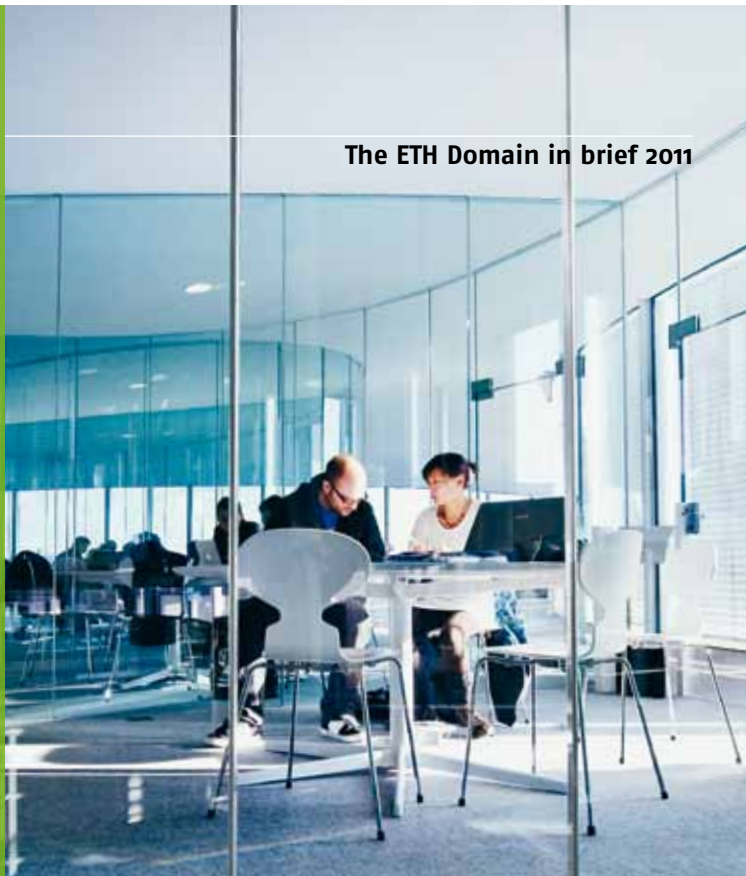


The ETH Domain in brief 2011





Dear readers

The high density of excellent educational and research institutions enhances Switzerland's appeal. The federally owned ETH Domain, with its two tertiary institutions ETH Zurich and EPFL, as well as its four research institutes PSI, WSL, Empa and Eawag, conducts teaching and research at the international forefront.

In exemplary fashion, the Rolex Learning Center at EPFL demonstrates the commitment of the public and private sectors to an open and innovative learning environment; the nanotech lab to be opened by IBM and ETH Zurich in 2011 also speaks for Switzerland as a research location. In addition, a current bibliometric study conducted by Leiden University shows that the number of research publications from the ETH Domain and their influence on research activity worldwide have increased significantly in recent years.

In 2010, the ETH Board formulated the 2012–2016 ETH Domain strategy: the ETH Domain is to continue its success story in teaching, research and cooperation with industry, strengthening defined focus areas for research. In this regard, the ETH Domain is counting on Switzerland's politicians and the Swiss public to continue investing in education and research – as a prerequisite for the welfare of the nation, as a contribution to meeting global challenges and as an acknowledgement of the creativity of human curiosity.

A handwritten signature in black ink, appearing to read 'F. Schiesser'. The signature is stylized and fluid.

Dr Fritz Schiesser
President of the ETH Board

What the ETH Domain stands for

The ETH Domain comprises the two Federal Institutes of Technology in Zurich (ETH Zurich) and Lausanne (EPFL), as well as the four research institutes: the Paul Scherrer Institute (PSI), the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), the Swiss Federal Laboratories for Materials Science and Technology (Empa), and the Swiss Federal Institute of Aquatic Science and Technology (Eawag). In addition, the ETH Board (a strategic management body) and the Internal Appeals Commission of the ETH (an independent appeals body) also belong to the ETH Domain. In the ETH Law, the federal government defines the purpose of the two Federal Institutes of Technology and the four research institutes as follows:

- To educate students and qualified staff in scientific and technical fields and to provide permanent continuing education.
- To expand scientific findings through research.
- To foster upcoming young scientists.
- To render scientific and technical services.

- To perform public relations activities and to exploit research findings.

The objectives are expressed in concrete terms by the Federal Council and the parliament in the ETH Domain's 2008–2011 performance mandate.

The ETH Board defines the strategy for the ETH Domain within the political outlines set by the performance mandate and represents the ETH Domain to the government and authorities at the federal level. The Board regularly reports on the degree of target achievement. Operational management within the ETH Domain is the responsibility of the two Federal Institutes of Technology and the four research institutes.

Title page:

How half a million media invite to study: the Rolex Learning Center at EPFL offers quick access to a comprehensive library and a modern learning environment for students like Jade Francioli and Romain Chenillot.

The ETH Board 2011

The ETH Board comprises the following individuals from politics, industry and society:

- **Dr Fritz Schiesser**
President of the ETH Board and
Former member of the Council of
States
- **Prof. Dr Paul L. Herrling**
Vice-President of the ETH Board
Head of Novartis Institutes for De-
veloping World Medical Research
- **Prof. Dr Ralph Eichler**
President of ETH Zurich
- **Prof. Dr Patrick Aebischer**
President of EPFL
- **Prof. Dr Joël Mesot**
Director of PSI
- **Dr Dr h. c. Barbara Haering**
Member of the Board of Management
and Vice-President of the Supervisory
Board at econcept AG
- **Dr h. c. Hans Hess**
Independent member of the Board of
Directors, founder and President of
Hanesco, and President of Swissmem
- **Beth Krasna**
Member of ThinkStudio and inde-
pendent member of the Board of
Directors at ThinkStudio
- **Thierry Lombard**
Managing partner at Lombard Odier
Darier Hentsch & Cie
- **Dr Markus Stauffacher**
Delegate of the university assemblies
of ETH Zurich and EPFL,
Senior Scientist at ETH Zurich
- **One seat is vacant.**

The Federal Institutes of Technology and the research institutes are headed up by:

- **Prof. Dr Ralph Eichler**
President of ETH Zurich
- **Prof. Dr Patrick Aebischer**
President of EPFL
- **Prof. Dr Joël Mesot**
Director of PSI
- **Prof. Dr James Kirchner**
Director of WSL
- **Prof. Dr Gian-Luca Bona**
Director of Empa
- **Prof. Dr Janet Hering**
Director of Eawag

What the ETH Domain strives for

The institutions in the ETH Domain (ETH Zurich, EPFL, PSI, WSL, Empa and Eawag) want to expand their internationally cutting-edge positions. The ETH Board, as the strategic governing and supervisory body, defines specific objectives in its 2012–2016 strategic planning for the ETH Domain: The ETH Domain is to continue to raise the quality of teaching, encouraging the students' will to perform and learn, and to respond to the growth in student numbers by increasing the number of scientific staff.

Fundamental research enables the ETH Domain to make breakthroughs on a long-term basis. In order to play a role in dealing with social and economic challenges at the same time, the ETH Domain is to place particular emphasis on the following five key focus areas of research in the coming years:

- Advanced manufacturing technologies
- Energy technologies for a sustainable world
- Engineering for life sciences
- Environmental systems and technologies

- Methods and platforms for the advancement of science.

The ETH Domain's successful competence centres (see pp. 18–19) strengthen interdisciplinarity, while the leading involvement in the national initiatives SystemsX.ch and NanoTera.ch strengthens Switzerland as a research location. Investment in research infrastructures, like ETH Zurich's supercomputing centre CSCS, the X-ray laser SwissFEL at PSI and the neuroinformatics project Blue Brain at EPFL, makes research at the international forefront possible.



How ideas can be put into practice: in focus projects, mechanical engineering students at ETH Zurich learn how to develop a product. The student Péter Fankhauser heads the project "Rezero", a robot which balances on a ball.

ETH Zurich

ETH Zurich stands for excellent teaching, groundbreaking fundamental research and the application of results for the benefit of society. Founded in 1855, it now offers an inspiring environment for researchers and a comprehensive education for its students as one of the world's leading technical, scientific tertiary institutions.

ETH Zurich has over 16,000 students from around 80 countries, including 3,500 doctoral students. Over 400 professors are currently teaching and researching in the fields of architecture, construction science, engineering, natural sciences, mathematics, system-oriented sciences, and management and social sciences. ETH Zurich regularly appears at the top of international rankings as one of the best universities in the world. A total of 21 Nobel laureates have studied, taught or conducted research at ETH Zurich, underlining the excellent reputation of this tertiary institution.

Transferring its knowledge to industry and society is one of ETH Zurich's primary concerns. Its success in this regard is verified by the 80 new patent applications each year and the

215 spin-off companies which emanated from this tertiary institution between 1996 and 2010. ETH Zurich orients its research strategy towards global challenges, such as climate change, the world's food supply and human health.

www.ethz.ch/index_EN



How a unique learning atmosphere was established: the bold architecture of the Rolex Learning Center drew international attention to the performance of EPFL and offers students a place for inspired learning.

EPFL

EPFL is the birthplace of the modern computer mouse and ambitious scientific projects like Human Brain, Hydroptère (the world's fastest sailing boat) and Alinghi (twice winner of the America's Cup), as well as numerous innovations in the field of sustainable development, such as the famous dye-sensitised solar cells. This renowned tertiary institution offers teaching at every study level (from bachelor's level through to doctoral level) and has been growing at a remarkable speed since becoming a federal institution in 1969.

Directly overlooking Lake Geneva, EPFL accommodates around 11,700 people: more than 7,700 students and 4,000 researchers, along with technical and administrative staff. With the Rolex Learning Center, the new landmark which is unique worldwide, the campus simultaneously offers highly attractive living conditions and very modern working conditions in teaching and research.

EPFL is one of the world's most international tertiary institutions. People from over 130 nations meet every day and the education is consistently pro-

vided in two languages (French and English) from master's level onwards. What makes EPFL particularly distinctive is that it encourages international partnerships, sponsoring and joint projects between the scientific community and industry. The campus also encompasses Innovation Square, where over 100 start-ups and research centres run by renowned companies find a dynamic environment. Each year, 20 start-ups and spin-offs are launched thanks to technologies developed at EPFL.

www.epfl.ch/home-list-en



How a chemical reaction takes place, step by step: this is one of the themes which researchers will study as of 2016 at SwissFEL, PSI's new X-ray laser. Dr Bolko Beutner takes part in the commissioning of the SwissFEL test facility.

PSI

PSI is Switzerland's largest research centre for the natural sciences and engineering. It conducts top-level research on the subjects of matter and material, people and health, and energy and the environment. By means of fundamental and applied research, it has been working since 1988 on sustainable solutions to central issues arising from society, industry and science. With the Neutron Source, the Synchrotron Light Source and the muon source, PSI operates large-scale scientific research facilities which are unique in Switzerland, and even worldwide. These facilities are also available to researchers from tertiary institutions and industry. Each year, over 2,000 researchers come to PSI from around Switzerland and the whole world for experiments which can only be conducted here. Alongside its research, PSI runs Switzerland's only facility for the treatment of specific cancers with protons.

Around 700 of the approximately 1,300 employment positions at PSI are occupied by scientists. In 2010, around 600 doctoral students took measurements at PSI for their doctoral theses; about

200 are writing their theses within the framework of full-time employment at PSI. A total of 85 trainees are being taught 13 professions in all. School pupils, students and professionals receive training and continuing education at PSI.

In 2011, PSI is focusing on its future national large-scale facility SwissFEL, an X-ray free-electron laser, which makes it possible to observe brief changes in atomic and molecular structures and is oriented towards the requirements of Swiss research.

www.psi.ch/psi-home



How snow cover develops in interplay with the atmosphere: research being carried out at the WSL Institute for Snow and Avalanche Research at Weissfluhjoch near Davos. Together with Dr Charles Fierz, the team has developed the numerical calculation model Snowpack, which is used world-wide.

WSL addresses the use and protection of landscapes and habitats, acting as a bridge between science and implementation. WSL is committed to landscapes and forests with a high quality of life, and to responsible handling of natural hazards in the Swiss Alps. In research, WSL has a leading position worldwide and provides foundations for sustainable environmental policy in Switzerland. It develops solution strategies for socially relevant problems, together with its partners from society, industry and the scientific community. In so doing, it works in an interdisciplinary and transdisciplinary manner; this practice-oriented approach to research is a particular strength. The Institute for Snow and Avalanche Research (SLF) is part of WSL. In 2010, WSL celebrated its 125th anniversary.

WSL employs a good 500 staff in Birmensdorf, Davos, Lausanne, Bellinzona and Sion. About half are scientific staff, while another 75 individuals are working on their theses. The rest are made up of technical and administrative staff, as well as trainees and student apprentices.

The year 2011 was declared the International Year of Forests by the UN; in Switzerland, it marks the start of the National Research Programme "Resource Wood" and WSL is represented on this programme's Steering Committee. Therefore, alongside the other topics which WSL has been addressing for years, such as natural hazards, snow, landscape and biodiversity, particular attention is to be paid to forest research in 2011. In addition, WSL is continuing its anniversary activities, celebrating 75 years of SLF. www.wsl.ch/index_EN and www.slf.ch/english_EN



How wind in cities can be used to air-condition buildings in a CO₂-neutral manner and to carry away pollutants: in the new wind tunnel at Empa, Jonas Allegrini measures three-dimensional flow fields around building models designed by ETH professor Josep Lluís Mateo.

Empa

Empa is the ETH Domain's interdisciplinary research institution for materials science and technology. It develops solutions for industry and society in the fields of nanostructured materials, environmental, energy-oriented and sustainable building technologies, biotechnologies and medical technologies. Together with industrial partners or via spin-offs in the Empa technology centres glaTec and tebo, it implements its research results in marketable innovations, thus contributing to the competitiveness of the Swiss economy. It also creates the scientific foundations for sustainable societal development. Empa has been providing public authorities with base data for political decisions and conducting studies on behalf of federal offices since 1880.

At the end of 2010, around 940 staff were working at Empa, including 24 professors, around 140 doctoral students and 40 trainees. In addition, there are around 200 graduands and student apprentices each year. Alongside numerous projects with industrial researchers, over 200 projects financed by SNSF, CTI and the EU Framework Programmes are continually under way.

In 2011, the focus is mainly on "clean tech" (among other things, Empa is planning NEST, a modular residential and office building that enables the development and testing of sustainable building technologies), as well as on biotechnology and medical technology, in that cooperation with university hospitals, cantonal hospitals and industry is being intensified, for instance.

www.empa.ch



How ecosystems influence the emergence and disappearance of species and conversely: with a new experimental research equipment in Kastanienbaum, Eawag is studying these effects. At Eawag, Dr Martine Maan conducts research into speciation.

Eawag

Eawag is one of the world's leading aquatic research institutes. Its strengths and success are based on 75 years of combining research, teaching and continuing education, as well as on consulting and knowledge transfer. The combination of natural sciences, engineering and social sciences allows comprehensive aquatic research, ranging from relatively untouched natural waterbodies, through to fully engineered wastewater management systems. Eawag focuses its research activities (which cover a wide range of subjects) on how to balance people's need to use water with the necessity of maintaining the function and durability of the aquatic ecosystem.

The 23 professors, a good 150 scientific staff and around 150 doctoral students find a unique research environment at Eawag. This enables them to seek answers to questions which bring new scientific findings and cover fundamental social requirements. The interdisciplinarity and the incorporation of interest groups from industry and society play an important role in this regard.

In 2011, Eawag is celebrating its 75th anniversary. Its research concentrates on methods of integrated water management, the effect of global changes on aquatic ecosystems and the development of new methods for wastewater treatment and nutrient recovery.

www.eawag.ch/index_EN

The competence centres of the ETH Domain

In 2006, the ETH Board set up four subject-oriented competence centres for interdisciplinary research, where institutions which are active in the respective fields work together in close cooperation. In 2010, it provided 15.0m CHF of financial support for these centres. The ETH Board intends to continue supporting the competence centres and, accordingly, in its strategic planning for 2012–2016, it established their role as important elements in the implementation of five focal topics. However, as of 2013, the ETH Board will gradually phase out its start-up financing.

Competence Center Energy and Mobility (CCEM)

In cooperation with institutions and research teams from the entire ETH Domain, with partners from universities of applied sciences and from industry, CCEM, for which PSI is responsible, is conducting research into technologies which increase energy efficiency, decrease emissions of pollutants and CO₂, and reduce dependence on fossil fuels via the use of renewable energy sources, in 19 current projects.

At present, CCEM is focusing on the use of electricity for mobility, on the use of different biomass shares for energy production and on low-CO₂ electricity generation. In 2010, the ETH Board also decided to integrate Novatlantis, the sustainability initiative of the ETH

Domain, into CCEM by 2012, in order to enable more effective linking of the industry networks which Novatlantis maintains with CCEM's scientific networks.

www.ccem-ch.ch

Competence Center Environment and Sustainability (CCES)

CCES, for which ETH Zurich is responsible, supports interdisciplinary projects in the core areas of natural resources, sustainable land use, climate and environmental change, environment and health, and natural hazards and risks. More than 500 researchers from several of the ETH Domain's institutions are involved in the 17 projects currently under way and the technology platform Swiss Experiment.

At present, CCES is focusing on the continuation of research work in the respective subject areas and on the integration of the infrastructures of the technology platform Swiss Experiment into a single tool, which will allow comprehensive data access and data mining. In addition, with CCES@School, in cooperation with GLOBE Swiss and partner universities of teacher education, research findings from CCES projects are prepared in a manner which can be understood by pupils at secondary school level.

www.cces.ethz.ch

Competence Center for Materials Science and Technology (CCMX)

CCMX, for which EPFL is responsible, promotes scientific and technological exchange involving materials science and technology. It strengthens cooperation between tertiary institutions and Swiss industry, making it easier for Swiss industry to access fundamental and practical knowledge. In 2010, CCMX supported 15 multi-partner projects in the education and research units Materials for the Life Sciences and Metallurgy, as well as the analytical platform for materials characterisation. Another 9 projects were approved in 2010 and shall start in 2011.

The fields on which CCMX is currently focusing include, among others, new kinds of metallurgy and modelling of metallic systems, nanomaterials and safety aspects, new kinds of biomaterials and drug delivery systems for medical applications. The research activities are complemented by courses and events, which attracted more than 400 participants in 2010.

www.ccmx.ch

National Competence Center in Biomedical Imaging (NCCBI)

NCCBI, for which EPFL is responsible, interconnects highly specialised laboratories in the field of imaging processes within the ETH Domain. This enables the use of cutting-edge technology, for instance in the study of degenerative illnesses.

At the end of 2010, the third call for project proposals took place, within the framework of which NCCBI will be able to discuss up to 15 additional doctoral scholarships. In particular, the third call for project proposals aims to promote application-oriented projects and to incorporate Swiss universities of applied sciences.

www.nccbi.ch

ETH Domain key figures

Income statement, consolidated	2009	2010
CHF m		
Income	2,789	2,915
Federal financial contribution	1,905	1,984
Federal accommodation contribution	276	284
Consolidation in the ETH Domain	-7	-9
Change in second-party resources / third-party funding	-95	-109
Total project-oriented second-party resources and third-party funding	561	619
Of which second-party resources*	372	409
Swiss National Science Foundation	154	193
Commission for Technology and Innovation	41	33
Research assignments from federal offices	64	73
European Research Programmes	114	110
Of which third-party funding**	188	210
Service revenue / other income, financial result	149	145
Expenditure	2,751	2,855
Consolidation in the ETH Domain	-7	-9
Personnel expenditure	1,723	1,770
Material and operating expenditure***	849	876
Depreciation and amortisation	119	138
Other expenditure****	66	80

* Second-party resources: resources obtained competitively which originate directly or indirectly from federal resources or from the EU.

** Third-party funding: funding which originates from private sources.

*** Material and operating expenditure: materials, provision of goods and services, accommodation expenditure, external rental expenditure.

**** Other expenditure: changes in internal performance commitments, transfer expenditure.

Balance sheet, consolidated	2009	2010
CHF m		
Assets	1,995	2,237
Current assets	1,201	1,354
Fixed assets	794	883
Liabilities	1,995	2,237
Borrowing	336	412
Capital commitments	1,031	1,141
Equity	628	683

Staff (with employment contracts)	2010
Full and associate professors	547
Assistant professors with tenure track	83
Assistant professors without tenure track	40
Scientific staff	11,013
Technical staff	3,523
Administrative staff	2,471
Trainees	390

Knowledge and technology transfer	2010
Patents	179
Licences	176
Spin-offs	45

Students by level of study at ETH Zurich and EPFL	2010
Bachelor's studies	11,716
ETH Zurich	7,757
EPFL	3,959
Master's studies	5,997
ETH Zurich	4,281
EPFL	1,716
Diploma studies	191
ETH Zurich	191
Doctoral studies	5,408
ETH Zurich	3,507
EPFL	1,901
MAS/MBA	792
ETH Zurich	606
EPFL	186
Total	24,104
ETH Zurich	16,342
EPFL	7,762

Teaching at the research institutes	2010
Supervised bachelor's/master's/diploma theses	452
% enrolled in the ETH Domain	47.3
Supervised doctoral theses	708
% enrolled in the ETH Domain	69.5

Students incl. doctoral students by discipline	2010
Architecture	2,994
ETH Zurich	1,848
EPFL	1,146
Civil and Geomatic Engineering	2,405
ETH Zurich	1,434
EPFL	971
Engineering	5,985
ETH Zurich	3,901
EPFL	2,084
Information and Communication Technology	2,070
ETH Zurich	1,029
EPFL	1,041
Exact and Natural Sciences	4,155
ETH Zurich	2,606
EPFL	1,549
Life Sciences	3,176
ETH Zurich	2,472
EPFL	704
System-Oriented Sciences	2,205
ETH Zurich	2,205
Management, Technology and Economics	859
ETH Zurich	592
EPFL	267
Humanities, Social and Political Sciences	255
ETH Zurich	255

ETH Board

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Board of the Swiss Federal Institutes of Technology
ETH Board

