



Science-Switzerland, April – May 2010

News on Swiss science, technology, education and innovation

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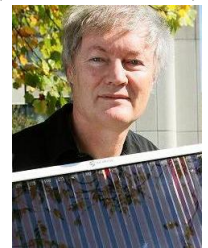
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2010 Millennium Prize Awarded To Michael Grätzel At EPFL

President of the Republic of Finland Tarja Halonen handed the 2010 Millennium Prize (EUR 800'000) to Prof. Michael Grätzel who is the father of third generation Dye-Sensitized Solar (DSS) cells known as "Grätzel cells". Inspired by photosynthesis, this unique form of low-cost solar cells has only recently been commercialized. The technology is a promising alternative to standard silicon photovoltaics. The Millennium Technology Prize is the largest technology prize in the world and is awarded only once every two years.

<http://tinyurl.com/00-100609>

(EPFL, June 9, 2010)



Swiss Pavilion Opens At Shanghai Expo

As part of its strategy of communication abroad, Switzerland will be presenting itself at the Shanghai Expo in an open and inter-active pavilion covering 4,000 m². The chosen topic - Rural-Urban Interaction - is dealt with in a playful manner. The building is an open hybrid structure exemplifying both technology and nature, containing both the town and the country and keeping them in balance. It is covered by a semi-transparent curtain of woven metal netting made up of 10,000 cells that generate electricity using state-of-the-art solar technology and illustrating the creative force of the sun's rays. The organizers expect 2.5 million visitors in the coming months.

<http://tinyurl.com/00-100501>

(news.admin.ch, May 01, 2010)



1. Policy

Polish-Swiss Research Programme

(news.admin.ch, April 01, 2010)

Poland is making major efforts to meet the growing requirements of the EU in the research field. Switzerland is supporting this venture with the Polish-Swiss research program, aimed at improving the position of Poland as a research centre and Polish-Swiss cooperation. Swiss research institutions now have the opportunity to work together with Polish institutions and submit joint research projects in the following five fields: information and communication technology, renewable energies, nanotechnology, health care and the environment. Projects ranging from CHF 300,000 to 2 million and with a duration of up to five years will be supported.

<http://tinyurl.com/01-100401>

Eight New National Centers Of Competence In Research

(SNSF, April 15, 2010)

At a press conference held at the headquarters of the Swiss National Science Foundation (SNSF) in Bern, Federal Councilor Didier Burkhalter announced the launch of eight new National Centers of Competence in Research



(NCCRs). The NCCRs will be set up with the long term support of the executive boards of the Universities of Bern, Geneva, Lausanne, Zurich, the EPF Lausanne and the ETH Zurich. The Universities of Bern, Geneva and Lausanne will also be involved as co-leading houses in four of the new NCCRs. The Confederation will allocate CHF 30 million per year for the eight new NCCRs between 2010 and 2013.

<http://tinyurl.com/01-100415c>

Fellowship Policy For Advanced Researchers

(SNSF, May 05, 2010)

These Fellowships enable young scientists planning to follow an academic career to benefit from a stay abroad in order to increase their knowledge and scientific reputation. The fellowships are supported by the Swiss National Science Foundation (SNSF) in any discipline, except experimental and clinical medicine.

<http://tinyurl.com/01-100505>

Swiss National Foundation Funded Record CHF 700 Million In 2009

(SNSF, May 25, 2010)

In 2009 the Swiss National Science Foundation (SNSF) invested more than ever before in Swiss research: CHF 707 million which is 6% more than in 2008. The SNSF last year approved around 2,900 research proposals, of which 25% was awarded to the humanities and social sciences, 37% to mathematics, natural and engineering sciences and 38% to biology and medicine. Last year researchers submitted significantly more applications than in previous years. Starting 2009, the government provided for the first time annual funding for overhead to cover the indirect research costs incurred by universities and other research institutions through SNSF-funded projects.

<http://tinyurl.com/01-100525>

2. Higher Education

Promoting Young Talents

(ETH Zurich, April 20, 2010)

The "Excellence Scholarship and Opportunity Program" has been sponsoring talented master-program students for three years. The latest meeting between donors and the sponsored students revealed impressive results. The finance for the scholarship grants originates from a fund administered by the ETH Zurich Foundation, which is supplied mainly through donations. It will be possible to award 30 additional scholarship grants this year. The "Meet the Talent" event also gave the donors an opportunity to test the passion and capacity for enthusiasm of the talented young scholars in a personal discussion.



<http://tinyurl.com/02-100420>

Modern Environmental Teaching In The Classroom

(SNSF, April 22, 2010)

The National Centre of Competence in Research (NCCR) "MICS – Mobile Information and Communication Systems" inspires students at Wallis school with enthusiasm for modern environmental monitoring and helps explain complex environmental phenomena in the classroom. The concept is so successful that it is now spreading to other cantons as well. The idea is to turn the classroom into a real research laboratory. This is the motto of the climATscope teaching initiative, jointly developed by the NCCR MICS and various institutions in French-speaking Switzerland.

<http://tinyurl.com/02-100422a>

Record 24 Spin-Off And 15% More Students

(ETH Zurich, April 22, 2010)

In 2009, ETH Zurich scientists showcased some sensational research results and the school acts as a magnet for undergraduate, masters and PhD students: around 3,100 students started a degree in 2009, 2,500 of whom at bachelor level, meaning that for the first time ever over 15,000 people were enrolled (including 3,400 PhD students). The 2,500 new undergraduates signal an increase of 15% compared to the previous year. Meanwhile, the organizational adjustments in the board of education provide quality assurance. Members of ETH Zurich launched 24 new spin-offs with jobs for highly qualified personnel – a new record also in 2009. Since 1996, 195 new firms from ETH Zurich research commercially have come into being.



<http://tinyurl.com/02-100422b>



European Cultural Award For Science City

(ETH Zurich, April 30, 2010)

Since 2003 ETH Zurich has steadily been developing the Science City campus as a model university of the 21st century. The initiator of the visionary project, Gerhard Schmitt, a professor of architecture at ETH Zurich, has now received the 2010 European Cultural Award for Science in Strasbourg. Science City is acknowledged as an exemplary model that endeavours to solve the problem of many university expansions and new foundations, which are often planned as isolated satellites on the outskirts of towns. It is also ETH Zurich's largest sustainability project

<http://tinyurl.com/02-100430>



Continuing Education In Trend

(news.admin.ch, May 11, 2010)

According to a recent study published by the Federal Statistical Office, a clear majority of the Swiss population participates in continuing education activities. Independent study such as self-directed learning is the most popular form of continuing education. Non-formal educational activities based on a student-teacher relationship, such as classes, seminars and lectures are also popular, as more than one person out of two chooses this type of continuing education. Although participation rates are high overall, there are observable differences depending on individuals' labor market status and level of education.

<http://tinyurl.com/02-100511>

3. Life Science / Health Care

Strengthening Stem Cell Research

(SNSF, April 09, 2010)

The National Research Programme «Stem cells and regenerative medicine» (NRP 63) recently launched in Switzerland seeks to find a solid basis for medical applications for stem cells in the future. Without stem cells, wounds would not heal; blood, skin and other tissue would not be able to regenerate either. Without these biological «all-rounders», there would be no origin for life – or way to survive. Stem cells are not only expected to explain how humans, animals and plants grow; they are also expected to help find cures for illnesses such as Parkinson's disease or type 1 diabetes. NRP 63 comprises a total of 12 projects and hopes to make its contribution to the laying of solid groundwork for future medical applications.

<http://tinyurl.com/03-100409>

Assembly Of Protein Strands Into Fibrils

(ETH Zurich, April 12, 2010)

Researchers at ETH Zurich, EPFL and at the University of Fribourg have evidenced a basic general mechanism describing how filamentous proteins assemble into ribbon like structures, the so-called Amyloid fibrils. Combining experiments and theory, they could explain how denatured milk proteins assemble into ribbon like structures composed of up to five filaments. These findings are shining a surprisingly new light on the assembly of these proteins: single proteins build the long filaments and subsequently the filaments assemble side by side to form the ribbon-like twisted fibers. The ribbon-like structure is the logic consequence of the strong charge carried by the building blocks of the fibers.

<http://tinyurl.com/03-100412a>



New Treatments For Depression

(EPFL, April 12, 2010)

Researchers from the Brain Mind Institute at EPFL reveal how understanding the functioning of a molecule called MIF, or macrophage migration inhibitory factor, may change the way we treat depression. They first detected a concentration of MIF protein in stem cells in the hippocampus, a key area for memory formation and neuron generation during adulthood. By genetically and pharmaceutically manipulating the level of MIF in the hippocampus of rats, the researchers discovered that the absence of MIF significantly reduced the production of neurons and increased anxiety. They also found that the lack of MIF decreases the ability of anti-depressants to stimulate neurogenesis. These findings have led the researchers to conclude that MIF plays an important role in neurogenesis and, in turn, the condition of anxiety and depression.

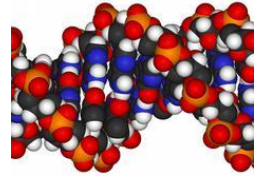
<http://tinyurl.com/03-100412b>



New Genetic Sub-Code Discovered

(ETH Zurich, April 22, 2010)

Biologists and computer scientists from ETH Zurich and the Swiss Institute of Bioinformatics identified a new sub-code in genomic information that determines at which rate given products must be made by the cell. It provides novel insights into how the decoding machinery works, and more pragmatically, it makes possible to read information about gene expression rates directly from genomic sequences. Additionally, the new sub-code provides insight into cellular processes at the molecular level. The discovery of this novel sub-code will therefore also provide more information about the functioning of ribosomes, special factories allowing the production of proteins throughout translation.



<http://tinyurl.com/03-100422a>

Improving Skiers' Performance

(UNIL, April 22, 2010)

Sports science researcher Frédéric Meyer posed the question of how the performance of competitive skiers could be improved. To collect accurate data at the Swiss Championships in Stoos in March 2010 he clothed a dozen giant slalom professionals in white overalls fitted with 19 markers positioned on the body's main joints. The technology he developed enables the movements of sportsmen and women to be reconstructed in 3D. In addition, a force platform placed like a balance under both shoes, made it possible to measure the forces interacting between the skier and the snow. The aim is to discover if an "active" movement can improve a skier's performance and speed in the transition between two bends.

<http://tinyurl.com/03-100422b>

New Department For Sustainable Agronomy

(ETH Zurich, April 26, 2010)

ETH Zurich is forming a new Department of 'Health Sciences and Technology', to support collaboration between natural scientists and engineers working in nutrition, movement and neurosciences as well as in medical technology. A key objective will be to ensure that knowledge and technology are transferred into clinical practice. Agricultural Sciences and Environmental Sciences are also to be merged and will intensify the research effort into a sustainable food supply.



<http://tinyurl.com/03-100426>

Clinical Trial For New Tumor Fighting Drug

(Debiopharm, April 27, 2010)

Debiopharm Group announced that it has started patient enrolment in its Phase I clinical trial for the small molecule inhibitor of heat shock protein 90 (Hsp90), Debio 0932. This trial will evaluate the maximum tolerated dose and safety of Debio 0932 in patients suffering from advanced solid tumors or lymphoma. The preclinical work carried out suggests that Debio 0932 may be able to enhance the efficacy of treatment against certain tumors, where there currently is a large unmet medical need. The new treatment has already shown efficacy in mice in various tumor xenografts.

<http://tinyurl.com/03-100427>

Stress-Induced Premature And Bigger Babies

(swissinfo.ch, May 04, 2010)

Everyday stress in pregnant women may lead to bigger newborns and earlier births, a Basel University study has found. The researchers discovered that common stress can increase babies' body weight and length, as well as their abdominal and head circumferences. The team also looked at emotional symptoms such as anxiety and mild depression, and found they too led to earlier births. But unlike common life stress, these symptoms resulted in smaller sized newborns. The issues of premature births and growth restrictions in the uterus have become a major public health concern and both have been linked to a higher risk of medical problems and death during infancy.



<http://tinyurl.com/03-100504>

HIV Spread Study In Switzerland

(SNSF, May 06, 2010)

For the first time, Swiss HIV Cohort Study researchers have reconstructed on a molecular basis how the AIDS agent HIV has spread in Switzerland over the past 30 years. Data shows that the distribution of sterile needles to drug addicts, introduced in 1986, also protected many non-drug addicts against the disease. The researchers dis-



covered a total of 60 different transmission chains in which at least ten persons each were infected with HIV. All of these chains belonged to one of only two chain types: either the transmission chains comprised mainly addicts who inject heroin or other drugs into their veins and heterosexuals, or they were a chain type in which the virus predominantly spread among homosexual men.

<http://tinyurl.com/03-100506>

New Planning In Nursing Environment

(University of Basel, May 06, 2010)

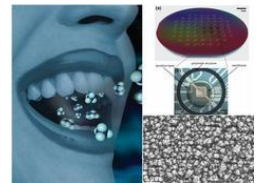
The RN4CAST project aims to develop innovative forecasting methods by addressing not only nurse-patient ratios but quality ratings both of nursing staff and of patient care. As a three-year international multi-centred study, the RN4CAST project is funded by the European Commission's 7th Framework Program. It focuses on the nursing work environment and the deployment of nursing staff, and on defining their connections with nursing quality and patient outcomes. The research teams will include at least 30 hospitals in each of the 14 participating countries. The University of Basel's Institute of Nursing Science (INS) conducts the Swiss part of the study.

<http://tinyurl.com/03-100506b>

Diabetic Test Through Breath Examination

(ETH Zurich, May 10, 2010)

Exhaled air from diabetics contains slightly higher levels of acetone vapor than healthy persons. A new kind of sensor from ETH Zurich can now selectively detect acetone even in the smallest concentrations. A substrate with gold electrodes for the sensor is coated with an ultra-thin semiconductor film made of tungsten oxide mixed with silicon nanoparticles. Through rapid heating and cooling, a semiconductor layer forms on the electrodes, capturing the metastable crystalline phase of epsilon tungsten oxide that resonates with acetone. The spongy structure of the deposited materials traps the acetone particles, giving it the required high selectivity for indisputable detection of acetone vapor in the human breath, and thus type 1 diabetes diagnosis.



<http://tinyurl.com/03-100510a>

Better And More Cost-Effective Medicine With Nanoscience

(news.admin.ch, May 10, 2010)

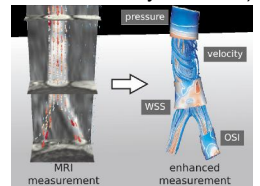
With the comprehensive introduction of managed care systems, it is possible to steer the whole treatment process centrally, which leads to a better quality of treatment and also contributes to preventing unnecessary measures. In view of the rapid development of nanoscience and nanotechnology, the question that arises is how to apply these new tools, techniques and materials for the benefit of human health. The government therefore has a strong strategic interest in supporting and encouraging this valuable effort in the field of nanomedicine in order to lay the foundations for better public health, but also to benefit economy thanks to more accurate diagnostics and more efficient treatments which will help to contain both direct and indirect costs of healthcare.

<http://tinyurl.com/03-100510b>

Efficient Blood Flow Measurements

(ETH Zurich, May 11, 2010)

A new blood flow measurement enhancement method has been developed, to obtain accurate and highly resolved patient-specific local blood flow information. The method uses sparse information from medical imaging modalities, without having to perform any computational fluid dynamic simulations. It can be used for e.g. atherosclerotic plaque rupture risk predictions. All the simulation work is done beforehand so as to accumulate knowledge of the blood flow patterns typically occurring in a given vascular location, which is then used to perform an intelligent interpolation based on the measurement data. This new approach allows to obtain high-quality blood flow fields from sparse flow measurement data in vivo.



<http://tinyurl.com/03-100511>

Myelin Regulation Process Discovered

(ETH Zurich, May 12, 2010)

The proper transmission of nerve signals along body nerves requires an insulation layer, named myelin sheath. To be efficient this sheath is designed to have a certain thickness and researchers from the ETH Zürich have now discovered that proteins Dlg1 and PTEN interact to control the myelin sheath thickness. In experiments conducted on cell cultures and the sciatic nerve in mice, they were able to demonstrate that Dlg1 inhibits myelin growth. Together with PTEN, they ensure that the growth of the myelin sheath does not go to excess





in the mouse's development. If the brake is "released" by suppressing Dlg1 or PTEN, it results in myelin excess that not only leads to an extra-thick myelin sheath, but also to its degeneration.

<http://tinyurl.com/03-100512>

Heatwaves Pose Health Risk

Scientists from ETH Zurich revealed heatwaves could pose an increased health risk this century in Southern European river valleys and along the Mediterranean coast. Using six new climate models, they found considerable differences regarding the temperature rise and changes in the atmospheric humidity over Southern Europe, thus arriving at different future risk scenarios. Most of the high-risk areas are densely populated, with major cities like Milan, Athens or Naples being affected. Cities are warming up more intensely during the day and cooling off less effectively at night than the open land. However, this so-called "heat island effect" and the cities' air pollution wasn't even accounted for in this study, which means the situation on the ground could get even worse.

(ETH Zurich, May 17, 2010)



<http://tinyurl.com/03-100517>

High-Precision 3D Model Of Blood Flow

EPFL Laboratory of Multiscale Modeling of Materials has developed a computer program that accurately models the complex system of blood flow in the heart for individuals at an unheard-of precision of ten millionths of a meter or ten microns. Based on a detailed heart scan, the simulation juggles over a billion different variables in order to represent a fluid containing ten-million red blood cells. These individual-specific models will allow for a detailed study of the cardiovascular system and lead to early predictions of heart conditions such as arteriosclerosis, or the hardening of arteries that often leads to heart attacks. Plans are in the works to develop the program for individual PCs for clinical applications within the next two to three years.

(EPFL, May 20, 2010)

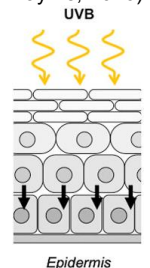


<http://tinyurl.com/03-100520>

Protein Switch Prevents Damage From UVB Rays

The protein Nrf2 plays a crucial role in tissue repair and in the protection against carcinogenesis. Cell biologists from ETH Zurich have now discovered a previously unknown role for this molecular switch, which activates numerous genes that prevent cell damage in the skin caused by UVB rays from the sunlight. The protein switch Nrf2 is a so-called transcription factor; these proteins activate specific genes the cell needs in a particular situation. If the skin is now exposed to UVB, it is protected by a series of mechanisms triggered by Nrf2. The protective molecule glutathione (GSH), which consists of three amino acids, plays a central role here, capturing the aggressive radicals and rendering them harmless. This protective mechanism also extends to neighboring cells.

(ETH LIFE, May 28, 2010)



<http://tinyurl.com/03-100528>

4. Nano / Micro Technology / Material Science

Life Sciences & Nanotech Platform

The Swiss Biotech Association (SBA) identified industrial and academic players as well as issues within the field of nanotechnology and life sciences to create the Nanotech Platform. The aim of these events is the gathering of ideas and the further identification of mutual interests that are important to this industry segment. Innovative ideas might be furthered with industry-industry or academic-industry projects. The next nanotechnology platform planned at IBM Forum Zurich Research will cover the topics "Lab-on-a-Chip" and "Drug Delivery". With some 3000 scientists, SBA is the largest industrial IT research organization in the world.

(IBM Zurich, April 01, 2010)

<http://tinyurl.com/04-100401>

Smart Materials Projects Approved

The Swiss National Science Foundation (SNSF) has approved 21 research projects for the National Research Programme "Smart Materials" (NRP 62), with available funding totalling CHF 6.6 million. At the beginning of last year, researchers submitted a total of 79 pre-proposals, the majority of which were assessed by the NRP 62 Steering Committee as being of a high standard.

(SNSF, April 07, 2010)

<http://tinyurl.com/04-100407>

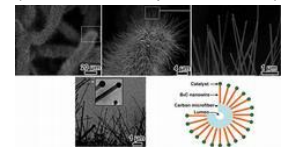


Reinforced Cotton With Boron

(ETH Zurich, April 13, 2010)

Researchers from Switzerland, the United States and China have discovered that cotton can be transformed into a material that is extremely tough as well as flexible. What scientists have done is to combine the carbon in the shirt's cotton with boron – the third-hardest material on earth. The result is a lightweight shirt reinforced with boron carbide, which is used to protect tanks. The research is a conceptual change in fabricating lightweight, fuel-efficient, super-strong and ultra-tough materials that offered unprecedented opportunities. The result is a fabric that is lightweight but tougher and stiffer than the original T-shirt. And it is still flexible, an improvement over the current boron-carbide plates used in bullet proof vests and body armor.

<http://tinyurl.com/04-100413>

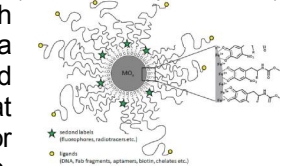


Stable Magnetic Nanoparticles For Biomedical Applications

(ETH Zurich, April 16, 2010)

Stabilization of magnetic nanoparticles used as contrast agents in biomedical imaging such as Magnetic Resonance Imaging (MRI) and for magnetic targeting and therapeutics is a daunting problem without a solution to date. Anchor groups for dispersants were developed at ETH Zurich which lead to ultra-stable nanoparticles under physiological conditions and at elevated temperatures. The resulting stable shells enable additional functionalization for targeting and multimodal imaging. The latter can be achieved by coupling e.g. fluorophore, Positron Emission Tomography (PET) or Single Photon Emission Computed Tomography (SPECT) labels to the iron oxide cores.

<http://tinyurl.com/04-100416>



Record Fast Switching, Low Power Transistors

(ETH Zurich, April 19, 2010)

Transistors, the cornerstone of electronics, are lossy and consume energy. Researchers from the ETH Zürich and EPF Lausanne have developed transistors targeting high switching speeds and higher output powers. The devices can be used more efficiently as conventional transistors, so as to reduce energy consumption and CO₂ emissions. Instead of using Aluminium-Gallium Nitride, the researchers exploit the favorable properties of a newer material combination consisting of Aluminium Indium Nitride (AlInN/GaN). They managed to break their own record of 102 GHz by increased the cutoff frequency by 41 percent up to 144 GHz in a single step.

<http://tinyurl.com/04-100419>



Luminescent Nanoparticles To Detect Finger Marks At Crime Scene

(UNIL, April 22, 2010)

Andy Becue is working as an assistant lecturer at the School of Criminal Justice of the University of Lausanne. His research aims at developing new methods to detect finger marks, based on the use of luminescent nanoparticles. The challenge of this research consists in finding a way to graft these nanoparticles onto the secretion residue that are left on a substrate after someone touched it. The luminescence of one nanoparticle can be equivalent to more than 10,000 dye molecules. Using this method, it will be possible to go beyond the current sensitivity limits, and to detect finger marks that can not be detected nowadays. Another research strategy could consist in targeting DNA or blood, on garments for example, using such functionalized and luminescent nanoparticles.

<http://tinyurl.com/04-100422a>

New 3D Microscopic Technique For Nanoscale Structures And Devices Manufacturing

(IBM Zurich, April 22, 2010)

IBM scientists have created a 3D map of the earth so small that 1,000 of them could fit on one grain of salt. The scientists accomplished this by means of a new, breakthrough technique that uses a tiny, silicon tip with a sharp apex — 100,000 times smaller than a sharpened pencil — to create patterns and structures as small as 15 nanometers at greatly reduced cost and complexity. This patterning technique opens new prospects for developing nanosized objects in fields such as electronics, future chip technology, medicine, life sciences, and opto-electronics.

<http://tinyurl.com/04-100422b>

Second Call For EuroNanoMed

(SNSF, April 27, 2010)

Following the success of the 1st Call in 2009, EuroNanoMed is launching its 2nd Joint Transnational Call for funding of innovative research projects in Nanomedicine. Proposals can address the three subfields regenerative medicine, diagnostics, targeted delivery systems.

<http://tinyurl.com/04-100427>



New Material Based Socks To Prevent Blisters

Empa researchers and experts from armasuisse have developed novel socks which reduce the chances of blisters forming on the wearer's feet. The prototype footwear, made of various fibers, reduces friction at the toes and heels, absorbs perspiration and has a particularly comfortable feel. The researchers chose to make the material used for the heel and toe sections of the socks out of a special fiber, while the rest of the garment is made of a woolen mixture which absorbs dampness particularly well.

<http://tinyurl.com/04-100507>

(EMPA; May 07, 2010)



Material Science Award

For the fifth time, materials scientist Sara Morgenthaler from ETH Zurich's Materials Research Center teamed up with a committee of PhD students to organize a graduate symposium for budding young researchers in materials research. The idea of the symposium is to encourage the exchange of ideas between the young researchers. Whilst they all work with materials, their research fields and backgrounds are various, ranging from physics, chemistry to engineering. Marta Bally, Anja Hänzi and Thomas Helbling share the first Materials Research Award to be presented at ETH Zurich, which they received for their outstanding research during their dissertations.

<http://tinyurl.com/04-100512>

(ETH Zurich, May 12, 2010)

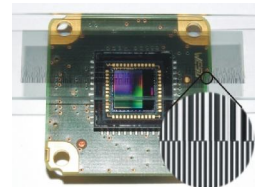


Low-Cost Technology For Absolute Position Measurements

Swiss Center for Electronics and Microtechnology (CSEM) introduced an absolute position encoder with sub-nanometer resolution. The innovative principle is based on measurement of two tracks of patterns using image processing. The coarse absolute position is derived from a binary pattern of a polynomial sequence, while phase measurement of a regular grating is used to obtain the fine position within one period of the coarse position. Due to the distribution of phase information the measurement is highly robust, insensitive to dust/damage, and does not require precise marking.

<http://tinyurl.com/04-100520>

(CSEM Neuchatel, May 20, 2009)



Selection of National Research Program On Nanomaterials

The call for proposals published in the context of the National Research Programme "Opportunities and risks of nanomaterials" (NRP 64) received a total of 44 outline proposals for a total of CHF 21,1 million. The NRP 64 has approximately CHF 7,5 million to fund projects for a initial duration of three years. Foreign external experts and the members of the steering committee evaluated the applications according to their scientific quality and their relevance to the goals of the programme. Based on these deliberations the Steering Committee selected to invite 21 applicants to submit full proposals (CHF 8 million). A total of 23 projects could not be taken into account.

<http://tinyurl.com/04-100521>

(SNSF, May 21, 2010)

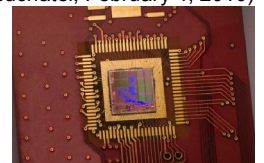
5. Information & Communications Technology

Low Power System-on-Chip With Integrated Processor

The Swiss Center for Electronics and Microtechnology, CSEM, has developed a unique System-on-Chip (SoC) tailored for portable wireless communication products including an integrated Digital Signal Processing (DSP) processor and optimized power management to maximize battery life.

<http://tinyurl.com/05-100204>

(CSEM Neuchatel, February 4, 2010)



Elegant Programming Language For Social Networks

A new Open Source computer programming language developed in Switzerland could be destined to replace Java, the language that powers much of the Internet and many other commercial applications. Scala, developed at EPFL, is already the programming language of choice for social networking sites such as Twitter, LinkedIn and Four-

(EPFL, April 14, 2010)



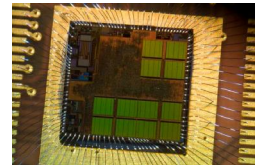
Square. An estimated 100,000 programmers are already using the language and it continues to attract attention from industry for its elegance and programming muscle. The release of version 2.8 has been announced during Scala Days, which took place on the EPFL campus April 15-16, 2010.

<http://tinyurl.com/05-100414>

New Ultra Low Power Processor Cores

(CSEM Neuchatel, March 2, 2010)

The icyflex family of ultra low power 16/32-bit RISC processor cores developed by CSEM, the Swiss Center for Electronics and Microtechnology, offers a flexible architecture that allows for different combinations of control and Digital Signal Processing (DSP) functionality. Three silicon-proven cores are so far available, consuming as little as 6 μ W/MHz. These low power and low voltage processors cores are designed to match the need of portable products.



<http://tinyurl.com/05-100302>

Cybercrime's Many Facets

(news.admin.ch, April 29, 2010)

Cybercrime has many facets, ranging from data theft for the purposes of making money to hacking websites as a way of giving vent to political frustration. Those affected are companies, administrations, political parties and even the federal administration. Incidents occurred in which harmful software was used to access external computer systems and steal data. The data was subsequently either put on sale or provided to the media or misused for other purposes. More and more frequently, the internet is also abused as an outlet for political, sporting or religious protest, with the organizations concerned being hacked, defaced or saturated with political or religious statements. In the case of Distributed Denial of Service (DDoS) attacks, the website of the victim is simultaneously accessed by thousands of computers and is thereby disabled.

<http://tinyurl.com/05-100429>

Outstanding ICT Location

(Greater Zurich Area, April 31, 2010)

Switzerland is one of the best technology locations in the world. The World Economic Forum's (WEF) recently published Global Technology Report 2009/10 shows Switzerland holding an excellent fourth position: Compared to the previous report Switzerland managed to improve its position by one rank. The report highlights the importance of Information and Communications Technology (ICT) as an enabler of sustainable economic development. Switzerland mainly owes its excellent position to the key role ICT companies play for the Swiss economy.

<http://tinyurl.com/05-100431>

Disney Research Centre As Only Lab In Europe

(ETH Zurich, May 03, 2010)

"Disney Research Zurich" - the only Walt Disney research lab at a European university - was officially opened. It won't only be developing new technology for Walt Disney's film animation studios, but also for all areas of the concern including television, games, theme parks and merchandising. One of DRZ's projects is centered on modeling human faces with a scanner that can scan a human face up to 60 times per second from different angles using several cameras. The lab is also researching three-dimensional film. 20 computer scientists and eight PhD students are currently working on 35 different research projects



<http://tinyurl.com/05-100503>

Detecting Emotions With Eye Analysis

(news.admin.ch, May 17, 2010)

As part of the National Centre of Competence in Research (NCCR) "Interactive Multimodal Information Management", nViso, a young start-up company, is developing a system for detecting emotions, based on an analysis of facial expressions and eye movement. These are data processing models developed with the help of facial databases. By means of a camera, they can recognize different parts of a face, track changes in time and space, and relate them to specific facial expressions. The eyes are a fundamental element in this identification process. Refined to its ultimate degree, the technology can even pinpoint the pupils and provide information on the direction of viewing.

<http://tinyurl.com/05-100517>



6. Energy / Environment

Animal Invasive For The Ecosystem

(ETH Zurich, April 15, 2010)

The Swiss wanted to rear cattle in Tanzania and in so doing completely disturbed the ecosystem. Using native Zebu cows and Boran bulls from Kenya, Swiss farmers bred fast growing and robust high-performance cattle. The experiment started successfully, but then the cattle started to be affected by diseases which were transmitted by ticks and tsetse flies. The appearance of bushes became the biggest problem of this practical experiment. The redistribution of nutrients in the ground due to the high amount of livestock made the animals more susceptible to diseases. In addition some invasive plant types took root, spreading quickly across the area which was rich in nutrients.

<http://tinyurl.com/06-100415>



Laser For 3D Ash Cloud Mapping

(Swissinfo.ch, April 19, 2010)

Laser weather technology, originally devised for 3D humidity maps, is the ideal solution for monitoring the volcanic ash cloud. Bertrand Calpini and his team at the MeteoSwiss Aerological Station in Payerne have been using the innovative Light Detection and Ranging (Lidar) weather measurement system to map the ash cloud over Switzerland. The high-tech instrument, launched in 2008, provides continuous data on the vertical distribution of humidity in the atmosphere up to an altitude of 10km. It can also detect fine particles, including pollen, and can build up 3D temperature profiles.

<http://tinyurl.com/06-100419>



Model For Electrical Dust Storms

(ETH Zurich, April 21, 2010)

ETH Zurich researchers have modeled a mechanism with which they can explain how particles of a dust cloud can accumulate a powerful electrical charge and may discharge in a lightning flash. Initially an external electrical field polarizes the neutral dust particles, resulting in a complex charge distribution at the particle surface. The wind-driven granules collide together as they swirl around causing local charge equalization at the contact surfaces, which changes the charge of each colliding particle although the sum of the charges stays constant. Since the granules remain in the electrical field, they become polarized again. The continuous neutralization of individual dust particles on contact with the ground finally leads to an increase in the dust cloud's total charge.

<http://tinyurl.com/06-100421a>



Tests Support Flight Ban

(ETH Zurich, April 21, 2010)

Using state-of-the-art measuring technology, ETH Zurich scientists measured the extent to which the atmosphere was affected by the volcanic eruption in Iceland directly in the ash cloud. The results suggest that the flight ban was justified. In the meantime, the volcano has settled down, but a change in the magma composition has generated speculations. There is no indication that the volcano will become spontaneously explosive but should the magma develop in this direction, or the higher acidic magma reservoirs of Katla heat up and become activated, it could trigger the most formidable kind of eruption of them all: a plinian eruption.

<http://tinyurl.com/06-100421b>



Bacterial Biosensors To Detect Pollutants

(UNIL, April 22, 2010)

A laboratory at the University of Lausanne has invented "bacterial biosensors" that provide easy alternatives for testing water quality. By using different receptor proteins in the cell, the laboratory has designed biosensors with different detection capabilities covering a range of toxic substances. The cells are brought in contact with a water sample and after a period of incubation the signal produced by the cells is recorded. The intensity of this signal (colour or light) is proportional to the concentration of the toxic compound, which allows correct quantification. Since the cells are living and reproduce by themselves, the production of biosensors is very easy and cheap.

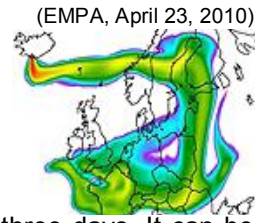
<http://tinyurl.com/06-100422>



Ash Cloud Meteorological Forecasting

Empa continuously monitors the make-up of the air on Switzerland's Jungfrauoch and has been able to provide important information about changes in the concentration of harmful substances caused by the volcano Eyjafjöll. The researchers normally combine their measurements of harmful substances in the atmosphere with models of atmospheric flow in order to identify the source of the pollutants discovered. With the aid of weather forecasts, the same model can be used to show how clouds of harmful substances will spread from sources such as volcanoes allowing meaningful forecasts to be made for periods of two to three days. It can be used to assess the risks posed by clouds of ash to aircraft engines.

<http://tinyurl.com/06-100423>



Public Call For Energy Innovations

The federal government has issued a new call for entries to its Watt d'Or competition which seeks to foster innovative energy ideas and encourage the public to think about using energy more efficiently. Applicants have until July 31 to submit details of initiatives which develop new technologies or reduce energy wastage from buildings, appliances and infrastructures. Bern offers no cash prize or research grant for winners, so rewards are recognition and publicity.

<http://tinyurl.com/06-100427>

(Swisster.ch, April 27, 2010)

Tackling Climate Change In The Alps

The Alps are not only more seriously affected by the temperature rise but are also more sensitive to the effects of climate change than areas in the Swiss Mittelland. For example, the receding snow line poses a threat to the lower-altitude skiing areas and tourist resorts. Moreover, soil stability is impaired by the thawing of permafrost, resulting in a growing number of mudflows and rockfalls. A workshop organized by the Alpine Space Programme and the Federal Office for Spatial Development addressed the question of how people living in the Alps can tackle these effects, helping to highlight areas requiring action in future projects as well as necessary improvements to ongoing ones.

<http://tinyurl.com/06-100429>

(news.admin.ch, April 29, 2010)

Solutions For Geological CO₂ Sequestration

Finding solutions for capturing carbon dioxide (CO₂) emissions, whether in the atmosphere or at its source in order to store them in the earth, has become a major scientific preoccupation. To respond to this challenge, the EPFL is creating a new research chair dedicated to the geological sequestration of the greenhouse gas. Petrosvibri SA, an enterprise exploring the possibility of exploiting natural gas beneath Lake Geneva, has signed an agreement with the school and will invest CHF 2.5 million for the creation of a chair dedicated to the study of long term underground storage of CO₂.

<http://tinyurl.com/06-100505a>

(EPFL, May 05, 2010)

Pollen's Secret Life

Delving into the miniscule world of pollen shows that the grains are in fact very varied and very beautiful – and that they go to great lengths to have sex. As the micronaut, Oeggerli uses Scanning Electronic Microscope (SEM) images to capture what is usually barely visible to the human eye and then colours the images using a secret formula, spending up to 20 hours per picture. The result is both stunning and unexpected. Pollen structures, which can clearly be seen in the images, are another source of interest and could be helpful in developing many pollen at a time or in distribution.

<http://tinyurl.com/06-100505b>

(swissinfo.ch, May 05, 2010)



Fire Blight Genome Sequenced

Researchers at Agroscope Changins-Wädenswil (ACW) have published the first complete genome sequence of the fire blight pathogen, *Erwinia amylovora*. They have already found several new genes hidden in this genetic blueprint that may influence pathogen survival and virulence. This breakthrough will accelerate the pace of fire blight research worldwide, and paves the way for developing innovative control strategies that target the Achilles' heel of this devastating apple/pear disease.

<http://tinyurl.com/06-100511>

(news.admin.ch, May 11, 2010)



A Threat To Electrical Stability In Hot Summer

An overloaded Swiss power network could prompt a major failure in the event of a hot summer, thus the Aargau-based power company calls for an investment of CHF 6 billion for renovation (75%) and extension (25%) of the national grid over the next ten years. An especially hot summer is a problem because there is less water in the lakes, a factor which compromises the country's reserves of hydroelectricity. The other reason is physical, since the grid is in metal, it gets hot and this lowers its capacity. The current network can only cope with surges of 120%.

(swisster.ch, May 19, 2010)



<http://tinyurl.com/06-100519>

Swiss Participation In International Earthquake Research

The government has approved Swiss participation in the Global Earthquake Model (GEM) which aims to calculate earthquake risk worldwide. The research project will also evaluate the number of victims and the financial losses, making a cost-benefit analysis for prevention measures, especially in the construction sector. GEM should be ready in five years' time and will be an Open Source software. The new system will integrate already existing models, such as those from the United States and Japan. The ETH Zurich's Swiss Seismological Service will be closely involved in the development of the tool.

(swissinfo, May 26, 2010)

<http://tinyurl.com/06-100526>

7. Engineering / Robotics / Space

Solar Impulse First Flight

Swiss adventurer Bertrand Piccard's team has successfully completed its first flight with a prototype for a round-the-world solar effort. The Solar Impulse plane landed after one and a-half hours in the air near its base, a military airfield at Payerne in western Switzerland. The aim of the test flight was to see if the plane, with the wingspan of a Boeing 747 and the weight of a small car, could keep a straight trajectory. Powered by almost 12,000 solar cells, rechargeable lithium batteries and four electric motors, Piccard and co-pilot Andre Borschberg plan to take the plane around the world. With the engines providing only 40 horsepower, the plane will fly almost like a scooter in the sky, at an average flight speed of 70km/h.

(swissinfo.ch, April 07, 2010)



<http://tinyurl.com/07-100407>

Prestigious Price For Swiss Inspection Robot

A joint project of ETH Zurich, EPF Lausanne, Alstom, and its joint venture and ETH spin-off Alstom Inspection Robotics (AIR) has been awarded with one of Europe's most prestigious awards in robotics. The participants of the joint project «Highly Compact Robots for Power Plant Inspections» received the highly respected «EUROP/EURON Robotics Technology Transfer Award». The robots carry out highly specialized maintenance work. To this aim the mini-inspectors move or crawl into barely accessible areas of turbines and generators, search for cracks and all kinds of material defects by means of laser, ultrasound or Foucault current. The detected weak points are recorded and visualized just like on a map.

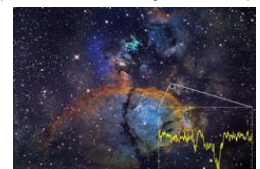
(Greater Zurich Area, April 23, 2010)

<http://tinyurl.com/07-100423>

Ionized Water Observation

Equipped with three different measuring instruments, Herschel is the first observatory that can study wavelengths from the infra-red to the millimeter regions. Arnold Benz, Professor at the Institute for Astronomy of ETH Zurich, and his team have specialized on the formation of stars and planets and are primarily interested in water, which is detectable only via this wavelength range. Their group identified ionized water using spectral lines and had already used its calculations to postulate that this would have to be formed during the birth of stars. Carbon monoxide in the proto-star's envelope is split into carbon and oxygen by X-rays and ultraviolet radiation, then each free oxygen atom combines to form water. Those can also be ionized during the splitting process. Ionized water is then formed.

(ETH Zurich, May 06, 2010)



<http://tinyurl.com/07-100506>



World's First Tilting Double-Decked Fast Train

(swissinfo.ch, May 15, 2010)

The CHF 1.9 billion order for 59 double-deck tilting trains that reach top speeds of 200km/h is Swiss Federal Railways' biggest-ever purchase, won by Canadian-run Bombardier Transport. New technology, in use for the first time in the world in double-deck trains, will allow long-distance trains to handle corners at higher speeds by tilting into a bend by up to two degrees. It is still nowhere near the eight-degree maximum tilt on conventional tilting trains. With the trains' passive tilt mechanisms enabling them to negotiate curves faster, journey times can be improved by around 10% without sacrificing passenger comfort.

<http://tinyurl.com/07-100515>



New Technology To Change Distance Between Train Wheels

(swisster.ch, May 19, 2010)

A new Swiss prototype wheel design allows trains to adapt to different sized rails thanks to a mechanism that can alter the distance between wheels. The technology finally solves a century-old problem between Montreux and Interlaken, where two different types of railway track force travelers to change trains in Zweisimmen. However, with a direct schedule expected to be in operation by 2015, Hans-Jürg Spirgi from the Goldenpass company hopes the innovation will increase tourism. The higher altitude tracks operate with rails at one meter apart; more conventional vehicles require a 1.4 meter span.

<http://tinyurl.com/07-100519>



8. Physics / Chemistry / Maths

Astrophysicist Awarded

(SNSF, April 07, 2010)

The Swiss National Science Foundation (SNSF) is awarding the Marie Heim-Vögtlin (MHV) prize annually since 2009, paying tribute to the outstanding achievements of women scientists during their MHV subsidy. The MHV prize winner 2010 is the astrophysicist Dr. Isabelle Cherchneff-Parrinello. She investigates the origin of dust in the early universe studying its chemical synthesis in primitive supernovae. Her work has upturned previous valuations of molecular production, in particular the way in which carbon molecules are produced by supernova explosions, earning her major international acclaim.

<http://tinyurl.com/08-100407>



Surface Science Prize

(IBM Zurich, April 12, 2010)

At the German Physical Society's (DPG) annual spring meeting the organization's Surface Science division selected Dr. Leo Gross, IBM Research - Zurich, for the Gerhard Ertl Young Investigator Award, a new scientific prize created and supported by Surface Science, a journal of Reed Elsevier. Gross was selected as the prize recipient for his work on charge measurement of atoms and atomic resolution of molecules with non-contact Atomic Force Microscopy (AFM). The Gerhard Ertl Young Investigator Award is given by the Surface Science division of the DPG to recognize a young researcher—less than 6 years since PhD completion—for his or her outstanding research in surface science. This is the first year of the prize, which will be awarded annually at the DPG Spring Conference.

<http://tinyurl.com/08-100412>

9. Architecture / Design

EPFL Learning Center Officially Inaugurated

(EPFL, May 27, 2010)

Interior Minister Didier Burkhalter inaugurated the brand new Rolex Learning Center at the federal institute of technology in Lausanne (EPFL). The head of education and culture said the one-story building could be compared to a "reinvented Babel, representing all disciplines and 120 nationalities on the campus." He also praised the "living space" inside the wall-less one-room teaching area, created by Kazuyo Sejima and Ryue Nishizawa, two Japanese architects and recent winners of the prestigious Pritzker Prize. Burkhalter said "By building this centre, Switzerland offers a powerful symbol of the importance it gives to its scientific establishment." The minister addressed some 900 guests, including predecessors Pascal Couchepin and Ruth Dreifuss.

<http://tinyurl.com/09-100527>





10. Economy, Social Sciences & Humanities

Forecasting Financial Bubbles

(ETH Zurich, May 03, 2010)

Professor Didier Sornette from the Department of Management, Technology and Economics (MTEC) at ETH Zurich is convinced that financial markets are not just random. To conduct his research, two hypotheses were made: firstly, financial bubbles can be diagnosed in real time before they end; secondly, the termination of these bubbles can be bracketed using probabilistic forecasts with a reliability better than chance. The results of the Financial Bubble Experiment (FBE) show that the dynamics of financial markets actually exhibit an identifiable structure, and also prove that the dynamics of financial markets are subject to a so-called "regime shift". This means that phases of strong growth are replaced by ones only exhibiting moderate growth or even declines, or vice versa.

<http://tinyurl.com/10-100503>



Antisocial Behavior Simulation

(ETH Zurich, May 11, 2010)

Over-fishing, tax evasion, freeriding: the Tragedy of the Commons happens again and again. A computer model now offers new insights into the way our society functions. In this model, the scientists from ETH Zurich allow four behavioral types to come into conflict: cooperators", "freeriders" who live at the expense of others, "moralists" who cooperate and also punish freeriders and "Immoralists" who punish freeriders although they behave anti-socially themselves. In the case of randomly chosen interaction partners, freeriders get the upper hand despite the punishment option. But when individuals interact in space with neighboring individuals, the computer simulations reveal that like-minded people aggregate in groups and segregate themselves from others who behave differently. Moralists then no longer need to compete with cooperators, and both rather battle against the freeriders.

<http://tinyurl.com/10-100511>



11. Technology Transfer / IPR / Patents

Knowledge And Technology Transfer At National Research Program

(SNSF, April 07, 2010)

With the appointment of Niklaus Bühler as Head of Knowledge and Technology Transfer, close links between research and practical work are now ensured. The National Research Program "Smart Materials" (NRP 62) should focus not only on scientific excellence but also their potential for industrial application. To ensure that researchers and practitioners can cooperate intensively, industrial partners are involved in the program from an early stage.

<http://tinyurl.com/11-100407>



Europe's Most Innovative Country

(Greater Zurich Area, April 15, 2010)

When it comes to innovation Switzerland is Europe's front-runner. No other European country produces more registered patents, trademarks and designs per capita than Switzerland. Switzerland had been holding the top position in 2008 already and could even extend its innovative lead in 2009. With its highly qualified workforce and due to outstanding efforts in fields of R&D, innovation in technology and intellectual property, Switzerland is well above the European average for most EIS 2009 indicators. A Swiss specialty is the high number of small and medium-sized companies (SME) which successfully manage to thrive in a global market with their innovative products and manufacturing technology.

<http://tinyurl.com/11-100415>

New Platform For Swiss Innovators'

(inno-swiss.com, May 18, 2010)

In partnership with Hyperweek and swissnex Boston, and supported by Gebert Rüt Stiftung, IFJ (Institute for Young Entrepreneurs) recently launched inno-swiss.com. This new social media platform is fully dedicated to strengthen and promote Swiss innovation and entrepreneurship on the international scene. Inno-swiss.com shall become the anchor for the Swiss innovators' community to extend their links, interact, and communicate with each other and



interested stakeholders. It allows promoting news of Swiss startups internationally to potential investors and strategic partners looking for cutting-edge Swiss technology.

<http://tinyurl.com/11-100518>

Two New Tenants For Innovation Square

(EPFL, April 26, 2010)

Two data-processing and pharmaceutical leaders, Cisco (USA) and Debiopharm Group (Switzerland) are coming to the EPFL's Innovation Square. This novel structure, at the intersection of where the entrepreneurial world and scientific institutions meet, is providing to be success despite the current global economic environment. Even before the opening of the first building, which is planned for this summer, three big names from industry have already answered the roll call, Logitech having already announced in 2009 that it was coming.

<http://tinyurl.com/11-100426>

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

“Einstein” In Open-Air Theater

(Gurten, Bern, April 27, 2010)

In his “miracle year” 1905, while living in Bern, Albert Einstein wrote the paper that would later make him famous around the world – on the theory of special relativity. Director and author Livia Anne Richard, however, places the main focus of this production on Einstein as a person, rather than as a physicist – offering visitors a glimpse behind the backdrop of success, fame and honor. The open-air performances of “Einstein” will take place on Bern's own mountain, the Gurten.

<http://tinyurl.com/12-100427>





Upcoming Science and Technology Related Events

Information Security and Cryptography-Fundamentals and Applications

June 14-17, 2010

<http://www.idrc.info>

Information security / Information technology
Sunstar Parkhotel Davos, Davos

7th International Conference on Physical Modelling in Geotechnics (ICPMG 2010)

June 28-July 1, 2010

<http://www.icpmg2010.ch/>

Physical modeling, design, geotechnics
ETH Zurich

Joining Technology

June 29, 2010

<http://tinyurl.com/joiningtech>

High-tech for thermal cutting, welding and coating
Hochschule Luzern, Horw

9th European SOFC Forum

June 29-July 2, 2010

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

Solid oxide fuel cell
Kultur-und Kongresszentrum Luzern, Lucerne

Third International NanoBio Conference

August 24-27, 2010

<http://www.nanobio.ethz.ch/>

Nanobio, nanomedical, nanotoxicology
Hönggerberg Campus, ETH Zurich

Swissmem Symposium 2010

August 26, 2010

<http://tinyurl.com/swissmem2010>

Innovation and Liquidity in actual environment
Lake Side, Zurich

Forum EPFL

October 12-20, 2010

<http://forum.epfl.ch>

Switzerland's biggest recruiting fair
EPFL campus

Swisstech 2010

November 16-19, 2010

<http://www.swisstech2010.com>

Europe's central fair for the subcontracting industries
Messe, Basel

Science-Switzerland Back Numbers

http://www.swissinnovation.org/Science-Switzerland_FebMar_2010.pdf

http://www.swissinnovation.org/Science-Switzerland_DecJan_2009-2010.pdf

http://www.swissinnovation.org/Science-Switzerland_OctNov_2009.pdf

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