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EPFL News – an update of EPFL activities

In late September Nestlé announced the creation of the "Nestlé Institute of Health Sciences". It will take up one whole building in EPFL's Innovation Square

Functional genomics and the associated sciences, which establish links between our gene pool, our eating behaviors and the expression of certain illnesses, are interesting an increasing number of representatives of academia and industry. Nestlé has made a strong statement in terms of this new area of activity by announcing the creation of a new company, Nestlé Health Sciences SA, and a new research institute which will take up one whole building in the innovation area of EPFL. Utilizing an investment of USD 500 million, the institute will focus its research on the diets of the future, with the goal of preventing illnesses such as obesity, diabetes and cardio-vascular disease.

The future Nestlé institute will have as its mission to interact with, and to build on, the unique technological platforms – at the interface between biotechnology and medicine – that EPFL has put in place over the last ten years or so. Nestlé joins branches of prestigious companies like Logitech, Debiopharm, Cisco, Alcan, Nokia and Crédit Suisse.

Nestlé has a strong presence in the Chinese Market as well as a continued relationship with EPFL as can be seen in this visit from the EPFL EMBA students to the research facilities in Beijing

Inauguration of the Michael Grätzel Center for Mesoscopic Solar Cells

M G C
太阳能电池研究中心

On July 19, 2010, EPFL Professor Michael Grätzel inaugurated Inauguration of the Michael Grätzel Center for Mesoscopic Solar Cells, in Wuhan, China. This ceremony, in conjunction with a 2-day conference (1st International Symposium on Mesoscopic Solar Cells) signals an important step forward in the relationship between EPFL, Prof. Grätzel, the Wuhan National Laboratory for Optoelectronics (WNLO), and the Huazhong University of Science and Technology (HUST).

The Michael Grätzel Centre for Mesoscopic Solar Cells contains a 500 m2 lab area, and a 60 m2 super-clean room for small solar cell device fabrication. Another 200 m2 super-clean room will be available soon for a laboratory production line of "all solid-state monolithic dye-sensitized solar cell".

EPFL Signs Memorandum of Understanding (MoU) with the Chinese Academy of Science

On 17 November, 2010, EPFL signed a MoU with the Chinese Academy of Science (CAS) completing the network of EPFL's formal relations with China's top institutions. On 21 January 2011, The Sino-Swiss Science and Technology Cooperation program announced a new call for joint research proposals to be conducted in majority with the Chinese Academy of Science partners. Other Chinese researchers are eligible for one third of the funds. About 20 joints grants of about USD 250'000 should be allocated.

Chinese researchers interested in finding EPFL research partners, kindly contact nicolas.musy@epfl.ch

Jerry Co-Founder of Yahoo at EPFL
At the Magistrale 2010 on October 9th, Jerry Yang, Co-Founder of Yahoo received an honorary doctorate from his former teacher at standard, Professor Giovanni De Micheli, who is now Director of the EPFL Integrated Systems Centre.
(http://actu.epfl.ch/news/la-magistrale-couronne-le-fondateur-de-yahoo/)

Bertarelli Foundation brings together Harvard Medical School and EPFL to create joint neuroengineering program

Harvard Medical School and EPFL have established a joint research and education program thanks to a contribution from the Bertarelli Foundation. The Bertarelli Program in Translational Neuroscience and Neuroengineering is a collaborative exchange aimed at improving quality of life for people with neurological disabilities.
(*http://actu.epfl.ch/news/harvard-et-lepfl-devoilent-leur-programme-commun-e/*)

William Chin, Didier Burkhalter, Ernesto Bertarelli, Patrick Aebischer.

EPFL partakes in the first 'Lake Geneva Region Innovation Cooperation Day' in Shanghai

On October 12th, 2010, EPFL Vice President for Innovation Ms. Adrienne Corboud Fumagalli, Mr. André Borschberg, Co-founder of Solar Impulse, and Prof. Willy Zwaenepoel, EPFL Dean of Computer and Communication Sciences I&C, partook as keynote speakers at the first 'Geneva Lake Region Innovation Cooperation Day' at the Swissôtel in Shanghai. On this occasion, the Mayor and Vice-Mayor of the city of Lausanne, as well as the Governor and Vice-Governor (Minister of the Economy) of the Canton de Vaud lead a delegation of 40 officials and members of the Lake Geneva business community to Shanghai. Also attending, some sixty to eighty local Chinese counterparts. This visit was a key opportunity to develop business, technological and official cooperation between the most promising regions of China and Europe.

Mrs. Adrienne Corboud-Fumagalli, EPFL Vice-President for Innovation and Technology Transfer

The following days after the event, Ms. Corboud-Fumagalli and Prof. Willy Zwaenepoel visited key Chinese Universities in the Shanghai region with the objective of strengthening cooperation between their respective organizations.

The event was seen as a great success by locals and foreign guests alike and a number of cross-border business initiatives have commenced following the event.


From left to right: Cao Shude, Partner at Natural Power Supply Technology Co.,Ltd Shandong., Ltd; André Borschberg Co-Founder of Solar Impulse; Xiao Zhen, EPFL China Relations Coordinator & SCS General Manager; Jérémie Trono Sales & Marketing Specialist at CH-ina

Mr. André Borschberg, Solar Impulse, CEO & Co-Founder

Born in Zürich, graduate from the EPFL in mechanical engineering and of the MIT in management sciences. CEO of Solar Impulse and Bertrand Piccard's associate from the project's inception, he is a passionate company manager, who has established and motivated a team of 75 people within Solar Impulse, composed of the best specialists coming from highly varied origins and backgrounds.

One flight over the student's nest

The solar powered airplane took off on Tuesday morning, 21st of October, at 08:00 from the military airport at Payerne for its first voyage across Switzerland, to Geneva and back. It touched down on the runway at Cointrin airport at 13:30, as scheduled, and was announced on the arrivals board!

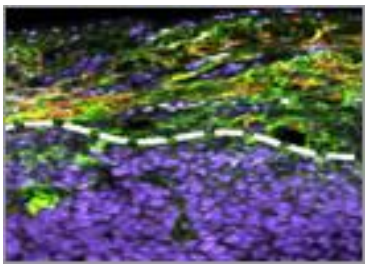
A new stage has been reached. These "Swiss Flight" experiences represent a real-life training, and must answer some essential questions:
How will Solar Impulse succeed in fitting in with the normal traffic levels of an international airport? During its scheduled world tour planned for 2012, the plane will have to land at several airports.

How will the teams manage the logistics on the ground? An exceptional aircraft needs exceptional attention, being both light and huge, with a 64-meter wing span.
(*http://actu.epfl.ch/news/one-flew-over-the-students-nest/)*

EPFL is celebrating its 1000th invention: Kandou

Kandou, invented by Harm Cronie and Amin Shokrollahi of the EPFL Laboratory of Algorithm, enables processors to communicate more rapidly – while using less energy – with their peripherals (memory, printers, monitors, etc.). This represents a small revolution in the world of computing, with the solution coming from . . . mathematics!
(*http://actu.epfl.ch/news/kandou-the-1000th-invention-from-epfl/*)

EPFL study reveals importance of relation between the lymphatic system and tumors



A new mechanism explaining how tumors escape the body's natural immune surveillance has recently been discovered at EPFL in Switzerland. The study shows how tumors can create a tolerant microenviroment and avoid attack by the immune system by mimicking key features of lymph nodes. The discovery, published in Science and in Science Express, online March 25, 2010, underscores the role of the lymphatic system in cancer and may open up new possibilities for cancer treatment.

"The tumor tricks the body into thinking it is healthy tissue," says lead author Melody Swartz, head of the Laboratory of Lymphatic and Cancer Bioengineering (LLCB) and EPFL professor. Swartz and her team set out to understand how immune tolerance is induced by tumors, allowing them to progress and spread. The researchers from EPFL concentrated their efforts on a certain protein that is normally present in healthy lymph nodes to attract T cells and program them to perform vital immune functions. They found that some tumors can secrete this protein to transform the outer layer of the tumor into lymphoid-like tissue. This outer layer then attracts and effectively re-programs the T cells to recognize the tumor as friend not foe, resulting in a tumor that goes undetected by the immune system.

Since most tumors progress only if they have escaped the immune system, this new understanding of one mechanism by which the tumor can bypasses or hides from immune defenses is an important step towards future cancer therapies. "The finding that tumors can attract naïve and regulatory T cells and educate them has important implications for tumor immunotherapy," says Jacqui Shields, from LLCB. The study also opens up potential novel areas of research focusing on the relationship between lymphatic systems and cancer research. According to Shields, the concept that tumors mimic lymphoid tissue to alter the host's immune response represents a new understanding of tumors' interactions with the lymphatic system.

The laboratory is affiliated with the EPFL's Institute of Bioengineering and the Swiss Institute for Experimental Cancer Research.
(http://actualites.epfl.ch/presseinfo-com?id=892)

Switzerland

In the competitiveness rankings by the World Economic Forum 2010-2011, Switzerland came out on top again in the overall Global Competitiveness Index (GCI). The GCI is made up by analyzing 12 "pillars" including: Institutions, Infrastructure, Macroeconomic environment, Health and primary education, Higher education and training, Goods market efficiency, Labor market efficiency, Financial market development, Technological readiness, Market size, Business sophistication, and Innovation

Country/Economy	GCI 2010		GCI 2009	Change 2009-2010
	Rank	Score	Rank	
Switzerland	1	5.63	1	0
Sweden	2	5.56	4	2
Singapore	3	5.48	3	0
United States	4	5.43	2	-2
Germany	5	5.39	7	2
Japan	6	5.37	8	2
Finland	7	5.37	6	-1
Netherlands	8	5.33	10	2
Denmark	9	5.32	5	-4
Canada	10	5.30	9	-1

The authors of the report state that Switzerland's continued 1st place position is characterized by an excellent capacity for innovation and a very sophisticated business culture. They also comment that Switzerland's scientific research institutions are among the world's best.

Swiss complete world's longest rail tunnel

On October 15, 2010 Swiss engineers drilled through the last two meters of rock of the 57 km long Gotthard Base Tunnel in the Swiss Alps. After 14 years of construction the tunnel was finally completed when a giant drilling machine nicknamed Sissi cut through the last slice of rock to connect both ends. The tunnel, composed of two single-track tunnels, cost $10.6 billion to build.

Base tunnels through the Alps constantly encounter problems, such as high stress due to excessive burdens or uncertain ground conditions due to varying geology. Throughout the Gotthard base tunnel project, EPFL's Laboratory for Rock Mechanics (LMR), has been involved in the planning and construction of the project. DAT (Decision Aids for Tunneling) developed by EPFL-LMR and MIT of USA has been used several times for project planning and execution, in order to optimize tunnel construction procedure and management. EPFL LMR has 4 PhD students carrying out research on tunneling boring machines (TBM) in difficult ground. The research aims to improve the performance of TBM tunneling in highly fractured and squeezing, blocky and spalling, and mixed rocks. EPFL LMR has an International Master Training Program on tunneling and some courses actually conducted at the Gotthard base tunnel construction site.
(http://lmr.epfl.ch)

Students of the EPFL International Masters Program for Tunneling in front the tunnel boring machine inside the Gotthard base tunnel. Three students are from China.

Swiss Universities Ranked Top in Engineering in Europe

Swiss (and especially EPFL) Researchers proved once again they are at the top of their fields. This ranking is by citations per paper (impact) for European universities that published 1,000 or more papers in engineering during the period. The ranking demonstrates that quality of work produced at EPFL and ETH.

(http://www.timeshighereducation.co.uk/story.asp?sectioncode=26&storycode=414302&c=1)

Top European universities in engineering					
Data provided by Thomson Reuters from its Essential Science Indicators, January 2000-August 2010					
Euro rank	**World rank**	**Institution**	**Papers**	**Citations**	**Citations per paper**
1	**14**	**Swiss Federal Institute of Technology, Lausanne (EPFL)**	**2,360**	**21,045**	**8.92**
2	16	University College London	1,333	11,776	8.83
3	29	Pierre and Marie Curie University	1,594	12,816	8.04
4	30	Technical University of Denmark	2,156	17,277	8.01
5	31	Catholic University of Louvain	1,009	8,056	7.98
6	33	University of Genoa	1,252	9,915	7.92
7	34	University of Oxford	1,922	15,121	7.87
8	38	University of Lund	1,593	12,389	7.78
9	**40**	**Swiss Federal Institute of Technology, Zurich (ETH)**	**2,765**	**21,251**	**7.69**
10	42	University of Cambridge	2,690	20,377	7.58

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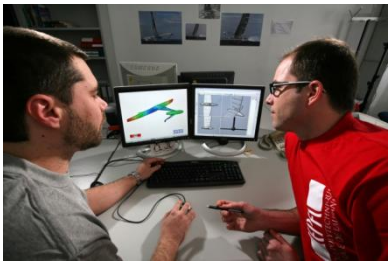
Hydroptère -The Boat That Flies – Collaboration Beyond Breaking Records

The Hydroptère is a sail boat fitted with hydrofoils designed to reach the fastest possible speeds on water with wind power only.



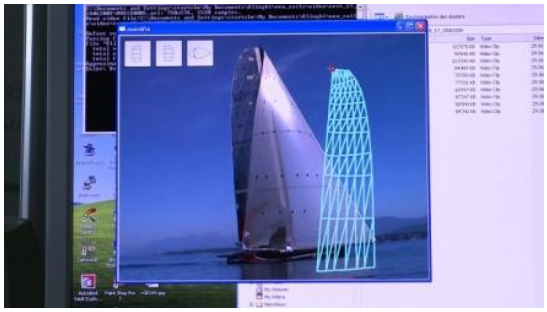
The French navigator Alain Thibault has been collaborating with EPFL's top technology researchers to build the world's fastest sail boat. In 2008 the Hydroptère was the first sail boat to have reached more than 90 Km/h. On December 21st 2008, it became the fastest sail boat in the word reaching 104 Km/h with winds reaching 45 km/h.

This 35 foot half bird, half boat, is a prototype of the future Hydroptère Maxi. The secret of this boat is not so much its huge mast, but rather its foils, appendixes that lean in the water at a 45 degree angle. As soon as 20Km/h is reached, these immerged wings generate a push that lifts the sail boat, exactly like an airplane. The boat then flies a few meters above the surface with only 2.5 square meters of foils in contact with the water.

A lab model of Hydroptère called Hydroptère.ch was launched on October 8, 2010 on Lake Geneva in order to validate a range of improvements that will then be implemented to Hydroptère Maxi. Above all, Hydroptère.ch will determine the final geometry of Hydroptère Maxi as the decision has not yet been made between a catamaran and a trimaran.

Finally, all the data gathered on Hydroptère and Hydroptère.ch will help Alain Thibault and his team to begin the conquest of their ultimate dream: a circumnavigation around the world aboard Hydroptère Maxi in about 40 days (2014).

The America's Cup -How EPFL Technology Helped Win the World's Biggest Sailing Event



EPFL has always nurtured a spirit of adventure and elected to commit to innovative projects combining fundamental and applied research, which truly drive innovation and technology transfer. EPFL is the Official Scientific Advisor to Alinghi for the 33rd America's Cup, a new challenge for which, together with Alinghi's design team and other partners, the institution will contribute to improve technology in many areas such as:

- Composite materials – to optimize materials to make this Formula One of the sea both light and robust.
- Fluid Dynamics – to develop simulation tools to ensure that the yacht is designed to make the most of its water environment.
- Sail Visualization – to measure the shape of sails in racing conditions so as to perfect them.
- Optical Measurements – fiber optics integrated in the yacht structure serve to measure key parameters in racing conditions.
- Route Optimization – the skipper's instinct backed by computing.

There are 7 EPF Labs involved including: Steel Structures Laboratory (ICOM), Laboratory of Polymer and Composite Technology (LTC), Chair of Modelling and Scientific Computing (CMCS), Computer Vision Laboratory (CVLAB), Advanced Photonics Laboratory (LOA), Chair of Probabilities (PROB), Biomedical Imaging Group (LIB)

The America's Cup adventure is a good example of effective multi-disciplinary cooperation – a 9-year partnership between EPFL and Alinghi.

Alinghi was the first European boat to win the Cup and also the first boat that won in its first entry in the cup. On November 26, 2010, Alinghi, two times winner of the America's Cup, announced that it will not enter a team in the 34th edition of the prestigious sailing trophy. Instead it has launched a new program that will see the Swiss team participating in the Extreme Sailing Series.

The Extreme Sailing Series is a championship raced with 40-feet catamarans that is expanding geographically and commercially in 2011 whilst maintaining a truly level playfield and exciting competition. This provides the perfect ground for Alinghi to develop its international sailing activity and technology with EPFL.

(http://alinghi.epfl.ch/en/index.html)
(http://www.alinghi.com/en/news/news/index.php?idIndex=200&idContent=22686)