



Science-Switzerland, February – March 2012

News on Swiss science, technology, education and innovation

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Albert Einstein World Award of Science 2012 Goes to Michael Graetzel

(EPFL, February 22, 2012)

The Interdisciplinary Committee of the World Cultural Council has selected Prof. Michael Graetzel as the winner of the ALBERT EINSTEIN World Award of Science 2012. This award is a highly prestigious acknowledgement by outstanding personalities within the scientific community, spanning over five continents, all of whom are members of the World Cultural Council. The prize is being awarded to Prof. Michael Grätzel (LPI - Laboratory of Photonics and Interfaces) for his outstanding contribution to the welfare of mankind and the health of the planet. His invention, the Graetzel (solar) cell is a technological break-through that promises to strongly increase the consumption of renewable solar energy; arguably one of the most important sectors in sustainable energy production.



<http://swissinnovation.org/news/web/2012/00-120222-8e.html>

Switzerland Tops Innovation Ranking

(FUTURE.CH, February 07, 2012)

For the fourth consecutive time, Switzerland has won first position in the European Innovation Scoreboard 2011, the UE's official innovation ranking. Among other things, its top rank is due to the large investments in research & development made by the private sector. However, Switzerland's innovation performance is increasing less than that of other countries. Indeed over the last five years, Switzerland has shown a 1.3% 'innovation growth', whereas countries such as Croatia or Turkey have recorded growths between 4% and 5%. Among large countries, the US and Japan are on top.

<http://swissinnovation.org/news/web/2012/02-120207-64.html>

1. Policy

4% More Funding for Research, Education and Innovation

(20Min, February 22, 2012)

The Swiss Federal Council has decided to give priority to research, education and innovation, thus increasing the budget by 4%. Switzerland will invest 26 billion francs in research and education between 2013 and 2016. Newly elected Federal Councillors, Alain Berset and Johann Schneider-Ammann, have stressed the need for Switzerland to invest more in research and education, Switzerland's only "natural resource". The budget also takes into consideration Switzerland's nuclear power plant phase-out. The Federal Institute of Technology and other universities will receive an average increase of 4%, and colleges 5%. The budget will allow the Swiss National Foundation and the Commission for Technology and Innovation to improve the already high level in research and innovation.

<http://swissinnovation.org/news/web/2012/01-120222-d2.html>



National Strategy Towards High-Performance and Sustainable ICT

(Admin, March 09, 2012)

Information and communication technologies (ICT) offer numerous opportunities for the economy and society in Switzerland through their potential for innovation. In order to make the most of this potential, the Federal Council has updated its strategy for an information society in Switzerland. The strategy is applicable immediately and will be updated regularly. The strategy designates the areas of activity in which the innovation potential of ICT can have a particularly great impact. As a basis for a sustainable information society, the Federal Council envisions high-performance, open transmission networks. Therefore, for the first time, it has included the topic, 'Infrastructure', in its strategy. Also, the topic "Energy and Resource Efficiency" has now been incorporated, in order to achieve sustainable, environmentally friendly use of ICT.

<http://swissinnovation.org/news/web/2012/01-120309-6a.html>

More Budget for ETH Domain

(ETH Zurich, March 12, 2012)

The ETH Board is increasing the 2013 budgets for all six institutions of the ETH Domain by 2.1% in comparison with the preceding year, and additionally placing an emphasis on teaching. In the first meeting in its new composition, the ETH Board allocated the 2013 funds for the six institutions of the ETH Domain – ETH Zurich, EPFL, PSI, WSL, Empa and Eawag. In doing so, it followed the principle of further promoting the two Federal Institutes of Technology, which occupy a top international position in their specific fields, and of acknowledging the renewed strong performance of the research institutes in their specific fields.

<http://swissinnovation.org/news/web/2012/01-120312-8b.html>

2. Education

Management in Technology with High Distinction

(UNIFR, February 15, 2012)

The International Institute of Management in Technology (IIMT) of the University of Fribourg and its postgraduate study courses have once again been accredited – without conditions and with the highest distinction – by the Swiss University Conference (SUC). Through this accreditation, the SUC attests that the IIMT – as well as its Executive MBA, Executive Diploma in ICT and Utility Management postgraduate courses – offer a continuing education program of the highest quality. This accreditation is valid for 7 years. The Swiss Center of Accreditation and Quality Assurance in Higher Education, together with a group of 5 international experts, has reviewed an auto-evaluation report and shared its approval recommendation to the SUC.

<http://swissinnovation.org/news/web/2012/02-120215-e7.html>

New Rector of ETH Zurich

(ETH Zurich, March 12, 2012)

The ETH Board has elected Lino Guzzella, ETH Professor of Thermotronics, as a member of the Executive Board. ETH President Ralph Eichler supported the proposal put forward by the ETH Zurich Professors' Conference, which last December voted by 373 votes out of 400 to appoint Lino Guzzella as Rector to the ETH Executive Board, responsible for Education. The professor will hold the office for a period of four years. Prof. Guzzella will take up his post on 1 August 2012. He has been a full Professor of Thermotronics in the Department of Mechanical and Process Engineering since 1999. In his research, Lino Guzzella works on modelling and model-assisted optimisation and control of energy technology and mechatronic systems.



<http://swissinnovation.org/news/web/2012/02-120312-b3.html>

3. Life Science / Health Care

Efficient Training Monitor for Elite Swimmers

(EPFL, February 01, 2012)

Researchers from the Laboratory of Movement Analysis and Measurement (LMAM), working in collaboration with the University of Lausanne, have taken the first step in developing a tool that can help improve elite swimmers' workouts. They developed waterproof inertial systems to be sewn into the swimming suit, equipped with accelero-



meters and gyroscopes that can record a variety of measurements as the athlete swims. This system, called Physiolog III, has a number of advantages over the conventional cameras that coaches have been using up to this point. A camera can only focus on one swimmer at a time and it takes several days to analyze the data. Worn by the swimmers, the system provides a practical tool to analyze the performance from several athletes simultaneously, and it only takes a few minutes

<http://swissinnovation.org/news/web/2012/03-120201-00.html>

Sugar Mechanism in Proteins

Oligosaccharyltransferase is an enzyme that plays a key role in binding short chains of sugars to proteins. Researchers at ETH Zurich have discovered how this enzyme operates in the bacteria *Campylobacter*. Although the enzyme is different in this bacterium than in humans, its core functionality is the same. This new knowledge could be used in two different ways. First, vaccinations could be created by mimicking the identifying sugar chains of harmful bacteria. This would build up defenses in the human immune system against bacteria with the same sugar chains. Second, further research could identify how to make the enzyme impotent, thereby making harmful bacteria harmless.

<http://swissinnovation.org/news/web/2012/03-120201-9e.html>

(SNF, February 01, 2012)



Fur Pattern of Cattle Explained

Prof. Leeb and Prof. Drögemüller of the University of Bern, together with colleagues from Belgium, have published a study in the magazine 'Nature' showing that gens with changing chromosomes are responsible for the white and brown fur pattern of certain types of cattle. This study for the first time shows that gens in mammals can form themselves to new groups. The team in Bern was studying the reasons for the color pattern of a certain Swiss breed of cattle while the Belgians were doing the same on a visually similar breed of Belgian cattle. Chromosome 6 explains the fur pattern of the Swiss cattle and chromosome 29 the fur pattern of Belgian cattle. Chromosome 6 is known for its important role in pigment production. Chromosome 29 has not been linked to such a function so far.

<http://swissinnovation.org/news/web/2012/03-120201-b2.html>

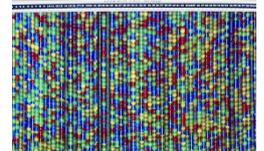
(UNIBE, February 01, 2012)

Gene Sequencing For Personalized Medicine

Swiss pharmaceutical company Roche is looking to secure its future and betting on personalised medicine in the process. Last week, the Basel-based firm made an offer for Illumina, a San Diego company that makes machines which help decode DNA at lower cost. While the cost of gene sequencing has dropped, its potential in medicine has been on the rise. Sequencing helps identify new targets for pharmaceuticals. It also better defines patients that are most likely to respond to drugs. And with Illumina at the front of the field, Roche doesn't want to be left behind. DNA sequencing is the foundation of personalised medicine. Roche already expects a new generation of drugs targeted at specific groups of patients.

<http://swissinnovation.org/news/web/2012/03-120202-5d.html>

(Swissinfo, February 02, 2012)



Breastfeeding and Lung Health

A new study from the University of Bern shows that breastfeeding has significant health benefits for respiratory health in children. Furthermore, and in contrast to a US study on breastfeeding by mothers with asthma that showed an increased risk of asthma in the child, the University of Bern report shows that children with asthmatic mothers develop larger lungs when breastfed. The mechanism behind this finding is not clear, but the researchers are considering hormones in the milk and mechanical stimulation as possible reasons.

<http://swissinnovation.org/news/web/2012/03-120203-ca.html>

(UNIBE, February 03, 2012)

New Immunotherapy Against Leukemia

Leukemia is a blood disease caused by malfunctioning Leukemia stem cells. This disease is very resistant to chemotherapy and radiation treatment, leading to high recurrence rates. Swiss researchers are now proposing an alternative immunotherapy treatment that suppresses signal transmission of CD27, a cell growth molecule that stimulates the Leukemia stem cell. This approach is much more targeted than others, and it has been demonstrated successfully in mice. However, until a working solution for humans is created, another five to ten years could pass.

<http://swissinnovation.org/news/web/2012/03-120207-26.html>

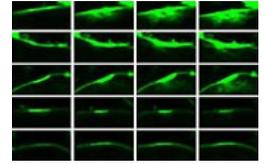
(UNIBE, February 07, 2012)



Insight into Causes of Multiple Sclerosis

(UNIBE, February 07, 2012)

Neuroimmunologists from the University of Zurich have demonstrated that damaged myelin in the brain and spinal cord does not cause the autoimmune disease Multiple sclerosis (MS). This rules out a popular hypothesis on the origins of MS: the "neurodegenerative hypothesis", which was based on observations that certain patients exhibited characteristic myelin damage without a discernable immune attack. It was assumed that MS-triggering myelin damage occurs without the involvement of the immune system. Using genetic tricks, they induced myelin defects without alerting the immune defense, in order to ascertain whether an active immune defense causes the disease based on a combination of an infection and myelin damage. The researchers conducted a variety of further experiments – without success. The scientists are now primarily looking for the cause of the development of MS in the immune system instead of the central nervous system.



<http://swissinnovation.org/news/web/2012/03-120207-2c.html>

Realtime Imaging of Metabolism

(UZH, February 09, 2012)

Researchers at the University of Zurich and ETH Zurich are developing a new application of magnetic resonance imaging (MRI) to "see" metabolic processes unfold. MRI detects magnetically charged particles added to an organism, specifically hydrogen atoms until now. The new approach makes use of polarized carbon atoms from organic molecules that are injected into the organism. This makes it possible to observe not only the original molecules, but also their byproducts after metabolism. Potential applications of this new technology include the monitoring of chemotherapy and cardiovascular diseases. The intake and breakdown of sugars in cells can also be monitored.

<http://swissinnovation.org/news/web/2012/03-120209-4f.html>

New Immunity System Mechanism Discovered

(UNIGE, February 09, 2012)

A team led by the University of Geneva and the Charity University Medicine Berlin has discovered a brand new mechanism that helps our immunity system react to viral intrusion. Possibilities to exploit this mechanism in future vaccines lead to new hopes in preventing and curing infectious diseases and cancers. During a viral intrusion, cytotoxic T lymphocytes identify and kill cells that contain viruses and bacteria, or form a cancer. These lymphocytes are likely alerted by dendritic cells which can identify viruses through pathogen associated molecular patterns (PAMP). The newly discovered defense system relies however on signals that are emitted only after some cells have been destroyed by a virus. When dying, they indeed release different molecules, including one called damage associated molecular pattern (DAMP). The researchers suspect that the lymphocytes' reaction intensity is strongly linked to one of these DAMP, the interleukin 33. Control of this molecule could therefore be used to strongly stimulate a person's immunity system.

<http://swissinnovation.org/news/web/2012/03-120209-e6.html>

Molecule Prevents Fat Combustion

(ETH Zurich, February 10, 2012)

Researchers in the group led by Willy Krek, Professor of Cell Biology at ETH Zurich, have bad news and good news for obese people. The scientists showed that a molecule, Hif1, is active in the white cells of the abdominal fat in mice. It ensures that the fat does not melt away even when the diet is changed. High concentrations of this signalling molecule are also present in massively overweight people. The good news: the process is reversible. When the researchers switched off the relevant molecule in mice, the suppressed metabolic route started working normally again, the mice burnt fatty acids and the fat deposits melted away.



<http://swissinnovation.org/news/web/2012/03-120210-d4.html>

Genome Protection Mechanism

(UNIGE, February 13, 2012)

Researchers at the University of Geneva have discovered the key role of two proteins in the creation of a cellular 'anti-enzymes shield'. Through the use of molecular 'hoods' called telomeres, this protection system prevents chromosomes' extremities to be recognized as accidental DNA breaks and falsely repaired. Indeed, joining chromosomes together would lead to a tumorous development. This discovery brings light to the cells' complex system that corrects anomalies in our genome. It is constituted of patrolling proteins, molecules that activate alarms and enzymes that repair damages. The discovery focused on two proteins, Rif1/2, that bind to telomeres and deactivate the DNA reparation control alarm system for chromosomes' extremities.

<http://swissinnovation.org/news/web/2012/03-120213-59.html>



New Approach to Muscular Dystrophy

(UNIBAS, February 15, 2012)

Researchers from University of Basel have explained a certain type of inherited muscular degenerative disease on a molecular level. A certain form of muscular dystrophy is caused by mutations of the membrane protein dysferlin. It is a repair protein that regulates repair functions in the muscle membrane. The mutated protein is recognized as faulty and eliminated by the body's quality control system, the proteasome. But without dysferlin, the muscle membrane can't repair itself and one observes the symptoms of muscle wasting. By using the proteasome inhibitors lactacystin and bortezomib in patient cell cultures, the researchers were able to reactivate the mutated dysferlin, and repair the cells.

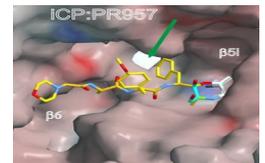
<http://swissinnovation.org/news/web/2012/03-120215-79.html>

How the Body Distinguishes Between Self and Non-Self

(PSI, February 16, 2012)

Like a shredder, the immunoproteasome cuts down proteins into peptides that are subsequently presented on the cellular surface. The immune system can distinguish between self and non-self peptides and selectively kills cells that, due to a viral infection, present non-self peptides at their surface. In autoimmune diseases, this mechanism is deregulated and the immune system also eliminates uninfected cells by mistake. However, inhibition of the immunoproteasome may alleviate disease symptoms and progression. Biochemists at the Technische Universität München (TUM), with the help of measurements taken at the Paul Scherer Institute, have now succeeded in determining the first crystal structure of an immunoproteasome. The results are reported in the renowned journal «Cell» and will enable the development of new drugs that selectively target the immunoproteasome.

<http://swissinnovation.org/news/web/2012/03-120216-a9.html>



Compact Electrocardiogram Monitor

(CSEM, February 21, 2012)

The Swiss Center for Electronics and Microtechnology is starting a project, named IcyHeart, that will develop an integrated system-on-a-chip that senses, converts, processes, and transmits a patient's electrocardiogram (ECG) signals. The system enables unobtrusive, remote monitoring of the ECG. The system will combine low-power electronics and special signal processing software designed for low-power chips to achieve its size and power goals. Real-time processing will allow for abnormal events to be detected quickly. The project hopes to have a significant societal and economic impact in Europe.

<http://swissinnovation.org/news/web/2012/03-120221-a1.html>

Personalized Treatment for Diabetes

(UNIGE, February 22, 2012)

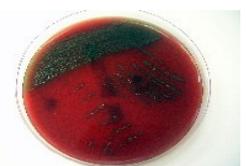
Project DIRECT (Diabetes REsearch for patient stratiFication), gathering experts from 21 European academic institutions and stakeholders from the pharmaceutical industry, aims to establish a stratification of type 2 diabetes patients to develop personalised, and therefore more effective, treatments. This 54 million franc budget project is supported by the Innovative Medicine Initiative (IMI), a joint program of the European Commission and the European Federation of Pharmaceutical Industries (EFPIA). Over a period of 7 years, the consortium will develop biomarkers and tests to differentiate diabetic patients. Researchers from University of Geneva will play a key role in experimental and statistical analysis of gathered patient data.

<http://swissinnovation.org/news/web/2012/03-120222-d0.html>

New Bacteria Discovered

(UZH, February 22, 2012)

Bacteria are important and abundant in our bodies, and bacteria from the Streptococcus genus are often found in our mouths, where they are harmless. Nevertheless, they can sometimes invade our bloodstream and cause heart or brain infections. Scientists at the University of Zurich have discovered a new species of Streptococcus that can cause endocarditis or meningitis. They were able to differentiate the new bacteria, which they named Streptococcus tigurinus after an older name for Zurich, by molecular-biological and phenotypical traits. Further research is needed to determine how abundant this species is.



<http://swissinnovation.org/news/web/2012/03-120222-4f.html>



Treating Depression

(UNIBAS, February 22, 2012)

Swiss and German researchers have performed a pilot study that shows the benefits of botulinum toxin injections to the forehead in alleviating depression. In a randomized, blind study, patients with an established history of depression untreatable by traditional medications were given either a real injection or a placebo. The first positive effects were seen within two weeks, and within six weeks the symptoms of 60 percent of the experimental group had been cut in half. Improvements were noticed until the end of the sixteen week study. The researchers hypothesize that facial muscles not only reflect our mood, but affect our mood as well. Further study is needed to determine under what conditions such injections are most helpful.

<http://swissinnovation.org/news/web/2012/03-120222-9d.html>

Communication between Brain Hemispheres

(UNIBE, February 23, 2012)

A group of neuroscientists under the lead of Prof. Matthew Larkum, University of Bern, discovered how the brain hemispheres through touching help to level or suppress stimuli. This discovery might hold new therapy methods for stroke patients. The corpus collosum which connects the brain hemispheres helps to coordinate the stimuli that the brain receives. So far, this process was not understood on the cellular level. The new insights, based on clinical and basic research, are central for the understanding of the countless interactions between the brain hemispheres. The study has been published in "Science".

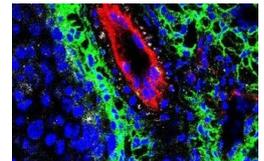
<http://swissinnovation.org/news/web/2012/03-120223-9f.html>

Tumor Detection Escape Mechanism for Effective Drugs

(EPFL, February 24, 2012)

Melody Swartz at EPFL and Stéphanie Hugues at UNIGE have identified an important mechanism that could lead to the design of more effective cancer vaccines. Their discovery shows how tumours evade detection. The study describes for the first time how lymph vessels surrounding a tumour ward off T cell attack. The researchers studied a type of tumour that expresses large amounts of VEGF-C, a molecule that is naturally expressed in humans and that stimulates lymphatic growth. Having engineered the tumor cells to express a foreign antigen, they compared the efficacy of a vaccine designed to prime T cells to kill cells carrying that antigen, either when VEGF-C was present or when its activity was blocked. With VEGF-C suppressed, the vaccine's efficacy increased and tumour growth slowed fourfold.

<http://swissinnovation.org/news/web/2012/03-120224-98.html>



Evaluation Tool for Chronic Pain

(EPFL, February 27, 2012)

Chronic pain has a significant impact on the physical, social and emotional functioning of those who suffer from it. It is also notoriously challenging to diagnose and treat. Scientists at EPFL have developed a new tool that will give doctors an objective way to evaluate a patient's pain level. This will enable targeted treatments and monitoring. How we move is an excellent indicator of overall health. When we feel good, we move around continually. When we're in pain, we reduce our physical activity. This observation has led to an original approach for evaluating chronic pain. A team from EPFL's Laboratory of Movement Analysis and Measurement (LMAM) has developed a clever, easy-to-use visual tool to help doctors assess their patients' pain levels. The research appears online journal PLoS One.

<http://swissinnovation.org/news/web/2012/03-120227-8d.html>



Cell Experiments in Zero Gravity

(UZH, February 27, 2012)

Medical Doctor and cell biologist Oliver Ulrich, University of Zurich, conducts research on the human immune system in zero gravity. It is well known that astronauts suffer easily from diseases of the airways, skin fungus, slow-healing wounds and a disrupted bone metabolism. In order to get a better understanding of the cell function in zero-gravity, University of Zurich and the Swiss Air Force jointly started an ambitious research program. In the course of regular training flights, Tiger jets fly a zero gravity flight maneuver during which a fully automated experiment apparatus conducts experiments with human immune cells. From these experiments the researchers know that different cell types of the immune systems react differently to the loss of gravity. Even the activities of certain genes change seconds after zero gravity starts.

<http://swissinnovation.org/news/web/2012/03-120227-bc.html>



Successful Salt Iodization

(ETH Zurich, March 01, 2012)

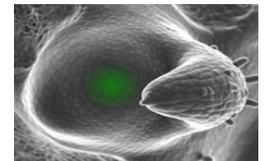
The world's population has never been so well supplied with iodine as today. Major progress in salt iodization is evident in a new global study in school children done by nutrition researchers at the ETH Zurich. But there is still room for improvement of the situation in Africa and South East Asia. Iodine deficiency causes goiter (swelling of the neck) and impairs mental development, but these health problems are being eliminated by iodized salt in many countries. According to a new study, the population in 105 countries is consuming enough iodine - and goiter and mental retardation due to iodine deficiency is hence not a general public health problem anymore. Between 2003 and 2011 the number of countries with iodine deficiency decreased from 54 countries to 32.
<http://swissinnovation.org/news/web/2012/03-120301-b1.html>



Cell Growth Mechanism

(UNIBE, March 01, 2012)

A cross-disciplinary team of scientists at the University of Bern has discovered a new mechanism, aside from genetics, that controls cell growth. They found that how stem cells in plants differentiate depends on the mechanical pressure on their cell walls. Cells at the tip of a growing shoot experience high pressure on their cell walls, which in turn keeps the stem cells from expanding and differentiating. Conversely, stem cells below the tip do not experience this pressure and can expand quickly and differentiate. This mechanism regulates these important stem cells and keeps them from growing uncontrollably.
<http://swissinnovation.org/news/web/2012/03-120301-f1.html>



More Effective Chemotherapy

(UZH, March 05, 2012)

Chemotherapy drugs don't always have the expected effect on cancerous cells, and the mechanism by which they work has not always been well understood. It was assumed that some drugs, such as Top1 inhibitors, caused breaks in the DNA of cancer cells. However, recent research has shown that some cancer cells can activate a molecular brake that changes the effect of Top1 and gives the cells time to repair themselves, decreasing the effects of the drug. Additionally, the scientists know which enzymes are responsible for the defense mechanism and hope to create new treatments that target them.
<http://swissinnovation.org/news/web/2012/03-120305-6e.html>

European Neuroscience Project to Focus on Vinegar Fly

(UNIFR, March 07, 2012)

Researchers from eight European universities, including the University of Fribourg, are collaborating for the FliACT project, which focuses on solving some of the hottest questions of neuroscience through the study of the vinegar fly's brain. The group has been created by the European commission and brings together institutes from domains such as neuroscience, molecular genetics and biotechnology. The study of the vinegar fly aims at understanding the way humans assimilate and interpret information using senses of smell and vision. The fly is also used for research on the basic genetic principles of neurodegenerative sicknesses such as Alzheimer. The project will also bring scientists together for joint experiments, training on most recent technologies and the creation of 3 startups.
<http://swissinnovation.org/news/web/2012/03-120307-6a.html>



Towards Better Harvest

(UZH, March 07, 2012)

Plant biologists at the University of Zurich have discovered that a special transport protein is required to establish the symbiotic relationship between plants and soil fungi. The formation of this symbiosis is a strictly regulated process that the plant activates in low nutrient levels. The roots release the hormone strigolactone, which is detected by the fungi. The fungal hyphae grow towards the roots, penetrate them, and enter the root cortex. Exactly how strigolactones are released into the soil from the roots and how the fungi find the entry points in the roots was not known until now. The researchers were able to demonstrate that the protein PhPDR1, belonging to the ABC-transporter family found in bacteria but also in humans, transports strigolactones. They observed that PhPDR1 is expressed more highly in a low nutrient content in order to attract more symbiotic fungi, which then supply more nutrients. The targeted control of this protein could lead to greater harvests.
<http://swissinnovation.org/news/web/2012/03-120307-1a.html>





Gorilla Genome Sequenced

(UNIGE, March 08, 2012)

Swiss and British scientists have, for the first time, sequenced the genome of the gorilla, the last remaining hominid that hasn't had its genome sequenced. While previous molecular studies have shown that the chimpanzee is the closest relative to humans, this new study showed that certain parts of our genome are most closely related to gorillas, especially the genes related to sensory perception, audition, and cerebral development. This comparative study is important because it sheds new light on our origins and the period when hominids began to diversify. An additional part of the study looks at how genes are expressed and how small changes in genes result in different expression.

<http://swissinnovation.org/news/web/2012/03-120308-85.html>



Social Cohesion in Chimpanzees

(UZH, March 08, 2012)

A study by researchers at the University of Zurich confirms anecdotal evidence that chimpanzees intervene impartially in conflicts. Such policing behavior is important for the social cohesion of cohabiting groups. A mediator is most likely to become involved if the conflict is large and involves more than two members. Additionally, a high ranking male or female is generally needed to successfully resolve a conflict. The anthropologists who generated these results studied several groups of captive chimpanzees. One of the groups had new females introduced and was in the process of having the ranks of males change, which led to interesting observations.

<http://swissinnovation.org/news/web/2012/03-120308-ba.html>



Automatic Underwater Safety

(EPFL, March 12, 2012)

A student at EPFL has created a new safety device for divers and formed a company to develop and sell it. The device, named Suba, is an intelligent wristband that automatically controls the inflation and deflation of the buoyancy system. It can take over when a diver panics and automatically control decompression stops during the ascent from a dive. With this device they hope to combat the majority of diving accidents, which occur due to incorrect decompression. The new company, Pandora Underwater Equipment, was founded in EPFL's incubator space, the "Garage", and received Venture Kick funding in 2011.

<http://swissinnovation.org/news/web/2012/03-120312-f8.html>

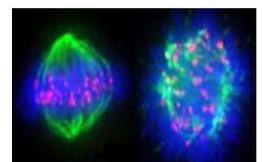


Cell Division Mechanism

(UNIBAS, March 14, 2012)

Researchers at the University of Basel have explained how the enzyme Aurora B functions in cell division. An important step in cell division is splitting the 23 chromosome pairs that make up our DNA into the two new cells. Faults in this step can lead to tumor cells instead of regular cells. Aurora B regulates the interaction between the spindle apparatus and two protein complexes involved in the splitting. The spindle apparatus attaches fibers to the chromosomes to pull them apart, and Aurora B controls the timing and strength of this attachment. This research may lead to further insight into the development of tumors and cancer.

<http://swissinnovation.org/news/web/2012/03-120314-04.html>



Vaccine Hope for the Malignant Gliome

(UNIGE, March 15, 2012)

The malignant gliome is the most common and wrenching type of brain cancers and the impact of current treatments are limited. A group of researchers from the University of Geneva and its Hospital, in collaboration with a German company, are exploring new ways to treat this sickness and have discovered targets on tumorous cells against which a patients' immunity system could be directed. The key to the immunotherapy system is to detect and destroy tumorous cells without affecting healthy ones. This is done through the identification of peptides that are only present at the surface of sick cells. So far, a dozen of peptides, among the dozen of thousands, have been isolated. For the first time, this discovery will allow the development and then testing of vaccines and cellular therapies targeting the malignant gliome.

<http://swissinnovation.org/news/web/2012/03-120315-20.html>

New Virtual Molecule Modification

(ETH Zurich, March 16, 2012)

New software developed by ETH Zurich researchers has learned important rules of chemistry. Whereas in the past chemists carried out a computer-aided active ingredient search mainly by combing through data bases containing a limited number of candidate molecules to find which of them was most suitable, ETH Zurich researchers led by Gisbert Schneider, Professor at the Institute of Pharmaceutical Sciences, are now going one step further: they have developed a program that has memorized important rules of organic chemistry and can use it to build new active ingredient molecules from first principles. The researchers call it “de-novo design”. Schneider’s computer program can assemble and modify molecules virtually on the modular principle and can compare them with existing molecules to calculate how well they fulfill the conditions defined by the researchers.

<http://swissinnovation.org/news/web/2012/03-120316-0e.html>

Social Network and Memory

(UNIBAS, March 16, 2012)

Researchers at the University of Basel recently studied how social networks are represented in our memory. They conducted an experiment where they asked participants to list people they knew and then studied the relationship between the recall order and each of the people. They found that how well two acquaintances know each other most significantly affects how close to each other they are in the recall order. In other words we group people by their relationships to each other, not necessarily by the class or type of acquaintance they are. A second factor in recall order is the frequency of contact with the person being recalled.

<http://swissinnovation.org/news/web/2012/03-120316-5d.html>

Pioneering Approach in the Study of Neurodegenerative Diseases

(EPFL, March 19, 2012)

The connections between neurons might play a role in neurodegenerative diseases, including Alzheimer’s Disease (AD). In a pioneering approach to studying how neurodegenerative diseases like AD spread within the brain, Robert Meissner and Anja Kunze, researchers at EPFL, have developed a novel in vitro experimental method that allows them to connect healthy neurons with “infected” neurons and then observe the results. The two EPFL scientists have designed a cell culture device with two compartments in which it is possible to “connect” healthy neurons and “sick” neurons via a neurite network. Their work will make it possible to conduct in-depth studies of how neurodegenerative diseases spread via the connections between neurons. The method can be used for many types of tests, including tests for other neurodegenerative diseases.



<http://swissinnovation.org/news/web/2012/03-120319-9b.html>

Nightingale Singing Communication

(UNIBAS, March 21, 2012)

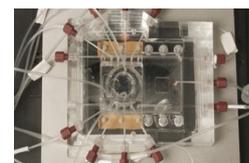
Nightingales communicate by singing, and they can express their mood in this way too. When annoyed by other birds in their territory, male nightingales will sing more quickly and interrupt others. Researchers tested what positions are most threatening to these birds by playing songs through loudspeakers. Contrary to their expectations, rivals at the same height as the defender were viewed as more threatening than ones higher up. Birds higher up need to be stronger to counter higher winds and to ward off predators, but they may also just be passing through the territory instead of trying to gain it or harass the defender.

<http://swissinnovation.org/news/web/2012/03-120321-bf.html>

Artificial Intestine Analyzes Food Quality

(EPFL, March 26, 2012)

EPFL researchers have developed a miniature on-chip gastrointestinal tract in order to observe the effects of various nutrients on health. The NutriChip is a miniature artificial intestinal wall that can be used to identify foods that cause inflammation in the human body. Once a given food has been digested and absorbed by the intestine, it carries certain molecules into the body. These molecules set off an immune response, in the form of slight, temporary inflammation. Biomarkers for inflammation can then be found in the blood. This is a normal phenomenon, but it must be monitored because it can set the stage for inflammatory chronic illnesses. The NutriChip compares different foods in terms of their ability to lower the concentrations of inflammation biomarkers. It uses CMOS high-resolution optical sensors in order to precisely detect and measure cytokine production by the immune cells that are on the other side of the layer of intestinal wall cells.



<http://swissinnovation.org/news/web/2012/03-120326-9b.html>



Smoking and Schizophrenia

(UZH, March 26, 2012)

Schizophrenia is known to be a hereditary disease, but the main responsible genes have not been identified yet. Most studies in this area compare the frequency of risk genes in healthy and unhealthy patients, but a new study by researchers at the University of Zurich studied the processing of auditory stimuli. Healthy people can filter out irrelevant stimuli, while schizophrenic patients have trouble doing so. The study focused on the TCF4 gene, a known risk gene. People carrying TCF4 have trouble filtering auditory stimuli to various degrees, with smoking exacerbating the effect. Thus, smoking may increase the risk of TCF4 leading to schizophrenia. Smoking demographics should be considered in future studies.

<http://swissinnovation.org/news/web/2012/03-120326-01.html>

Forgetting Mechanism

(UNIBE, March 26, 2012)

The brain processes and stores information through neurons and synaptic processes. The synapses transmit electrochemical signals, but sometimes a signal is transmitted too late without having an effect on the receiver. In this case, a feedback mechanism weakens the connection. Researchers at the University of Bern studied this feedback mechanism and found that astrocyte cells play a key role. These cells, activated when neurons receive a signal too late, produce a cannabis-related substance that weakens the neuron connections. These new findings may lead to better pain therapy through weakening of neurons responsible for processing pain. It may also explain why cannabis helps mitigate pain in certain cases.

<http://swissinnovation.org/news/web/2012/03-120326-56.html>

Sea Reptile Skeletons

(UZH, March 27, 2012)

Intact ichthyosaurus skeletons are often found with the bones of their embryonic young scattered outside their skeleton. The leading theory until now has been that gas from decomposition exploded the cadaver and spread the embryos. However new research by a Swiss and German team shows that gas pressures are not sufficient to explode cadavers. The researchers measured the pressure in human cadavers, which are approximately the same size as ichthyosauruses. The latest hypothesis is that water currents washed the embryos out of the skeleton, but otherwise left everything intact. In other cases, gas made the cadaver float and then spread widely after decomposition, not leaving any intact skeletons.

<http://swissinnovation.org/news/web/2012/03-120327-78.html>



High-Precision Linear Accelerator for Cancer Treatment in Small Animals

(UZH, March 29, 2012)

The Vetsuisse Faculty at the University of Zurich is using a linear accelerator capable of targeting inoperable tumours in small animals without damaging the surrounding cells. The bundled, high-energy x-rays are not only used to treat cancerous growths, but also degenerative joint diseases, inoperable or recurring salivary gland cysts. The linear accelerator is used for treatment as well as research and training. Current research involves measuring how long the effects of x-ray treatment last, such as in cases of canine arthritis, as well as the long-term effects of x-ray exposure on hormonal production. Results from such studies could be useful in cancer treatment in humans.

<http://swissinnovation.org/news/web/2012/03-120329-fc.html>



4. Nano / Micro Technology / Material Science

IBM Nanotechnology Center Working on Future Computer Technology

(Tagesanzeiger, February 11, 2012)

ETH and IBM scientists at IBM Nanotechnology Center in Zurich work with Black Magic, a machine containing the latest nanotechnology in an ultra-clean environment. PhD student Tobias Süss, for example, uses the machine to produce a carbon nanotube 1000x-thinner than a human hair. The IBM scientists have one primary objective: developing a generation of computers which is faster and more energy-efficient. With today's technology, major advances in computer technology are close to impossible. Therefore, new materials and concepts are needed and nanotechnology might deliver exactly these ingredients. Nanowires, for example, could be used as circuit elements for processors





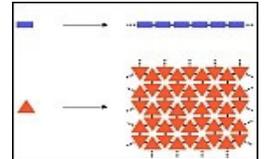
which will consume less electricity than current models. The new center is not yet working to capacity and future investments will be made according to the needs of the scientists.

<http://swissinnovation.org/news/web/2012/04-120211-52.html>

World's First Two-Dimensional Polymers

Swiss scientists have created a small sensation in synthetic chemistry. The team of scientists from ETH Zurich and Empa succeeded for the first time in producing regularly ordered planar polymers that form a kind of «molecular carpet» on a nanometer scale. Dieter Schlüter and Junji Sakamoto have succeeded in making a decisive breakthrough in the synthetic chemistry of polymers. They have for the first time created two-dimensional polymers. Although graphene counts as a naturally occurring representative of a two-dimensional polymer it cannot be synthesized in a controlled way. In order to develop a synthetic chemistry that generates two-dimensional molecules the ETH chemists had to first and foremost create oligofunctional monomers in such a way that they join together purely two-dimensionally instead of linearly or even three-dimensionally.

(Empa, February 13, 2012)



<http://swissinnovation.org/news/web/2012/04-120213-d4.html>

Revolutionary Energy-Efficient Milling Process

A sensational method for the complete separation of the wheat grain during the milling process has been developed by the Swiss company Anutec GmbH. With this method, the bran is not milled with the corn but directly sifted. Flour production with this new milling technology is much more efficient: one milling and sifting step is sufficient where previously several working steps were needed. The method also yields better flour quality. For the connected sifting technique, Anutec uses the ultra sound technology, 'Sonoscreen plus', developed by Telsonic AG. By simply selecting the sieve, the flour grade can be classified. From an energy-saving and ecology perspective the new method is highly promising: up to 90% of energy and time can be saved therefore making the production of bread cheaper, according to Arthur Nussbaumer, director of Anutec.

(Pressebox, February 22, 2012)



<http://swissinnovation.org/news/web/2012/04-120222-06.html>

Magnetic Nano Particles for Blood Cleansing

Inge Herman, Postdoc at University of Zurich, uses magnetic nano particles for blood cleansing. Blood does not only play an important role in the cardio-vascular system but also transports nutrients as well as harmful bacteria and poisons. Current blood filtering methods often not only remove the dangerous but also the benign substances. Herman and her colleagues from the laboratory of Prof. Stark at ETH Zurich developed nano particles with an iron core and a carbon casing. On the surface of this nano particle, molecules with the ability to bind poisonous substances are anchored. Because of the iron core, the nano particles and the poisonous substances attached to them can be removed with a magnet. In vitro the method functioned well and the Swiss National Science Foundation supports further research.

(UZH, February 24, 2012)

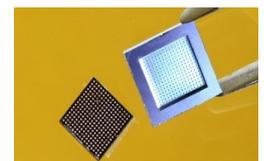


<http://swissinnovation.org/news/web/2012/04-120224-c8.html>

New Cost Effective Biochips

Scientists in EPFL's Laboratory of Life Sciences Electronics (CLSE) have recently completely re-engineered the design of semiconductor biochips, making them renewable. This in turn reduces their cost by a factor of ten, which otherwise would correspond to hundreds of francs a piece. The invention was recently described in an article and an interview in the scientific journal Electronics Letters. EPFL scientists found a way to separate the liquids that needed to be analyzed from the electronic circuits. They developed a component that is placed on top of the electronics, like a cap. The sample of biological material, placed in the cap, never enters into contact with the circuits. Its electrical impulses are transmitted by an array of electrodes passing through the silicon layer of the cap.

(EPFL, March 14, 2012)



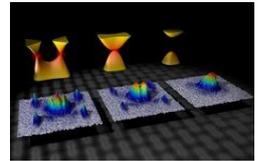
<http://swissinnovation.org/news/web/2012/04-120314-37.html>



Material Search Tool Using Cold Atoms

(ETH, March 15, 2012)

Researchers under the lead of Prof. Tilman Esslinger of the Institute of Quantum Electronics, ETH Zurich and at NCCR Quantum Science and Technology used a set of laser beams to create a honeycomb-like structure similar to that found in graphene. By loading ultra-cold atoms into this optical lattice, they can simulate electronic properties of this promising material. Graphene is a single layer of carbon atoms, which form a two-dimensional honeycomb structure. This makes graphene an exceptionally good conductor, of great interest for future electronic devices. The results are published in "Nature". Prof. Esslinger and his team loaded ultra-cold potassium atoms into a special lattice structure made of laser light thereby simulating the properties of graphene. The newly created tool now offers new options in the search for useful materials.



<http://swissinnovation.org/news/web/2012/04-120315-d2.html>

5. Information & Communications Technology

Semantic Web Search

(UNIFR, February 02, 2012)

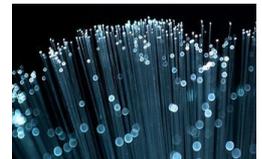
Professor Curd -Mauroux, University of Fribourg, has created a classification system based on semantic web that makes searches more reliable, precise and exhaustive. The system, called ScienceWISE, uses contents of published articles instead of their keywords and is based on ontologies; semantic networks that form data schemes. The user can then navigate inside a graph, going from one concept to another one while exploring related thematic. This also helps in avoiding limitations due to the use of keywords, such as the absence of a particular word, the use of its synonyms or the problem of articles written in a different language. Semantic web, sometimes called Web 3.0, is thus based on data structures that can be processed, used, offered or combined automatically or manually. The efficiency of ScienceWISE has already been demonstrated through ontology of dark matter, in partnership with the largest portal on physics, arXiv.org.

<http://swissinnovation.org/news/web/2012/05-120202-f4.html>

Fiber Optics in Computer Screens To Save Energy

(EPFL, February 22, 2012)

A single fiber-optic can light up computer screens. This innovation put in place by L.E.S.S., a recently formed spin-off of EPFL, brings energy savings of 30% while boosting processors. "Slim as a hair, powerful as 100 LEDs": the advantages of this technology have the allure of a slogan. Laptop screens are composed of different filters for colors and of a source of white light situated in the lower portion of the frame. With LED, which is currently used, 60% of the light remains trapped inside these diodes and accounts for a significant loss in efficiency. The fiber optics developed by L.E.S.S. could bring just as much luminosity and contrast while conserving a quarter of the energy. That liberated power could be used by the processor to gain speed.



<http://swissinnovation.org/news/web/2012/05-120222-35.html>

Big Science Kick-Start European Cloud Computing

(CERN, March 01, 2012)

A consortium of leading IT providers and three of Europe's biggest research centres (CERN, EMBL and ESA) will launch a European cloud computing platform. "Helix Nebula - the Science Cloud", will support the massive IT requirements of European scientists, and become available to governmental organisations and industry after an initial pilot phase. The partnership is working to establish a sustainable European cloud computing infrastructure, supported by industrial partners, which will provide stable computing capacities and services that elastically meet demand. During a two-year pilot phase, Helix Nebula will be deployed and tested based on three flagship projects proposed by CERN, EMBL and ESA: to accelerate the search for the elusive Higgs particle, to boost large-scale genomic analyses in biomedical research, and support research into natural disasters.

<http://swissinnovation.org/news/web/2012/05-120301-3a.html>

Revolutionary 3D Camera

(EPFL, March 28, 2012)

The 29-year old entrepreneur Luigi Bagnato, who just finished his PhD at EPFL, has developed a revolutionary camera that can simultaneously film in 3D and with a 360° angle. Bagnato is currently looking for financing to make this happen. He has been awarded phase I and II venture-kick funding. "In Switzerland, there's a lot of support for



young entrepreneurs. It is fertile ground for creating a company," says Bagnato. Bagnato's camera is made up of several miniature cameras arranged into a small volume about the size of a ping-pong ball. The device has two major advantages over existing models. It makes 360° movies at 30 frames per second in full HD, and the process for image reconstruction is integrated into the device. There's no post production.

New Home for Swiss Supercomputer

(ETH Zurich, March 13, 2012)

The staff at the Swiss National Supercomputing Centre (CSCS) has moved to their new office in Lugano-Cornaredo. The new ultra-modern office building will provide ideal working conditions for this innovative team of people. The supercomputers will follow in April, where they will be installed in the new facility which is to house Switzerland's high-performance computers for the next 40 years. In front of the computer building stands the modern, five-storey office block into which the approximately 50 employees of CSCS have moved. Maria Giuffreda, head of user support, says: "I see the new supercomputer centre literally as a new beginning for CSCS, the result of a lot of hard work over the past few years, and offering us the prospect of a challenging and rewarding adventure during future generations of supercomputing."



<http://swissinnovation.org/news/web/2012/05-120313-5e.html>

6. Energy / Environment

Nitrogen Stripping Water Treatment Plant

(Eawag, February 01, 2012)

Eawag researchers have developed a means of producing fertilizer from wastewater, and thereby saving energy and raw materials. This innovative project was honoured at the Swiss Environmental Prize awards ceremony with a special recognition award. The Environmental Prize went to Neurobat AG for its work in developing an intelligent HVAC controller. Carried out at the Kloten/Opfikon water treatment facility the project represents the first industrial-scale implementation in Switzerland of the technical process known as nitrogen stripping. In this process, valuable nitrogen is recovered from wastewater and processed into fertilizer for agricultural purposes. The stripping process itself involves the use of air to remove and capture gaseous elements such as nitrogen from liquids.



<http://swissinnovation.org/news/web/2012/06-120201-0e.html>

Electricity from Photosynthesis Protein

(EPFL, February 03, 2012)

Photovoltaic panels made from plant material could become a cheap, easy alternative to traditional solar cells. An entirely novel approach to photovoltaics has been developed in joint collaboration between MIT and EPFL. By taking the very protein in plants that allows for photosynthesis and engineering it to produce electrical current, MIT researcher Andreas Mershin has opened the door for potentially cheap and easy to reproduce solar energy. The work is an extension of a project begun eight years ago by Shuguang Zhang from MIT and EPFL professor Michael Graetzel. Mershin was able to adapt a photovoltaic substrate that is significantly more responsive to sunlight. The substrate is similar to the one used in dye-sensitized solar cells (DSSC), but the substance (photosystem-I) is radically different from the dye normally used.



<http://swissinnovation.org/news/web/2012/06-120203-ef.html>

Electric Cars Increasingly Accepted

(EPFL, February 08, 2012)

Electric vehicles have a good image in Switzerland, according to a study conducted by EPFL's Transport Center in association with Renault Suisse. A public transport user, owning one or more cars, comfortably well-off and from the German speaking part; this is just one of the profiles of people who are potentially interested in buying an electric vehicle in Switzerland. The identification of these target segments within the Swiss population has been performed jointly by the Transportation Center and the Transport and Mobility Laboratory at EPFL as part of a study performed in cooperation with Renault Suisse SA. The French automotive company wanted to be able to understand and predict the demand for such vehicles, and thus to get a clearer idea of the potential of the market in Switzerland.



<http://swissinnovation.org/news/web/2012/06-120208-a1.html>



How Mountain Ranges Get their Shape

(ETH Zurich, February 14, 2012)

Tectonics, climate and the topography of the mountain ranges interact through a complex system of interactions and feedbacks. The nature and strength of these links are examined by an international team lead by Jean-Daniel Champagnac (Ambizione Fellow) at the geological Institute of the ETH Zurich on the basis of data collection of 69 mountain ranges over all continents. Climate coupled with the rate of earth crust thickening are crucial to determine the erosion rate of the mountain range and its overall shape. This team recently published a study that constrain the strength of these interactions on the basis of measured tectonic, climatic and topographic values of different mountain ranges on the Earth surface. The study ran over six years.



<http://swissinnovation.org/news/web/2012/06-120214-82.html>

Loss of Fish Species Caused by High Nutrient Inputs

(Eawag, February 16, 2012)

Within a relatively short period, eutrophication has led to a reduction of almost 40% in the number of endemic whitefish species in Swiss lakes. Only in deep perialpine lakes least exposed to high nutrient inputs has the original diversity of endemic species been able to survive. But even these species have become less genetically distinctive. The decline in the diversity of whitefish species is not merely due to a loss of habitats. The disappearance of species has been largely caused by the hybridization of formerly distinct species. According to a study by scientists from Eawag and Bern University, this in turn can be explained by the eutrophication of Swiss lakes between 1950 and 1980.

<http://swissinnovation.org/news/web/2012/06-120216-a2.html>

Permafrost Maps

(UZH, February 20, 2012)

Permafrost plays an important role in the discussion over global warming because of the local and global effects it can have on nature and humans, but its global extent is not well known beyond the extreme climates. Much permafrost lies underground, and thus is difficult to measure, and it can have a lot of variation in transition zones between polar and equatorial climates. Measuring and modeling is further complicated by the lack of temperature and weather measurements in some parts of the world, such as Siberia. Researchers at the University of Zurich are taking all of these uncertainties into account in new maps of permafrost, hoping to create a better understanding of the issue.



<http://swissinnovation.org/news/web/2012/06-120220-5a.html>

Earthquakes Explained by Stick-Slip Model

(EPFL, February 20, 2012)

David Kammer, a doctoral student at EPFL's Computational Solid Mechanics Laboratory (LSMS), has developed a digital model that explains what happens at the interface between two materials when they slide against each other; like a book on a table, or tectonic plates. Earthquakes occur at the point where two tectonic plates meet. Between each period of sliding, forces accumulate between them up to the point where the friction resistance is overcome, leading to movement. This displacement of the Earth's crust triggers a shock-wave that is transmitted to the surface of the planet. The doctoral student, whose research results are being published in the journal 'Tribology Letters', has thus discovered another path to explore for the communities of mechanics and geoscience, by revealing that the energy-related aspects are critical.

<http://swissinnovation.org/news/web/2012/06-120220-04.html>

Innovative Incontinence Briefs

(Empa, February 21, 2012)

Scientists at Empa have worked with the industrial partner Incosan GmbH to develop a multi-layer pad and special briefs to make daily life easier for people suffering from incontinence. Those affected find the feeling of wetness, the cooling associated with this, and the smell of urine unpleasant. The idea was to develop a reusable pad that works according to what is known as the «waterfall principle». This means that the urine passes away from the body through spacer fabric into an absorbent layer. This prevents cooling, and there is no feeling of wetness since the liquid cannot get back onto the skin again once it is absorbed.



<http://swissinnovation.org/news/web/2012/06-120221-2b.html>



Low-Cost Solar Energy

(CSEM, February 21, 2012)

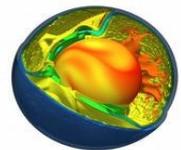
A consortium led by the Swiss Center for Electronics and Microtechnology is researching improvements in printed-plastic solar technology under its SUNFLOWER project. Printed-plastic solar cells are inexpensive to produce, recyclable, and flexible, allowing them to be integrated in structures and mobile devices. However, they currently are inefficient and have a low lifetime. The SUNFLOWER team wants to improve the solar cells in these two areas while simultaneously decreasing production costs through environmentally friendly technologies. The consortium combines industrial, institutional, and academic entities to form a comprehensive team.

<http://swissinnovation.org/news/web/2012/06-120221-8e.html>

Plate Tectonics Modelled Realistically

(ETH Zurich, February 23, 2012)

In his doctoral thesis with ETH Zurich Professor Paul Tackley and in collaboration with his colleagues, Fabio Crameri has for the first time succeeded in realistically simulating how an oceanic plate sinks of its own accord under an adjacent plate. At the same time he showed why only one of the plates rather than both subducts into the Earth's mantle, and how this process affects the dynamics of the Earth's interior. A new plate forms continuously at a mid-oceanic ridge, allowing an ocean basin to grow until the plate is old and heavy enough to sink under the adjacent continental margins. The modelling was calculated on the "Monte Rosa" supercomputer belonging to Switzerland's National Supercomputing Centre, and the "Brutus" cluster at ETH Zurich.



<http://swissinnovation.org/news/web/2012/06-120223-3d.html>

Solar Impulse Tests Limits of Endurance

(Swissinfo, February 24, 2012)

The world's first round-the-world flight by a solar-powered aircraft is a step closer to reality following the successful simulation of a 72-hour non-stop flight. For three days André Borschberg had lived – eating, sleeping and exercising - in the confined space of the cockpit, all while piloting the plane through a series of simulated landings and weather conditions. The brainchild of Swiss adventurer Bertrand Piccard, the Solar Impulse project aims to complete a round-the-world journey beginning in April 2014 in an aircraft powered solely by energy from the sun. The journey is expected to take about two months and while stops are planned on all continents, the longest flight leg – the crossing of the Pacific Ocean - could take up to five days and nights.



<http://swissinnovation.org/news/web/2012/06-120224-49.html>

Reducing House Controller with Neural Network

(EPFL, March 06, 2012)

Neurobat S.A., a start-up from EPFL and CSEM, has developed a thermal regulator that uses neural networks to learn about the energy consumption of a house. An efficient central heating system is essential to save energy. However, most of the existing installations only react to the outside temperature in regulating their output. Neurobat S.A. has developed a system that manages multiple parameters and learns what is best for a house. The technology has spun off into a new start-up called Neurobat (for Neuron and Batiment, the word for building in French). The Neurobat regulator has already been installed in several test buildings. Tests have shown savings in fuel up to 65%, which suggests that savings of around 50% are viable in average buildings. The company won the 2012 Swiss Environment Award.



<http://swissinnovation.org/news/web/2012/06-120306-9e.html>

Vacuum Technology Efficient Solar Panels

(CERN, March 09, 2012)

A CERN spin-off company, SRB Energy, is using ultra-high vacuum technology developed for particle accelerators to increase the efficiency of solar panels. New solar panels using this technology will be installed on the roof of Geneva's airport terminal building. To create ultra-high vacuums, thin film coatings that attract residual gas molecules using "getter" technology are used. In solar panels, the vacuum acts as an insulator that allows internal temperatures of 80 degrees Celsius to be maintained even with cold outside temperatures; this increases the panel's efficiency. The new company has its research facilities in Switzerland and production facilities in Spain. It licenses the thin film coating technology from CERN.



<http://swissinnovation.org/news/web/2012/06-120309-0b.html>



Hydrogen-Powered Environment Friendly Street Cleaning Vehicle

(Empa, March 13, 2012)

Since 2009, a hydrogen powered street cleaning vehicle has been undergoing testing on the streets of Basel. The Empa project is intended to take hydrogen drives out of the laboratory and onto the streets in order to gain experience on using them under practical conditions. The result of the pilot trial: hydrogen as a fuel for municipal utility vehicles saves energy, is environmentally friendly and is technically feasible. In figures: instead of 5 liters of diesel per hour the hydrogen powered vehicle needs only 0.3 to 0.6 kg of fuel per hour (that is, 40-80 MJ per hour). In terms of CO₂ emissions, the new vehicle performs about 40% better than a diesel powered equivalent.



<http://swissinnovation.org/news/web/2012/06-120313-fa.html>

Disposal or Recycling Plastic in Electric Appliances

(Empa, March 16, 2012)

Electrical and electronic appliances are not only made from metallic materials, but also consist of up to more than 20% of plastics in average. Recycling companies find themselves confronted with a growing amount of electrical and electronic waste, as plastics from scrap equipment are rather diverse and may contain hazardous substances. Depending on the type of plastic and its application, legally defined maximum concentration values are exceeded, and recycling has to be ruled out unless further action is taken. Empa researchers have studied the proportion of restricted substances found in plastic components from waste electrical and electronic equipment. Results from the study have been incorporated into the new European WEEELABEX (WEEE LABEL of EXcellence) standard, which governs the collection, sorting, storage, transport, reuse, treatment and disposal of electrical and electronic equipment.

<http://swissinnovation.org/news/web/2012/12-120316-e8.html>

Ideal Woodlark Habitat

(UNIBE, March 21, 2012)

Birds that feed on insects have been decreasing in number in Europe. A recent study of one such type of bird, the woodlark, shows that ground vegetation cover affects its feeding habits. The bird prefers ground that is only partially covered in vegetation. Neither fully covered nor bare ground is as good. Researchers hypothesize that the vegetated parts are conducive habitats for insects, while the bare parts allow for easy access to the vegetated parts. These results may require rethinking of agriculture policy to help reverse the trend in decreasing bird populations.

<http://swissinnovation.org/news/web/2012/06-120321-92.html>

New Method Explains Rock Erosion

(SNF, March 21, 2012)

With the support of the Swiss National Science Foundation (SNSF) geologists at ETH Zurich developed a new method explaining how glaciers erode rocks. Melt waters beneath the glacier play a crucial role in this new method which now for the first time can explain the formation of over-steep valleys or Norwegian fjords. The researchers discovered that the crucial factor to explain erosion is the speed of ice movement rather than its mass. The melt water beneath the glacier influences the speed with which the ice of the glacier moves. With more speed the erosion rate increases. Water conditions haven't been taken into consideration in other models but have now shown to be crucial in the explanation of rock erosion, explains Frédéric Herman, co-author of the study published in Earth and Planetary Science Letters

<http://swissinnovation.org/news/web/2012/06-120321-28.html>

Wastewater Plants as Hotspots for Antibiotic Resistance Genes

(Eawag, March 22, 2012)

Large quantities of antibiotic-resistant bacteria enter the environment via municipal – and especially hospital – wastewater streams. In the first sampling program ever conducted on this scale in Switzerland, Eawag researchers obtained data for municipal wastewater, lake water and lake sediments. Some of the findings were in line with expectations, e.g. particularly high levels of highly multiresistant bacteria in wastewater of a major healthcare facility. The study also produced surprising results: while, overall, more than 75% of bacteria are eliminated at the treatment plant, the proportion of especially resistant strains is increased in treated wastewater. According to microbiologist Helmut Bürgmann, the treatment plant is likely to serve as a hot spot for the exchange of antibiotic resistance genes. Here, bacteria encounter others already adapted to the environment, and mobile genetic elements can be readily transferred.

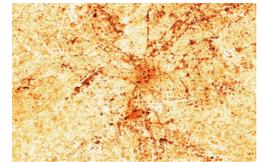
<http://swissinnovation.org/news/web/2012/06-120322-60.html>



Cities To Experience More Heat Stress

(ETH Zurich, March 28, 2012)

Summer heat stress could increase more sharply in cities than in the surrounding rural areas. ETH has taken into consideration urban heat stress in global climate models for the first time. The new scenarios offer an outlook on how climate change might affect cities and thus the health of their population. "Nights with high heat stress" rise more sharply in cities than in the surrounding rural areas and thus the health risk for city dwellers increases significantly. It is hard for the human body, which produces about 100 watts (joules per second) of heat, to release its heat into the surroundings in temperatures close to the body's own. And if there is also high humidity, it becomes harder to cool down as the cooling evaporation of sweat no longer works.



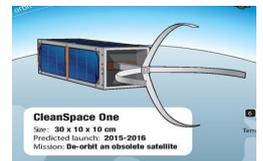
<http://swissinnovation.org/news/web/2012/06-120328-bd.html>

7. Engineering / Robotics / Space

Space Debris Cleanup Satellite

(EPFL, February 15, 2012)

The proliferation of debris orbiting the Earth is an increasingly pressing problem for spacecraft, and it can generate huge costs. To combat this scourge, the Swiss Space Center at EPFL is announcing the launch of CleanSpace One, a project to develop and build the first installment of a family of satellites specially designed to clean up space debris. "It has become essential to be aware of the existence of this debris and the risks that are run by its proliferation," says Claude Nicollier, astronaut and EPFL professor. To move beyond mere rhetoric and take immediate action to get this stuff out of orbit, the Swiss Space Center at EPFL is launching CleanSpace One, a project to build the first prototype in a family of "de-orbiting" satellites.



<http://swissinnovation.org/news/web/2012/07-120215-b6.html>

Cosmic Lens Helps to Understand Black Holes

(EPFL, March 21, 2012)

Using the Hubble Space Telescope, EPFL scientists have identified rare cases of galaxies that contain super-massive black holes acting as gravitational lenses. This will lead to a better understanding of how black holes are formed. Two years ago, scientists in EPFL's Laboratory of Astrophysics (LASTRO) discovered a quasar, a galaxy with a black hole at its center, that functioned as a gravitational lens; a kind of cosmic magnifying glass. It showed both the presence of the super-massive black hole as well as another galaxy in the background, very distant and in almost perfect alignment. The light coming from this distant galaxy made it possible to measure the mass of a quasar for the first time. The study results are published in *Astronomy & Astrophysics*.



<http://swissinnovation.org/news/web/2012/07-120321-ca.html>

Miniaturized Motor Control for Extreme Mining Conditions

(CSEM, March 21, 2012)

ÀAC Microtec and the Swiss Center for Electronics and Microtechnology (CSEM) have been awarded an EU Eurostars project to develop high-temperature motor control products for the offshore and mining industry. The technology enables the control of drill rigs that are exposed to high temperatures and vibration. The companies expect to have the first products ready for trials and testing in 2013. The miniaturized motor control products must tolerate temperatures in excess of 200 °C, have a size of less than 20 mm in diameter, and all control logic must be integrated together with the motor, so that just power needs to be transmitted over long distances.

<http://swissinnovation.org/news/web/2012/07-120321-4e.html>

Automated Transfer Vehicle to ISS

(NZZ, March 22, 2012)

The third European Space Agency (ESA) Automated Transfer Vehicle (ATV), named "Edoardo Amaldi", launched to the International Space Station (ISS) on March 23rd. The ATV is a resupply ship that brings freight, gases, food, and water to the ISS and boosts its orbit using the ATV's propulsion system. The ATV has components made by the Swiss company Ruag, including structural components, heat shields, and a docking computer. The ATV will stay docked until mid-August before burning up in the atmosphere with trash from the ISS onboard.

<http://swissinnovation.org/news/web/2012/07-120322-3f.html>



8. Physics / Chemistry / Math

Quantum Connection Between Light and Vibrational Motion

(EPFL, February 06, 2012)

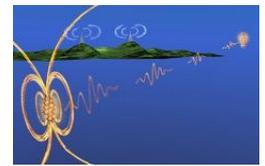
EPFL researchers under the direction of Tobias Kippenberger have now shown that it is possible to use light to control the vibrational motion of a large object, consisting of a hundred trillion atoms, at the quantum level. The object they used was a 30-micrometer diameter glass donut mounted on a microchip. The team injected a laser into a thin optical fiber, and brought the fiber close to the donut, allowing light to 'jump' to the object and circulate around up to a million times. The tiny force exerted by the photons traveling inside the glass ring can cause it to vibrate. But the force can also dampen the vibrations, and thus cool down the oscillatory motion. The study has been published in Nature.

<http://swissinnovation.org/news/web/2012/08-120206-42.html>

Single Photon Communication Between Two Molecules

(ETH Zurich, February 12, 2012)

Scientists at ETH Zurich and the Max Planck Institute have been able to implement single photon communication between two molecules using quantum mechanics. Making a photon and a molecule interact is difficult because both are so small that they usually miss each other when the photon is shot at the molecule. However, if the incoming photon is resonant with the quantum mechanical transition of the molecule, then the molecule captures photons over a larger area. This setup allows a photon-emitting molecule to communicate with a receiving molecule using a single photon, which acts as a quantum bit. This is an important advancement in the practical application of quantum mechanics.



<http://swissinnovation.org/news/web/2012/08-120212-9a.html>

Tantalizing Hints of New Physics at CERN

(CERN, February 13, 2012)

CERN's LHC will run with beam energy of 4 TeV this year, 0.5 TeV higher than in 2010 and 2011. The data target for 2012 is 15 inverse femtobarns for ATLAS and CMS, three times higher than in 2011. The LHC's excellent performance in 2010 and 2011 has brought tantalizing hints of new physics. ATLAS and CMS experiments have seen hints that a Higgs might exist in the mass range 124-126 GeV. However, to turn those hints into a discovery, or to rule out the Standard Model Higgs particle altogether, requires one more year's worth of data. The LHC is scheduled to enter a technical stop at the end of this year to prepare for running at its full design energy of around 7 TeV per beam.

<http://swissinnovation.org/news/web/2012/08-120213-8d.html>

Translational Research in Radiation Oncology

(CERN, February 20, 2012)

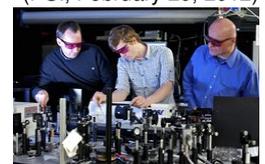
A new kind of conference will be launched next week in Geneva, uniting physics, biology and medicine for better healthcare. Starting on 27 February, the ICTR-PHE conference brings together the long established International Conference on Translational Research in Radiation Oncology, which has been held every three years from 2000, with CERN1's Physics for Health workshop, which was launched in 2010. "We hope to create a global network in which information between scientists from the various disciplines can be successfully exchanged," said Jacques Bernier, conference co-chair and head of Radiotherapy at Geneva's Genolier Clinic. "The common effort of all the parties involved will maximize the effect of the therapy and improve the quality of life of patients."

<http://swissinnovation.org/news/web/2012/08-120220-79.html>

Magnetization Properties

(PSI, February 29, 2012)

Researchers at the Paul Scherrer Institute have been investigating the process by which iron-rhodium alloy is magnetized. They found that a two-step process takes place; first multiple regions magnetize locally, and then the regions align themselves with each other. The second phase takes longer than the first, and the overall process, which takes about 300 picoseconds, is about 300 times slower than demagnetization. To "see" the process, the Swiss Light Source was used to measure the spacing between atoms, which is larger in a magnetized state than in a demagnetized state. A laser was used to magnetize the alloy through heating. This research could lead to the next generation of magnetic computer storage.



<http://swissinnovation.org/news/web/2012/08-120229-f5.html>



Quantum Relays

(UNIGE, March 05, 2012)

Since a decade and a half, physicists have been able to entangle light's quantum particle, the photon. This phenomenon consists of 'splitting' a quantum particle in two, and then observing both entities behaving exactly as one, despite being potentially separated spatially by a great distance. This goes against the laws of the macroscopic world we are used to. Nevertheless, physicists from University of Geneva's Applied Physics Group have successfully entangled not only quantum particles, but also macroscopic crystals visible by the naked eye. The experiment consists of sending two entangled particles through a neodymium crystal. Because the photons are intricate, so too are the quantum properties of each crystal's neodymium atoms. This can be confirmed by looking at the photons as they exit the crystals. This could open the door to the creation of 'quantum relays', which would serve future large scale quantum cryptography systems or quantum computer's memories.

<http://swissinnovation.org/news/web/2012/08-120305-00.html>

New Results from CERN Large Hadron Collider

(CERN, March 05, 2012)

New results from the LHCb experiment, which studies the decay rate of the B-sub-s meson particle, test the limits of the Standard Model of physics. This, in turn gives scientists an idea of how much new physics than can expect to find in the decay of this particle. The Standard Model explains approximately four percent of the observable Universe, but new physics is needed to explain the remaining 96 percent. The decay of the B-sub-s meson to two muons is an extremely rare event. The most recent results show that the decay rate is close to that predicted by the Standard Model.

<http://swissinnovation.org/news/web/2012/08-120305-cc.html>

Groundbreaking Spectroscopic Antihydrogen Measurement

(CERN, March 07, 2012)

In a paper published by Nature, the ALPHA collaboration at CERN reports an important milestone on the way to measuring the properties of antimatter atoms. This follows news reported in June last year that the collaboration had routinely trapped antihydrogen atoms for long periods of time. ALPHA's latest advance is the next important milestone on the way to being able to make precision comparisons between atoms of ordinary matter and atoms of antimatter, thereby helping to unravel one of the deepest mysteries in particle physics and perhaps understanding why a universe of matter exists at all. ALPHA reports the first measurement of the antihydrogen spectrum. In the ALPHA apparatus, antihydrogen atoms are trapped by an arrangement of magnetic fields acting on the magnetic orientation of the antihydrogen atoms.

<http://swissinnovation.org/news/web/2012/08-120307-21.html>

9. Architecture / Design

“Learning from Tokyo” Symposium and Exhibition in Zurich

(Learning from Tokyo, March 01, 2012)

The “Learning from Tokyo” Symposium and Exhibition was held in Zurich from March 9-24. The exhibition and symposium showcased small scale housing projects by young, creative architecture offices in Japan. The exhibition focused on the quality and diversity of living space produced on small building lots with limited budgets in the center of a city such as Tokyo. The symposium featured some of the protagonists of this new generation of architects and established a dialogue with Swiss architects, planners, city officials and the interested public. The project was supported by the Japan Foundation, the Sakae Stünzi Foundation, the IKEA foundation and All Nippon Airlines (ANA) and was organized jointly with representatives from the city, academia and the private sector.

<http://swissinnovation.org/news/web/2012/09-120301-24.html>

Swiss Center for Global Environmental Sustainability in Singapore

(NZZ, March 17, 2012)

In presence of Swiss Federal Councilor Alain Berset, and President Ralph Eichler of ETH Zurich, the “Singapore-ETH Centre for Global Environmental Sustainability (SEC)” was opened. The research centre, which is supported by two local universities, will focus on the future of cities. Focusing on the rapid urbanization in Asia and Africa, over 100 researchers will develop sustainable spatial solutions in the Future Cities Laboratory. For example, the use of alternative building materials like bamboo which might replace steel in developing countries will be tested. Asia is interesting for this kind of research because the countries and societies in this region are in the process of undergoing deep changes.

<http://swissinnovation.org/news/web/2012/09-120317-a3.html>



10. Economy, Social Sciences & Humanities

Effect of Video Surveillance

Researchers from University of Neuchatel have analysed the crime rates and criminal cases in the United Kingdom, France, Sweden, Germany, and Switzerland, and have found that the preventive effect of surveillance cameras is not always proven in the long term. However, they are useful in helping solve crimes.

<http://swissinnovation.org/news/web/2012/10-120322-2f.html>

(UNIFR, March 22, 2012)



Artists Are Just Happier

A study by two economists from the University of Zurich has found that artists, although they earn less and are one and a half times more likely to be unemployed, are on average happier in their occupations. This stems from the versatility and the autonomy associated with artistic work. The original study was carried out in Germany by 'The Socio-Economic Panel' of the German Institute of Economic Research in Berlin and looked at 300 subjects over the period 1990-2009. An unexplored reverse correlation could exist, in that art doesn't necessarily generate happiness, but in fact just attracts happy people. Nevertheless, the association is similar in Switzerland.

<http://swissinnovation.org/news/web/2012/10-120216-d1.html>

(UZH, February 16, 2012)



11. Technology Transfer / IPR / Patents

SPARC Office Relocated to ETH Zurich

(ETH Zurich, February 02, 2012)

The international project for atmospheric and climate research SPARC (Stratospheric Processes And their Role in Climate) relocated its coordination centre from Canada to Switzerland. SPARC celebrated the inauguration of its new office at ETH Zurich and its 20th anniversary. SPARC is a core project of the World Climate Research Programme (WCRP). It coordinates research worldwide on the stratosphere, the atmospheric layer in the 15 to 50 km altitude range. Founded in 1992, SPARC significantly contributed to the present-day knowledge of chemical and physical processes in the atmosphere and, by doing so, helped to improve global prediction models for ozone and climate. Relocating the SPARC coordination centre from Toronto to Zurich bears great opportunities for Switzerland.

<http://swissinnovation.org/news/web/2012/11-120202-ee.html>

12. General Interest

Strong Swiss Demand Abroad

(NZZ, February 02, 2012)

Switzerland increased its exports once again last year. Strong demand from the Asian region and a successful watch industry explain the increase in exports. Overall, demand slowly decreased last year. The strong Swiss franc had a noticeable impact on prices. In total, Swiss companies have exported goods and commodities of a value of 197.6 billion Swiss francs. Only the metal, watch, nutrition and machine industries experienced growth. The textile and paper industry made the biggest losses.

<http://swissinnovation.org/news/web/2012/12-120202-3d.html>





13. Calls for Grants/Awards

Call for Proposals in Brain Research Collaboration

(EPFL, February 15, 2012)

The 21st century is being hailed as the "Century of the Brain" whereby international collaboration among top complimentary research centers has become a primary tool for advancing brain research. The new Edmond and Lily Safra Center for Brain Sciences (ELSC) at the Hebrew University and the Brain Mind Institute (BMI) at EPFL have recently signed an agreement with the aim of fostering bilateral scientific cooperation. The two institutions will provide support funds for pioneering and ambitious joint research projects, including salaries for M.Sc. and Ph.D. research fellows, facility and travel expenses, based on proposals submitted by teams from the two institutions. A brief, 1-2 page proposal describing the project is required. Deadline: January 1, 2013.



<http://swissinnovation.org/news/web/2012/13-120215-88.html>

Call for Proposals on Global Poverty and Risk

(SNF, March 06, 2012)

The Swiss Agency for Development and Cooperation (SDC) and the Swiss National Science Foundation (SNSF) are jointly launching the "Swiss Programme for Research on Global Issues for Development" with an initial call for proposals. The programme supports interdisciplinary and transdisciplinary research dedicated to solving urgent global problems. The focus will be on reducing poverty and global risks. The programme consists of five thematic research modules and a thematically open module for projects without pre-defined topics. An interdisciplinary approach is strongly encouraged and research results are expected to be applied and implemented within the political and practical realms. Eligible for funding are transnational research partnership projects that consist of at least one Swiss research group and two research groups from two different developing countries

<http://swissinnovation.org/news/web/2012/13-120306-f1.html>

Grants for Biomedical Projects

(UZH, March 07, 2012)

The Zurich Center for Integrative Human Physiology (ZIHP) supports cooperative projects involving several research groups with a balanced representation of basic and clinical research. Projects should address questions of general biomedical interest. All ZIHP members are entitled to apply for cooperative project grants. Non-ZIHP members are welcome to participate in the projects, but will not be financed by the ZIHP. The maximal amount per project will be CHF 300'000 per year. The funding of the cooperative projects will begin by January 2013 for at least 2 years. Successful projects will have a clear focus on integrative human physiology. Cooperation across topics is a plus. The limited funds available require that support is largely restricted to financing student salaries. Deadline: May 5 2012. More information at: info@zihp.uzh.ch

Upcoming Science and Technology Related Events

40th International Exhibition of Inventions of Geneva

April 18 – 22, 2012

<http://www.inventions-geneva.ch/cgi-bin/gb-exposants.php>

Licences / Inventions

Geneva Palexpo, Geneva

2012 EARTO (European Association of Research and Technology Organisations) Annual Conference

May 7 – 8, 2012

<http://www.earto-geneva-2012.eu/>

Innovation

International Conference Center Geneva (ICCG), Geneva

European Summit for Clinical Nanomedicine (CLINAM 2012)

May 7 – 9, 2012

<http://www.clinam.org/>

Nanomedicine

Congress Center Basel, Basel

EPFL - MicroNanoFabrication Annual Review Meeting The Networking Forum

May 8, 2012

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

MicroNanoTechnology

EPFL, Rolex Learning Center, Lausanne

Fascination of Plants Day 2012

May 18, 2012

<http://www.swissplantscienceweb.ch/plantday12>

Plant science

Various venues

Swiss NanoConvention 2012

May 22 - 24, 2012

www.swissnanoconvention.ch

Nanotechnology

Beaulieu Lausanne Congress & Exhibition Center, Lausanne



LAUSANNETEC

May 22 - 24, 2012

<http://www.lausannetec.com/en/>

High-precision/Microtechnology

Beaulieu Lausanne Congress & Exhibition Center, Lausanne

Seminars in Information Security and Cryptography "Information Security and Cryptography - Fundamentals and Applications"

June 11 - 13, 2012

<http://www.infsec.ch/seminar1.html>

IT

Courtyard Zurich North, Zurich

Seminars in Information Security and Cryptography "Building Secure Software Systems"

June 14 - 15, 2012

<http://www.infsec.ch/seminar2.html>

IT

Courtyard Zurich North, Zurich

16th ETH-Conference on Combustion Generated Nanoparticles

June 24 - 27, 2012

http://www.lav.ethz.ch/nanoparticle_conf/

Nanoparticles

ETH Zentrum, Zurich

10th European SOFC Forum

June 26 - 29, 2012

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

Fuel cell

KKL Lucerne, Lucerne

Seminars in Information Security and Cryptography "Wireless and Mobile Network Security"

July 3 - 4, 2012

<http://www.infsec.ch/seminar3.html>

IT

Courtyard Zurich North, Zurich

Seminars in Information Security and Cryptography "Applied Information Security, Hands-on!"

July 5 - 6, 2012

<http://www.infsec.ch/seminar4.html>

IT

Courtyard Zurich North, Zurich

4th European PEFC and H2 Forum

July 2 - 5, 2013

<http://www.efcf.com/events/>

Fuel cells/hydrogen production, storage & infrastructure

Lucerne

4th International Disaster and Risk Conference IDRC Davos 2012 "Integrative Risk Management in a Changing World"

August 26 - 30, 2012

http://idrc.info/pages_new.php/IDRC-Davos-2012/831/1/

Disaster/risk management

Congress Center Davos, Davos

Science-Switzerland Back Numbers

<http://www.swissinnovation.org/Science-Switzerland>

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