable food supply chains, from field to table. The center will have facilities for feed storage, cow stalls, laboratories, and a metabolism center. The veterinary medicine faculty from the University of Zurich plans to occupy the new center and work together with faculty from ETH Zurich.



<http://swissinnovation.org/news/web/2015/06-150829-33>

### Optimized Design for Wood Heating Systems

(BFE, August 28, 2015)

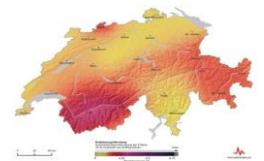
Wood heating systems are in trend, especially to produce heat and hot water in heat networks. In demand are systems that transform the energy stored in pellets and wood chips in ways that, thanks to optimum combustion, provide maximum heat and pollute the environment with dust and fumes only minimally. A research project at the University of Lucerne – supported by the Swiss Federal Office of Energy – aims to develop basic standards so that heating manufacturers can develop optimized designs.

<http://swissinnovation.org/news/web/2015/06-150829-f6>

### Serious Earthquake Hazard in Switzerland

(ETH Zurich, August 30, 2015)

The Swiss Seismological Service (SED) based at the ETH Zurich has updated its seismic hazard model and concludes that earthquakes are a more serious national hazard than previously thought. More than 500 earthquakes are registered yearly by the SED, the most recent of which occurred with magnitude 4.2 near Zug and was felt by thousands of people throughout central and eastern Switzerland. Moderate earthquakes occur repeatedly, and a strong or possibly catastrophic earthquake could happen at any time. The SED therefore makes sure that not only do the authorities and the public remain informed with the most up-to-date information, but it also publishes hazard maps for use by insurance companies and researchers involved in earthquake mitigation and risk management. The SED is the official federal agency for earthquake monitoring.



<http://swissinnovation.org/news/web/2015/06-150830-ff>

### Investigating Water Resources for Half a Century

(L'Express, August 30, 2015)

The Center for Hydrogeology and Geothermics at the University of Neuchâtel (CHYN) is renowned for its research on underground water flows in Switzerland and abroad. Growing urbanization and increasing agricultural activity make such research more needed than ever. The CHYN's recent 50th anniversary celebrations were attended by hundreds of alumni. Former director François Zwahlen recalled the Center's founding in 1965, by Professor Jean-Paul Schaer, its expansion within Switzerland and internationally, and its shift in focus from geology to geothermics. CHYN's strategy was to focus on niches it wanted to dominate. A unique master's degree has been introduced, as



well as a continuing education curriculum. Students appreciate the Center's practical orientation, with opportunities to undertake research from the Jura to the Alps, or from Kenya to Chad.

<http://swissinnovation.org/news/web/2015/06-150830-19>

### Quantifying the Impact of Volcanic Eruptions on Climate

(Le Temps, August 30, 2015)

A new method developed by an international team, involving researchers from the University of Geneva, produces more accurate estimates of the cooling induced by volcanic eruptions, according to a study published in Nature Geoscience. In 1991, the eruption of Mount Pinatubo in the Philippines made temperature drop by 0.4°C. Such eruptions emit huge amounts of sulfur that partly block solar radiation in the stratosphere, thereby cooling the climate for years. The main methods used to simulate cooling caused by volcanic eruptions – computer climate simulations and dendroclimatology (analyzing tree growth rings) – usually give conflicting results. By reconciling the two methods, scientists can make better estimates. The study suggests that radiation disruption due to volcanic activity had previously been overestimated.

<http://swissinnovation.org/news/web/2015/06-150830-09>

### Photovoltaic Building Facade Inaugurated

(CSEM, August 30, 2015)

Swiss non-profit CSEM inaugurated its first photovoltaic building facade in the City of Neuchatel, together with the utilities company Viteos. The facade not only integrates advanced heterojunction technology, but it also meshes with the building's architecture. The facade was designed to be semi-transparent to give it an elegant look. The solar panels used were completely designed and manufactured in Switzerland, and represent a successful transfer of technology from the laboratories of EPFL and CSEM to industry.

<http://swissinnovation.org/news/web/2015/06-150831-08>

### New Water Protection Law

(news.admin.ch, August 31, 2015)

The new water protection law takes effect on 1 January 2016. This means that over the next 20 years wastewater treatment plants will have to construct a further purifying stage for the removal of trace elements, such as hormones, cosmetics or medications. The necessary investment of millions of francs will also help better safeguard drinking water resources. Experts from political, administrative, business and scientific spheres met at EPFL in Lausanne for the annual Eawag Info day, exchanging information and viewpoints on the current challenges in implementing the law, and sharing the latest research results in the area of micropollutant elimination.

<http://swissinnovation.org/news/web/2015/06-150901-8b>

### Novel Competitors Affect Species' Responses to Climate Change

(ETH Zurich, September 15, 2015)

As the climate warms, many plants face an uphill struggle for survival. A ETH Zurich study indicates that this is particularly true wherever they face increased competition from plants that have migrated to their habitat due to climatic changes. For alpine plants, the average temperature rising could mean that in the future they will face competition from species that were previously unknown to them: plants that are found at lower elevations today, but migrated due to climate change. By conducting an experiment on the Calanda, near Chur, Switzerland, the researchers discovered that alpine plants can survive a climate that's three degrees warmer – provided they compete with their current alpine neighbours. The study published in Nature is the first empirical evidence that this new source of competition could be decisive.



<http://swissinnovation.org/news/web/2015/06-150916-56>

### Fossil Fuels or Renewables: Similar Future Costs

(EPFL, September 16, 2015)

Between now and 2050, the Swiss energy system is going to undergo fundamental changes in view of the decision of the Federal Council and Parliament to forgo nuclear power and their commitment to reduce greenhouse gas emissions. Switzerland's future energy system will have to fulfill these objectives. Whether Switzerland opts for fossil fuels, renewable energy or nuclear power, the cost will be about the same in 2050. Are renewable energies coupled with energy efficiency too expensive? Regardless of whether the Swiss people choose a future based largely on fossil fuels, nuclear power or a combination of renewable energy sources, the cost of our future energy



system is not likely to vary much. At least that's what Energyscope.ch, the energy calculator developed by EPFL, has determined.

<http://swissinnovation.org/news/web/2015/06-150916-b9>

### Numerical Model to Find Underground Mines

(ETH Zurich, September 18, 2015)

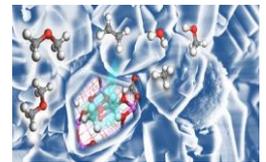
People are going to ever greater depths to find workable ore deposits. ETH geologist Christoph Heinrich conducts research into how to find these. Heinrich predicts a trend towards ore extraction from underground mines, which he also argues makes sense from an ecological perspective. Large-scale ore extraction in surface mining takes up giant swathes of land and consumes huge amounts of energy. The approach to find these underground mines is to examine the physical and chemical processes that cause metals to accumulate. To understand these processes quantitatively, Heinrich's group has developed a numerical model that simulates the large-scale circulation of surface water as well as the fluid expulsion from the magma.

<http://swissinnovation.org/news/web/2015/06-150919-00>

### Explanation for Methanol Synthesis

(ETH Zurich, September 20, 2015)

Today ethylene is primarily manufactured from crude oil in a process known as cracking, but the finite availability of crude oil have caused a surge for an alternative approach: its synthesis from methanol in the so-called methanol-to-olefins (MTO) process. A research team at ETH Zurich has proposed an explanation how the reaction begins. "We have shown that alumina, which is always present in zeolites, can easily transform methanol into ethylene and other hydrocarbons, which can then be converted into carbenium ions in the pores of the zeolite catalyst," explains Christophe Copéret, Professor of Surface and Interface Chemistry at ETH Zurich. "While the MTO process is up and running at industrial scale, this work sheds new light on how the process starts. And it shows that simple oxide materials like alumina can trigger carbon-carbon bond formation from methanol derivatives, thus opening new avenues for the upgrading of methanol into long chain hydrocarbons."



<http://swissinnovation.org/news/web/2015/06-150921-a5>

### Energy Intelligence Software for Demand Response

(EnerNoc, September 30, 2015)

EnerNOC celebrated its first anniversary in Switzerland. Given the increasing share of fluctuating renewable energy resources in Switzerland, the need for a system that can strike a balance between electricity generation and consumption has grown as well. EnerNOC, a provider for energy intelligence software (EIS), developed a technology platform that uses demand response to stabilize the Swiss transmission grid, thus contributing to the recently enacted Swiss Energy Strategy 2050. In July 2014, a swissnex delegation under the leadership of Dr. Steinmann (BFE) visited EnerNOC's Boston, MA headquarters during Energy Innovation Days to learn about demand response opportunities. Shortly thereafter, EnerNOC founded its Swiss entity and now celebrates a strong market entry with a successful introduction of electrical industrial load (like cement mills or gas compressors) into the Swiss tertiary reserve market.

<http://swissinnovation.org/news/web/2015/06-150930-38>

## 7. Engineering / Robotics / Space

### First Cybathlon in Preparation

(ETH Zurich, August 02, 2015)

In autumn 2016, the first Cybathlon will take place in the Swiss Arena in Kloten, Zurich. Physically impaired people will compete in this unique event using the latest assistive technologies. The aim of Cybathlon is to provide a platform to promote the development of assistance systems that provide disabled people with optimal support in everyday life. It also aims to break down barriers among the public, people with disabilities and technology developers. At least 30 participating teams from 15 countries will participate in a trial run. Each team comprises technology developers and at least one "pilot", who controls the technical aids. The technology used may be existing marketed products or prototypes from research laboratories. The competition has six different disciplines relating to everyday tasks.

<http://swissinnovation.org/news/web/2015/07-150802-c7>



## Zooming in on Black Holes

(NZZ, August 09, 2015)

Astronomers from all over the world are planning to zoom in on Sagittarius A\*, an object that is believed to be a supermassive black hole in the center of our galaxy. Black holes, a consequence of Einstein's general theory of relativity, have been a hot topic of astrophysics for decades, now researchers want to build a virtual telescope that can catch a glimpse of the event horizon of Sagittarius A\*. The project aims to build a network of radio telescopes from around the world including the Chilean Apex-Telescope and the South Pole Telescope, which would gather data from the object at the same time and later correlate the data. This way one could get a high resolution image of the shadow of the event horizon, allowing for new insights into the mysteries still surrounding black holes.

<http://swissinnovation.org/news/web/2015/07-150810-d1>

## Insect Eyes for Drones

(EPFL, August 11, 2015)

Insects such as flies benefit from having compound eyes made of thousands of visual receptors called ommatidia. This feature allows flies to perceive their environment and detect movement, even in the dark, using minimal energy. In an attempt to mimic this example of nature's prowess, a research group at EPFL has developed their own artificial compound eye under the European Commission funded project CURVACE that can be used as a sensor for very small drones. Such a sensor would allow drones to be relatively autonomous. The researchers are excited about the range of potential applications for their artificial eye, which include drones for rescue or surveillance tasks, self-driving cars, and even helping the visually-impaired.

<http://swissinnovation.org/news/web/2015/07-150811-fb>

## Swiss Upgrade of Saudi Electrical Network

(myScience, August 11, 2015)

Swiss company ABB has won a USD 150 million contract to upgrade five substations in Saudi Arabia's electrical network in preparation for a fifty percent capacity increase by 2020. Because of Saudi Arabia's booming economy, the country's electricity provider has determined that an improved infrastructure is necessary. In one substation, ABB will be replacing its own transformers that have operated reliably for over thirty years.

<http://swissinnovation.org/news/web/2015/07-150812-cd>

## Entry-Level Tethered Camera Drone

(Blick, August 14, 2015)

A Swiss company, Fotokite, just launched a new entry-level drone, called the Phi, that is tethered to the user and can be used for aerial photography. The same company also offers a professional version for a higher price. Launching the drone is intuitive, requiring just the wave of a hand to start. The drone is controlled using buttons and movements of the tether, and it carries aloft a GoPro camera. The company offers the drone on the website Crowdfunding with an estimated shipment date of March of next year.

<http://swissinnovation.org/news/web/2015/07-150815-9b>

## Bamboo Bicycles

(ETH Zurich, August 20, 2015)

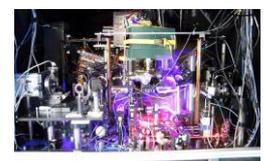
Three computer science students at ETH Zurich want to bring to market a bicycle made of bamboo at a price of no more than 500 Swiss francs. The young entrepreneurs are sourcing the bamboo for the bike frames from China. The main components – the bottom bracket, gears and brakes – are all conventional parts. The first batch of bikes is now in production. The bikes will come only in standard sizes – and with a standard set of parts, and the aim is to sell 300 of them throughout Europe.

<http://swissinnovation.org/news/web/2015/07-150820-a5>

## Higher Accuracy Optical Atomic Clock in Development

(NZZ, August 18, 2015)

Atomic clocks set the standard for time measurement. Now, researchers are working on optical atomic clocks, which promise a 100-fold increase in accuracy by using cesium atoms that oscillate near the frequency of light. The best clock will gain or lose one second in 15 billion years. One promising application for these clocks is in geodesy, or the measurement of the Earth. The passage of time is altered slightly by gravity due to the relativistic phenomenon known as red shift. By comparing two clocks in different places on Earth, the





relative height above the geoid, or surface of equal gravitational potential, can be measured. The new generation of clocks makes this measurement more accurate than previous methods.

<http://swissinnovation.org/news/web/2015/06-150819-9c>

### **Quadrocopters Build Bridge Autonomously**

(IEEE, September 21, 2015)

Research on the use of drones in search-and-rescue situations is ongoing, but there's no denying that the small, lightweight aerial vehicles have potential. New research by a team at ETH Zurich has proven that they could help humans navigate precarious terrain, too: A team of quadrocopters has successfully built a rope bridge that is capable of bearing the weight of a human. Moreover, the drones built the bridge autonomously, demonstrating that they are capable of building full-scale load-bearing structures without the need for human intervention. The Aerial Construction project is a collaboration between the Institute for Dynamic Systems and Control and the Chair of Architecture and Digital Fabrication.

<http://swissinnovation.org/news/web/2015/07-150921-90>

## **8. Physics / Chemistry / Math**

### **Ultra-high-energy Neutrino Discovered**

(Université de Genève, August 02, 2015)

Buried in ice on the South Pole, the gigantic IceCube detector, the largest in the world, captures neutrinos. These elementary, high-energy particles are formed in stars, in supernovas, near black holes, or when high-energy cosmic rays strike the atmosphere, so carry valuable information about the deep universe. Neutrinos were discovered in 1956 by two American explorers Frederick Reines and Clyde Cowan – earning them a Nobel Prize. The international team of 310 physicists driving the IceCube project, including from the University of Geneva, have detected a neutrino that has more energy than any previously observed. The IceCube project has thus found a source of the most powerful cosmic rays. This discovery was presented at the 34th International Cosmic Ray Conference in The Hague, the Netherlands.

<http://swissinnovation.org/news/web/2015/08-150802-61>

### **CERN Compares Protons and Antiprotons with High Precision**

(myScience, August 09, 2015)

The Baryon Antibaryon Symmetry Experiment (BASE) at CERN's Antiproton Decelerator reports the most precise comparison of the charge-to-mass ratio of protons and antiprotons. The charge-to-mass ratio – an important property of particles – can be measured by observing the oscillation of a particle in a magnetic field. Researchers at CERN found the charge-to-mass ratio to be identical, supporting a fundamental symmetry between matter and antimatter. Any difference, however small, between the charge-to-mass ratio of protons and antiprotons would break a fundamental law known as CPT symmetry. This symmetry reflects well-established properties of space and time and of quantum mechanics, so such a difference would constitute a dramatic challenge to the basic theoretical framework of particle physics.

<http://swissinnovation.org/news/web/2015/08-150810-2e>

### **Math and Computational Models Elucidate Brain Processes**

(University of Basel, August 09, 2015)

Researchers working under the Basel Genetics Memory Project, dedicated to transferring knowledge from research to therapy, have published a new study in the journal PNAS. The study involved 1700 adults and consists of a computational model that has successfully been able to describe various human memory processes. Mental processes such as memory are not possible to measure directly and have therefore eluded our scientific understanding. Now, the model developed by the mathematician Dr. Gediminas Luksys and his team has been able to show that distinct genetic profiles are responsible for specific memory processes. For example, the researchers found that certain proteins are associated with learning, while a cell adhesion set has been linked to memory storage. Therapies for various neuropsychiatric disorders may be on the horizon thanks to this deepened understanding of how memories form.

<http://swissinnovation.org/news/web/2015/08-150809-ee>



## Chasing Dark Light Particles

(Tages Anzeiger, August 11, 2015)

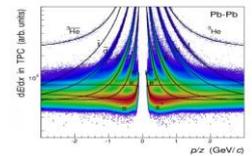
Dark matter is still not well understood. While Geneva's Large Hadron Collider is busy trying to look for new particles which may explain this phenomenon, Boston University Physics Professor Lee Roberts is interested in well-known particles called muons which are normally produced by cosmic rays in the Earth's atmosphere. However, muons can also be formed experimentally using special magnets. The researchers have been tracking the path of these particles which is affected by magnetic fields with special sensors, similar to experiments conducted almost a decade ago in which certain laws of particle physics were discovered to be broken. Those interested in related research by Zurich scientists have the opportunity to attend events organised under the City of Zurich's 'Forschung live' (Research Live) project, where free public lectures will be given by some of Zurich's prominent physicists.

<http://swissinnovation.org/news/web/2015/08-150811-e3>

## CERN Precisely Compares Light Nuclei and Antinuclei

(myScience, August 16, 2015)

The ALICE experiment at the Large Hadron Collider (LHC) at CERN has made a precise measurement of the difference between ratios of the mass and electric charge of light nuclei and antinuclei. The result confirms a fundamental symmetry of nature to an unprecedented precision for light nuclei. The measurements are based on the ALICE experiment's abilities to track and identify particles produced in high-energy heavy-ion collisions at the LHC. The ALICE collaboration has measured the difference between mass-to-charge ratios for deuterons (a proton, or hydrogen nucleus, with an additional neutron) and antideuterons, as well as for helium-3 nuclei (two protons plus a neutron) and antihelium-3 nuclei.



<http://swissinnovation.org/news/web/2015/08-150817-75>

## Optimizing Routes of Container Ships

(myScience, August 16, 2015)

ABB, a power and automation group, is working with MeteoGroup to equip 140 container ships from Maersk Line with advisory software to optimize routes, boost maritime safety and protect precious cargo based on factors including the hull design and the weather; helping them avoid conditions that could be harmful to the ship, its crew or its cargo. This will enable captains to define on-board loading conditions, and more accurately determine areas of the ocean where their ship's motion is likely to exceed threshold values. Routes can then be optimized automatically to skirt adverse conditions, ensuring cargo arrives safely and on-time at its destination port.

<http://swissinnovation.org/news/web/2015/08-150816-34>

## Understanding Electron Spin Stability for Quantum Computing

(University of Basel, September 05, 2015)

In a quantum computer, quantum states known as qubits essentially replace the ones and zeroes which make up the bits of a typical computer. Exploiting the principles of quantum mechanics, quantum computers can have enormous processing speeds. However, this will depend on whether electron spins persist for long enough periods of time. Research that explores how to extend this so-called 'coherence time' (currently just over a millisecond) has therefore been focused on what other factors stabilise these spins besides reducing interference caused by nuclear spins. Now, physicists at the University of Basel and the Swiss Nanoscience Institute have found that a process in which electrons are exchanged between a quantum dot and an external reservoir can affect the coherence of qubits. Publishing in the journal 'Physical Review Letters', the researchers continue in a long tradition of progress in this field of quantum computing, dating back to 1998 when the concept of using electron spins in quantum dots as qubits was first proposed by Prof. Daniel Loss of the University of Basel.

<http://swissinnovation.org/news/web/2015/08-150905-fc>

## Single Photon Source from Quantum Dot

(University of Basel, September 06, 2015)

With the help of a semiconductor quantum dot, physicists at the University of Basel have developed a new type of light source that emits single photons. For the first time, the researchers have managed to create a stream of identical photons from a semiconductor. A quantum dot consists of a few hundred thousand atoms and forms by self-assembly under certain conditions in a semiconductor. Single electrons can be trapped inside a quantum dot



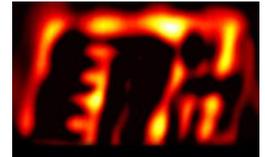
and are confined on a nanometer scale. An individual photon is emitted when a quantum state decays. Quantum cryptography and quantum communication are two potential areas of application for single-photon sources. These technologies could make it possible to perform calculations that are far beyond the capabilities of today's computers.

<http://swissinnovation.org/news/web/2015/08-150906-c1>

### Acoustic Imaging with Outline Detection

(ETH Zurich, September 19, 2015)

Scientists at ETH Zurich have developed a new method to differentiate very weak and short sound waves from longer ones. When used in acoustic imaging, their technology makes it possible to detect only the outline of objects. The imaging device which, rather than producing a photorealistic image of an entire object, shows only its contours and edges. Sound waves are reflected off edges in a remarkable way: The acoustics near the edges is dominated by so-called evanescent waves. These waves have a much shorter wavelength than the incident sound waves that produce them. As the evanescent waves decay very fast as they propagate they can only be measured in close proximity to the edge. The work conducted by the ETH researchers is currently just a proof of concept. The method still needs to be refined before it can be applied in practice. The scientists used sound at an audible frequency in their study. However, it would also be interesting to adapt the method for ultrasound that has shorter wavelengths.



<http://swissinnovation.org/news/web/2015/08-150920-8c>

## 9. Architecture / Design

### Architects to Solve Indoor Heat Issues in Houses

(St. Galler Tagblatt, August 17, 2015)

Being surrounded by concrete and asphalt does nothing to quell the unbearable heat waves in the summer and eventual rises in global temperature. Installing air conditioning units are hardly a solution if Switzerland hopes to decrease its energy consumption. Therefore, today's architects face the challenge of maintaining cool indoor temperatures. ETH Zurich Professor of Architecture and Sustainable Building Systems Arno Schlueter believes there is much to be learnt from the design of old wooden houses. Features such as small window size and the use of natural stone and stone slabs have immense cooling effects that many modern buildings do not benefit from. Today's architects, according to Schlueter, must make sure that buildings are sustainable in all respects and that they must adapt to the changing physical conditions with particular reference to cities.

<http://swissinnovation.org/news/web/2015/09-150817-f6>

## 10. Economy, Social Sciences & Humanities

### More than Half of Psychological Studies Non-Reproducible

(NZZ, August 23, 2015)

A recent study published in Science has found that more than half of all studies published in three psychology journals are non-reproducible. Criticism against research in social psychology is not unprecedented but for the first time the problem of reproducibility has been thoroughly studied. While some researchers rejected the findings by pointing out the noisiness of data due to the dependence on inherently inconsistent human subjects or the impossibility of reproducing the exactly same conditions, others were more open to the criticism. Martin Kleinmann of the University of Zurich for example explained the findings with the lacking appreciation for studies reproducing known results and the tendency to omit unwanted results.

<http://swissinnovation.org/news/web/2015/10-150824-ac>

### Post-holiday Syndrome

(Tages Anzeiger, August 16, 2015)

Are holidays really relaxing or do they create more stress overall? Dutch researchers have been studying the phenomenon of 'Post-holiday Syndrome' for several years and have found that stress levels in employees upon returning from holidays are usually as high, if not higher than before they left. However, this so called 'Post-holiday



'Depression' in German is a gross misnomer according to Professor Achim Elfering of the Department of Work and Organisational Psychology at the University of Bern. He says that 'depression' is not the appropriate term to use because it is a mental disorder with specific symptoms which require clinical diagnosis. Industrial and Organisational Psychologist at ETH Zurich Dana Unger concurs on the complexity of depression as a phenomenon, and suggests that it is probably the work itself, not the holiday, to blame.

<http://swissinnovation.org/news/web/2015/10-150816-90>

### Spotlight on Autism

(University of Zurich, August 07, 2015)

In 1911, Swiss psychiatrist Eugen Bleuler coined the term 'autism' for the first time. However, although it has been recognised as a disorder by the psychiatric community for over a century, much remains unknown about the nature of the condition. Diagnosing autism reliably remains a challenge because of its spectrum of symptoms, and it requires comprehensive observation, interviews, and histories of childhood development. It is estimated that 1 in every 100 children in Switzerland are autistic, with boys being affected three to six times more than girls. Nevertheless, intervention and therapy are recommended as early as possible. The University of Zurich and University Hospital of Zurich's Clinic for Child and Adolescent Psychiatry are collaborators on autism research, and the latter recently organised a conference on autism at the Irchel campus, thereby putting a spotlight on this domain of child and adolescent psychiatry.

<http://swissinnovation.org/news/web/2015/10-150807-bb>

### Interdisciplinary Study on ADHD Diagnosis and Treatment

(myScience, August 11, 2015)

More and more children are diagnosed with attention deficit disorder with or without hyperactivity (ADHD), yet opinions differ on the best treatment. In a new research project, scientists from the University of Fribourg, the Zurich University of Applied Sciences and the Collegium Helveticum are investigating the increase in the number of observed ADHD cases, as well as current drug treatments. The study examines individual, psychological, medical and social factors leading to ADHD diagnosis, support measures and drug prescriptions. Supported by the Mercator Foundation Switzerland, the project involves researchers from diverse disciplines as well as parents, carers and educators. It aims to ascertain whether therapies prescribed to children with attention problems respect children's well-being and whether current practices could be improved.

<http://swissinnovation.org/news/web/2015/10-150811-b3>

### The Massacres of the Early Neolithic Period

(University of Basel, August 14, 2015)

The discovery and detailed anthropological analysis of a mass gravesite in Schöneck-Kilianstädten, Germany, sheds new light on the early Neolithic period (5600-4900 B.C.). Results from research done at the University of Basel and the University of Mainz reinforces the first impressions that the mass grave was a site of a massacre in which, mainly male, adults and children were tortured and mutilated. As this is only one of several recently discovered mass graves in the area, scientists now believe that the early Neolithic was a time of extremely violent conflicts that were dominated by systematic violence between communities.

<http://swissinnovation.org/news/web/2015/10-150815-61>

### LEGO Kits to Help Women in India

(EPFL, September 25, 2015)

Finding a toilet in India can be mission impossible. Overpopulation and the lack of sanitary facilities lead to contamination of the soil and groundwater. Making matters worse, women are frequently assaulted when they have no other choice but to relieve themselves in the open. These observations spurred Marc-Edouard Schultheiss and Alexandre Bouchet, two students of EPFL, to head to India for a three-month humanitarian project supported by Engineers of the World. Once there, they focused on teaching villagers how to build a shower and toilet connected to a pit. But the two students ran into illiteracy problems. "And since the women never went to school," said Marc-Edouard, "understanding a diagram and using numbers – even for measuring things out with a meter stick – was a challenge for them." To resolve this dilemma and enable the women to pass along their skills far into the future, they came up with a surprising idea: that of using LEGO blocks to create a model. The kit comes complete with bamboo sticks and strings with colored markers to use as a measuring instrument.

<http://swissinnovation.org/news/web/2015/10-150925-2c>



## 11. Technology Transfer / IPR / Patents

### ETH Zurich Industry Day with Record Participation

(ETH Zurich, August 21, 2015)

At the end of August, ETH Zurich held an "Industry Day", where researchers from the university presented their ideas and projects to colleagues in industry. The goal of this day was to promote the flow of ideas out of the university and into practical products and services. Professor Petra Dittrich gave a five minute presentation on her lab's work on bioanalytical methods and 'lab-on-a-chip' technologies, which allow for miniaturized testing of organic compounds. Her technology can also be used for creating micrometer-sized fibers and wires that bind to targeted biomolecules. A change in conductivity can be measured to determine concentration of the target molecules.

<http://swissinnovation.org/news/web/2015/11-150822-5a>

### Swiss Startups Making World-Wide Waves

(20min, September 01, 2015)

Swiss startups are surprising people and making waves the news headlines across the world. Recently, the UK business insider picked their 12 favorite Swiss startups, writing how surprised they are at the vibrant startup scene despite the high cost of living in the country. For instance, they feature Dacuda, the 3D scanning application for smartphones. Other startups on the list are headquartered in Switzerland because of the progressive data privacy laws - it is mandatory to inform a person when personal communication is under surveillance. Protonmail was founded at CERN in Geneva and features client-side mail encryption services, and the Canadian startup silent circle moved its headquarters to Geneva in order to profit from the Swiss legal framework as well.

<http://swissinnovation.org/news/web/2015/11-150901-c7>

### EPFL: 100 Inventions per Year Over the Past Decade

(EPFL, September 22, 2015)

The number of inventions evaluated by EPFL's Technology Transfer Office (TTO) has shot up in recent years. 950 inventions were submitted between 2005 and 2014 versus 450 between 1995 and 2004. The number of patent filings has increased in similar proportions, rising from 256 between 1995 and 2004 to 539 between 2005 and 2014. This increase is due in part to EPFL's growth. Of the 1500 inventions filed so far with the TTO, around 40% have been or will be put to commercial use through a license agreement with a start-up or existing company. The number of innovations currently being used by companies in the form of licenses is also twice as high now (391) as in 2005 (191). More than half of these rights were assigned in recent years to Swiss companies with fewer than 250 employees.

<http://swissinnovation.org/news/web/2015/11-150923-99>

## 12. General Interest

### 82 4000m Peaks in 2 Months: Ueli Steck Sets a Record

(20min, August 11, 2015)

Extreme mountain climber Ueli Steck, 38, has climbed himself to a new record of successfully conquering all 82 mountains over 4000m across the Swiss, French, and Italian Alps. Between climbs, Steck walked or cycled and did not use motorised transport, which made his project even more challenging. Steck call his achievement a 'very nice experience, a very nice journey'.

<http://swissinnovation.org/news/web/2015/12-150811-74>



### How Switzerland Invented Rankings and Became a Nation of Science

(ETH Zurich, August 12, 2015)

Since the 18th century, the international success of natural science research has played a significant role in shaping the international image of Switzerland. It was a botanist from Geneva who, in 1873, published the first scientific rankings in history. In his "Histoire des Sciences", Alphonse de Candolle asked how scientific success could be determined objectively. "Proportionate to population size, Switzerland was indisputably at the top of the rankings", says Bernhard C. Schär, post-doctoral fellow with the Chair for History of the Modern World at ETH Zurich. Today Switzerland is still a successful science nation, although the criteria might have change. "But what has remained is the simultaneous cooperation and competition within the international scientific system. The Swiss natural sciences are still very much active in the international networks – not least in numerous projects in the southern hemisphere", acknowledged Schär.

<http://swissinnovation.org/news/web/2015/12-150812-44>



## 12. Calls for Grants/Awards

### Call for ERC Starting Grants

(European Commission, July 29, 2015)

ERC Starting Grants are designed to support excellent Principal Investigators at the career stage at which they are starting their own independent research team or programme. Applicant Principal Investigators must demonstrate the ground-breaking nature, ambition and feasibility of their scientific proposal. Starting Grants may be awarded up to a maximum of EUR 1'500'000 for a period of 5 years. Submission deadline is November 17, 2015.

<http://swissinnovation.org/news/web/2015/13-150729-3e>

### Call for Papers: Solid Oxide Cells and Electrolysers Forum

(efcf.com, September 02, 2015)

The 12th European SOFC & SOE forum 2016 will address issues of science, engineering, materials, systems, applications and markets for all types of Solid Oxide Fuel Cell and Solid Oxide Electrolysis technologies as well as for Reactors and Separators based on Solid Oxide Membranes. The Forum continues the strong tradition as one of the leading international meetings on Solid Oxide science, technology and implementation. Members of academic institutions, research organizations and industry are invited to submit papers. Technical papers dealing with above topics with emphasis on fundamentals, materials, systems and applications may be submitted via Author Center by 30 November 2015.

<http://swissinnovation.org/news/web/2015/13-150902-ba>

### Call for Extended Abstracts: Tech4Dev 2016: From Innovation to Social Impact

(EPFL, September 30, 2015)

The 4th International Conference of the UNESCO Chair in Technologies for Development, Tech4Dev 2016, gives you an opportunity to present your research at a unique multidisciplinary Conference focused on innovative technologies for social impact in the Global South. Core thematic areas are Technologies for Humanitarian Action, medical Technologies, Science and Technology for Disaster Risk Reduction, Technologies for Sustainable Access to Energy, ICT for Development, Technologies for Sustainable Habitat and Cities. Deadline is November 6.

<http://swissinnovation.org/news/web/2015/13-150930-56>

## Upcoming Science and Technology Related Events

### International Carbonate Mound Conference

November 1-5, 2015

<http://events.unifr.ch/carbonatemounds/>

Earth Science

Ascona

### National Palliative Care Days

Dezember 2-3, 2015

<http://goo.gl/tXGXBg>

Healthcare

Bern

### International Conference: Recoding the City

November 5-7, 2015

<http://www.gta.arch.ethz.ch/events/recoding-the-city/information>

Architecture

Zurich

### International Symposium on Cavitation

December 6-10, 2015

<http://cav2015.epfl.ch/>

Mechanical Engineering

Lausanne

### Changing Paradigms in Drug Development: Company Strategy

November 17, 2015

<http://goo.gl/qjohkC>

Biotech

Bern

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