



Science-Switzerland, October - November 2014

News on Swiss science, technology, education and innovation

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Nobel Laureates 2015 in Chemistry with Link to ETH Zurich

(ETH Zurich, October 08, 2014)

This year's Nobel Prize in Chemistry was awarded for advances in a high-resolution microscopy. One of the laureates, William Moerner, has a connection to ETH Zurich: He was a visiting professor here for one year in 1993/94. Moerner's year at ETH was his first post as a researcher and lecturer at a university. "This was an important period for him; by making the transition from industry to a university career," says Wild, an professor at ETH Zurich who remains in contact with Moerner to this day. During his stay at ETH (and previously at IBM), Moerner worked on making individual molecules microscopically visible. In subsequent research, Moerner and other researchers, including Betzig and Hell, contributed towards the development of sophisticated light microscopy systems that are now able to see living samples, such as cells, at high resolution.



<http://swissinnovation.org/news/web/2014/00-141008-2e>

4.8% of 2013 Worldwide R&D Investment Originated from Switzerland

(Federal Administration, October 28, 2014)

The 1000 largest global companies have increased their spending on research and development by only 1.4% last year – a marked drop from the 10-year average growth rate of 5.5%. Companies headquartered in China generated a 46% increase in R&D spending last year, while North American and European companies increased spending by only 3.4% and 2.5%, respectively, and Japanese companies spent 14% less. Volkswagen retains its place as the international leader in terms of investment in new technologies and products with an R&D budget of USD 13.5bn. Samsung is just a hair's breadth behind (USD 13.4bn), followed by Intel and Microsoft. In 5th place is Roche, the highest-ranked Swiss company. Its main competitor Novartis followed in the 6th place. Although, investment by Swiss companies has decreased, 4.8% of worldwide R&D investment still comes from Switzerland.

<http://swissinnovation.org/news/web/2014/00-141028-2b>

Swiss Standard of Living among best in Europe

(Federal Administration, November 11, 2014)

According to the Federal Statistical Office's (FSO) Survey on Income and Living Conditions (SILC), Switzerland was among the countries with the highest standard of living in Europe in 2013. The inequality of income distribution in Switzerland was slightly less marked than the European average. A small percentage of Switzerland's population was faced with material deprivation (Switzerland: 4.0%; EU: 19.5%). This does not exclude financial difficulties as 19.6% of people lacked the means to meet an unexpected financial expense within one month. Furthermore, almost 1 in 10 people (8.7%) could not afford to take a week's holiday away from home. The general standard of living in Switzerland, measured by the median equivalised disposable income was among the highest in Europe along with Norway and Luxembourg. In Switzerland, this income was 1.7 times greater than that of Italy and 1.3 times greater than that of Germany or France.

<http://swissinnovation.org/news/web/2014/00-141111-6a>

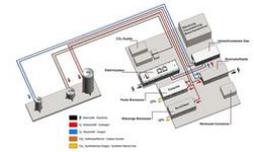


1. Policy

Swiss Energy Strategy: Focus on Renewable Energy

(Paul Scherrer Institute, October 10, 2014)

The energy strategy 2050 of the Swiss Federal Government plans a strong expansion of the new renewable energies, focusing on solar and wind power. The integration of these decentralized power with a high temporal variability constitutes a big challenge for existing electricity networks. One possible solution offered in the plan would be to use the surplus power to create energy-rich gases, such as hydrogen or methane. These gases could be converted back into electrical power when the need arises. This Power-to-Gas concept is a central topic of the new Energy System Integration platform (ESI) of the PSI.



<http://swissinnovation.org/news/web/2014/01-141010-90>

Switzerland and US to Sign MoU on Vocational Training

(Basler Zeitung, October 11, 2014)

On Friday, 10 October, as part of the annual World Bank Day, Federal Councillor Johann N. Schneider-Ammann met the United States Secretary of Labor Tom Perez. Their discussion focused on continuing to exchange information and experiences in vocational training, initiated by the head of the EAER with Dr. Jill Biden, wife of the American Vice President Joe Biden, during her visit to Winterthur in September of this year. Through these visits, the United States became introduced to the dual education system of Switzerland which allows for a vocational training as alternative to the higher education with an academic path. Within the next months, the two countries aim to sign a so-called Memorandum of Understanding to strengthen their bilateral collaboration in the area of education.



<http://swissinnovation.org/news/web/2014/02-141011-09>

Switzerland to Participate in World's Most Powerful Neutron Source ESS

(Federal Administration, October 01, 2014)

The Federal Council is requesting that Parliament approve Switzerland's continued participation to the world's most powerful neutron source, the European Spallation Source (ESS). The ESS research infrastructure in Lund, Sweden is expected to become the world's most powerful neutron source. The ESS will help researchers gain insight into various materials and biological structures. Parliament has already approved Switzerland's contribution of around CHF 32 million for the first construction phase. The contribution amounting to around CHF 98 million for the second construction and operation phase until 2026 should now be approved. Switzerland's participation will then amount to 3.5% of the ESS' total costs of around CHF 3.7 billion. Seventeen partner countries are involved in the project.

<http://swissinnovation.org/news/web/2014/01-141001-74>

Overhaul of the Commission for Technology and Innovation

(NZZ, October 10, 2014)

Swiss Federal Councillor Johann Schneider-Ammann, is working on reorganizing the way innovation is sponsored by the Swiss government. The current Commission for Technology and Innovation (CTI), which supports the development of innovative products with subsidies of above 100 million Swiss Francs annually, is set to be overhauled completely in the process. Reasons for the overhaul include inefficiencies that are reflected by annual administrative costs of 17 million Swiss francs or 13.7% of the total CTI budget. By the end of the process the CTI is meant to mirror its big brother the Swiss National Science Foundation becoming a second national foundation for innovations and startup companies.



<http://swissinnovation.org/news/web/2014/01-141010-41>

2. Education

Ranking: ETH Zurich Best Outside US & UK in Times Ranking

(Times Higher Education, October 17, 2014)

Times Higher Education World University Ranking (Times Ranking), Shanghai Ranking and QS Ranking are the three main ranking lists comparing higher education institutions worldwide. All three rankings are traditionally dominated by American and British universities. Times Ranking is based on 13 criteria related to teaching, research,



innovation and international aspects among others. According to Times Ranking, ETH Zurich remains the best university outside the US and UK. EPF Lausanne, University of Zurich, University of Geneva and University of Bern improved their position compared to last year's ranking, whereas University of Basel and University of Lausanne slightly worsened.

<http://swissinnovation.org/news/web/2014/02-141017-3b>

Financial Times Ranking: Executive MBA HSG Makes Big Leap Forward

(University of St. Gallen, November 28, 2014)

In this year's Financial Times global ranking of executive MBAs the Executive MBA HSG occupies 51st place. Compared to 2013, the program moved up 13 places in the ranking. The EMBA HSG occupies a sensational 5th place in the important category "Aims achieved" and likewise performed strongly in the two categories "Career progress" and "Working experience", where it was ranked 15th and 16th respectively. The first place of the ranking went to the Trium Global EMBA by HEC Paris, LSE, and New York University.

<http://swissinnovation.org/news/web/2014/02-141128-a3>

Education and Research Considered Key to Future Growth

(NZZ, October 01, 2014)

Switzerland's economic success depends on well-trained professionals. Since Economiesuisse believes they are essential for sustainable economic growth, it supports prioritizing education and research at federal level, and networking among local research institutions at international level. The business federation has formulated guidelines for education, research and innovation policy to continually improve the quality of all courses in the Swiss education system. It recommends strengthening the independent profiles of universities and colleges. It believes colleges should build on their core strength of proximity to professional practice. Universities should remain accessible, ensuring fair conditions for qualified graduates on master and PhD programs and facilitating entry into professional life for bachelor graduates. However, tuition fees should be raised for master programs, while ensuring equal opportunities through scholarships and student loans.



<http://swissinnovation.org/news/web/2014/02-141001-ee>

University Rankings or Individual University Profiles

(The Guardian, October 01, 2014)

According to the latest university rankings, Switzerland with its eight million inhabitants has two universities ETH Zurich and EPFL in the top 20. The best known university rankings are based on indicators that are allocated a weighting. These are academic reputation, faculty/student ratio, citations per faculty, employer reputation, international student ratio and international staff ratio. However some academics are highly skeptical about the usefulness of these indicators. A new U-Multirank site has recently been developed where users can compare how two universities perform on different indicators. Although U-Multirank could be a rich source of information, many top universities have so far refused to provide their data.



<http://swissinnovation.org/news/web/2014/02-141001-7e>

Educational Grants and Student Loans in 2013

(Federal Administration, October 10, 2014)

In 2013, cantons spent 334 million francs on contribution to education. 95% of the total amount was spent on grants and 5% on student loans. Federal contributions accounted for 25 million francs, which is equivalent to 8% of cantonal contributions. Taken inflation into account, the total sum spent on student grants and loans between 1990 and 2013 decreased by 3% while GDP continuously increased. 7.2% of all students in post-compulsory education received a grant, while 0.5% of all students received a loan. In 2013, recipients of grants received an average of 6800 francs and recipients of loans received an average of 5700 francs. As a rule, the higher the level of education, the higher the attributed grant.

<http://swissinnovation.org/news/web/2014/02-141010-50>

New Collaboration: IMD and the Tuck School of Business at Dartmouth

(IMD, October 15, 2014)

The Swiss top-ranked business school IMD and the Ivy League Tuck School of Business at Dartmouth join forces to collaborate on executive program. The "Transition to Business Leadership" program that starts in spring 2015



will help global organizations develop their talent pipeline to ensure a competitive edge. It will be offered in two modules, alternately held at IMD and Tuck at Dartmouth. The collaboration brings together top thought leaders in management from both universities, who combine best-in-class teaching with real-world-expertise. Another joint program called “The Job of the CEO” will soon be launched by the two business schools.

<http://swissinnovation.org/news/web/2014/02-141015-86>

Dual Education: Recipe for Successful Competitive Economy

(FHNW, October 28, 2014)

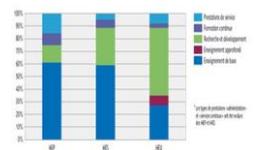
The Swiss dual education system as well as the practice-oriented universities of applied sciences seems to be a recipe for success of Switzerland’s competitive economy. Hence, a high-rank Chinese delegation from the Yunnan province visited the FHNW in Olten to get insights about the successful Swiss dual education system. Within the scope of a new educational policy China is planning to establish and expand vocational training schools and universities of applied science in the country until 2020. With over 20 years of experience in China FHNW is the perfect partner to support the country to reach this goal.

<http://swissinnovation.org/news/web/2014/02-141028-49>

R&D at Higher Education Institutions

(Federal Administration, October 31, 2014)

Among higher education institutions, cantonal universities and federal institutes of technology focus most on research and development (R&D), with 54% of staff resources involved in R&D. At universities of applied sciences and universities of teacher education, this percentage appears to be smaller, 30% and 14%, respectively. In natural sciences, technical sciences as well as in medicine and pharmacy, more than 50% of the staff is involved in R&D, while at law faculties only 40% focuses on research. Finally, applied R&D is particularly strong in information technology and life sciences, whereas there is little applied research in music, arts, design, teacher training and applied linguistics.



<http://swissinnovation.org/news/web/2014/02-141031-cf>

CASE Program Receives the CBIE Award in Canada

(FHNW, November 21, 2014)

The Canadian Bureau for International Education (CBIE) has awarded the Canadian Academics Studying Europe (CASE) Program with the “Panorama Award for Outstanding International Education Program in Capacity Building”. CASE is run by the FHNW School of Business in Basel and the Capilano University in British Columbia. It was developed in 2008 as a further education and implementation program for Canadian deans, faculty representatives and lecturers. Over 80 participants have benefited from CASE, participating in 10-day study trips through Switzerland, France and Germany. In Canada, the educational system in Switzerland and the EU, comprising a dual- and university of applied sciences model, is considered a significant success factor, particularly of the Swiss economy. The FHNW School of Business has signed eight contracts with Canadian universities.



<http://swissinnovation.org/news/web/2014/02-141121-95>

Funding Granted to 52 Projects from Young EU Researchers

(Rectors Conference of the Swiss Universities, November 01, 2014)

The Scientific Exchange Program between Switzerland and the New EU Member States (Sciex-NMSch) - part of the Swiss contribution to EU enlargement - aims at establishing scientific partnerships to develop individual researchers’ capacities, foster innovation and establish networks among researchers. The Sciex-NMSch Program finances fellowships for research stays in Swiss research teams lasting 6-24 months (total CHF 3.5 million). Of 172 eligible proposals submitted, 52 were selected: from Bulgaria (4), the Czech Republic (10), Hungary (11), Latvia (8), Lithuania (12), the Slovak Republic (5) and Slovenia (2). Most projects concern Natural and Technical Sciences: Basic Biological Research (11), Chemistry (10), Engineering Sciences (5), Environmental Sciences (5) and Physics (3). 13 concern Human and Social Sciences. Of the researchers, 37 are Doctoral Candidates, 15 are PostDocs, and 22 are female.

<http://swissinnovation.org/news/web/2014/02-141101-75>

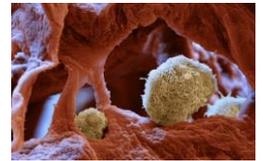


3. Life Science / Health Care

How the Lungs Fight the Flu Virus

(ETH Zurich, October 01, 2014)

Patients with a serious viral infection caused by the influenza virus often suffer from shortness of breath. Since the virus damages the lung tissue, less oxygen is drawn into the body when the patient inhales. In more serious cases this can even lead to death. Researchers at ETH Zurich used mice to analyze how the innate immune system maintains pulmonary functions during viral infections. They found that a specific type of immune cell called the alveolar macrophage protects the organism from the life-threatening complications of a flu infection by removing the debris of cells that have been destroyed by the virus. The results of the study have been published in PLoS Pathogens, and those of a subsequent study in Nature Immunology. The researchers hope their findings may help treat influenza.



<http://swissinnovation.org/news/web/2014/03-141001-8b>

Forming Memories of Subconscious Experiences

(University of Bern, October 01, 2014)

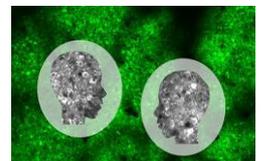
Researchers at the Institute of Psychology at the University of Bern and the University Hospitals in Bern and Zurich have discovered a new function of the hippocampus. According to their research, the hippocampus is able to store new memories based on subconscious experiences. In an experiment conducted by the researchers, a group of volunteers' ability to retain and retrieve information presented to them in form of hidden word pairs was tested. The results show stark differences between healthy volunteers and volunteers with known damage in the hippocampal region of the brain. While the healthy volunteers were able to store and retrieve information presented to their subconscious mind, the ones with known hippocampal damage were not, suggesting a central role for the hippocampus in the newly discovered subconscious memory formation.

<http://swissinnovation.org/news/web/2014/03-141001-9d>

USD 750,000 Grant for University of Zurich Neuroscientist

(University of Zurich, October 01, 2014)

Fritjof Helmchen of the University of Zurich's Brain Research Institute was recently awarded a grant of USD 750,000 from the US National Institute of Health as part of the US BRAIN Initiative for his research using microscopes. The Helmchen group is interested in observing different regions of the brain and how they communicate, and have therefore developed a prototype microscope that splits a single laser beam in half and directs these beams through different parts of the brain. These beams are eventually routed through a lens while the microscope captures patterns of cellular activity that are then analyzed by a special software. Currently able to record these patterns of activity over weeks, Helmchen is hopeful that the process of learning in the brain can be elucidated using this technology.

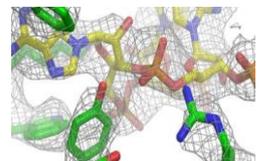


<http://swissinnovation.org/news/web/2014/03-141001-fd>

Mapping the Structure of Mitochondrial Ribosomes

(ETH Zurich, October 06, 2014)

Ribosomes are complex molecular machines found in cells that translate DNA into proteins. Higher organisms (plants, animals, etc.) have two types of ribosomes, one in the main part of cells, and one in mitochondria, which produce energy for the organism. Understanding the structure of ribosomes is important for understanding and designing antibiotics, which should attack the ribosomes of bacteria infecting a human, without affecting the human's own cells. Researchers at ETH Zurich were able to map part of the molecular structure of mitochondrial ribosomes, which can look very similar to bacterial ribosomes. This new understanding will help advance antibiotic science.



<http://swissinnovation.org/news/web/2014/03-141006-0d>

Lab on a Chip for Large Pollen

(startupticker, October 07, 2014)

Amphasys, a Swiss high tech company, has developed an extra-large 250 µm microfluidic chip equipped with microelectrodes is used as a high-sensitivity sensor that measures changes of the electrical resistance of the fluidic medium when a cell or another particle passes through the applied alternating current field. This "lab-on-a-chip"



technology enables efficient and reproducible determination of pollen viability, ploidy and developmental stages of microspores. With these larger size chips the technology can now be applied to almost any pollen species, including pumpkin, maize, and cotton. This provides a standardized, reliable and easy-to-use method that allows a constant monitoring of pollen viability.

<http://swissinnovation.org/news/web/2014/03-141007-95>

Novel Dialysis Agent to Treat Overdoses

(ETH Zurich, October 15, 2014)

Every minute counts in the event of an overdose. ETH Zurich professor Jean-Christophe Leroux and his team have developed an agent to filter out toxins from the body more quickly and efficiently. It can also be used for dialysis in patients suffering from hepatic failure. To date, antidotes exist for only a very few drugs. When treating overdoses, doctors are often limited to supportive therapy such as induced vomiting. Treatment is especially difficult if there is a combination of drugs involved. Leroux and his team knew that lipid emulsions can bind to drugs when injected into the blood stream. The researchers pursued this approach in their own studies, developing an agent based on liposomes, which are tiny bubbles with a lipid membrane as an outer layer. Instead of an intravenous injection, the agent is used as a dialysis fluid for so-called peritoneal dialysis.



<http://swissinnovation.org/news/web/2014/03-141015-42>

Wyss Center at Campus Biotech Geneva

(Le Temps, October 15, 2014)

The futuristic Campus Biotech in Geneva is filling up quickly. Its Wyss Center for bio- and neuro-engineering is its showpiece, aiming to develop neurotechnologies that benefit humans. The Wyss Foundation is financing the Human Brain Project – a platform for technology transfer – also based at Campus Biotech. Director John Donoghue, a world-renowned researcher and professor at Brown University in Rhode Island (USA), is a pioneer in brain-computer interfaces. His vision is to “make the blind see, the deaf hear, and paralyzed people walk”. The ultimate goal is to develop parts of an artificial nervous system that can replace the biological model. Success depends on sharing knowledge and experience among scientists worldwide, and building bridges between research and the business world to enable real-world applications.



<http://swissinnovation.org/news/web/2014/03-141015-3c>

New Imaging Approach to Monitor Cell Metabolism

(EPFL, October 22, 2014)

Scientists at EPFL used a novel imaging technology called NanoSIMS - Secondary Ion Mass Spectrometry - to monitor how glucose is metabolized into glycogen in liver and brain cells. NanoSIMS technique combined with electron microscopy provided insight into glycogen formation over time as well as into its distribution within the cell. Findings showed that liver cells transform glucose into glycogen almost 25 times faster than brain cells. Researchers are currently working on improving precision and detection accuracy of the method by combining it with fluorescence imaging. Further, they are planning to use this new imaging method to track how signaling molecules are distributed and metabolized in different parts of the brain.



<http://swissinnovation.org/news/web/2014/03-141022-e7>

UV-activated membrane delivers medication

(EMPA, October 23, 2014)

Instead of using injections or probes to deliver drugs it gets more and more common to use non-invasive technologies. Following this trend, researchers at Empa have developed a light sensitive membrane, which releases a gentle dose of medication to the skin of a patient. This drug-loaded plaster will especially be helpful for people who fear injections or premature babies to spare them additional stress. The technology delivers the active agent via a membrane when irradiated with UV light. Visible light is not able to activate the membrane what prevents the active agent from permeating through it.



<http://swissinnovation.org/news/web/2014/03-141023-46>



Wyss Institute at Harvard and University of Zurich collaborate

(Wyss Institute at Harvard, October 27, 2014)

The Wyss Institute for Biologically Inspired Engineering at Harvard University and the University of Zurich recently announced a formal partnership. The collaboration formalizes and elevates an existing collaboration between a Wyss core faculty member and the Director of the Swiss Center for Regenerative Medicine and the Regenerative Medicine and Organoid Technology Research Program at the University of Zurich. By the strength of the highly interdisciplinary combined team, new technologies and innovative therapies should be developed more efficiently. The partnership will also allow scientists from both institutions to work with each other. University of Zurich is the Wyss Institute's 11th collaborating institution.



<http://swissinnovation.org/news/web/2014/03-141027-7d>

Alternatives to Antibiotics

(startupticker, November 03, 2014)

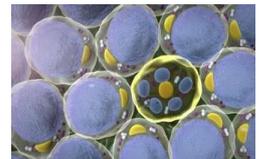
Antibiotics are used to treat bacterial infections, but because of their use, antibiotic-resistant strains of bacteria are developing, posing a danger to humans. Swiss startup LASCCO has developed a new medicine, a liposome, that treats bacterial infections differently. Rather than targeting the bacteria, it attracts bacterial toxins to disarm the bacteria. The bacteria can then be eliminated directly by the immune system. Liposomes have a membrane that resembles that of a host cell, which attracts the toxins. The University of Bern is involved with the development, and has tested the medicine on mice, which reacted favorably to the new treatment.

<http://swissinnovation.org/news/web/2014/03-141103-7a>

Bile Acids May Help Fight Diabetes

(EPFL, November 04, 2014)

EPFL scientists have shown that a receptor activated by bile acids can reduce fat-tissue inflammation and insulin resistance in obesity-linked diabetes. The growing epidemic of obesity across the world is associated with an equivalent increase in type-2 diabetes, which results from the body's ineffective use of insulin. Obese people often develop inflammation in their fat tissue, which, in turn, can reduce the sensitivity of fat cells to insulin, resulting in type-2 diabetes. EPFL scientists, working with researchers from the University of Amsterdam in the Netherlands, and the University of Perugia in Italy, have shown that bile acids activate a little-known receptor to overcome the loss of insulin sensitivity. This discovery, published in *Clinical Investigation*, opens a new way for addressing inflammation in type-2 diabetes.



<http://swissinnovation.org/news/web/2014/03-141104-ca>

Volunteers Recruited in Geneva to Test the Ebola Vaccine

(Republic of Innovation, November 04, 2014)

A vaccine against the Ebola virus is now being tested in Geneva. Swissmedic has authorized the recruitment of volunteers to take part in the vaccine trial at the University Hospitals of Geneva (HUG). The study aims to test the vaccine's safety and ability to generate an immune response in humans. Participants must be healthy people, aged 18 to 65. They will receive either one dose of vaccine or a placebo, and be closely supervised over six months. The trial will involve nine visits to the HUG Clinical Research Center HUG and will be remunerated CHF 810. Most participants are planning to go to Africa to help combat the Ebola epidemic. The second phase of the trial will test the vaccine's efficacy on the ground.

<http://swissinnovation.org/news/web/2014/03-141104-82>

New Antibiotic in Mushroom Growing on Horse Dung

(ETH Zurich, November 07, 2014)

Microbiologists and molecular biologists at ETH Zurich and the University of Bonn have discovered a new agent in fungi that kills bacteria. The substance, known as copsisin, has the same effect as traditional antibiotics, but belongs to a different class of biochemical substances. Copsisin is a protein, whereas traditional antibiotics are often non-protein organic compounds. The researchers led by Markus Aebi, Professor of Mycology, discovered the substance in the common inky cap mushroom *Coprinopsis cinerea* that grows on horse dung. When they began their research, the scientists were interested in understanding how this fungus and various bacteria affect each other's growth. This involved cultivating the fungus in a laboratory along with several different





types of bacteria. It was found that *C. cinerea* is able to kill certain bacteria. Further research demonstrated that the copsin produced by the mushroom is responsible for this antibiotic effect.

<http://swissinnovation.org/news/web/2014/03-141107-97>

Ghost Illusion Hidden in Cortex

(EPFL, November 06, 2014)

Patients suffering from neurological or psychiatric conditions have often reported a strange “feeling of a presence”. EPFL researchers analyzed the brains of 12 patients with neurological disorders who have experienced this kind of “apparition.” The patients’s brains showed interference with three cortical regions: the insular cortex, parietal-frontal cortex, and the temporo-parietal cortex, the areas involved in self-awareness, movement and proprioception, respectively. Blindfolded participants performed movements with their hand in front of their body. Behind them, a robotic device reproduces their movements, touching them on the back with a temporal delay between the participant’s movement and the robot’s touch. Under these asynchronous conditions, distorting temporal and spatial perception, several subjects reported a strong “feeling of a presence”, even counting up to four “ghosts” where none existed. This “feeling of a presence” actually results from a dissonance between sensorimotor brain signals, interpreted as coming from someone else.

<http://swissinnovation.org/news/web/2014/03-141106-b0>

First Mind-Controlling of Gene Networks

(ETH Zurich, November 11, 2014)

ETH Zurich researchers led by Professor Martin Fussenegger have developed the first gene network to be operated via brainwaves. Depending on the user’s thoughts, it can produce various amounts of a desired molecule. The inspiration behind the project was a game that picks up brainwaves in order to guide a ball through an obstacle course. The system makes use of an EEG headset. The recorded brainwaves are analysed and wirelessly transmitted via Bluetooth to a controller, which in turn controls a field generator that generates an electromagnetic field; this supplies an implant with an induction current. A light then literally goes on in the implant: an integrated LED lamp that emits light in the near-infrared range turns on and illuminates a culture chamber containing genetically modified cells. When the near-infrared light illuminates the cells, they start to produce the desired protein.

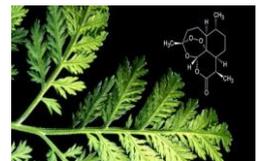


<http://swissinnovation.org/news/web/2014/03-141111-a0>

Computer Based Screening of Active Agents

(ETH Zurich, November 12, 2014)

A team of researchers from ETH Zurich has now developed a computer-based method to predict the mechanism of action of new active agents the fight multi-antibiotic resistant pathogens. Natural active agents are usually very large molecules that often can be synthesized only through very laborious processes. Using the computer-based method were able to predict a variety of potential target structures for 210,000 known natural substances. An understanding of the exact mechanism of action of a natural substance enables the design of smaller, less complex molecules that are easier to synthesise. Once a substance is chemically synthesised, it can be optimised for medical applications.

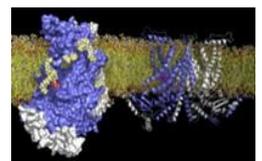


<http://swissinnovation.org/news/web/2014/03-141112-4a>

Architecture of a Lipid Transport Protein Revealed

(University of Zurich, November 13, 2014)

Biochemists from the University of Zurich have described the complex architecture of a lipid scramblase. This protein family controls the transport of lipids between the two layers of a cell membrane, and triggers blood coagulation. The results of the research, published in Nature, shed light on previously unknown mechanisms of lipid transport. Understanding the architecture and function of lipid scramblase is important, because malfunctions can cause various hereditary diseases. Using specific drugs to modulate this protein could be a potential strategy for novel therapies, e.g. for treating Scotts syndrome (a blood coagulation disorder), or muscle disease associated with scramblase malfunctioning. The project was funded by the European Research Council and the Swiss National Science Foundation’s National Center of Competence in Research “TransCure”.



<http://swissinnovation.org/news/web/2014/03-141113-18>



Discovery of Substances to Increase Metabolism

(20 Minuten, November 21, 2014)

Nestlé and many other companies have been working to discover substances that increase metabolism the way sports and exercise do. Nestlé, through its Institute of Health Sciences on the EPFL campus, has discovered natural substances that control the AMPK enzyme, which acts as a switch for metabolism. While the lifestyle consequences of such a substance may be obvious, it could also be used to help people with limited mobility who can't otherwise participate in exercise. It also needs to be noted that the boundary between nutrition and medicine is becoming more and more difficult to distinguish with such discoveries.



<http://swissinnovation.org/news/web/2014/12-141121-67>

Teaching the Immune System to Fight Cancer

(startupticker, November 13, 2014)

The Immuno-Oncology therapeutic protocol's approach is to use the patient's entire cancer cell as a vaccination antigen, combined with a potent immune boosting agent delivered continuously by a small capsule under the skin. This reprograms and boosts the patient's own immune system to fight cancer. The first component is a vaccine aiming at an immune protection against existing cancer and metastases. The second component is an immune-boosting agent which is provided via genetically re-programmed cells that secrete the agent in a sustained manner at the site of vaccination. These cells are themselves immuno-protected by a small hollow-fibre capsule, implanted under the skin. The phase 1 trial in Geneva is due for completion in the middle of 2015.

<http://swissinnovation.org/news/web/2014/03-141113-4a>

ETH Zurich Biomedical Spin-Off Wins Award

(ETH Zurich, November 21, 2014)

ETH Zurich biomedical spin-off Aeon Scientific won the 2014 Swiss Technology Award in the start-up category. The company is developing surgical equipment to treat cardiac arrhythmia. The system is controlled remotely by the surgeon, and the surgical tools are steered to millimeter accuracy using magnetic fields. Initial research started in a lab at ETH Zurich in 2003, and the company was established in 2010. The first system is expected to be put into operation in January 2015, and the company will continue to seek investors for further development.



<http://swissinnovation.org/news/web/2014/03-141121-8f>

DNA Survives Space Environment

(University of Zurich, November 26, 2014)

A quickly-devised experiment by researchers at the University of Zurich shows that genetic information in DNA can survive spaceflight and reentry into the atmosphere. They applied genetic material to the outside of the TEXUS-49 sounding rocket launched from Esrange, Sweden. On return of the rocket, the DNA material was found to still be present and able to transfer genetic information. These results have important implications for thinking about how life spreads in the solar system and the risks of accidentally bringing genetic material from Earth to other planets.



<http://swissinnovation.org/news/web/2014/03-141126-01>

Are 12-hour shifts of nurses and overtime associated with the quality of care?

(University of Basel, November 28, 2014)

Twelve-hour shifts are becoming more common for nurses in hospitals, finds the RN4CAST-study in twelve European countries including Switzerland. The analysis conducted by European researchers including University of Basel's Institute of Nursing Science shows not only that this shift form is on the rise, but also that it might have a detrimental effect on the quality of care provided. Although hospital managers and nurses seem to favor longer shifts to reduce staff handover (and cost) or because of higher flexibility for nurses, the study suggests nurses working for ≥ 12 hours were more likely to report poor or failing patient safety, poor/fair quality of care, and more care activities left undone. The study of 31'627 registered nurses in general medical/surgical units within 488 hospitals in Europe was published in the November issue of Medical Care.

<http://swissinnovation.org/news/web/2014/03-141128-1b>



Genetic Analysis to Determine the Origin of Meat

(20min, November 29, 2014)

In light of a recent incident where a Swiss producer of meat intentionally mis-labelled the origin of meat, consumers are starting to doubt the origin of meat. Scientists from the company Biolytics are now working on developing a genetic test that can identify the origin of meat. Specifically, they aim to be able to distinguish if chicken meat comes from Hungary or Switzerland. The company has several years of experience in testing meat, in order to determine if the meat is from cows, swines, or horses.



<http://swissinnovation.org/news/web/2014/03-141129-b6>

4. Nano / Micro Technology / Material Science

Handling of Magnetic Beads in Microfluidics

(startupticker, October 15, 2014)

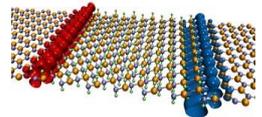
Spinomix SA, a Swiss technology platform company announced the approval of two US patents while three others are pending approval. Spinomix provides innovative sample processing solutions to the life sciences sector. The company's unique MagPhase technology enables homogenous handling of magnetic beads in microfluidics based systems, thus enhancing bioassay efficiency and in a further step, allowing for sample processing automation. MagPhase technology is currently applied in nucleic acid purification, a market estimated to represent over one billion dollars. The vision of the company is to expand the use of microfluidic cartridges into additional areas, such as protein purification or cell isolation.

<http://swissinnovation.org/news/web/2014/11-141015-21>

Ultra-Thin Electrical Wire

(EPFL, November 12, 2014)

At EPFL scientists have shown with that it is possible to generate a conducting channel with a width of a few atoms in the contact zone between different sheets of insulating materials. This work could enable the creation not only of new micro- and nanoelectronic devices but also of a new kind of solar cell. The fabrication of the electrical channel is a two-step operation. It is made by fixing a proton (i.e., a hydrogen atom) on a sheet of boron nitride above each boron atom (B) and one below each nitrogen atom (N). Thus sandwiched between the hydrogen atoms, the "decorated" boron nitride sheet generates a conductive channel a few atoms wide when it is placed in contact with a "pristine" sheet of BN.

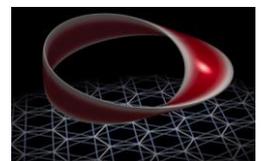


<http://swissinnovation.org/news/web/2014/04-141112-18>

A Quantum Simulator of Graphene

(ETH Zurich, November 12, 2014)

Researchers at ETH Zurich have created a graphene simulator using lasers and potassium atoms. The lasers are used to trap the atoms in a hexagonal structure in ultra-cold temperatures. Quantum effects are simulated using this device. One test has been of a theoretical structure of graphene, called a Haldane model, where time-reversal symmetry, a key quantum concept, is broken. This means the system behaves differently depending on if time runs forwards or backwards. While this is only a concept at this point, if it could be transferred to real material, it could result in, among other breakthroughs, ultrafast components for quantum computers.



<http://swissinnovation.org/news/web/2014/04-141112-3f>

Improved Micro-Actuators for Movement in Fluids

(ETH Zurich, November 18, 2014)

Researchers at ETH Zurich have been developing actuators with dimensions on the order of micrometers that can be precisely controlled in fluids using external magnetic fields. The actuators are made by 3D printing resin and magnetic nanoparticles into helical shapes. Magnetic fields can orient and rotate the helices, driving them through a fluid. Such devices could be used to precisely deliver medicine or biosensors to specific areas in the body.



<http://swissinnovation.org/news/web/2014/04-141118-49>



5. Information & Communications Technology

ETH Zurich and EPFL among Top 25 Universities for Computing

(Alp ICT, November 05, 2014)

Switzerland is well represented in the QS World University Rankings 2014/2015. ETH Zurich is considered the world's 8th best university for studying computer science, while EPFL ranks 22nd. The Massachusetts Institute of Technology (MIT) comes top, followed by Stanford University, then Carnegie Mellon University. The QS World University Rankings is an annual ranking of more than 3,000 universities, published by Quacquarelli Symonds. It takes into account the reputation of the institution among academics and employers, based on global surveys. The faculty/student ratio is also considered, as well as the number of citations, and international diversity, based on the ability of institutions to attract faculty and students from foreign countries. The ranking aims to help students make informed comparisons among their international study options.



<http://swissinnovation.org/news/web/2014/05-141105-33>

Digital Security for Documents

(EPFL, October 03, 2014)

To make documents inaccessible to a third party, two post-doctoral fellows at EPFL have created a start-up around data security solutions. The solutions are based on the clever but intuitive ideas of locking files in a safe or breaking them apart like a jigsaw puzzle, also referred to as key-based encryption and files-splitting, respectively. The first one, swi5t is a software solution that encrypts files before placing them on a cloud server by first enveloping them in a secure HTML file. The other product, uKeepIt, first splits each file into multiple pieces, much like a jigsaw puzzle, and encrypts and stores each fragment on one or several clouds. Only users that have the password can find the pieces and put them together again.



<http://swissinnovation.org/news/web/2014/05-141003-bc>

New Mobile Apps Improve Retail Experience

(Scandit, October 02, 2014)

Scandit (www.scandit.com), developer of the leading software-based barcode scanning solution for smartphones, tablets and wearables, has introduced a series of apps for mobile devices. This optimizes operational processes and the customer experience. Scandit's app series Mobile App Suite for Retail offers a range of fully customizable, cross-platform mobile applications designed for employees and customers. The series includes Clienteling, Mobile Point of Sale (mPOS) Mobile shopping (mShopping), self-checkout, shopping lists, and procurement. These apps enable multi-channel retail strategies, ranging from warehousing and administration to sales and beyond. Since they can be easily integrated into existing systems, they can be introduced quickly without high development costs to the retailer.

<http://swissinnovation.org/news/web/2014/05-141002-3d>

Smartphone Understands Gestures

(ETH Zurich, October 08, 2014)

The group of Computer Science at ETH Zurich has developed a new app enabling users to operate their smartphone with gestures. The program uses the smartphone's built-in camera to register the shape of a hand gesture which is then reduced to a simple outline by using a new type of algorithm. This is followed by the execution of the command associated with the gesture. The app has a minimal processing footprint which makes it ideal for smartphones. The objective is to keep the gestures as simple as possible, so that users can operate their smartphone effortlessly. Developers are certain that this application or at least parts of it will find its way onto the market.



<http://swissinnovation.org/news/web/2014/05-141008-e8>

Treating Acrophobia With 3D Glasses

(20min, October 10, 2014)

Researchers at the University of Bern are currently testing a new therapy to treat acrophobia that is irrational fear of heights. In case of treatment of any irrational fear, let it be spiders or heights, patient have to be confronted with their subject of anxiety. The novelty of this therapy is that confrontation is only virtual providing patients a protective, reassuring environment. The intensity of the experience is computer controlled, therefore it can be increased step by





step. Until now, thirty people have tested 3D glasses offering virtual experience and the results are promising. Given that such 3D glasses have recently become affordable, virtual confrontation therapy could soon become part of everyday fear therapy.

<http://swissinnovation.org/news/web/2014/05-141010-67>

HES-SO Shines at MIT's Conference on the Internet of Things

(HES-SO, October 10, 2014)

The University of Applied Sciences in Western Switzerland (HES-SO) won several prizes at the Fourth International Conference on the Internet of Things, held at the Massachusetts Institute of Technology (MIT) in October. It won the prize for the best scientific paper at the workshop on the Web of Things, the best demonstration of the conference, and a brilliant 3rd place in the Hackathon. The HES-SO was represented by teams from Valais and Fribourg, which collaborate on the Internet of Things and intelligent data analysis. The MIT innovation award relates to the fusion of these fields, notably integrating machine learning directly on the sensors in a "smart building" and "smart city" to enable decision-making based on artificial intelligence. This is useful for safety and energy efficiency.

<http://swissinnovation.org/news/web/2014/05-141010-ae>

Software for Internet of Things

(startupticker, October 14, 2014)

Swiss innovators launched software which turns any digital surface into an immersive platform. The dizmo platform seamlessly connects digital and physical objects in the home and at the workplace. Dizmo breaks down traditional boundaries between device, operating systems, apps and software, transforming the way users work, play and live. It supports orchestration and collaboration in a new way enabling any data to instantaneously be accessed on any surface, anywhere and made interactive.



<http://swissinnovation.org/news/web/2014/05-141014-fd>

Accenture Develops Life Sciences Cloud for R&D

(Alp ICT, October 17, 2014)

Accenture has unveiled its scalable, secure, regulatory-compliant cloud platform for research and development in life sciences, hosted by Oracle. Its aim is to accelerate clinical development, improve patient outcomes, and make R&D more efficient, through a new single analytics platform that brings together multiple internal and external data sources across clinical, safety, regulatory and operational functions. Accenture has also formed a coalition with big pharma companies like Merck and Pfizer to bring innovation to the Accenture Cloud. This should speed up drug development, while improving quality and reducing costs. The cloud comprises: a Clinical Trial and Scientific Data Warehouse for managing patient data to improve strategic decision making; an Operational Data Warehouse for monitoring clinical trials and managing supplier relationships; an Information eXchange Hub to ensure integration and security.



<http://swissinnovation.org/news/web/2014/05-141017-cb>

6. Energy / Environment

World's First White Solar Panels

(CSEM, October 28, 2014)

CSEM has announced the world's first white solar modules. Most PV modules, built to maximize sunlight absorption, appear blue-black. For decades architects have been asking for a way to customize the color of solar elements to make them blend into a building's skin. Despite of this demand, no one was ever able to realize a truly white solar module, as white reflects most of the light - contrary to the requirements of all solar panels. CSEM has developed a new technology to make white solar modules. It combines a solar cell technology able to convert infrared solar light into electricity and a selective scattering filter, which scatters the whole visible spectrum while transmitting infrared light.

<http://swissinnovation.org/news/web/2014/06-141028-2f>



High Efficiency Solar Sunflower

(startupticker, October 03, 2014)

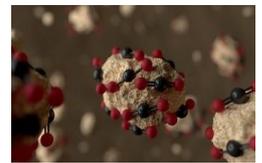
Airlight Energy has developed a High Concentration PhotoVoltaic Thermal (HCPVT) system, which resembles a 10-meter-high sunflower. It uses a 40-square-meter parabolic dish made of patented fiber-based concrete, which can be molded into nearly any shape in less than four hours and has mechanical characteristics similar to those of aluminum at one-fifth the cost. The inside of the parabolic dish is covered with mirrors concentrating the sun's radiation onto a dense array of multi-junction photovoltaic chips. Each chip produces an electrical power of up to 57 watts on a typical sunny day. The system is encased in a large inflated transparent plastic enclosure to protect them from rain or dust. Researchers believe that with high-volume production they can achieve a cost of two to three times lower than comparable systems.

<http://swissinnovation.org/news/web/2014/06-141003-73>

A Carbon Capturing Slurry

(EPFL, October 13, 2014)

In the effort to reduce carbon dioxide emissions, researchers have long been working on a technique called carbon capture, which allows the collecting and storing away of carbon dioxide released into the atmosphere. However engineering challenges prevented large scale implementations of the technique to date. Now scientists from EPFL, UC Berkeley and Beijing have developed a new technology that could represent a significant breakthrough. The technique developed by the scientists combines the two prevalent technologies, carbon capturing solids and liquids, resulting in a carbon capturing slurry. This slurry combines the best of both worlds, it is low cost, efficient and allows easy separation from CO₂. A field test of the slurry is now being planned.



<http://swissinnovation.org/news/web/2014/06-141013-ab>

Plant Communities More Robust Than Monocultures

(University of Zurich, October 16, 2014)

Research from the University of Zurich shows the benefits of diverse plant communities vis-a-vis monocultural planting. Grouping different species of plants allows them to use resources more efficiently, be more robust to pests, and produce higher overall yields. For example, grasses can develop leaves suited to using direct sunlight while clover in the same field develops leaves to gather weaker sunlight closer to the ground. Also, pests have a more difficult time spreading because another host plant of the same species is not necessarily nearby. The result is that biodiversity may be another key approach to feeding our growing population and maintaining food safety.

<http://swissinnovation.org/news/web/2014/06-141016-58>

Melting Glaciers Release Pollutants

(Paul Scherrer Institute, October 31, 2014)

As glaciers increasingly melt due to climate change, it is not only the landscape that is affected. Melting glaciers also release many industrial pollutants into the environment. Within the scope of a Swiss National Science Foundation project, researchers from the Paul Scherrer Institute, Empa, ETH Zurich and the University of Berne have measured the concentrations of a class of these pollutants – polychlorinated biphenyls (PCB) – in the ice of an Alpine glacier. Measurements reveal that PCB levels in the atmosphere have decreased since the 1970s, thanks to the meanwhile global ban on PCBs. Through the progressive melting of the glaciers, however, this residual waste risks being released back into the atmosphere.



<http://swissinnovation.org/news/web/2014/06-141031-0f>

Research Identifies How to Solve Potential Water User Conflicts

(Eawag, November 04, 2014)

The Swiss water economy is ill prepared to cope with upcoming climatic and social changes. However, research undertaken over the past five years through the National Research Program "Sustainable Water Management" (NRP 61) concludes that Switzerland will have enough water if regional collaboration is expanded, if sustainable solutions to water conflicts are found, and if water protection efforts are continued. NRP 61 expects the most pronounced changes to occur in the high mountains. As temperatures rise, around 90% of Swiss glaciers may disappear by the end of this century, fundamentally changing the Alpine water economy. The researchers recommend that the Confederation develop a national water strategy that unites the existing partial strategies, and involve all relevant actors and the broader population in implementing the strategy.



<http://swissinnovation.org/news/web/2014/06-141104-65>



Groundwater Temperature Mirrors Atmospheric Temperatures

(ETH Zurich, November 10, 2014)

New research at ETH Zurich shows that groundwater warms and cools with the local and regional atmosphere, which in turn mirrors global warming trends. This relationship was previously unexpected, and was only discovered due to forty years of groundwater temperature measurements from the cities of Cologne and Karlsruhe, Germany. The temperature has risen significantly in those forty years. The exact consequences of this change are not well known yet, but it is hypothesized that it could have a negative effect on organisms that seek cold waters, or it could promote growth of undesirable bacteria. On the positive side, it could help improve geothermal energy usage.



<http://swissinnovation.org/news/web/2014/06-141110-e6>

High-performance Solar Cells Move into Production

(CSEM, November 17, 2014)

A pilot plant for the production of high efficiency heterojunction (HJT) solar cells was recently inaugurated at Meyer Burger Research AG in Neuchâtel. The plant was developed with CSEM and supported by the Swiss Federal Office of Energy and the Canton of Neuchâtel. It is a successful example of technology transfer to industry, as well as a flagship project for Swiss innovation in the growing cleantech sector. The Meyer Burger technology group is a leading global equipment provider in the photovoltaic industry. The group aims to optimize the HJT coating technology in terms of performance, process and costs, and to scale it up for industrial volume production. The pilot line will later serve as a key platform for research and development, and help bring new innovations to market.

<http://swissinnovation.org/news/web/2014/06-141117-ad>

Project on Distribution Grid Optimization

(startupticker, November 12, 2014)

Two start-ups, Embotech and Adaptricity, together with Inspire AG have started a CTI project for optimal planning and sizing of active electricity distribution networks. The goal of the project is to develop new optimization methods tackling the toughest large scale problems in distribution grid optimization. The technology will allow scenarios with high penetration of renewable energy generation, orders of magnitude faster than today. It will enable realistic quantification of the effects of renewables on grid stability and the associated costs for a safe grid operation. A decision support software that can explore thousands of grid extension possibilities will also be developed. The software will be an invaluable tool helping to avoid investments into the wrong infrastructure.



<http://swissinnovation.org/news/web/2014/06-141112-e1>

Kite Power: Flying Wind Power Plants

(20min, November 28, 2014)

A Swiss start-up is prototyping a novel technology to produce wind power. The company uses a tethered wing to harnesses the wind energy. The mechanical energy of the kite is transferred by the tether to the ground station, where it is converted into electrical power. Electrical energy is produced by transforming the aerodynamic lift force of the flying kite into a rotational motion of the ground-based winch. A closed-loop process is achieved by flying so called pumping cycles. After having achieved a threshold altitude, the kite is reeled in with a minimal energy investment. The company, TwingTec, has already released a first system capable of producing electrical energy in the 50 kW range.

<http://swissinnovation.org/news/web/2014/06-141128-45>

7. Engineering / Robotics / Space

World Record: Fastest Acceleration Car in 1.785 seconds

(ETH Zurich, November 03, 2014)

The Academic Motorsports Club Zurich, comprising of students from ETH Zurich and the Lucerne University of Applied Sciences and Arts, developed an electric race car for the Formula Student competition. They broke the world record for acceleration from 0-100 km/h with a time of 1.785 seconds. Additionally, they have been top competitors in the Formula Student competitions, with three wins this year, and the top two scores in two separate rac-





es. The car has four electric motors in the wheel hubs, and an advanced traction control system. The team was formed in 2006, and this has been their most successful year yet.

<http://swissinnovation.org/news/web/2014/07-141103-e9>

New Rotary Wing Drone

(startupticker, October 08, 2014)

Swiss drone company senseFly recently launched its new eXom rotary wing drone, which can be used for inspection and mapping flights using its advanced TripleView camera head. The drone can take high resolution video, still, and thermal images without changing sensors. It also has ultrasonic sensors and shock-absorbing shrouds to keep it safely away from surrounding obstacles. The autopilot can be used to fly the drone with high-level commands, or a complete flight plan can be specified, sending the drone on an extended mission autonomously.



<http://swissinnovation.org/news/web/2014/07-141008-58>

Biorobotics Is Flourishing

(EPFL, October 15, 2014)

EPFL Professor Auke Ijspeert is a specialist in the flourishing field of biorobotics, or the design of robots that mimic biological systems. A lot of the research in this field centers on understanding how animals have adapted their locomotion to the difficulties of their environment, and then using this knowledge to build more efficient robots. In return, the robots can be used to run experiments to even better understand animal locomotion. Of course, animal locomotion can be very complex, requiring a large amount of research to decipher properly.



<http://swissinnovation.org/news/web/2014/07-141015-23>

Perspectives of European Space Exploration

(European Academies Science Advisory Council, October 01, 2014)

The relevance of European space exploration is emphasised in a new report of the European Academies Science Advisory Council (EASAC). Further exploration is necessary for a better understanding of life in the solar system and beyond, but also for economic and societal benefits. In this context, considerations are presented regarding manned and unmanned space flight. The report was produced under the direction of Thierry Courvoisier, astrophysicist at the University of Geneva and president of the Swiss Academies of Arts and Sciences. EASAC is the association of national science academies of the EU Member States and including Switzerland.

<http://swissinnovation.org/news/web/2014/07-141001-71>

A Better Spintronics Material

(EPFL, October 17, 2014)

Spintronics is the analog of electronics, but using electron spin rather than charge to encode binary information. Spintronics promises to improve speed and energy consumption, compared to electronics, but it is a challenge to find materials that can have their spin influenced without being affected by electronic charge. Now, researchers at EPFL and the Paul Scherrer Institute, along with colleagues in Paris, have discovered that an electrical insulator, strontium titanate, has the required properties; the material can be used to influence the spin of electrons. Additionally, this material may also be used to develop a more stable quantum computer based on elusive Majorana fermions, which could be detected with strontium titanate.



<http://swissinnovation.org/news/web/2014/07-141017-e2>

Controlling Objects via Emotions

(EPFL, October 20, 2014)

SmartCadia, a small device developed by a spin-off of the EPFL's Embedded System Laboratory, could change the way we interact with everyday objects. The device which is able to measure the heart rate, respiration, skin conductivity and physical activity, can essentially assess a user's emotional state. The founders of the spin-off suggest a wide range of applications for their device. Obvious applications for SmartCadia are computer games in which the data captured by the device could lead to more immersive experiences. Furthermore the device could help users manage their emotional state, providing guidance for breathing and yoga exercises to reduce stress. Work on the validation of the system is ongoing with first applications available starting 2015.

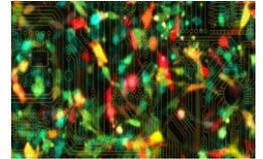
<http://swissinnovation.org/news/web/2014/07-141020-19>



New Biocomputer Components Developed

(ETH Zurich, October 22, 2014)

Scientists have been working on developing biocomputers, which are logic circuits developed from biological building blocks. It is envisioned that these computers will eventually be used to reprogram cells, for example to fight cancer or other diseases. One difficulty with biocomputer components is that signal transmission does not always follow a clear on/off state. To solve this problem, researchers at ETH Zurich have developed a way to activate biocomputer sensor components only when needed, thereby reducing false signals. An enzyme is used to express the component's gene when needed. A related development is a biological signal converter that makes component connections more modular. The signal converter can even handle multiple signals simultaneously.



<http://swissinnovation.org/news/web/2014/07-141022-08>

Robot Locomotion Inspired by Nature

(20min, October 24, 2014)

Sending robots onto missions deemed too dangerous for humans is not a new idea but developing autonomous robots for such tasks presents serious engineering challenges. One major stepping stone encountered by engineers working on autonomous robot locomotion is the overcoming of obstacles such as rubble, mud or steep slopes. Researchers at the ETH Zurich and Lausanne let themselves be inspired by nature to solve these issues. Examples for robots developed by researchers include a robot dog called StarLETH, an amphibian inspired Salamandra Robotica II that is able to crawl and swim and the Cheetah-Cub, which is able to reach speeds of up to 5 km/h. The development of these new kind of autonomous robots, able to move in diversified ways, could open up new possibilities for the deployment of robots in dangerous exploration as well as search and rescue missions.



<http://swissinnovation.org/news/web/2014/07-141024-1f>

Navigation Performance Device

(EPFL, October 31, 2014)

A device developed by Anemomind helps evaluate performance during sailboat racing. The instrument draws on GPS and environmental data specific to the boat. The device goes beyond simply determining how fast the boat is going: it compares the boat's speed to historical data. Algorithms automatically calculate, in real time, the boat's speed as a percentage of the highest speed previously achieved under the same conditions. The calculations are made using data recorded during training sessions and previous races. If the device indicates 80%, then by pulling a little on the sails or varying the angle of the wind, one could go faster. The goal is to get close to 100%, a number that represents the maximum speed achieved with the boat under the same meteorological conditions.

<http://swissinnovation.org/news/web/2014/07-141031-80>

Future Resilient Systems Program Launched in Singapore

(ETH Zurich, November 14, 2014)

Critical infrastructure systems that deliver energy supply, transportation, communication, banking, finance, emergency, and other services form the "backbone" of modern societies. They are becoming increasingly complex and interconnected. The Singapore-ETH Center for Global Environmental Sustainability has launched a new research program called "Future Resilient Systems" (FRS) to develop innovative approaches that make these systems more robust and resilient, and enable them to self-organize, recover and learn like a biological system. The FRS program focuses on energy supply systems as a model that could be applied to other critical infrastructure systems. Funded by Singapore's National Research Foundation, the program draws upon the expertise of ETH Zurich researchers in collaboration with the Nanyang Technological University, National University of Singapore, Singapore Management University, and the Swiss-based Paul Scherrer Institute.



<http://swissinnovation.org/news/web/2014/07-141114-36>

Mysterious Astronomical Object Detected

(ETH Zurich, November 19, 2014)

ETH Zurich scientists are on a team that is studying a mysterious astronomical object that could be either a recoiled black hole or a mega-star undergoing a very long explosion. The former would occur from the merger of two galaxies and the ejection of their combined black hole. In both cases, the discovery would be a first, and moreover,



discovering a recoiled black hole could lead to proof of gravitational waves, which are predicted by the theory of General Relativity, but haven't been observed directly.

<http://swissinnovation.org/news/web/2014/07-141119-75>

SwissFEL X-Ray Laser Installation to Begin

(Paul Scherrer Institute, November 20, 2014)

The two year installation project for a new large-scale research facility for a new X-ray Lasers is due to get underway in early 2015. The free-electron X-ray laser SwissFEL will produce very short pulses of X-ray light with laser-like properties at a high intensity by generating electrons, bringing them to a high energy level with a linear accelerator and sending them on a slalom course using undulators, a special arrangement of magnets. As they zig-zag, the electrons emit light, which intensifies itself strongly and culminates in the brilliant flash of X-ray light that is used for the experiments on SwissFEL. Once completed, SwissFEL will be one of five free-electron X-ray lasers in the world.



<http://swissinnovation.org/news/web/2014/07-141120-2f>

8. Physics / Chemistry / Math

Physics Professor at the University of Geneva wins 'Swiss Nobel Prize'

(Federal Administration, October 01, 2014)

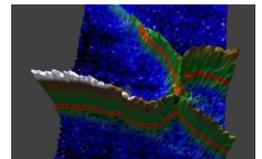
Nicolas Gisin, professor of physics at the University of Geneva has been awarded the Marcel Benoist Prize 2014, the Swiss science award that has been awarded since almost hundred years to scientists based in Switzerland for their the most useful scientific discovery or study, in particular in disciplines which are of significance for human life. The prize recognizes Gisin's outstanding work on the theoretical foundations and possible applications of quantum mechanics and quantum cryptography. In the 1990s the scientist was one of the first physicists to understand how quanta could be transmitted over fibre-optic networks. One of his experiments is considered by the American Physical Society to be one of the most important scientific milestones of the 20th century

<http://swissinnovation.org/news/web/2014/08-141001-a2>

New Multiparticle States Observed

(ETH Zurich, October 10, 2014)

Experiments conducted by the group of Professor Atac Imamoglu at the Institute of Quantum Photonics at ETH Zurich in collaboration with the ETH Zurich's Laboratory for Solid State Physics led by Professor Werner Wegscheider have led to the observation of new multiparticle states that have not yet been described theoretically. By using techniques from quantum optics they examined two dimensional electron gases in a microresonator and were able to study quasiparticles referred to as polaritons, as well as strongly correlated electron gas at temperatures close to absolute zero. Under these conditions superpositions of two multiparticle states so different they normally exclude each other could be observed. Superposition states such as the ones recorded by Imamoglu and his team could have potential applications in the future development of quantum computers based on photons.



<http://swissinnovation.org/news/web/2014/08-141010-09>

Advantageous Spintronic Properties of Strontium Titanate for Novel Semiconductors

(Paul Scherrer Institute, October 12, 2014)

For some years, scientists have had their sights on oxides such as strontium titanate as an interesting alternative to the well-established semiconductors. It was recently discovered that strontium titanate, although actually an insulator, can form a metallic layer on its surface, in which electric current can flow. A team led by scientists from the Paul Scherrer Institute (PSI) has now found advantageous spin-properties of strontium titanate: It has both electrons of a 2D character, and electrons of a 3D character, which penetrate deeper into the material. The 2D electrons can move in two different ways corresponding to two sub-bands, and especially a relatively large amount of energy is required to allow the electron transition from one band to the other. This property makes strontium titanate an important base material for applications in spintronics.

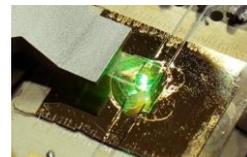
<http://swissinnovation.org/news/web/2014/08-141012-1e>

Refined Magnetic Resonance Imaging Used to Detect Single Atom

(ETH Zurich, October 16, 2014)

Researchers of ETH Zurich and University Leipzig were able to detect a single hydrogen atom using a new high-resolution magnetic resonance imaging technique. The standard magnetic resonance imaging, usually capable of resolving details of up to one tenth of a millimeter, was modified to detect signals from a single hydrogen atom, which requires refining the resolution power of a standard MRI by a factor of one million. The improvement was achieved through the use of a novel diamond sensor chip for the measurement of the MRI signals. If this new method can be made ready for regular use in the laboratory, the huge increase in the spatial resolution power of MRI could one day lead to a new way to determine protein structures.

<http://swissinnovation.org/news/web/2014/08-141016-c3>



New Behavior in High-Temperature Superconductivity

(Paul Scherrer Institute, October 19, 2014)

An international team of researchers from SLAC National Accelerator Laboratory and Stanford University (both California) and the Paul Scherrer Institute (Villigen, Switzerland) has observed a new, unexpected kind of behavior in copper-based high-temperature superconductors. Explaining the new phenomenon - a new, unexpected form of collective movement of the electrical charges in the material - poses a major challenge for the researchers. A success in explaining the phenomenon might be an important step toward understanding high-temperature superconductivity in general. The crucial experiments were conducted at the Paul Scherrer Institute's Swiss Light Source.

<http://swissinnovation.org/news/web/2014/08-141019-01>



Water lights molecules

(University of Bern, October 19, 2014)

Researchers at University of Bern have discovered that some molecules only glow and appear when they get connected to water molecules correctly. Depending on the spot where the molecule is connected to water its fluorescence changes. This implies that molecules cannot be regarded in insulation but depend on the context. Thus, some marker molecules that are for example used to analyze DNA, might not be as reliable as has been assumed. Hence, the chemists suggest that reviewing previous research results of such fluorescent samples might lead to different results with these findings at the back of one's mind.

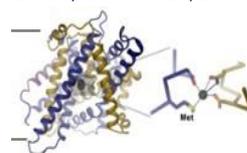
<http://swissinnovation.org/news/web/2014/08-141019-cf>

Structure of Iron Transport Protein

(University of Zurich, October 20, 2014)

Researchers of the University of Zurich have determined the first structure of an iron transport protein. Due to the major importance of iron in a wide variety of cellular processes, its uptake and storage is strictly regulated. In mammals, iron is imported into cells by the membrane transport protein DMT1. Mutations of DMT1, which affect its transport properties, lead to iron-related metabolic disorders. The researchers were able to explain why DMT1 binds the divalent metal ions iron and manganese (Fe^{2+} and Mn^{2+}), but not calcium (Ca^{2+}) – in spite of the latter being several orders of magnitude more abundant. The results provide a basis for novel approaches to treat iron-related metabolic diseases.

<http://swissinnovation.org/news/web/2014/08-141020-d8>



Chemical Computing: GPS without Satellites

(EMPA, October 27, 2014)

Researchers at EMPA have developed a chemical 'processor' capable of identifying the fastest way through a maze that relies simply on the laws of physical chemistry. Exploiting what is known as the Marangoni effect, the reactions between acids and alkalis are the basis of this new technique, which could have applications in transport planning, logistics, neuroscience, robotics, and graph theory. One of the main advantages of this technology over using traditional electronic methods for navigation is that all possible routes are found virtually in parallel instead of step-by-step discovery (which is more time consuming). The system has already been tested on a larger maze based on a Budapest neighborhood with successful results, and the researchers have published their work in the journal Langmuir.

<http://swissinnovation.org/news/web/2014/08-141027-c4>





New CERN General Director

(NZZ, November 04, 2014)

The European Organization for Nuclear Research (CERN) has named Fabiola Gianotti as its new general director starting in 2016. She is the first female to head CERN, and is well known in the field of particle physics. She headed the ATLAS experiment at CERN, which helped discover the Higgs boson in 2012. She was also named to the list of 100 most influential women by Forbes magazine. Next year, CERN's Large Hadron Collider will be back online with nearly double the energy it previously had, which will hopefully lead scientists to new discoveries in particle physics.



<http://swissinnovation.org/news/web/2014/08-141104-12>

Better Understanding of Mathematics by Learning from Examples

(ETH Zurich, November 07, 2014)

Two researchers at ETH Zurich found that students learn mathematics best if they first solve examples individually and then discuss the general principles. Anne Deiglmayr and Lennart Schalk are carrying out research at the Chair for Research on Learning and Instruction. In practice, the researcher recommend that the aim of maths teaching should not be the endless learning by rote of formulae and typical examples, but rather to teach conceptual and transferable knowledge. The findings suggest that collaborative group learning encourages this, because people can then discuss and compare different approaches to solutions, principles and concepts.



<http://swissinnovation.org/news/web/2014/08-141107-b8>

LHC Observes 2 New Baryons

(CERN, November 19, 2014)

The LHCb experiment at CERN's Large Hadron Collider announced the discovery of two new particles in the baryon family. The particles, known as the Ξ_b^- and Ξ_b^{*0} , were predicted to exist by the quark model but had never been seen before. A related particle, the Ξ_b^0 , was found by the CMS experiment at CERN in 2012. As well as the masses of these particles, the research team studied their relative production rates, their widths – a measure of how unstable they are – and other details of their decays. The results match up with predictions based on the theory of Quantum Chromodynamics (QCD).

<http://swissinnovation.org/news/web/2014/08-141119-2c>

New Cooling Technique Using Ultracold Atomic Gas

(University of Basel, November 25, 2014)

Physicists at the University of Basel have developed a new cooling technique for mechanical quantum systems. Using an ultracold atomic gas, the vibrations of a membrane were cooled down to less than 1 degree above absolute zero – the temperature at which all motion stops. Systems that use light to couple ultracold atoms and mechanical oscillators have already been proposed theoretically. The experiment at the University of Basel is the first worldwide to realize such a system and use it to cool the oscillator. Further technical improvements should make it possible to cool the membrane vibrations to the quantum-mechanical ground state. This technique may enable novel studies of quantum physics and precision measurement devices, as reported in Nature Nanotechnology.



<http://swissinnovation.org/news/web/2014/08-141125-4e>

9. Architecture / Design

Design Map Shows Best of Switzerland in Tokyo

(Architectural Record, October 01, 2014)

A new limited-edition Swiss Design Map showcases examples of Swiss design in Tokyo, to mark 150 years of Japanese-Swiss diplomatic relations. Swiss design is associated with core values like precision, craftsmanship, sustainability, innovation and quality, which are well-respected and appreciated in Japan. The map is aimed at showing Tokyo residents just how much Swiss design can be found in the city and making it more accessible to everyone. It shows five categories of location – architecture, fashion, product design, furniture and fabric, and culture. It



also provides information on selected designers and details of upcoming events where people can explore the relationship between Swiss and Japanese design, culminating in Japan's first exhibition dedicated to Swiss design starting in January.

<http://swissinnovation.org/news/web/2014/09-141001-ba>

Architects Developed Slum House 'Empowerment Shack'

"Empower Shack" is a simple 2-floor building made out of wood scaffolding and sheet metal, built for people living in slums. The small house has been developed by two ETH architects, who set up an urban think tank for projects in favelas and townships some years ago, as well as some of their students at ETH. The shack can be assembled in less than 24 hours and costs \$6000. As it is meant to have space for a workshop, shop or restaurant on the ground floor and housing space upstairs the "Empower Shack" is a form of foreign aid to help residents help themselves.

<http://swissinnovation.org/news/web/2014/09-141025-d7>

(SRF, October 25, 2014)



10. Economy, Social Sciences & Humanities

Physical Bitcoin Certificates

(startupticker, October 16, 2014)

Bitcoin is a new virtual currency that uses cryptographic keys to store value. Only the person who knows the specific private key has access to the associated value. An important security aspect is that the private key not be revealed to anyone. A new company, Bitcoin Suisse AG, is issuing physical Bitcoin certificates that have private keys printed on them in a secure way. The certificates look like banknotes, but have modern security features including a hologram. The key is accessed by scratching off an embedded plastic strip, and this process cannot be undone without obvious physical traces. Five different denominations are available.

<http://swissinnovation.org/news/web/2014/10-141016-d3>

Making Office Meeting More Productive

(University of Zurich, October 30, 2014)

Isabelle Odermatt from the Institute of Psychology at the University of Zurich published new research on office meeting practices in Switzerland. Her research based on written questionnaires aims to gauge the efficiency of office meetings as well as the level of contentment of attendees. The result of the survey shows a general dissatisfaction with more than a third of the respondents rating their last meeting as non-satisfactory. Reasons for these results can be found in meetings that are not well prepared and do not lead to tangible results, the study concludes. Odermatt therefore proposes the implementation of various changes, which range from improving the selection of attendees, introducing predetermined time limits and stricter adherence to an agenda, to holding meetings standing up instead of sitting down.

<http://swissinnovation.org/news/web/2014/10-141030-0d>



New Critical Media Lab

(FHNW, November 01, 2014)

Recently, the Institute of Experimental Design and Media Cultures at the Academy of Art and Design FHNW Basel opened the Critical Media Lab Basel. The Critical Media Lab is a vibrant, international hub for historically and contextually engaged critical design and media practices. The research projects are highly innovative and interdisciplinary at the crossroads of design, media arts, science and technology. One of the current projects is about developing a set of contemporary and pioneering research methods through projects supported by SNSF and CTI. The lab facility is located within the new Campus of the Arts at FHNW Basel and provides a space and up-to-date media technologies that support the projects.

<http://swissinnovation.org/news/web/2014/10-141101-e7>

Swiss Work Abroad for Experience

(The Boston Consulting Group, November 06, 2014)

A survey and report by The Boston Consulting Group show that most Swiss (about 75%) are willing to move abroad for a job. This is substantially more than the world average of 64%. However, they would not do so for bet-



ter economic opportunities, but rather for gaining important international experience. The three most desired destinations are all English-speaking (US, Canada, and UK), attributed to the importance of the language even in Switzerland. Conversely, Switzerland is in the top 5 of desired destinations for workers from other countries.

<http://swissinnovation.org/news/web/2014/10-141106-28>

Swiss HR Barometer 2014

(ETH Zurich, November 03, 2014)

The Swiss HR Barometer 2014, carried out by the University of Zurich and ETH Zurich, revealed that three out of four employees are happy with their jobs. At the same time, three out of five employees frequently suffer from stress as a result of their jobs. The high job satisfaction is in contrast with the high levels of stress. Respondents with a managerial role more frequently report job related stress than those without any managerial tasks. Since 2009, job insecurity has increased in Switzerland, giving rise to independent career orientation. A quarter of those surveyed plan and shape their career independently beyond organisational borders and therefore switch companies more frequently.



<http://swissinnovation.org/news/web/2014/10-141103-1f>

11. Technology Transfer / IPR / Patents

Swiss Startup Launches Website for American Investors

(startupticker, October 16, 2014)

Americanswelcome.ch, a new, web-based platform provides easy access to Swiss SEC-registered investment advisers eager to serve American clients in the United States without cross-border restrictions. The most entrepreneurial-spirited SEC-registered Swiss wealth managers provide easy access to their services on WAAW. Interested investors and business partners can easily find and research Swiss wealth managers dedicated to U.S clients, from the large bank-related institutions to smaller boutique-style companies. Lawyers, tax advisers and trust specialists are also present on the site.

<http://swissinnovation.org/news/web/2014/11-141016-8c>

Swiss Startup Wins European Award

(IFJ, November 01, 2014)

InSphero, a spin-off of ETH and the University of Zurich, not only won the TOP 100 Swiss Startup Awards 2014 but also the Life Sciences award of the Academic Enterprise Awards Europe. The company is a leading supplier of organotypic, biological in vitro 3D microtissues for highly predictive drug testing. These microtissues have the potential to revolutionize drug development. They are more predictive, last longer and are more affordable than conventional cell-based models, according to the startup. 15 of the world's biggest pharma and biotech companies already work with InSphero products. Now the company launched InSphero Diagnostics that uses microtissues for personalized medicine.

<http://swissinnovation.org/news/web/2014/11-141101-2e>

12. General Interest

Museum of Fine Arts Bern Accepts Gurlitt Collection

(20 Minuten, November 24, 2014)

The Museum of Fine Arts Bern has reached a major decision to accept the art collection of Cornelius Gurlitt, who in 2012 was found to be in possession of hundreds of artworks, some of which were stolen by the Nazis during World War II. Gurlitt passed away earlier this year and had named the museum in his will. Any artwork suspected of having been stolen will remain in Germany until it can be returned to its rightful heirs or cleared of suspicion, and the museum will accept any pieces with clear history.



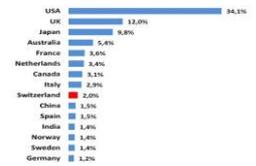
<http://swissinnovation.org/news/web/2014/12-141124-50>



Ig Nobel Prizes 2014

(Federal Administration, October 03, 2014)

Since 1991, the Annals of Improbable Research have awarded prizes for research that makes people laugh and then think. Highlights this year include dung beetles navigating by starlight, the reaction of reindeer to humans disguised as polar bears and the ethical inferiority of people who can't get up in the morning. Surprisingly, the list of the top 10 countries that produce such cutting-edge research looks very similar to the top 10 countries with universities in the top 100 in the QS ranking. However, Japan, France and Italy do better in Ig Nobel prizes than in the QS ranking. Switzerland has won some Ig Nobel prizes too, notably in the fields of physics (2013), peace (2009, 2008) and biology (2005).



<http://swissinnovation.org/news/web/2014/12-141003-46>

13. Calls for Grants/Awards

Call: Opportunities for Researchers from the Socio-economic Sciences and Humanities

(net4society, October 15, 2014)

The NET4SOCIETY, a transnational co-operation among National Contact Points for Socio-Economic Sciences and the Humanities (SSH), published the opportunities for researchers from the socio-economic sciences and humanities within the framework of Horizon 2020. The document comprises almost 40 calls with different sub topics. Application requirements and deadlines differ among the individual topics.

<http://swissinnovation.org/news/web/2014/13-141015-d6>

Call for Grants: Technology Fund

(startupticker, October 24, 2014)

Swiss small and medium-sized enterprises developing and marketing innovative technologies that reduce greenhouse gas emissions, support the use of renewable energy or conserve natural resources can apply for guarantees of up to 3 million for a duration of 10 years at most. The Technology Fund is a federal climate policy instrument falling under the responsibility of the Swiss Federal Office for the Environment (FOEN). The first loan guarantees are expected to be issued at the beginning of 2015.

<http://swissinnovation.org/news/web/2014/13-141024-d2>

Call: SNSF professorship

(SNSF, September 30, 2014)

The SNSF professorships address young and promising researchers who aim to pursue an academic career and start their own research team. An SNSF professorship includes the researcher's salary, a research grant, salaries of employees, as well as a contribution to infrastructure costs. The funding period is 4 years and may be extended by no more than 2 years. The submission deadline is May 1, 2015.

<http://swissinnovation.org/news/web/2014/13-140131-b1>



Upcoming Science and Technology Related Events

LS² ANNUAL MEETING 2015 ZURICH

January 29-30, 2015

<http://ls2-annual-meeting.ch/>

Life Sciences

Zurich

labotec 2015

May 6-7, 2015

<http://www.easyfairs.com/labotec-lausanne-2015>

Life Sciences

Lausanne

Micronarc Alpine Meeting

February 1-3, 2015

<http://mam2015.ch/>

Microsystems

Villars-sur-Ollon

Swiss Biotech Day 2015

April 14, 2015

<http://www.swissbiotech.org/events#event:1171>

Biotech

Basel

Alp ICT Venture Night 2015

February 5, 2015

<http://www.alpict.com/en/activites/>

Entrepreneurship

Geneva

EPFL - MicroNanoFabrication Annual Review Meeting

May 5, 2015

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

Micro & Nano Technology

Lausanne

Assessing the Valuation of New Ventures

March 24-26, 2015

<http://mot.epfl.ch/cas/program-module4>

Entrepreneurship

Lausanne

2015 NTN Swiss Biotech Innovation Day

August 19, 2015

<http://www.swissbiotech.org/events#event:1261>

Biotech

Zug

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