



# Science-Switzerland, June - July 2011

News on Swiss science, technology, education and innovation

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## Switzerland Tops World Innovation Rankings

A recent report by the French business school INSEAD and the World Intellectual Property Organization ranks Switzerland as the top country for innovation. The rankings are based on patent applications, research and development expenditure, and use of information technology. Switzerland has the highest number of patents per amount of GDP, and moved up to the leading position from a fourth place ranking last year. The second and third positions are held by Sweden and Singapore, respectively.

<http://www.swissinnovation.org/articles/2011/00-110708.html>

(SCCIJ, July 08, 2011)



## 1. Policy

### Swiss-South African Cooperation

(Federal Administration, June 20, 2011)

The South African Science and Technology Minister Naledi Pandor visited Switzerland to help strengthen research ties between the two countries. She met with Federal Councillor Didier Burkhalter to strengthen official ties, and then had a varied visit that included visits to EPFL, Eawag, CERN, and several private companies. The visit also marked the kick-off of new Biotech Business Development “Summer Camp”, to help promote technology transfer. Sixteen projects have received funding under the cooperation agreement involving approximately ten institutions in each country and sixty faculty and student exchanges. Further joint project funding will be awarded this year.

<http://www.swissinnovation.org/articles/2011/01-110620.html>

### More Flexibility for Research Funding

(Federal Administration, June 22, 2011)

New regulations passed by the Federal Council increase the flexibility of providing financial assistance to export-oriented small and medium businesses (SMB). The regulation affects research and development projects that fall under the purview of the Commission for Technology and Innovation. One change allows the cash contribution of the SMB to a project to be lowered, and another change introduces new financial products to help fund projects at an earlier stage and to simplify the process of finding a research institution partner. The goal of these regulations is to make Swiss firms more competitive when they are under cost pressures due to the strong Swiss Franc.

<http://www.swissinnovation.org/articles/2011/01-110622.html>

### Phasing Out Nuclear Power

(Federal Administration, June 25, 2011)

The Federal Council has decided to gradually withdraw from using nuclear power to generate electricity because of the recent disaster in Japan. Instead, Switzerland will rely on a program of increased electricity imports, reliance on renewable and fossil fuel power generation, promotion of efficient energy use, and targeted research efforts. Nuc-



lear power currently provides 39% of Switzerland's electricity and hydropower 56%. As current nuclear power plants reach the end of their safe operating life they will be decommissioned and not replaced with new ones. The first plant is expected to be decommissioned in 2019 and the last in 2034.

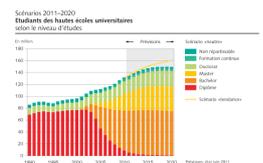
<http://www.swissinnovation.org/articles/2011/01-110625.html>

## 2. Education

### 3% More Students in Higher Education

(Federal Administration, June 15, 2011)

According to the Federal Office of Statistics, the number of students attending higher education institutions will continue to increase at a rate of 3-4% over the next ten years. Several factors drive this growth, including the increasing percentage of the population continuing their formal education, the increasing internationalization of the Swiss education system, and the development of Masters programs at universities of applied sciences. The first factor is especially driven by the increasing popularity of attending a university of applied science after finishing ones professional formation. Universities should see the greatest growth through 2015. The overall percentage of women may grow slightly, but female representation in technical and scientific fields will not change much.



<http://www.swissinnovation.org/articles/2011/02-110615.html>

### New Studies In Ergonomic Engineering

(CH-Forschung, June 20, 2011)

A new course of study called Applied Ergonomic Engineering is being created jointly by the universities of applied sciences of St. Gallen and Vorarlberg in Austria. The program will contain elements of engineering, psychology, business, and sociology, and will focus on the interaction of man and machine. This area of study is key to making products easy and natural to use, and will help drive innovation. The program will initially teach ergonomics in the context of construction, appliances, and software. The five-semester master program is open to students with an initial degree; some product development experience is desired but not required.

<http://www.swissinnovation.org/articles/2011/02-110620.html>

### UAE-Swiss Research Day

(EPFL, June 22, 2011)

EPFL Middle East is organizing a conference on the future of energy and sustainability with participation from EPFL, the University of Geneva, leading universities from the United Arab Emirates, and various public figures. The two-day conference in Switzerland will feature poster sessions on current graduate-level research projects, oral presentations, and a panel discussion. Energy and sustainability is a current topic of interest for both Switzerland and the UAE. EPFL Middle East is a new institute in the UAE that has started several research projects and will be offering advanced degrees with a strong focus on sustainability and energy.



<http://www.swissinnovation.org/articles/2011/02-110622.html>

## 3. Life Science / Health Care

### Insulin Resistance

(ETH Zurich, June 08, 2011)

Diabetes is an increasingly common disease that is caused by insulin resistance in fat and liver cells. As these cells become resistant to insulin, insulin-producing cells produce more and more insulin, eventually burning out, at which point the body cannot regulate its sugar intake anymore. Researchers at ETH Zurich have discovered two types of miRNA that are responsible for the insulin resistance. A large amount of miRNA 103 and 107 blocks the sugar-intake mechanism. The researchers discovered that by blocking the miRNA with antagomirs, which are complementary to miRNA, they could reduce insulin resistance and restore normal cell function. This result may be a new path to diabetes treatment.



<http://www.swissinnovation.org/articles/2011/03-110608.html>



## Effect of Positive Emotions on Pain

(ETH Zurich, June 07, 2011)

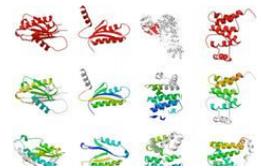
Researchers at ETH Zurich and the University of Zurich have discovered that the body does not separate the systems for pain and pleasure, and that positive emotions can help reduce pain, even more so than previously thought. Positive emotions release endorphins, which bind to neurons to block pain signals. To test the mechanism, researchers induced positive feels in test subjects and then tested their pain level. In half the subjects they injected a drug to block the direct effect of the endorphins. Nevertheless, their pain threshold was not significantly reduced. This unexpected result means that the blocked endorphins activate another mechanism to help block pain signals.

<http://www.swissinnovation.org/articles/2011/03-110607.html>

## Protein Structures Calculated by High-Performance Cloud Computing

(ETH Zurich, June 10, 2011)

Cloud computing is a model that is increasingly being used to perform high-performance computing, such as calculating protein structures. Cloud computing distributes computation across a large number of computers, which are provided as a service rather than a product. Researchers at ETH Zurich recently used cloud computing to compute hundreds of thousands of possible proteins from the bacteria streptococcus based on a large data set. The computation took approximately two weeks, and the researchers believe that it was easier than obtaining time on a supercomputer. The software was easy to install, and the solution is very cost-effective. Now the researchers need to search through the possible proteins to find the appropriate ones, something they will do with a computer too.



<http://www.swissinnovation.org/articles/2011/03-110610.html>

## Fetal Stress Indicators In Fingernails

(CH-Forschung, June 10, 2011)

That a mother's stress can affect the development of a fetus has been known, but until now there has been no easy way to measure the level of stress in a fetus. Tests on the amniotic fluid or on the fetus' blood are invasive and difficult. Researchers at the University of Basel have discovered that stress hormones accumulate in the fingernails of fetuses, and that this can be used as an indicator once the baby is born. What is still unclear is if stress has long- or short-term health consequences for the baby, but this indicator may help answer that question.

<http://www.swissinnovation.org/articles/2011/03-110610-2.html>

## HIV Protection Mechanism Discovery

(Tages Anzeiger, June 14, 2011)

Researchers at the University of Zurich, the University Hospital of Zurich, and ETH Zurich have discovered how HIV protects itself against attack from the human immune system. Like most viruses, HIV consists of a central nucleus surrounded by a "barbed" protein coat. Normally, the immune system attaches to a virus at the barbs. However, in the case of HIV, the barbs are normally surrounded by protein loops that protect the virus from the immune system. The key contribution of the research was to precisely determine the folding of these protecting proteins. The improved understanding may aid in finding a cure to HIV/AIDS.

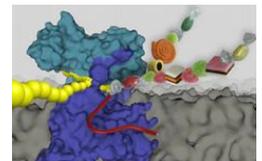


<http://www.swissinnovation.org/articles/2011/03-110614.html>

## Key Sugar Enzyme Discovery

(ETH Zurich, June 15, 2011)

Researchers at ETH Zurich have made an important discovery about an enzyme that is key to the glycosylation process, which attaches a sugar to a protein. Normally only eukaryotes can do this, but certain types of bacteria have the ability as well. The researchers were able to discover the structure of the enzyme, called oligosaccharyltransferase, by isolating it, crystalizing it, and then examining it with x-ray imagery. As a result, they now have a better idea how it performs its job. They hope that their research will help in the development of therapeutic treatments.



<http://www.swissinnovation.org/articles/2011/03-110615.html>

## Fighting Frog Deaths By Bacteria And Fungicide

(UZH, June 20, 2011)

Worldwide, frogs are dying in mass from chytrid fungus that has spread rapidly in the last several decades. For example, in Switzerland more than half of all ponds contain chytrid fungus. Researchers at the University of Zurich are participating in an international effort to find a strategy to control this problem that can be easily applied in nature. Candidate solutions include using bacteria and fungicide to control the fungus, as well as vaccinating the frogs



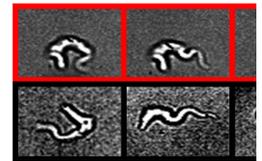
against the sickness. While treating individuals in a laboratory setting is relatively easy, doing so in nature presents its own challenges.

<http://www.swissinnovation.org/articles/2011/03-110620.html>

### Sleeping Sickness Parasites

(UNIBAS, June 20, 2011)

Sleeping sickness is a parasitic disease that affects thousands of people per year, and that is not fully treated. Researchers at the University of Basel have been researching the parasite that causes the disease and trying to determine how it moves. The parasite is a single-cell organism that moves by moving its flagella. They identified three behaviors, directed swimming, random swimming, and switching between the two primary types. The type is related to the connection of the flagella and the stiffness of the cell. The significance of this behavior has not yet been identified, but it may relate to the parasite's lifecycle and to the ability for it to escape antibodies.



<http://www.swissinnovation.org/articles/2011/03-110620-2.html>

### Artificial Polymer Replication of Nuclear Pore Complex

(CORDIS/UNIBAS, June 20, 2011)

Researchers at the University of Basel were able to replicate the nuclear pore complex (NPC) of a cell using artificial polymers. A NPC acts like a biological filter, and is a gatekeeper to a cell's nucleus. It allows certain molecules to pass through while blocking others, and the pores themselves are only 50 nanometers in diameter. The artificial NPC also works on a chemical basis and has the same selectivity and speed as the real thing. Potential applications of artificial NPCs is as high-precision filters that work on the molecular level.



<http://www.swissinnovation.org/articles/2011/03-110620-3.html>

<http://www.swissinnovation.org/articles/2011/03-110620-4.html>

### Rocking to Sleep

(swissinfo, June 20, 2011)

Researchers at the University of Geneva have completed a study to show that rocking back and forth helps a person fall asleep. It has been common belief that rocking in a rocking chair, or being cradled and rocked as a baby helps with falling asleep, but this study took a scientific approach. Test subjects were asked to take two 45-minute naps in a hammock, one while being rocked, and one while not being rocked. The study confirmed the belief. The study also looked at the brain mechanism responsible for this phenomenon.

<http://www.swissinnovation.org/articles/2011/03-110620-5.html>

### RNA Biogenesis Research

(Friedrich Miescher Institute, June 20, 2011)

Witold Filipowicz from the Friedrich Miescher Institute for Biomedical Research (FMI) was recently honored with the Lifetime Achievement Award by the RNA Society. The award recognizes his important and varied research on RNA biogenesis, functions, and metabolism. He was a pioneer in RNA research and paved the way for using it for biomedical purposes. His recent research on RNA interference and microRNAs has demonstrated that RNA plays an important role in regulating genes. Filipowicz originally trained in medicine, but joined the FMI in 1984. Additionally, he is adjunct professor at the University of Basel and Professor of Biochemistry at the Polish Academy of Sciences.

<http://www.swissinnovation.org/articles/2011/03-110620-6.html>

### Medicine to Shrink Tumors

(Roche, June 20, 2011)

A new Phase II study with the Roche experimental medicine Vismodegib has shown that it can help heal locally advanced and metastasizing basal-cell carcinoma (laBCC and mBCC, respectively), the most common type of skin cancer in much of the Western world. The study focused on patients for whom surgical removal was dangerous or impossible. The medicine acts on the hedgehog signaling pathway, which plays a role in more than ninety percent of BCC cases, by suppressing overactive pathways. Roche is also conducting a separate study of Vismodegib on patients with less severe BCC that can still be removed surgically.

<http://www.swissinnovation.org/articles/2011/03-110620-7.html>

### Hospital Statistics on Flat-Rate Payments

(Swiss Health Observatory, June 21, 2011)

The Swiss Health Observatory released a report regarding the effects of flat-rate payments to hospitals. With flat rate payments, there is the concern that patients will be discharged early for financial reasons, and that this will



lead to increased readmission rates. The flat-rate scheme will be implemented across Switzerland in 2012 but is already in use in several hospitals. The study has found that such a scheme has not led to early discharges or to increased readmission within thirty days. Nevertheless, the study does not offer predictions of how the new payment scheme will perform as of next year.

<http://www.swissinnovation.org/articles/2011/03-110621.html>

### Gene Control with Light

(ETH Zurich, June 23, 2011)

Researchers at ETH Zurich have figured out how to reconnect cascaded gene-signaling mechanisms to be able to artificially control the expression of certain genes. In their latest development, they connected a signaling mechanism from the eye with one from the immune system. As a result, they can control the production of GLP-1, a hormone that controls the production of insulin, through an external light source. The artificial signal cascade, when exposed to blue light, activates a series of other mechanisms, which eventually start the creation of GLP-1. The researchers demonstrated the ability to control insulin production in mice, and hope that the research will eventually lead to better diabetes treatment.

<http://www.swissinnovation.org/articles/2011/03-110623.html>

### Social Behavior of Fish

(UNINE, June 23, 2011)

New research shows that reputation plays a role in certain fish. Specifically, a certain species of cleaner fish behaves differently if it is being watched than if it isn't. The normal behavior, when being watched, is for the cleaner fish to eat parasites off of its client fish. However, when it isn't being watched, the cleaner fish sometimes cheats by biting the client to draw out mucus, which is tastier than parasites. However, the client fish may then run off, decreasing the food supply of the cleaner. The research shows that there is a marked difference between fishes being watched and not being watched, leading researchers to believe that they care about their reputation.

<http://www.swissinnovation.org/articles/2011/03-110623-2.html>

### Sugary Drinks Cause Health Problems

(UZH, June 24, 2011)

Research at the University of Zurich has shown a direct link between high intake of sugar and health problems. The study consisted of young men drinking two deciliters of soft drinks three times a day for three weeks. The results showed increased blood sugar, increase in fat, and a negative effect on cholesterol. Other factors showed an increased risk of heart attack and diabetes. Fructose is one sugar that cannot be used directly by the body, but must be turned into fat. Although fruits contain fructose, they should still be healthier than soft drinks because they contain much less sugar.



<http://www.swissinnovation.org/articles/2011/03-110624.html>

### Cell Division Mechanism

(UNIL, June 25, 2011)

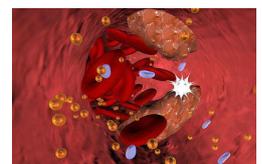
Researchers at the University of Lausanne have made a new discovery about how cell division is triggered. Previous research by Prof. Sophie Martin showed that an absence of the protein Pom1 at the center of a cell triggers it to divide. Now, her group has shown that there is a strong concentration of Pom1 on the edge of the cell, and it diffuses towards the center. Once the cell becomes too large for the center to feel the effects of the diffused Pom1, it divides. The research was performed on yeast cells; further research will determine if the same mechanism is applicable to other types of cells.

<http://www.swissinnovation.org/articles/2011/03-110625.html>

### Cholesterol Research

(UZH, June 27, 2011)

Cholesterol is a fat-like molecule that plays an important role in heart and blood vessel health. Too much cholesterol can build up on vessel walls and block blood flow, causing heart attacks. However, one type of cholesterol, HDL-cholesterol, has been regarded as "good" cholesterol because it can help reduce vessel blockage risks. Now, new research from the University of Zurich shows that too much HDL-cholesterol can also be bad in patients already suffering from heart disease because its composition can change. The researchers have recently received funding to further study this mechanism and the associated health risks.



<http://www.swissinnovation.org/articles/2011/03-110627.html>



## Fighting Leishmaniosis Tropical Disease

(UZH, June 29, 2011)

Leishmaniosis is a neglected tropical disease that is caused by protozoa, rather than by bacteria or viruses. Antibiotics have generally been prescribed, but how they work has not been well known. Researchers at the University of Zurich studied the mechanism. In bacteria, antibiotics attack ribosomes, the protein factories. In protozoa, there are two types of ribosomes, one inside the mitochondria and one outside, and the antibiotic attacks the latter ones. Researchers were able to modify bacteria to produce the same proteins as the relevant protozoa to analyze antibiotics. They will now use their method to test medicines on other types of tropical diseases.



<http://www.swissinnovation.org/articles/2011/03-110629.html>

## Neural Cartography of Sexual Desire Disorder

(UNIGE, July 01, 2011)

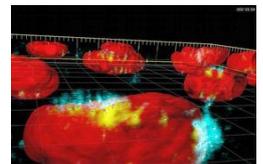
Psychiatrist Sexologist Dr. Francesco Bianchi-Demicheli and the Neuroscientist Stephanie Ortigue have investigated the neural bases of female hypoactive sexual desire disorder (HSDD), in order to better understand and improve the treatment of the afflicted women. The striking results of this research, conducted by the Universities of Geneva and New York, have been published in the Journal of Sexual Medicine. Using medical imaging, the researchers have confirmed the existence of specific brain regions which respond to sexual desire. What they have also surprisingly discovered is that HSDD women not only show less activation in these brain areas but also show additional activations in areas associated with higher order social and cognitive functions, such as inferior parietal lobule.

<http://www.swissinnovation.org/articles/2011/03-110701.html>

## Medical Iron Oxide Nanoparticles

(EPFL, July 01, 2011)

Researchers at EPFL are studying three medical applications of iron oxide nanoparticles. The first application involves detecting cancer with nanoparticles that selectively attach to cancer cells. The nanoparticles' special magnetic properties make them a good contrasting agent of MRI. A second application is targeted delivery of drugs directly into cells. This method would help avoid side effects created by current drug delivery methods. A third application is tumor treatment with heat. Again because of the magnetic properties of the nanoparticles, they can be agitated with an alternating magnetic field and thus be made to heat up, killing the heat-sensitive cancerous cells to which they are attached.



<http://www.swissinnovation.org/articles/2011/03-110701-2.html>

## Asthma Resistance

(UZH, July 01, 2011)

Researchers at the University of Zurich have attributed the increase in asthma patients in Western populations to the increased emphasis on hygiene and antibiotics. As a result, there are fewer bacteria living in our bodies. Bacteria provide important agitation to our immune system to build up its strength. For allergy-induced asthma, the bacteria *Helicobacter pylori*, a stomach bacterium plays a key role in building the immune system's resistance. The bacterium usually has no negative effects, although it can sometimes lead to various complications, and thus is often treated with antibiotics. Tests with mice show that early vaccination with *H. pylori* provides asthma resistance. This research may lead to better treatment of asthma and other similar diseases.



<http://www.swissinnovation.org/articles/2011/03-110701-3.html>

## Fear Response

(EveryDay Science, July 01, 2011)

Scientists at the University of Lausanne recently published a study on how a certain hormone, oxytocin, affects the fear response in humans and animals. The feeling of fear is created by the amygdala, a part of the brain. One way that fear can express itself is through paralysis of the individual and through physiological responses, such as increased heart rate. The researchers found that oxytocin can inhibit the pathway to the brainstem and reduce paralysis, while not affecting other aspects of fear. This allows the individual to react to fear without ignoring it. This phenomenon has been shown in rats in a laboratory environment.

<http://www.swissinnovation.org/articles/2011/03-110701-4.html>

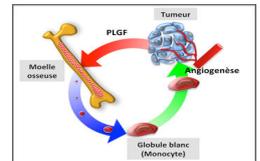


## Early Breast Cancer Detection

A new discovery may make it possible to devise a blood test able to detect breast cancer at an early stage. A team at Fribourg University, working with colleagues at Lausanne University Hospital, has found a hitherto unknown mechanism that helps tumors to grow. They found that the tumor produces a molecule known as PGF (placental growth factor), which gets into the blood stream and attracts large white blood cells, normally found in the bone marrow, to the area of the tumor where they promote the formation of blood vessels. It should be possible to design a test that detects when cells have been “taught” to form new blood vessels, and thus to catch the cancer at an early stage.

<http://www.swissinnovation.org/articles/2011/03-110704.html>

(UNIFR, July 04, 2011)



## Medical Demographic Joint-Database

The “Swiss National Cohort” (SNC) is a database of statistical data that ties together medical and demographic data, thus providing many opportunities to epidemiologists to perform insightful studies. The SNC was started in 2006 and contains data starting with the 1990 census. Recent studies have looked at heart disease, Alzheimer’s disease, and the suicide rate of HIV-infected individuals. An interesting paradox that has been discovered is that there is a lower rate of heart disease in the Swiss-French part than in the Swiss-German part of Switzerland. New funding will allow data on cancer to be integrated into the SNC and relevant studies on cancer to be created.

<http://www.swissinnovation.org/articles/2011/03-110705.html>

(UZH, July 05, 2011)

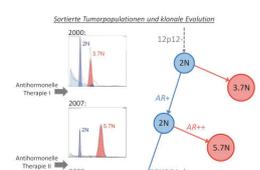


## Detecting Tumor Aberrations Towards Personalized Medicine

Tumors result from genetic mutations and can develop over many years. The genetic mutations making up a tumor can also change over time. As a result, therapeutic treatments that target specific types of mutations can fail to completely heal a tumor. Instead, they only apply selection pressure to the tumor, kill some cells but allowing others to proliferate. Researchers at the University of Basel have created a new process by which the various types of mutations in a tumor can quickly be identified. This process will help to better develop and choose cancer medicines.

<http://www.swissinnovation.org/articles/2011/03-110706.html>

(UNIBAS, July 06, 2011)



## Heart Catheter Navigation System

ETH Zurich spin-off Aeon Scientific recently received a “venture kick” award to continue development of its heart catheter navigation system. Their technology uses magnetic fields to wirelessly steer microscopic instruments inside the body. Additionally, a three-dimensional computer representation helps the doctor steer the instrument. Current catheter use is not widespread because controlling the instrument is difficult. CEO Dominik Bell recently participated in an entrepreneurial workshop in Boston, which helped develop his ideas and win this latest award. The monetary award will be used to purchase new hardware, file patents, and market the product.

<http://www.swissinnovation.org/articles/2011/03-110707.html>

(ETHZ, July 07, 2011)

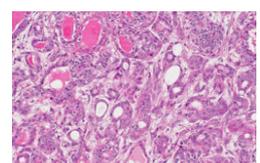


## Signaling Pathway Model of Breast Cancer

Researchers at the Friederich Miescher Institute for Biomedical Research have created a model for one of the signaling pathways involved with breast cancer. Specifically, they studied the phosphoinositide 3-kinase (PI3K) pathway, which exhibits a mutation in approximately 30% of all breast cancer cases. Their research confirmed that a mutation in the gene that encodes this kinase can cause tumors in mice. The model will be used to test various therapeutic treatments and help identify any resistance mechanisms that could inhibit the treatment. Breast cancer is the second-most common cause of cancer death.

<http://www.swissinnovation.org/articles/2011/03-110707-2.html>

(Friederich Miescher Institute, July 07, 2011)



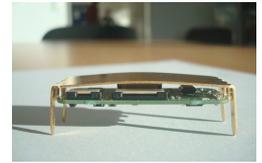


## Inexpensive Medical Imaging Technology

Researchers at the Swiss Center for Electronics and Microtechnology (CSEM) are developing a low-cost medical imaging technology known as Electrical Impedance Tomography (EIT). This technology, provides an internal image of the body by using electrical stimulations and voltage measurements on the skin. One advantage of this approach is that it avoids harmful ionizing radiation. The main challenge in using EIT has been the lack of appropriate sensors for use in a hospital environment, something that the researchers are trying to solve by using active electrodes.

<http://www.swissinnovation.org/articles/2011/03-110708.html>

(CSEM, July 08, 2011)



## Cancer Risk Study of Children Close to Nuclear Reactor

The recently completed CANUPIS study by the University of Bern contemplated the increase in cancer risk for children born and growing up near nuclear reactors in Switzerland. The study took advantage of the Swiss National Cohort database, which ties together medical statistics and demographic information of the entire Swiss population. The relative risks of cancers, such as leukemia, at different distances from a reactor were compared, and the study found that there was no statistically significant increase in risk for children living close to a reactor. Nevertheless, due to the low cancer rate, the statistics have large uncertainty bounds.

<http://www.swissinnovation.org/articles/2011/03-110712.html>

(UNIBE, July 12, 2011)

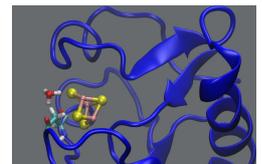


## Role of Water in Catalytic Reactions

Computer simulation plays an important role in determining how electrons and protons move in a chemical reaction. Often, these movements happen too quickly to accurately determine solely through experimental methods. Researchers at the University of Basel have been studying proton transfer reactions, which move a hydrogen nucleus from one reaction constituent to another, in the context of the Ferredoxin I protein. They were able to show how water plays an important role in the catalytic reaction that attracts a proton into the protein. A combination of experimental and simulation work was required to determine the mechanism.

<http://www.swissinnovation.org/articles/2011/03-110713.html>

(UNIBAS, July 13, 2011)



## Intelligent Bed Prevents Bedsores

A new spin-off company from ETH Zurich and Empa recently received a first round of funding to propel its intelligent nursing bed to market. The company, named «compliant concept», is developing a bed that mimics the natural movements of a healthy person, such as turning in bed, helping to prevent bedsores. The bed is made of intelligent materials and the mattress lies of a joint-less but flexible slatted frame. It is currently undergoing testing in medical clinics, and a second round of funding will allow for an expansion to more markets.

<http://www.swissinnovation.org/articles/2011/03-110713-2.html>

(Empa, July 13, 2011)

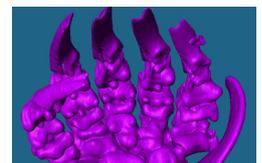


## Mole Finger Development

Researchers at the University of Zurich have been studying polydactyly, an anomaly where an animal has more than ten fingers or toes, in moles. Unlike other animals where polydactyly is rare, having a second thumb on each paw is a regular occurrence in moles. Using molecular markers, the researchers were able to show that the additional digit does not develop like the primary ones, but develops later, and generally without movable joints. They also noticed a correlation between polydactyly and abnormal hormone levels. For example, female moles may have male-like genitalia. Similarly, elevated levels of testosterone in mothers are suspected as one cause of polydactyly in humans.

<http://www.swissinnovation.org/articles/2011/03-110714.html>

(UZH, July 14, 2011)



## Newly Found Gene Involved in Parkinson Disease

Researcher Christian Wider, from UNIL-CHUV, co-published an article on the discovery of a new gene involved in the Parkinson disease. Published in the American Journal of Human Genetics, Wider identified a sixth gene in collaboration with Jacksonville's Mayo Clinic, Florida, and Prof. Vingerhoets at the CHUV, Lausanne. Up to now, little

(UNIL, July 15, 2011)



evidence had been able to link the disease to familial factors. But the new gene, VPS35, has been found to be mutated on all members of several families concerned with the disease. VPS35 codes for a protein essential to the transport of membrane proteins that must be destroyed or recycled. The discovery of the 6<sup>th</sup> gene will allow future medication's research to focus on intracellular recycling, therefore targeting one of Parkinson disease's causes rather than its symptoms.

<http://www.swissinnovation.org/articles/2011/03-110715.html>

### Biology Gold and Bronze Medals for Switzerland

Several young Swiss students participated in the International Biology Olympiad (IBO), performing well, with a gold medal by Gaëtan Colussi and two bronze medals by Jacqueline Mock and Daniel Ballmer. This was the first IBO gold medal for Switzerland. 227 students from 58 countries participated in the weeklong event in Taipei. The competition consisted of both theoretical and practical segments, including identifying spiders and performing laboratory experiments. Aside from the competition, the event also served to foster ties between the young students and acted as a cultural exchange with the host country. The Swiss team is looking forward to the next competition in 2013, which will be held in Bern, Switzerland.

(VSWO, July 17, 2011)

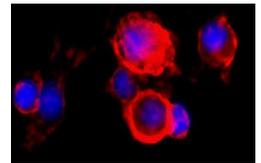


<http://www.swissinnovation.org/articles/2011/03-110717.html>

### Drug Administration Timing Key for Cancer Treatment

Carole Bourquin, Professor in Pharmacology at the University of Fribourg, has discovered that the timing at which drugs are administered plays a key role in the treatment of cancer diseases. These results should allow for the development of new, more efficient strategies for the treatment of tumors. This study shows for the first time that a repeated stimulation of the innate immune system's receptors can lead to a "neutralisation" of the immune system by the treatment. An alternative treatment scheme, able to efficiently counter an experimental tumour with a smaller active ingredient's total dose than in conventional methods, has been designed.

(UNIFR, July 19, 2011)



<http://www.swissinnovation.org/articles/2011/03-110719.html>

### Memory Loss Treatment

Researchers at EPFL have been researching the molecular causes of memory loss, which occurs in a wide range of diseases. One active area of research is in cell adhesion molecules, which are suspected to play an important role in memory loss. The role of these molecules was studied in the context of psychiatric disorders, Alzheimer's disease, and aging. Understanding the molecular causes of memory loss may lead to pharmacological treatments to restore memory. The research also created a better understanding of the structural and functional mechanisms of memory loss, pointing the way for further research.

(EPFL, July 21, 2011)



<http://www.swissinnovation.org/articles/2011/03-110721.html>

### Measuring Pain

The pain that someone feels can be difficult to measure and quantify if the person cannot express it. This leads to difficulties in proper pain management in infants, patients under sedation, or people with significant disabilities. Scientists at the Collegium Helveticum, a joint research center between the University of Zurich and ETH Zurich, have been studying enzyme markers that correlate with pain, specifically alpha amylase in saliva. There is a correlation between the level of pain and the amount of enzyme in saliva. The researchers are causing controlled amounts of pain in test subjects with a heat pad and comparing their indications of pain with the amount alpha amylase in their saliva.

(UZH, July 21, 2011)



<http://www.swissinnovation.org/articles/2011/03-110721-2.html>

### Viruses Use Macrophages as Trojan Horse

Mucous membrane cells have no external receptors that would allow a virus to enter the cell, thereby making it a mystery how some viruses nevertheless penetrated through these membranes. Researchers at the University of Zurich researched the theory that viruses used some sort of "Trojan horse" mechanism and found that macrophag-

(UZH, July 21, 2011)



es can allow a virus to enter. Macrophages generally help fight viruses, but when they do so, they expose receptors that both activate the macrophage, and also give the virus a pathway into the cell. This research may lead to better treatments for viruses, as well as cancer because viruses are sometimes used to transport medicines for gene therapy.

<http://www.swissinnovation.org/articles/2011/03-110721-3.html>

### Arthritis and Youth Sports

(UNIBE, July 22, 2011)

A study by medical researchers at the University of Bern suggests that people who play high-intensity sports in their youth are at a ten times higher risk of developing arthritis in the hip than members of the general population. The researchers looked at the hips of 37 professional basketball players and 38 people who didn't play high-intensity sports in their youth. The athletes had a deformed femur head where it meets the hip, and they were more likely to exhibit pre-arthritis formations. As a result, they were at risk of painful and reduced hip motion during their later years.



<http://www.swissinnovation.org/articles/2011/03-110722.html>

### Malaria Vaccine Promising

(UNIBAS, July 25, 2011)

Scientists at the Tropical and Public Health Institute in Basel have been developing and testing a new malaria vaccination that has produced promising results so far. The vaccination is based on two synthetic peptides that mimic antigens produced by the malaria pathogen. It has undergone an initial study with fifty patients in a malaria-prone region of Tanzania. The study showed a fifty percent reduction in the risk of developing a sickness. Further studies will confirm these numbers with larger pools of patients, and there is hope that results will continue to be positive and that this research will lead to an effective vaccine.



<http://www.swissinnovation.org/articles/2011/03-110725.html>

### Candidate Antibody For Universal Flu Vaccine

(EurekAlert, July 28, 2011)

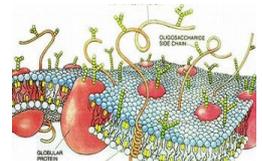
A novel, proprietary monoclonal antibody (FI6) has been discovered by the Swiss Humabs BioMed SA and the Institute for Research in Biomedicine (IRB), in collaboration with the UK Medical Research Council. FI6 is the first neutralizing antibody that targets all 16 hemagglutinin subtypes of influenza A and represents a major step towards finding a universal flu vaccine. When used prophylactically or therapeutically FI6 protected mice and ferrets from infection by influenza A virus using multiple mechanisms. "As the first and only antibody which targets all known subtypes of the influenza A virus, FI6 represents an important new treatment option", said Prof. Antonio Lanzavecchia, Chief Scientific Officer of Humabs and Director of the IRB. The discovery has been published in the journal Science.

<http://www.swissinnovation.org/articles/2011/03-110728.html>

### Life Observation of Cell Membrane's Proteins

(EPFL, July 27, 2011)

Proteins on the cell surface play an essential role in the survival of the cell. They govern the exchanges between the interior and the exterior. EPFL scientists have found a way to observe them in action. They have developed a method based on fluorescence microscopy that gives them a very precise image of the composition of the membrane and the exchanges taking place there. The proteins in the membrane play critical roles in the cell, particularly in energy transfer, gene expression and nutrient transport. Using the method they developed, the scientists can count these proteins very accurately. In so doing, they obtain valuable information on their interactions and their evolution. Eventually, this technique could help develop more effective drugs.



<http://www.swissinnovation.org/articles/2011/03-110727.html>

## 4. Nano / Micro Technology / Material Science

### Nanocontainers for Drug Delivery Systems

(Basellandschaftliche Zeitung, June 10, 2011)

Researchers at the University of Basel have developed nano-sized containers to deliver medicine to specific areas of the body. The containers are made up of peptides, which are amino acid chains. The molecules are designed to



be hydrophobic on one side and hydrophilic on the other so that they naturally form spheres in water. Medicine molecules can be enclosed in these spheres and safely transported to their destination, where they naturally break down.

<http://www.swissinnovation.org/articles/2011/04-110610.html>

### Intelligent Materials

(SNSF/UNIFR, June 28, 2011)

Researchers at the Adolphe Merkle Institute have created a new intelligent material that changes properties when it is immersed in water, but regains its original properties when dried. The material is created by embedding crystalline cellulose nanofibers into a polymer. When dry, the nanofibers form hydrogen bonds and become stiff. However, when immersed in water, the bonds are broken and the material becomes flexible like rubber. As an initial demonstration, the researchers manufactured artificial bait worms for fishing that are stiff when dry, but flexible like a worm when immersed in water. They also envision more advanced applications, such as brain electrodes, which need to be stiff for accurate implantation, but flexible afterwards so that they remain in place.



<http://www.swissinnovation.org/articles/2011/04-110628.html>

### Nanotechnology Against Oil Pollution

(ETHZ, June 28, 2011)

ETH Zurich spin-off HeiQ recently developed an impregnated textile, called "Oilguard", that is highly effective at absorbing oil. The fleece-based material is impregnated with a hydrophobic chemical that allows the textile to absorb up to six times its own weight in oil. The textile was rapidly developed after the explosion of the Deepwater Horizon oilrig, and then used to help prevent oil pollution on beaches in the USA. Mats of the material are simply rolled out on the beach and then disposed of in a cement oven. The company has previously developed several other chemical coatings that act as fluid barriers, or that make surfaces anti-bacterial.

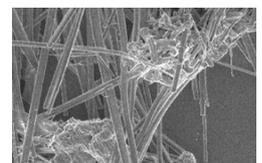


<http://www.swissinnovation.org/articles/2011/04-110628-2.html>

### Nanowire Properties

(EPFL, July 12, 2011)

Nanowires are small structures with diameters on the order of nanometers. When these wires are made up of crystalline structures without a center of symmetry they are capable of efficient second harmonic generation (SHG). SHG is the phenomenon by which a material emits an optical signal at exactly double the fundamental frequency with which it is being excited. Researchers at EPFL have studied the polarization properties of nanowires exhibiting SHG when stuck or trapped in other material. Their method may lead to a simple way of evaluating the structural order and c-axis orientation of a material. They also studied the efficient wave-guiding properties of nanowires.



<http://www.swissinnovation.org/articles/2011/04-110712.html>

## 5. Information & Communications Technology

### Electronics Contest

(EPFL, June 23, 2011)

Students from EPFL recently participated in China's iCAN contest for the first time. The objective of the contest was to impress expert judges with a project using sensors, a fairly open topic. One team won third place with a project to build an environmental map using smartphones and simple atmospheric sensors plugged into the phone's audio jack. The measured data, along with GPS position, is transmitted over social networks. Another EPFL team developed a smart bracelet that allowed wearers to command their electronics using arm motions. Both teams developed their projects outside of their normal class schedule, and thoroughly enjoyed the experience.



<http://www.swissinnovation.org/articles/2011/05-110623.html>



## Breakthrough Memory Technology

(IBM, June 30, 2011)

Researchers at IBM Research Zurich are developing and testing a new type of memory that is 100 times faster than flash memory, is non-volatile, and can endure more read-write cycles than flash. This phase-change memory exploits the difference in resistance of an alloy when it changes from crystalline phase to amorphous phase, or vice-versa. The main challenge that needs to be overcome is that the resistance can change over time. For memory cells that store multiple bits through several discrete resistance levels this can cause errors in reading the cell value. IBM's technique is to use an advanced modulation coding technique that exploits the fact that, generally, the relative order of resistance levels does not change due to drift.

<http://www.swissinnovation.org/articles/2011/05-110630.html>

Parameter	Normal Access Flash Memory (NAND)	Flash	Phase-Change Memory (PCM)	Multi-Level Cell (MLC)
Speed	Green	Red	Yellow	Green
Density	Green	Red	Yellow	Green
Endurance	Green	Red	Yellow	Green
Retention	Green	Red	Yellow	Green
Scaling	Green	Red	Yellow	Green

■ Best in class    ■ Average / Good/adequate    ■ Worst / White in class  
■ Good / Adequate    ■ Bad / White in class

\* The application is sensitive to drift  
 \* The application is sensitive to drift  
 \* The application is sensitive to drift

## Performant Architecture for Financial Transaction

(EPFL, July 14, 2011)

The research team of Prof. Anastasia Ailamaki recently received the Best Demonstration Award at the 2011 SIGMOD conference, the premier research conference for data management. The team demonstrated a unique architecture, named DORA, for executing financial and business transactions. DORA breaks the limitations of conventional transaction systems to achieve higher performance. In addition to developing the system, the team also created an intuitive conference presentation that demonstrated DORA in a graphical way.

<http://www.swissinnovation.org/articles/2011/05-110714.html>



## Informatics Gold Medal for Switzerland

(VSWO, July 18, 2011)

Nikola Djokic, a student from Lucerne, won a gold medal at the most recent Balkan Informatics Olympiad (BIO), and several other students placed well too. The weeklong competition with 45 competitors consisted of six algorithmic puzzles that needed to be solved quickly and efficiently. One puzzle involved analyzing a cryptographic device with only a software interface. Another involved storing and comparing numbers with the minimum number of bits possible. In addition to the competition, the event included visits to local sights, which the students enjoyed.

<http://www.swissinnovation.org/articles/2011/05-110718.html>

## 6. Energy / Environment

### Exploring Lake Geneva

(EPFL, June 01, 2011)

Two Russian submarines have arrived on Lake Geneva to explore the lake and collect various data about it. One focus will be to collect data on micropollutants, which are pollutants that make it past water treatment plants and into the lake. These pollutants have a currently unknown effect on the lake and the local food chain. Another focus will be the flows of the lake and the sediment canyons formed at the mouth of the Rhone River. The project is an international effort with the participation of 10 institutes from five countries. This data collection stage is only a beginning that will be followed by many years of analysis and research.

<http://www.swissinnovation.org/articles/2011/06-110601.html>



### New Risk Center

(ETH Zurich, June 23, 2011)

ETH Zurich is opening a new research center to study risk. Our understanding of the complexity of our society and how it pertains to risk is reaching the limits of science. A pertinent example is the effects the explosion of the Deepwater Horizon oil platform had on the ecology, tourism, and economy of the areas surrounding the Gulf of Mexico. The new center will be multi-disciplinary and hopes to become a leading center for risk research. The center will play other roles, including cooperating with large projects at ETH Zurich, and improving the dialog between scientists, politicians, and businessmen. The center is partnering with insurance companies to help provide financial support.

<http://www.swissinnovation.org/articles/2011/06-110623.html>





## Mobile Air Quality Sensors

A joint project between ETH Zurich and EPFL, called OpenSense, is developing mobile sensors to measure atmospheric properties and pollutant levels in a city. The sensors will be placed on the roof of public transportation buses and trams, and will transmit their sensor readings via the mobile phone network. This approach provides wider data collection than fixed-location sensors and could be used to warn people of pollutant levels in their neighborhood. Challenges in designing the sensors include making them weather and traffic-resistant, locating them accurately, for which GPS is used, and transmitting data only when it is useful in order to not overwhelm the communications network.

<http://www.swissinnovation.org/articles/2011/06-110627.html>

(EPFL, June 27, 2011)



## Detecting Water Pollution

Drinking water wells located near rivers are in danger of becoming polluted with microorganisms when the river reaches high levels. However, this pollution can be difficult to detect. Researchers at the University of Basel together with the company Endress+Hauser are developing a warning system that combines sensor measurements with a statistical model to provide accurate pollution risk assessments. The researchers looked for the correct sensor data, such as temperature, pH, and electrical conductivity to correlate to water pollution. The new system will help water suppliers make good decisions about when to shut off pumps due to pollution.

<http://www.swissinnovation.org/articles/2011/06-110701.html>

(UNIBAS, July 01, 2011)



## Water in Europe Highly Dependent On Alpine Glaciers

It is during summer, when we most need their water, that glaciers melt the most. A study at the University of Fribourg shows that this process has important consequences for Europe as a whole. The researchers have analyzed the contribution of glaciers to runoff from large-scale drainage basins in Europe for the major streams originating in the Alps. By comparing monthly runoff yields from glacierized surfaces in the summer months with measured runoff at gauges along the entire length of the streams, the relative portion of water from glacier storage change for each month is calculated. Shockingly, more than a quarter of Rhone's water that flow into the Mediterranean Sea and even 7% of Rhin's water in the Netherlands originally come from Alpine glaciers. A drying up of these glaciers would have major consequences for Europe's provision of water.

<http://www.swissinnovation.org/articles/2011/06-110711.html>

(UNIFR, July 11, 2011)

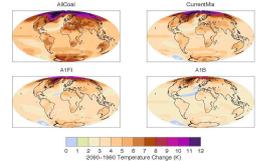


## Worst-Case Global Warming

Researchers at ETH Zurich, along with international colleagues, studied possible worst-case global warming scenarios, and found that even with realistic but pessimistic assumptions the global temperature could increase more than predicted by the worst-case models to date. Under their worst-case scenario the population would grow to 15 billion people by the end of the century, and energy dependence on coal would increase to 90 percent. With these assumptions temperatures by 2100 would rise 5.1 degrees on average and 11-12 degrees at the North Pole. With slightly more moderate assumptions on energy dependence, the rise is still 3.7 degrees. Global rainfall patterns would also change significantly. Nevertheless, this research presents possibilities, not predictions, and serves to expand our thinking about global warming.

<http://www.swissinnovation.org/articles/2011/06-110707.html>

(ETH Zurich, July 07, 2011)

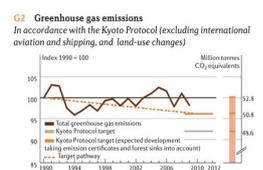


## Swiss Environmental Situation

A recently released study on the environmental situation in Switzerland by the Federal Statistical Office reports mixed results on Switzerland meeting its environmental goals. Most air and groundwater pollution targets are being met, and the pressure on the environment is increasing at a slower rate. However, levels of particulate matter, ozone, and nitrogen dioxide are higher than targeted, and micro-pollutants are still being detected in lakes and rivers. Climate change and biodiversity remain challenges, with Switzerland not meeting its Kyoto protocol targets. Additionally, 70% of Swiss material needs were imported, adding to the environmental pressure abroad.

<http://www.swissinnovation.org/articles/2011/06-110713.html>

(Federal Administration, July 13, 2011)





## Aging Particulate Matter

Researchers at the Paul Scherrer Institute have studied how fine particulate matter in the air changes and ages over time. They discovered that the process has a strong dependence on the humidity of the air. When the air is dry, organic particulate matter can only be attacked by pollutants, such as ozone, on its surface. However, in more humid conditions the particulates can turn into a gel and present a pathway to the inside of the particulate, allowing pollutants to attack it more aggressively. These changes can have widespread effects on many things, ranging from our health to the climate. Increase in allergies has been attributed to the increase in fine particulate matter.

<http://www.swissinnovation.org/articles/2011/06-110713-2.html>

(PSI, July 13, 2011)



## Deepwater Oil Dynamics Study

For the first time, scientists gathered oil and gas directly as it escaped from a deep ocean wellhead — that of the damaged Deepwater Horizon oil rig. What they found allows a better understanding of how pollution is partitioned and transported in the depths of the Gulf of Mexico and permits superior estimation of the environmental impact of escaping oil, allowing for a more precise evaluation of previously estimated repercussions on seafloor life in the future. This study has been completed by EPFL Professor Samuel Arey and the Woods Hole Oceanographic Institute. Lab analysis led the scientists to describe for the first time the physical basis for the deep sea trajectories of light-weight, water-soluble hydrocarbons such as methane, benzene, and naphthalene released from the base of the rig.

<http://www.swissinnovation.org/articles/2011/06-110718.html>

(EPFL, July 18, 2011)



## 7. Engineering / Robotics / Space

### Fast IC-based Power Grid Management

Researchers at EPFL have developed an integrated circuit for managing a power grid. The chip is 1000 times faster than software running on a computer, and so it can react much more quickly to critical situations that might shut down the power grid. The chip can simulate problems before they happen and be ready with a solution. This approach also has the advantage of being able to plan, nearly in real time, for the use of renewable energy sources, which often are dependent on current environmental conditions. A technology transition plan has been developed, and the system may be operational in a small town in the United Arab Emirates within five years.

<http://www.swissinnovation.org/articles/2011/07-110609.html>

(EPFL, June 09, 2011)



### High-Precision Modular Robots

High-precision industrial robots often take years to develop, but a researcher at EPFL has created a prototype that is modular yet achieves precisions on the order of nanometers. The robot is constructed from a number of plates, each of which has one to three degrees of freedom, and which is mounted on a cubic frame. Several of these plates together give the robot up to six degrees of freedom. The robot relies on the mechanics of flexible parallel structures and high-precision machining to achieve its precision. High-tech industries, such as the watchmaking, optical, and microtechnology industries can greatly benefit from such a technology by reducing their retooling time.

<http://www.swissinnovation.org/articles/2011/07-110617.html>

(EPFL, June 17, 2011)



### Automated Driving

EPFL is participating in a demonstration of highly automated vehicle technology in Sweden. The project was funded by the EU with the goals of making driving safer and more efficient, and placing Europe at the forefront of automotive research. The project involved the collaboration of seventeen European partners. EPFL was mainly involved in two projects. One was the development of a camera that can detect traffic signals at a distance of up to 130 meters with low-quality cameras, and another was the development of advanced hybrid technology that smart-

(EPFL, June 21, 2011)



ly switches modes based on advanced information, such as traffic signal status, terrain, and traffic, and gives feedback to the driver.

<http://www.swissinnovation.org/articles/2011/07-110621.html>

### Neutron Star Flare

(Sky & Telescope/UNIGE, June 28, 2011)

Researchers from the University of Geneva, working with the XMM-Newton telescope, have observed, for the first time, a dramatic flare from a neutron star in a binary system with a blue supergiant. The neutron star absorbed gases from its neighbor and emitted a large X-ray flare. Other supergiant-neutron star binary systems tend to emit X-rays at a regular rate. The scientists theorize that normal pairs have fairly circular orbits, but the recently-observed pair has a more eccentric orbit, leading to uneven amounts of gas being deposited on the neutron star by the supergiant.



<http://www.swissinnovation.org/articles/2011/07-110628.html>

### Quadrotor Control Technology

(Tages Anzeiger, July 08, 2011)

Researchers at ETH Zurich have demonstrated the use of a Kinect controller, normally used with the Microsoft Xbox gaming console, to control a quadrotor (a four rotor helicopter). The controller interprets the pilot's gestures and controls the quadrotor accordingly. Takeoff is controlled by pointing at the vehicle, and then its movement is controlled by pointing to the desired location. Holding the left hand up commands it to perform a flip. The flight system also includes a set of cameras that measure the quadrotor's location and software that creates a safety zone around the pilot.



<http://www.swissinnovation.org/articles/2011/07-110708.html>

## 8. Physics / Chemistry / Math

### Energy Usage in Quantum Computers

(ETH Zurich, June 01, 2011)

Researchers at ETH Zurich have made a new discovery in quantum physics that could help reduce the heat output of computers. Under classical physics according to the Landauer Principle heat is generated whenever data is deleted. However, due to quantum entanglement, if the quantum state is known in addition to completely knowing the classical state of the data, then it is possible for the deletion to absorb energy. This shows that the Landauer Principle only holds when the state of the data is unknown. The research also shows that thermodynamic and information entropy are directly related. Nevertheless, these results won't lead to a perpetual motion machine because data deletion cannot be performed continuously.

<http://www.swissinnovation.org/articles/2011/08-110601.html>

### Math Model for School Bus Optimization

(EPFL, June 08, 2011)

Mathematicians at EPFL recently took on the task of optimizing the school bus routes for the International School of Geneva. The goal was to reduce the travel time for students so that they would be more likely to take the bus than to be driven to school by car. The mathematicians modeled the problem as a discrete optimization problem with "regret" as a key factor. Regret, in this case, is the difference between the length of the bus ride and the length of the car ride. The optimization algorithm was designed to discard most choices quickly, in the end taking only half a day to compute the solution, which cut the worst-case difference between car and bus times by 25%.

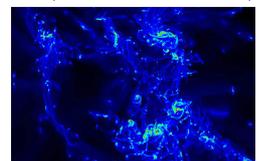


<http://www.swissinnovation.org/articles/2011/08-110608.html>

### Prediction Software with Large Space And Time Scales

(UZH, June 15, 2011)

University of Zurich guest professor Romain Teyssier is developing a numerical simulation to predict the evolution of the universe. The simulation must be able to simulate the development with large space and time scales, but also small ones at the level of individual stars. Only so can it build an accurate picture of galaxies. Because of the challenge of varying space and time scales, his software uses an adaptive mesh to choose the correct scale at



each point in the simulation. Teyssier has been working on the simulation for ten years, and recently received an award that will allow him to make his software more robust.

<http://www.swissinnovation.org/articles/2011/08-110615.html>

### LHC Milestone Achieved

(CERN, June 17, 2011)

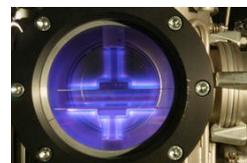
This month two of the CERN Large Hadron Collider's experiments reached the milestone of collecting 1 inverse femtobarn of data, or approximately the data of 70 million million collisions, a milestone set in 2010. With this amount of data, it is possible that new and exciting discoveries about the universe will be made, but the data is still being processed by hundreds of researchers around the world. It is hoped that the Higgs mechanism, which is the last missing link in the Standard Model of particle physics, will be found. Researchers also hope to find evidence for supersymmetry, which is a theory that explains the dark matter that makes up much of our universe.

<http://www.swissinnovation.org/articles/2011/08-110617.html>

### Controlling Plasma

(EPFL, June 28, 2011)

Controlling plasma is a key challenge in enabling fusion reactors, the potential key to our future energy needs. Plasma is generally controlled with magnetic forces. However, it is possible for surface instabilities, which form as filaments, to appear in the plasma. One EPFL research project recently showed that it is possible to control these filaments by applying voltage to them without directly touching them. Another project developed a method of using precisely controlled microwaves to prevent hot blobs of plasma from aggregating, rising to the surface, and damaging the reactor. Both projects are important steps to fully controlling plasma in a fusion reactor.



<http://www.swissinnovation.org/articles/2011/08-110628.html>

### Carbon-Hydrogen Bonds Now Breakable

(UNIGE, July 05, 2011)

From now on, it will be easier to break Carbon-Hydrogen (C-H) chemical bonds, one of the hardest yet most common bonds encountered in organic synthesis. This has been made possible by researchers at the University of Geneva, who have elaborated an extremely selective catalyst. Among others, the catalyst has been successfully tested for synthesis of Indoline, a molecule group present in numerous pharmaceutical agents and natural substances. For experts, this important advancement revolutionizes asymmetric synthesis, which leads to bioactive substances. The technique will also allow the engineering of new complex molecules from environmentally benign precursors, in an ultra-selective manner. Until now, when chemists had to break a C-G bond, they required comparatively subtle methods and very costly equipments.

<http://www.swissinnovation.org/articles/2011/08-110705.html>

### Chemistry Bronze Medals for Switzerland

(VSWO, July 20, 2011)

The Swiss team performed well at the recent International Chemistry Olympiad (ICHO) in Ankara, Turkey with bronze medals by Michelle Frei and Ludovic Scyboz. Around 300 students from 72 countries participated in the ICHO, which included both theoretical and practical aspects. Tasks ranged from analyzing the chemistry of gold extraction and artificial sugars to practical laboratory experiments performed at the Technical University in Ankara. Additionally the event allowed students from all over the world to meet each other and build contacts, and to visit the local sights. The ICHO coincides with the UNESCO International Chemistry Year 2011.



<http://www.swissinnovation.org/articles/2011/08-110720.html>

### Physics Bronze Medal for Switzerland

(VSWO, July 21, 2011)

The Swiss team earned a bronze medal and two honorable mentions at the International Physics Olympiad (IPhO) in Thailand. The medal winner was Jean-François Pinazza, and this was the first Swiss medal in two years, and only the sixth ever. Two additional students barely missed the cutoff for awards. The competition was challenging, covering both theoretical and practical aspects of physics, including the questions on gravity waves, the movement of charged particles in an atom, and black box system identification. The team also enjoyed being shown the sights in Bangkok. The competition attracted the participation of 400 students from 84 countries.

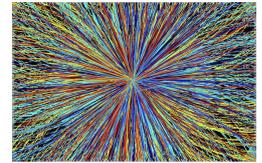
<http://www.swissinnovation.org/articles/2011/08-110721.html>



## LHC Experiments' Results

All of the LHC experiments are presenting results at a major particle physics conference in Grenoble. The conference follows an extremely successful start to LHC running in 2011, and results are eagerly awaited. "So far we've collected as much data as was planned for the whole of 2011 and that's already a great achievement for the LHC," said CERN Director General Rolf Heuer. "While it's still too early for the biggest discoveries, the experiments are already accumulating interesting results." The LHC experiments will present measurements with increased precision on known processes of the current model of particle physics, the Standard Model. They will also provide new measurements and limits on sought-after phenomena and particles, such as the Higgs boson.  
<http://www.swissinnovation.org/articles/2011/08-110721-2.html>

(CERN, July 21, 2011)



## Antimatter Weight At Unprecedented Accuracy

In a Nature paper, the Japanese-European ASACUSA experiment at CERN<sup>1</sup> reported a new measurement of the antiproton's mass accurate to about one part in a billion. Precision measurements of the antiproton mass, which will continue to improve, provide an important way to investigate nature's apparent preference for matter over antimatter. Any difference between the mass of protons and antiprotons would be a signal for new physics. To make these measurements, antiprotons are first trapped inside helium atoms, where they can be 'tickled' with a laser beam. The laser frequency is then tuned until it causes the antiprotons to make a quantum jump within the atoms, and from this frequency the antiproton mass can be calculated.  
<http://www.swissinnovation.org/articles/2011/08-110728.html>

(CERN, July 28, 2011)



## 9. Architecture / Design

### Building Energy Savings through Intelligent Software

The Smart Building project – a software developed by the Fribourg Engineering and Architecture School in collaboration with 3 Swiss companies – should allow to save up to 20% of a building's energy. This will be made possible by using a central software which takes into account technical parameters of the building, meteorological predictions and rooms' occupations. The software's architecture is that of a neural network, which will allow it to "learn" and improve itself over time. It will be particularly powerful when used in high-tech house with advanced energy management such as direct usage of solar energy, active slabs or "canadian wells". The software is currently tested on a special building whose walls are made of different materials and incorporate microstrips and Phase Changing Material coating.  
<http://www.swissinnovation.org/articles/2011/09-110628.html>

(Le Temps, June 28, 2011)



### Aerospace Architectural Tower

«La Macchina di Santa Rosa» is getting ready for a man-powered transportation through the center of Viterbo, Italy, in the night of September 3rd, 2011. An event proposed for being listed as UNESCO World Cultural Heritage. The 30 meter high tower is carried by 100 men through the narrow streets of the medieval town. «Fiore del Cielo» is the name of the competition winning design by the two aerospace architects Arturo Vittori (Italian) and Andreas Vogler (Swiss). The macchina was built and inaugurated in 2009. The light-weight tower has been developed using parametric 3D design methods and real scale mock-ups in collaboration with local manufacturers and experts. The tower is illuminated by hundreds of candle flames and more than 1200 computer-controlled LEDs.

<http://www.swissinnovation.org/articles/2011/09-110721.html>

(Architecture and Vision, July 21, 2011)





## 10. Economy, Social Sciences & Humanities

### The Growth of Swiss Industry

(Federal Administration, June 16, 2011)

The Federal Office of Statistics reports that financial figures from the first trimester show growth compared to the figures from last year's first trimester. Production, revenue, and orders all grew at healthy rates. Production was led by durable and investment goods. Exports were a key factor in driving overall revenue growth.

<http://www.swissinnovation.org/articles/2011/10-110616.html>

### New World Heritage Sites in Switzerland

(UNIGE, June 28, 2011)

The UNESCO has decided to classify as World Heritage a hundred prehistoric sites near the Alps. 56 of these sites are in Switzerland. Forel Institute's prehistoric Archaeology research group, which belongs to the University of Geneva, has been actively implied in the study and classification process. The scientists have been collecting large amounts of data, which has led to a better understanding of these threatened sites. Of particular interest are the "stilts sites" immersed in lakes, which are characteristic of Neolithic populations who lived by lake shores between 5000 and 500 BC. The studies have shown that these populations were divided in about 30 different cultural groups, with very diversified construction methods.



<http://www.swissinnovation.org/articles/2011/10-110628.html>

## 11. Technology Transfer / IPR / Patents

### Swiss Federal Institute of Intellectual Property

<https://www.ige.ch/en.html>

### Swiss Technology Transfer Association

<http://www.switt.ch/html/home.php>

## 12. General Interest

### Solar Impulse at Paris Air Show

(Solar Impulse, June 15, 2011)

Solar Impulse, the solar-powered aircraft of Swiss origin, made the flight from Brussels to Paris to attend the Paris Air Show. The aircraft departed Brussels early in the morning and landed in Paris sixteen hours later after waiting for air traffic conditions that allowed it to land. The mission control team in Switzerland was able to communicate with the pilot the entire time. Solar Impulse is able to fly day and night using only solar energy. It was designed to show the potential of solar energy and to motivate society to find solutions to energy problems. Daily demonstration flights are planned for the air show.



<http://www.swissinnovation.org/articles/2011/12-110615.html>

### New World Record for Atlantic Crossing by Solar Powered Boat

(PlanetSolar, July 20, 2011)

PlanetSolar, the solar boat which is set to be the first one to circumnavigate the world using solar power alone, is continuing its adventure and is approaching the Philippines. The boat has journeyed more than 5,000 km of ocean since its departure from Cairns in northeast Australia. PlanetSolar has now been awarded a certificate from the Guinness Book of World Records for the fastest Atlantic crossing in a solar powered boat. PlanetSolar completed this record between Tired Caliper and Holy Martin, from October 22, 2010 to November 18, 2010, in 26 days, 19 hours and 10 minutes. The previous holder of this world record was detained by Sun21, who had crossed the ocean in 29 days.

<http://www.swissinnovation.org/articles/2011/12-110720.html>



## 13. Calls for Grants/Awards

### Excellence Scholarship & Opportunity Program

(ETH Zurich, June 21, 2011)

The ETH Zurich encourages excellent students wishing to pursue a Master's degree at ETH with a so-called Excellence Scholarship & Opportunity Program. This program gives its recipients a full coverage of their study and living costs during the Master degree course as well as specific assistance. Sponsored by Alumni, the Excellence Scholarship brings to Switzerland a system widely successful in the U.S. and other countries for attracting, financing and motivating excellent students. The scholarship program is open both to ETH students and students from other universities (national and international) who wish to pursue their Master's degree at ETH Zurich. A parallel program, the Master Scholarship Program, offers students a partial stipend during their Master degree course.

<http://www.swissinnovation.org/articles/2011/13-110621.html>

### Research on Global Issues

(SNSF, July 11, 2011)

The Swiss Agency for Development and Cooperation together with the Swiss National Science Foundation is creating a research fund to sponsor research on global issues in and with developing and emerging countries in Africa, Asia, and Latin America. The research should develop solutions for sustainable global development in these countries. Funding will be divided into two categories; one for predefined research themes, and the other for freely chosen ones. Major themes include reducing poverty and social strife, and improving agriculture, use of ecosystems, and the public health sector. Each theme will be funded at approximately CHF 2.2 million per year. An orientation event will occur in December 2011 and the first calls for proposals are expected in early 2012.

<http://www.swissinnovation.org/articles/2011/13-110711.html>

## Upcoming Science and Technology Related Events

### Cleantech Event Polen-Schweiz 2011

June 20, 2011

<http://tinyurl.com/cleantech-event-2011>

Energy  
ETH Zurich

### Information Security and Cryptography

June 20 – 24, 2011

Information Security and Cryptography  
Fundamentals and Applications (Seminar 1)  
Building Secure Software Systems (Seminar 2)

<http://www.infsec.ch>

Information security  
Courtyard Zurich North, Zurich

### European Fuel Cell Forum 2011

June 28 – July 1, 2011

<http://www.efcf.com>

Fuel cell  
Kultur- und Kongresszentrum Luzern, Lucerne

### ISREC Symposium 2011

September 7 – 10, 2011

<http://isrec2011.epfl.ch/>

Life Science  
EPFL, Lausanne

### Trends in Innovation in the Postal Market

September 15-16, 2011

<http://newsletter.epfl.ch/mir/index.php?module=epffiles&func=getFile&fid=234&inline=1>

Innovation in Network Industries  
EPFL

### World Resources Forum 2011

September 19 – 21, 2011

[www.worldresourcesforum.org](http://www.worldresourcesforum.org)

Natural resources  
Congress Center Davos

### 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/](http://idrc.info/pages_new.php/IDRC-Davos-2012/831/1/)

Disaster/risk management  
Congress Center Davos



## Science-Switzerland Back Numbers

[http://www.swissinnovation.org/Science-Switzerland\\_AprMay\\_2011.pdf](http://www.swissinnovation.org/Science-Switzerland_AprMay_2011.pdf)  
[http://www.swissinnovation.org/Science-Switzerland\\_FebMar\\_2011.pdf](http://www.swissinnovation.org/Science-Switzerland_FebMar_2011.pdf)  
[http://www.swissinnovation.org/Science-Switzerland\\_DecJan\\_2010-2011.pdf](http://www.swissinnovation.org/Science-Switzerland_DecJan_2010-2011.pdf)  
[http://www.swissinnovation.org/Science-Switzerland\\_OctNov\\_2010.pdf](http://www.swissinnovation.org/Science-Switzerland_OctNov_2010.pdf)  
[http://www.swissinnovation.org/Science-Switzerland\\_AugSep\\_2010.pdf](http://www.swissinnovation.org/Science-Switzerland_AugSep_2010.pdf)  
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[http://www.swissinnovation.org/Science-Switzerland\\_FebMar\\_2010.pdf](http://www.swissinnovation.org/Science-Switzerland_FebMar_2010.pdf)

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