ETH ZURICH

Annual report 2010

ETH Zurich

“Building on firm foundations in education and research, ETH Zurich is contributing towards solving complex problems in society.”

Ralph Eichler, President of ETH Zurich

ETH Zurich has come to symbolise excellent education, groundbreaking basic research and applied results that are beneficial for society as a whole. Founded in 1855, it today offers researchers an inspiring environment and students a comprehensive education as one of the leading international universities for technology and the natural sciences.

ETH Zurich has more than 16,000 students from approximately 80 countries, 3500 of whom are doctoral candidates. More than 400 professors teach and conduct research in the areas of engineering, architecture, mathematics, natural sciences, 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. 21 Nobel Laureates have studied, taught or conducted research at ETH Zurich, underlining the excellent reputation of the institute.

Transferring its knowledge to the private sector and society at large is one of ETH Zurich’s primary concerns. It has succeeded in this, as borne out by the 80 new patent applications each year and the 215 spin-off companies that were created out of the institute between 1996 and 2010. ETH Zurich orients its research strategy around global challenges such as climate change, world food supply and human health issues.

→ www.ethz.ch

Contents

Broad expertise in a small country

Dear reader,

When I visit universities in other countries, I often find that ETH Zurich is associated with "Swissness". Our university is undoubtedly one of the brands which is using this attribute to show the world a new and relaxed national self-awareness. Swissness here does not refer to some outdated notion of protecting our cultural heritage with William Tell's much overused crossbow, but rather a Switzerland that is open to new ideas and plays its part in the world at a national and global level. Alongside fine watches, tasty cheese and jagged mountains, the educational landscape is another of the country's treasures. Swiss diligence, discipline and determination are sought-after qualities, and so too is intelligence.

This is precisely where ETH finds its symbolic importance. It trains highly qualified experts to take responsibility and play leadership roles in industry and society. At the same time, as a leading and cosmopolitan university, it is working on solutions to the great challenges of the future, such as food and energy supplies, the environment, health and levels of risk. ETH also provides Switzerland with numerous scientific services which, because of the international nature of the research, are of equal benefit to other countries.

Some would-be prophets would have us believe that the future of manufacturing lies in Asia. In Switzerland, though, there are plenty of examples suggesting just the opposite. Here, all parts of the value creation chain involved in product development are located close together, putting us in an outstandingly strong position. Only rarely can such a density of highly qualified professionals and engineers be found, who can ensure an uninterrupted flow from fundamental research through product design to largely automated manufacture.

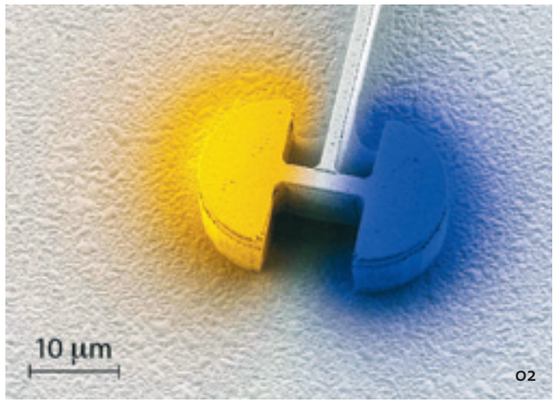
This trump card is based on Switzerland being a centre for both creative thinking and production, and wins through even in the face of ever more competitive pressure. Traditionally, ETH Zurich has always been strongly committed to fundamental research, but in the training it provides it is increasingly turning its attention to design skills and production technology. Design should ensure that products are, above all, easy to use and to maintain, optimising the interaction between man and machine. Innovative production technology, whether it be on a macro-, micro- or nanoscale, requires the development of autonomous systems and intelligent robots. It is these technological achievements which help our mechanical engineering industry, medical technology sector and other fields with a promising future to flourish.

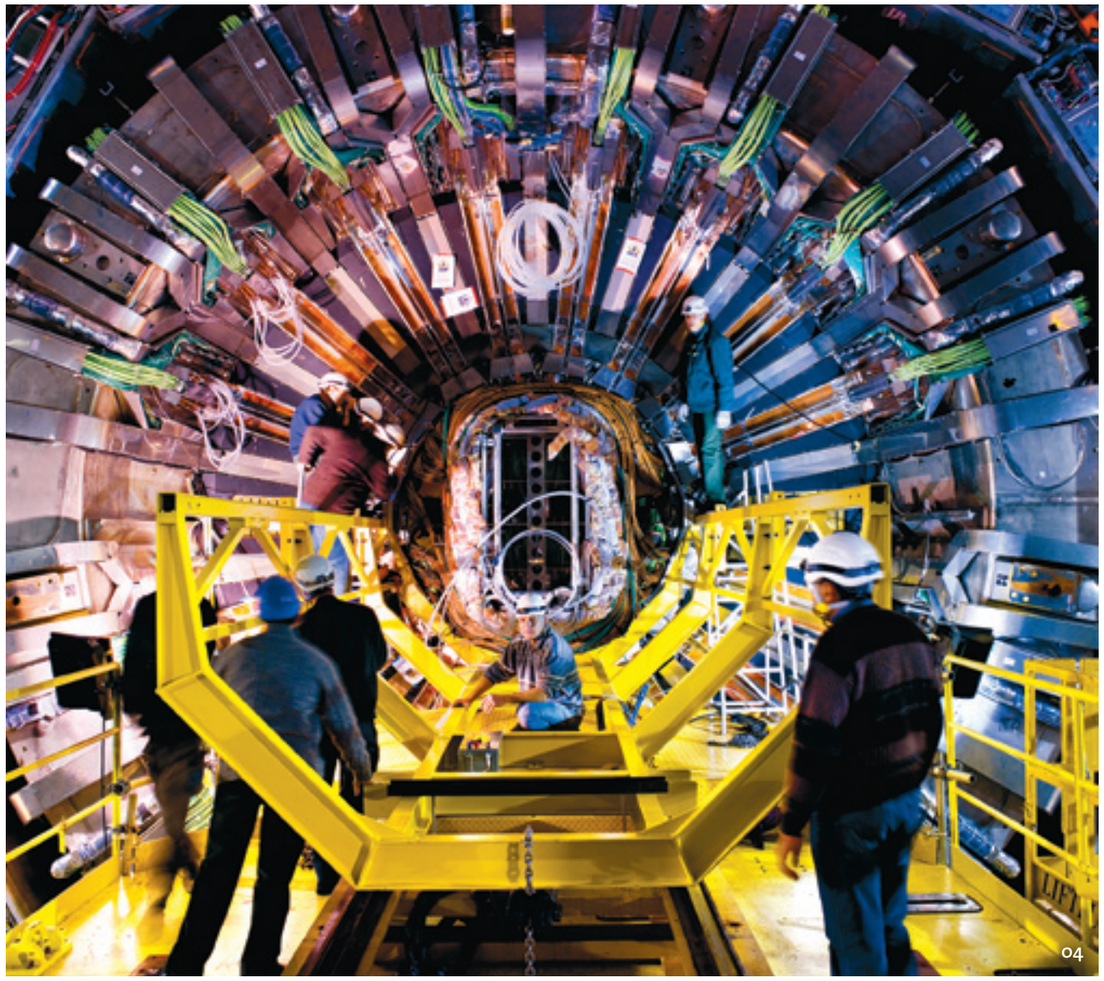
I would like to express my warmest thanks to all of our employees whose creative spirit and enthusiasm keep ETH Zurich on its successful course. A big thank you must also be said to our friends and sponsors, to the politicians and indeed taxpayers in general. It is they who make possible the outstanding education and effective fundamental research which takes place at our university. In return, society will benefit hugely from the results, in the form of the knowledge and expertise that are produced.

R. Eichler

Ralph Eichler, President of ETH Zurich

Highlights 2010





01 – New era for computing in Switzerland: Raffaele Balmelli, Operations Manager at Implenia Ticino, Thomas Schulthess, Director CSCS, and Roman Boutellier, Vice President Human Resources and Infrastructure at ETH Zurich, at the laying of the foundation stone for the new Swiss National Supercomputing Centre. → Page 26 ff.

02 – Smallest microlaser in the world: physicists at ETH Zurich are developing by far the smallest electrically pumped laser in the world. Just 30 micrometres long, this laser could one day revolutionise chip technology. → Page 20

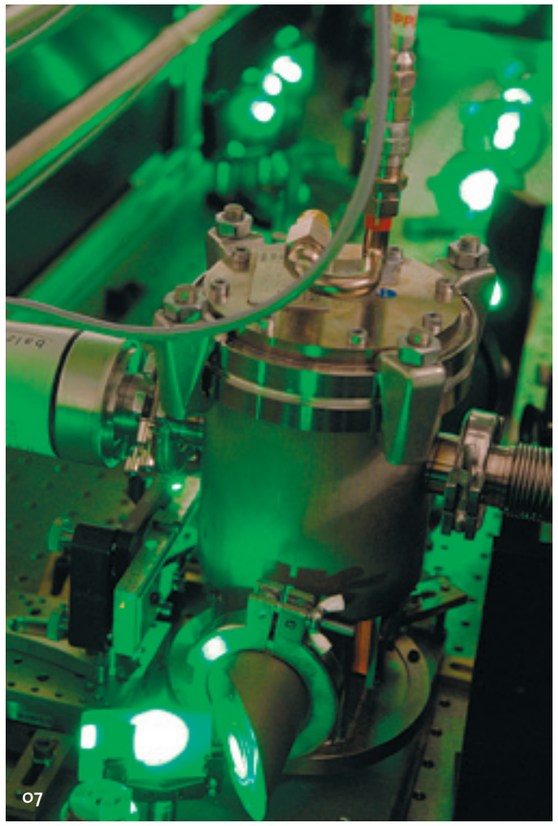
03 – Earthquake simulator in the *focus*Terra museum: a room weighing nearly three tonnes, which is shaken at the command of a computer, increases awareness among official bodies and construction services providers, and the population at large, of the need for protection against earthquakes. → Page 41

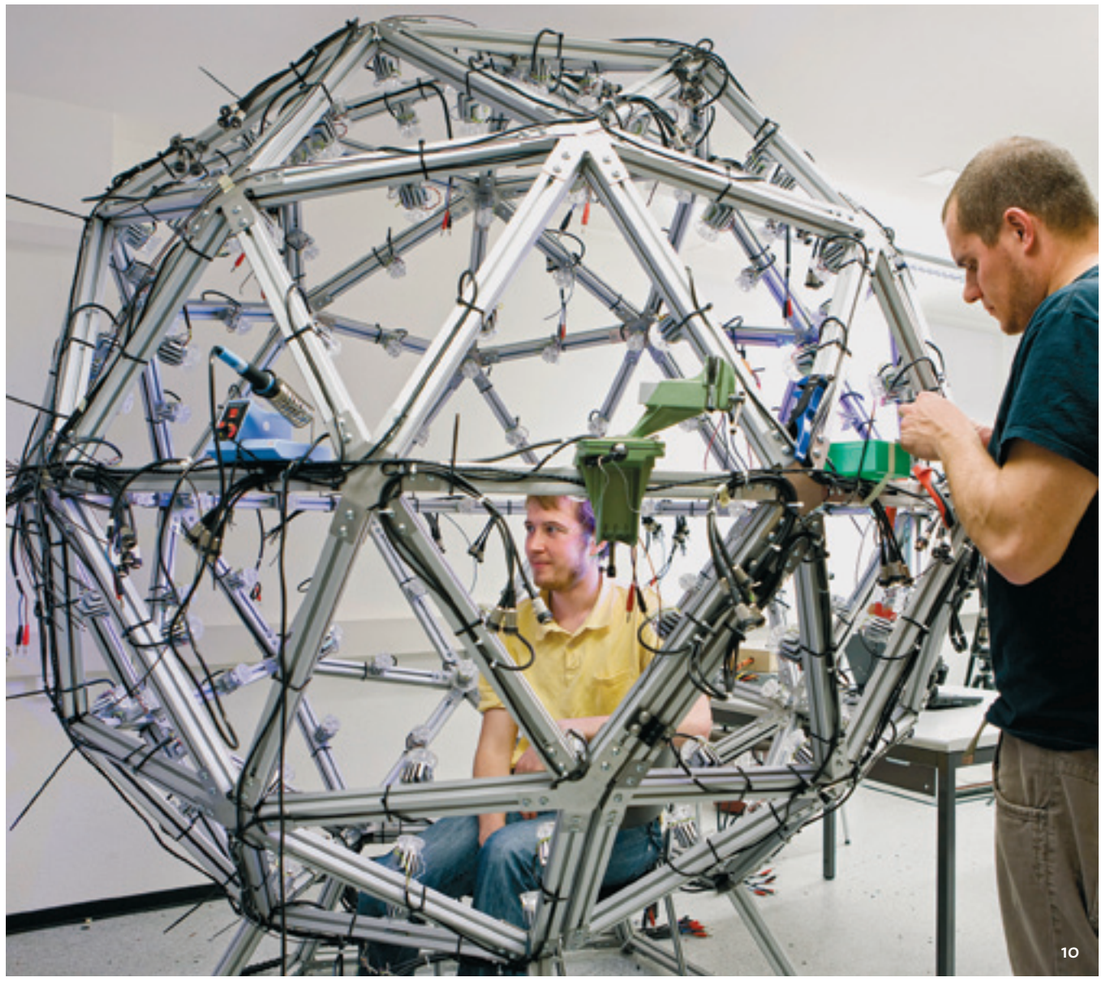
04 – World-famous partnership: with the CMS particle detector, ETH Zurich is making an extremely successful contribution to the Large Hadron Collider (LHC) at CERN, the world's largest research cooperation project, involving over 8000 scientists. → Page 14 ff.

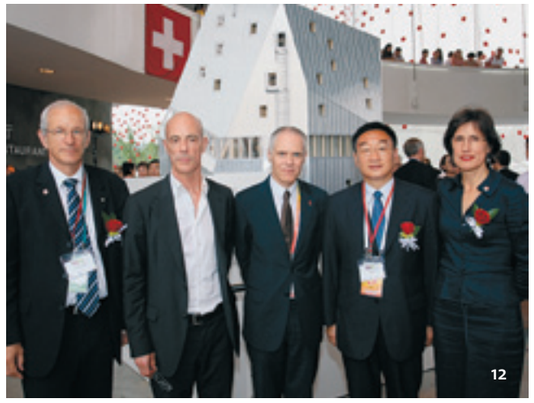
05 – Pioneers in protein research: Professor Rudolf Aebersold, ETH Zurich, together with Professor Amos Bairoch, University of Geneva, wins the Otto-Naegeli Award, one of Switzerland's most prestigious research prizes for their outstanding research in proteomics. → Page 19

06 – 20 million francs to encourage young talent: the entrepreneur and patron Branco Weiss (3rd from left) transfers his fellowship programme "Society in Science" to ETH Zurich. The scheme will enable support to be provided for outstandingly talented young researchers. → Page 14 ff.

Highlights 2010







07 – Short pulse lasers to measure ultra-fast processes: ETH physicist Ursula Keller and Thomas Feurer from the University of Bern take over as joint leaders of the new National Centre of Competence in Research "Molecular Ultrafast Science and Technology". → Page 14 ff.

08 – Sustainable exchange: together with students at the "Ethiopian Institute of Architecture, Building Construction and City Development", ETH students are building a prototype for a sustainable residential building in Addis Ababa. → Page 30 ff.

09 – ETH expertise for the construction project of the century: in 2010, with the breakthrough of the east tunnel of the Gotthard Base Tunnel, a major milestone was reached in one of the most important construction projects of the century, in which experts from ETH Zurich are involved in all kinds of ways. → Page 39

10 – Successful partnership: the "Disney Research Zurich" centre at ETH Zurich is Walt Disney's only research laboratory at a European university. It researches new technologies for modelling and simulating reality. → Page 22 ff.

11 – ETH Day: on its academic celebration day, ETH Zurich honours outstanding scientific achievements, and presents honorary doctorates and awards for the best lecturers. The ceremonial address is given by Swiss Federal Councillor Didier Burkhalter. → Page 64 ff.

12 – World Exhibition in Shanghai: Swiss Federal Councillor Moritz Leuenberger (centre) and the Chinese Minister of Water Resources Lei Chen (2nd from right) open the conference on "Future Cities" organised by ETH Zurich, the Chinese Academy of Sciences and swissnex China. → Page 41

Core duties of ETH Zurich

Growing student numbers make quality control the focus of attention in **education.** In **research,** there are new initiatives, projects and professorships to tackle global challenges. All kinds of links to industry guarantee the **knowledge and technology transfer** that creates social added value.

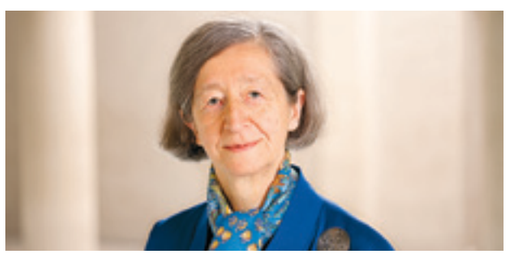
Excellent education despite squeeze on capacity

As a university of international standing, ETH Zurich is attracting more and more students from Switzerland and all over the world. One of the consequences of this positive trend is that, especially at Master level, suitable instruments need to be found to ensure that the excellent quality of education can be maintained.

In autumn 2010, about 2450 students began a Bachelor programme at ETH Zurich, 13 percent more new entrants than two years ago. This increase in interest, especially in engineering subjects, is very pleasing, in view of industry's complaints about shortages of engineers. However, because of the high numbers of new entrants, the two currently most popular programmes, Mechanical Engineering and Architecture, are reaching the limits of their capacity. The shortage of teaching space has been temporarily mitigated by making better use of lecture theatres, for example by duplicating classes at peripheral times, or, for the first time, broadcasting a complete lecture to other rooms. To overcome bottlenecks in the supervision of practical groups, additional resources have been put into employing senior and junior teaching assistants.

Over 16,000 students

The total number of students rose again to 16,342 (previous year: 15,378). This means that 53 percent more young people are studying at ETH Zurich today than in 2000. By 2010, student numbers had already reached the level that was predicted for 2013. By contrast, the budget funds available to the university, when adjusted for inflation, have only risen by less than 1 percent a year since 2000. Any further growth in student numbers without significant additional resources would jeopardise the quality of the education provided and put a question mark over research-related education. It is important that the high standard of education at ETH Zurich should continue to be based on a good faculty-to-student ratio, an excellent learning environment and innovative education methods. One example is the focus projects in the field of Mechanical Engineering, which play a significant part in the appeal and high quality of this programme (→ Page 12).



"To ensure high quality standards, we must have the freedom to be selective."

Heidi Wunderli-Allenspach, Rector of ETH Zurich

Performance-based admission to Master programmes preferred

One particular challenge is presented by the rapidly rising number of applicants for Master programmes. The Swiss economy and ETH Zurich itself have always benefited from having a good mixture of talent from Switzerland and other countries. That is why places at ETH Zurich are always available to excellent students from abroad. However, applications from abroad at Master level have increased disproportionately. Currently, twice as many students from other universities are applying for admission to a Master programme at ETH Zurich as are progressing from Bachelor to Master level internally. For the 39 available Master programmes this year, there were no fewer than 2600 applications from Bachelor graduates from other universities, 90 percent of which came from abroad.

This presents the university with an increasingly difficult task, in terms of both quantity and quality. There are considerable differences in quality among the applicants. This means that every application has to be reviewed against objective, transparent criteria, within a reasonable period of time. This is done using the requirements profiles that have been formulated for all Master programmes and are published on the Internet. However, there are no clear legal provisions for controlling the progression to Master level, either with regard to capacity on specific courses or on the basis of quality criteria. ETH Zurich is therefore engaged in talks with the Rectors' Conference of the Swiss Universities (CRUS) and the ETH Board about suitable instruments for this purpose.

Always promoting the best

In autumn 2007, ETH Zurich, with the help of private donors, launched the Excellence Scholarship and Opportunity Programme, as a tool to use in the competition for the best talent. The scheme encourages particularly outstanding students who want to take a Master programme at ETH Zurich. Under the support scheme, the students receive a special grant and more intensive supervision for the duration of their course. The results after three years are promising: since the start of the programme, 85 scholarship holders from Switzerland and 27 other countries have benefited from these performance-based grants. In 2010, ETH Zurich decided to also introduce a Master Scholarship Programme. In future years, this will further expand the range of students who can be supported.

The total number of students rose again in 2010. The shortage of teaching space has been temporarily mitigated by making better use of lecture theatres.

Partnerships with the world's best universities

Once again in 2010, as in the previous year, the number of young researchers wishing to write their doctoral theses at ETH Zurich rose enormously. With now over 3500 doctoral students, that is an increase of 4 percent.

The individualised admission procedure, as well as targeted partnerships and exchanges with top-ranking foreign partner universities, help to drive up standards at this level. Again in 2010, ETH Zurich entered into some new cooperation agreements with leading universities. It signed a Memorandum of Understanding on cooperation in the field of neurosciences with the University of Zurich and McGill University in Montreal, Canada. One of the purposes of the cooperation is to encourage exchanges between doctoral students. It is also worth mentioning the Memorandum of Understanding between ETH Zurich and the Japanese research organisation RIKEN. This is not only for the benefit of established scientists but should also lead to more ETH students visiting the RIKEN research laboratories. A number of other exchange agreements were also reached in 2010, including with Princeton University and several Japanese universities.

→ www.ethz.ch/excellence_scholarship

The fascination of focus projects – from the ballbot to electric racing cars

Among the engineering subjects at ETH Zurich, Mechanical Engineering is especially popular. One of the reasons for this is the focus projects, which were introduced in 1996. At that time, the number of new students entering the Department of Mechanical and Process Engineering had fallen very low. To attract more students to the course, some of the ETH professors at the time introduced focus projects. Later, Roland Siegwart, who is now the Vice President Research and Corporate Relations at ETH Zurich, became a driving force behind the scheme. The idea was that, in their fifth and sixth semesters, students should be able to put what they had learnt into practice, by working in teams to run a project independently – from the concept through all the planning and design stages to production and marketing. The knowledge they need is acquired by self-study, attending lectures and talking to experts in the field. These projects involve not only solving technical problems but also teamwork and social skills.

Furka is a purely electrically powered little racing car which goes from 0 to 100 kilometres an hour in just three and a half seconds.

Impressive results

Five of these projects were presented at the "Rollout" ceremony in the hall of the ETH Main Building. Once again in 2010, the results were impressive: for example, Alcedo, a flying drone, is able to automatically identify and mark the position of people buried under snow. In the HERMES project, the students carried out further development on the drive train of a hybrid racing car. A third group built the purely electric Formula Student car Furka, a little racing car weighing only 220 kilograms, which goes from 0 to 100 kilometres an hour in just three and a half seconds. HyRaii, a hydrofoil sailboat that flies through the air on the water like an aircraft, is the product made by another team. A fifth group produced Rezero, a robot that balances on a sphere – a so-called ballbot (→ Title page). These last two projects won cash prizes funded by Siemens PLM Software.

→ www.ethz.ch/rollout

Real-life insights into studying and research

To make young people curious about the different areas in which they could study or carry out research, and give them an insight into the reality of studying at university: these are the aims of ETH Zurich's activities for upper-secondary school pupils. Since January 2010, the Student Orientation and Coaching unit has been running a successful marketing campaign for students.

Under the title "ETH On the Road", ETH Zurich again visited upper-secondary schools all over Switzerland in 2010 to give pupils a realistic insight into studying at ETH Zurich – with exhibits, experiments, films, lectures and discussion sessions. The seven schools they visited once again included two schools outside German-speaking Switzerland.

School-leavers from all Swiss upper-secondary schools have traditionally been invited to student information days at ETH Zurich and the University of Zurich. Study weeks at ETH Zurich offer an in-depth look at everyday student life, by giving upper-secondary school pupils the opportunity to work on a project with researchers for a week. In 2010, 60 young people worked in the Departments of Agricultural and Food Sciences, Physics, and Electrical Engineering and Information Technology.

→ www.soc.ethz.ch

Fit for work

ETH Zurich has a newly established central organisation to help its students and doctoral students as they move from studying into the world of work. Since September 2010, the ETH Career Center has been providing extensive information about finding a job and preparing graduates for embarking on a career. It also shows them what is entailed in starting up a new company.

The main information portal is the website careercenter.ethz.ch. Here, anyone who is interested can find useful information, including advice from other internal organisations providing careers services, such as the specialist associations, the Student Union VSETH, ETH Juniors and ETH Alumni Career Services. The ETH Career Center also organises events where graduates can find out how to put together a job application or what important points they should consider during an interview or assessment session.

However, when making the transition from ETH Zurich to the world of work, graduates also ask themselves questions of a more personal nature: Am I interested in a specialist or management career? Should I be considering a major corporation or an SME? In what kind of company can I imagine starting work? To help answer these questions, the ETH Career Center offers individual reviews of a student's situation and will support graduates in reaching a decision. The aim is to suggest suitable areas in which to start work, not to find students a job. The service has been very well received: in the first two months, over 100 students have already taken advantage of the personalised advice on offer.

The ETH Career Center supports graduates during the transition from university to the world of work.

Valuable corporate contacts

The ETH Career Center cultivates close contacts with business. It has reached partnership and sponsorship agreements with 18 companies. These include companies in the electricity and power industry, the high-tech and life sciences sector, and also companies from the engineering, chemical, financial, IT and consultancy industries. Agreements are also in place with the Federal Administration and the industry association Swissmem, providing contacts with numerous SMEs.

The partner companies have further the opportunity of presenting themselves to students at "Company on Campus" events or platform discussions. ETH graduates from those companies introduce the company and talk about their personal experiences, and this puts them in touch with current students. The companies may also invite students to special workshops. This gives students the opportunity to find out in greater depth about a company they may wish to work for. For their part, the companies establish contact with about 2000 potential candidates, the select group of students who are completing their degrees or doctorates at ETH Zurich each year.

→ www.careercenter.ethz.ch/index_EN

Fundamental research: safeguarding the future

ETH Zurich carries out interdisciplinary research in the fields of health, nutrition, risk, energy and sustainable urban development, in order to find answers to pressing social problems. It makes use of its great strengths in fundamental research.

ETH Zurich makes sure that it focuses its research on socially relevant fields. On the basis of new findings from fundamental research, it aims to make a major contribution to solving the big challenges facing humanity. To achieve this ambition, and maintain its position as a leading university in international competition, ETH Zurich intends to appoint more professors in the next few years in specialist fields that will be important in the future.

New focuses for research

These specialist areas include health sciences, in which ETH Zurich is breaking new ground. It is bringing together its research and education activities in the fields of human movement sciences and sport, food sciences and nutrition, medical technology and neurosciences, and is establishing a new Department of Health Science and Technology (D-HEST). The aim is to systematically research health and the causes of illness. The scope of the research extends from the molecular level to whole organisms, and will take account of the patient's natural and social background. By working in close cooperation with the University Hospital and the University of Zurich, processes and technologies will be developed for both therapeutic and preventive treatments. The D-HEST forms the interface between health sciences and technology and aims to promote knowledge and technology transfer between clinics, industry and society.

"In 2010, researchers at ETH Zurich produced many groundbreaking findings."

Roland Siegwart, Vice President Research and Corporate Relations at ETH Zurich.

The new department will open in 2012.

How to feed the world is another important focus for research. Existing expertise in agricultural and environmental sciences is to be combined in a new Department of Environmental Systems Science (D-USYS). This will particularly boost the area of sustainable agriculture. The World Food System Competence Centre that was newly founded in 2010 aims to help secure a sustainable food supply for the world's population. The enterprise is being supported by companies, private individuals and foundations from business and industry, which enables some additional professorships in various different areas of research to be financed. This includes, for example, a donation of 10 million francs from Syngenta to the ETH Zurich Foundation. This funding allows a new professorship in sustainable agroecosystems to be established.

Rapid population growth is causing serious problems especially for countries in Asia and Africa. One organisation working to find solutions is the Singapore-ETH Centre (SEC) for Global Environmental Sustainability, which ETH Zurich has set up jointly with the National University of Singapore and the Nanyang Technological University. In September 2010, the first research programme started there with the Future Cities Laboratory. It is intended that this platform for sustainable urban development will produce various different scenarios for urbanisation and suggest ways of making urban planning sustainable. In the Ethiopian capital Addis Ababa, ETH Zurich has established an Institute for Urban Development in partnership with the university there.

ETH Zurich is sure that making these commitments will not only benefit the other countries but will also be worthwhile for Switzerland itself: the findings that are made will feed into the basic training of students in Switzerland and keep Swiss companies and workers globally competitive in the long term.

Encouraging technology transfer and young talent

Transferring knowledge and new technologies into society is a high priority for ETH Zurich (→ Page 22 ff.). By introducing the new Pioneer Fellowships, it aims to translate findings from fundamental research into marketable products even faster.

Furthermore, in 2010 the grants programme "Society in Science – The Branco Weiss Fellowship" that was set up in 2002 was transferred to ETH Zurich – just a few months before the founder of the programme, the entrepreneur, patron and friend of ETH Zurich, Branco Weiss, died in November 2010. The scheme enables outstanding young researchers to put into practice original research ideas which are relevant to society as a whole.

Field trials for cultivating maize in Mexico: with its new research focus on aspects of the world food system, ETH Zurich aims to help secure a sustainable food supply for the world's population.

The extent to which researchers at ETH Zurich have ideas with potential was apparent once again in 2010 from the research funding that was acquired, not least from the EU: six young researchers each received about 1.5 million euros from the European Research Council (ERC). The ERC Starting Independent Researcher Grant is designed to support promising young researchers; the sole selection criterion is academic excellence. In addition, there were seven ERC Advanced Investigators Grants for established scientists at ETH Zurich, who were awarded over 16 million euros for their projects in the fields of Physical Sciences and Engineering and Life Sciences.

Fundamental research is central

In collaboration with other Swiss universities, ETH physicists have laid the foundations for two National Centres of Competence in Research in the areas of quantum physics and researching ultra-short phenomena. The Swiss National Science Foundation awarded the two projects, each led by ETH scientists, a total of 34 million francs. The National Centre of Competence in Research Molecular Ultrafast Science and Technology (MUST) is already up and running. In this project, scientists are using special lasers to measure movements at atomic level lasting a femtosecond (10^{-15} of a second) or even an attosecond (10^{-18} of a second). Also taking part is the Paul Scherrer Institute (PSI), which will be involved in the project with its planned SwissFEL, a laser based on free electrons. It is hoped that groundbreaking results from this fundamental research will generate new technologies to enable previously impossible experiments to be carried out.

World-famous partnership

Finally, with the CMS particle detector, ETH Zurich is making an extremely successful contribution to the Large Hadron Collider (LHC) at CERN, the world's largest research cooperation project, involving over 8000 scientists. On 23 November 2009, two beams of protons collided for the first time in the LHC. Since then, CERN has been reporting new successes on an almost monthly basis. For example, thanks to the CMS detector, a phenomenon was observed which had previously only been recorded when heavy ions collided.

→ www.futurecities.ethz.ch
→ www.nccr-must.ch/home.html
→ http://lhc.web.cern.ch/lhc

Preventing and permanently eradicating gout

About one per cent of the population of industrialised countries suffers from the metabolic disorder gout. In this illness, uric acid forms crystals when it occurs in too high a concentration in the blood. Painful deposits accumulate in the joints, or crystals form in the kidneys, which can cause damage. The excessively high uric acid content in the blood is caused partly by genetic predisposition or an unbalanced diet.

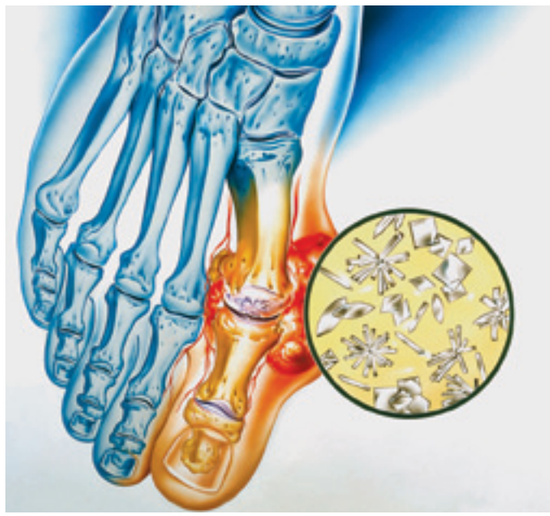
Lost during evolution

People suffer from gout because during the process of evolution – unlike other mammals – they lost an important enzyme which controls uric acid levels naturally. Now researchers at the Department of Biosystems Science and Engineering have developed a method giving hope to anyone who may be at risk of suffering from gout or already does.

While many medical problems can be solved by drugs being introduced into the body from outside, the researchers led by ETH Professor Martin Fussenegger are directly correcting the faulty metabolic pathway which leads to gout and so are helping the body to treat itself. The scientists have developed a synthetic network of specially prepared genes which are infiltrated into the cells. Once implanted in the body, this gene network called UREX regulates the level of uric acid in the blood and thus assumes the role of the lost enzyme. If UREX detects that the uric acid level is too high, this information is relayed to a switching circuit which controls another component. This then dispenses the correct dose of the enzyme to regulate the uric acid.

The complete gene network is incorporated in a single cell of which two million are enclosed in perforated 0.2 millimetre capsules made of seaweed gelatine. When the encapsulated cells are implanted in the body, they automatically attach themselves to the circulatory system and release their therapeutic effect. Thanks to this biological gene network, the cause of gout can be permanently eliminated to prevent the illness. UREX has already been tested successfully on mice and the patent has been applied for.

→ www.ethz.ch/human_therapy



The metabolic illness gout leads to painful deposits in the joints.

Using nano research to combat iron deficiency

About 1.5 billion people worldwide suffer from the consequences of iron deficiency. Fatigue, anaemia and developmental problems are just some of the symptoms. Women are particularly frequently affected. One solution is to add iron to food. Often elementary iron is used but this is not water-soluble and is not easily digested in the intestinal tract. Iron sulphate, on the other hand, is water-soluble and is easily processed by the body, but it changes the colour and taste of the food.

Now researchers led by Florentine Hilty and Michael Zimmermann at the Institute of Food, Nutrition and Health have found another promising solution: when reduced to nano size and mixed with the right metals, elementary iron can be easily absorbed by the body. Most effective is a mixture of iron zinc oxide and magnesium. Tests have shown that the body can use the iron much better in this form. The combustion technique deployed to produce the nano structures has been known about for some time. It was used on food for the first time three years ago by ETH scientists. However, more tests are required before nano-structured food of this kind can go on sale.

→www.ilw.agrl.ethz.ch

Diabetes diagnosis with no finger-pricking

Researchers in the group led by Sotiris Pratsinis, Professor of Particle Technology at the Institute of Process Engineering, have developed a sensor that can instantly measure acetone in the breath. That is an easy way to diagnose Type 1 diabetes or the symptoms of ketoacidosis, a complication of diabetes where there is a total lack of insulin. This is because in the breath exhaled by Type 1 diabetes patients the acetone concentration, at about 1800 ppb (parts per billion), is twice as high as it is in healthy people. During ketoacidosis, the proportion is even higher. The sensor can measure an acetone concentration of as little as 20 ppb and works very accurately even in very high humidity, such as occurs in exhaled breath.

To manufacture the sensor, the scientists coated a carrier which had gold electrodes with a semiconductor film made of tungsten oxide nanoparticles mixed with silicon. The mixture was produced in a flame at a temperature of over 2200° C. The nanoparticles rose up and were collected on the carrier substrate, which was then cooled with water. Through this rapid heating and cooling, a vitreous layer formed on the electrodes that is sensitive to acetone.

Non-invasive methods of diagnosing illnesses are becoming more and more important. Analysis of people's breath is key to this, as it is fast, cheap and easy to perform. Professor Sotiris Pratsinis hopes in future to be able to use similar sensors to test the breath for other illnesses.

→ www.ptl.ethz.ch

An innovative sensor can detect even small concentrations of acetone in exhaled breath.

Epigenetically inherited ailments

Brain researchers in the group led by Isabelle Mansuy, a professor at both ETH Zurich and the University of Zurich, have proved in mice that negative environmental influences at an early stage in life may not only have a negative effect on the behaviour of the individual in question throughout their life, but that the individual can pass on their changed behaviour to their descendants – even down to the third generation.

Such negative environmental influences include, for example, chronic severe stress or traumatic experiences. Young animals which are unexpectedly separated from their mother and are put under severe stress during the period of separation can show behaviour types later in life which could be interpreted as depression. Furthermore, the animals cannot control their impulses and are unable to deal appropriately with new or difficult situations.

Mansuy's research team was able to show that these behavioural changes are not due to mutations but to changes in what is called the methylation of certain genes in the brain and in the sperm. In this process, the small molecule methyl is, in certain genes, attached to or removed from one of the four basic components of DNA. This change to the methylation controls the activity of the affected genes and thus has an impact on important bodily functions.

In mice, scientists have identified a number of genes which are affected by methylation due to earlier stressful experiences. However, not all these genes are altered to the same extent. It depends where and how many methyl groups are altered.

It has long been believed that such behavioural information could be passed on epigenetically, but Mansuy's working group is the first to succeed in demonstrating this at molecular level in several generations. Since the symptoms displayed by the disturbed mice are also very pronounced in borderline, depressive or schizophrenic patients, the results from the trials with mice could perhaps be transferable to humans.

Mapping all human proteins

The decoding of the human genome in 2003 made headlines all around the world. In 2010, researchers at ETH Zurich and the Institute of Systems Biology (ISB) in Seattle made a comparable breakthrough: they succeeded in mapping the entire human proteome with a total of 20,300 proteins.

The proteome is what biologists call the entire set of proteins in an organism. The structure of these proteins is derived from what are called encoding loci, i.e. the physical positions of genes in the genome. In the case of humans, there are about 20,300 loci for a corresponding number of proteins. The ETH systems biologists and their American colleagues have produced reference values for all these loci in the form of mass spectroscopy data.

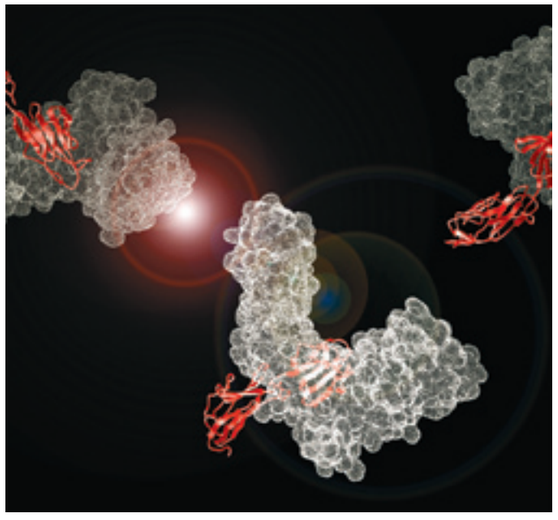
All proteins can be measured

Before being analysed with the mass spectrometer, the proteins were broken down into smaller components, so-called peptides. The pattern that the peptides produce in the mass spectrometer is always characteristic of one particular protein. It was particularly difficult and challenging to detect and measure rare species of proteins. The researchers solved this problem by "predicting" fragments of these proteins on the computer, producing them artificially and measuring the artificial products.

These reference data can now be used to measure the number and type of proteins in any sample of biological material. This will greatly improve the reliability and reproducibility of proteomics and significantly speed up progress in fundamental and applied research in biology and medicine. The information is stored in a database which is currently being expanded to include data on proteins that were altered after being synthesised in the cell.

The researchers, led by Rudolf Aebersold, Professor of Molecular Systems Biology, worked on developing the method and setting up the database and computer infrastructure for about seven years. Decoding the proteome then took only one year. In autumn 2010, the researchers were able to present their groundbreaking work at a specialist conference in Sydney in Australia. Now the reference database is available for all biologists to use in their research.

→ www.imsb.ethz.ch



Structure of an apolipoprotein: it transports fat in the blood and is one of the largest known proteins.

Prize-winning pioneer

Rudolf Aebersold is a pioneer in proteomics, a relatively new branch of biology. The term proteomics refers to the study of all the proteins existing in a cell or living organism at a specific time and in specific conditions. The proteome is dynamic and constantly changing. A good example of its dynamism is the way a caterpillar changes into a butterfly. The genome, i.e. the sum total of the genes, is the same in both forms of the organism, but the proteome is different. Researchers hope that proteomics will help them find new and effective substances to treat cancer, infections, and certain diseases of the nervous system.
In recognition of his outstanding and pioneering work in proteomics, Rudolf Aebersold, together with Professor Amos Bairoch of the University of Geneva, won the Otto Naegeli Prize for the promotion of medical research in April 2010, one of the most important scientific prizes in Switzerland. He was honoured for his development of analytical methods and computer models which make it possible to identify proteins and measure them quantitatively.

Electronics – in the very fabric

Researchers have been experimenting for some time with "intelligent" textiles, which could have electronic components stitched on to, or into them. Now scientists at the Wearable Computing Lab run by Professor Gerhard Tröster have gone a step further: they have developed a new technology for attaching thin film electronics and miniaturised, commercially available chips to plastic fibres. The researchers then succeeded in incorporating these plastic fibres with their numerous microchips and other micro-electronic elements directly into the textile structure of the fabric. The scientists used standard machines normally used in the textile industry to interweave the e-fibres with conventional yarn. Despite having the electronic components woven into it, the fabric hangs well, can be folded and feels just like normal material, so that clothes made from it can be worn in daily life. The microchips on the plastic ribbons are encapsulated. This means that the fabric can be washed several times in a washing machine at 30 degrees using a mild detergent, without the e-fibres losing their functionality. At present, the electronic fabric is available in strips. The researchers aim to be able to produce textiles without working by hand and in any size, which can be cut into any shape so as to meet the needs of the clothing industry, among other things. Possible applications for these hybrid fabrics would be for monitoring heart rate, supporting athletes during training and rehabilitation or monitoring members of the emergency services and firefighters. Ultimately it may also be possible to incorporate keypads or screens in everyday clothing. Developing these innovative electronic sensor fibres is part of the TecInTex project which comes under the Swiss "nano-tera.ch" initiative.

ETH researchers have succeeded in incorporating micro-electronic components directly into the textile structure of a fabric.

→ www.ethz.ch/electronic_textiles
→ www.nano-tera.ch/projects/69.php

Closing the security gaps in encryption

According to the Heisenberg uncertainty principle, it is not possible to accurately determine both the position and momentum of an atomic particle such as an electron simultaneously. This principle is used in quantum information technology – for example, it underlies the security of quantum cryptography as used in the encryption of data. However, the uncertainty principle only applies if all the information available about the electron is in classical format. Now physicists at ETH Zurich led by Professor Renato Renner, together with colleagues from two German universities, have shown that the principle can be rendered invalid by using quantum-mechanical information. Consequently, a would-be hacker using a quantum computer could break a cryptographic system based on the uncertainty principle. The physicists are therefore proposing an extended uncertainty principle which they have formulated, which applies even to quantum information. This means not only that the existing security gaps in quantum cryptography can be closed but also that the quantum properties of the components of quantum mechanical systems, such as transistors, can be tested.

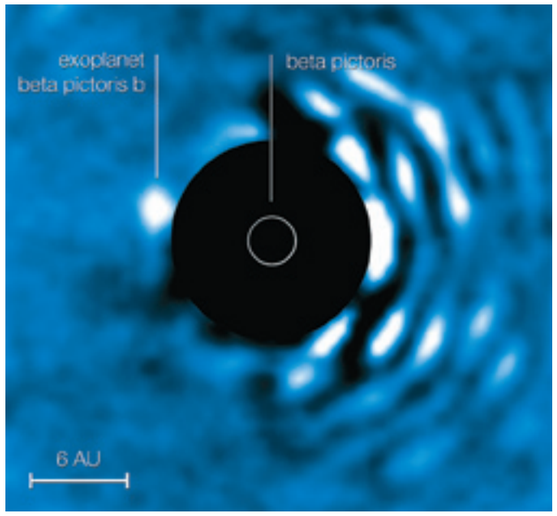
→ www.qit.ethz.ch

New optical system for exploring exoplanets

The Atacama desert in Northern Chile is a Mecca for astronomers. The extremely dry conditions mean that the observatories located there have a clear view far beyond our solar system, to distant stars and galaxies – and to planets orbiting other stars. These so-called exoplanets are very faint light sources which cannot be seen with conventional telescopes, as they are outshone by the light halo of their parent star. With the help of coronagraphs, which block out the light from the parent star, the existence of an exoplanet was directly verified for the first time a few years ago. Now scientists have developed an optical system for the Very Large Telescope in Chile which makes looking for exoplanets and studying these objects much easier. All that is required now is one optical component, the "apodising phase plate", which minimises the diffraction of the starlight. The Institute for Astronomy at ETH Zurich played an important role in its development.

When the light falls on the new optical system, fine grooves on the surface of the apodising phase plate alter the light waves. Part of the star's light is used to block out the bright diffracted light on one side of the star. In this way, faint light sources become visible. Thanks to this new optical system, only the size of a five-franc piece, the researchers have succeeded in confirming the existence of an exoplanet and collecting information about its movements, temperature and atmosphere.

→ www.exp-astro.phys.ethz.ch



The exoplanet Beta Pictoris b only becomes visible when an engraved filter is used to block out the light from the star Beta Pictoris.

The smallest microlaser in the world

Christoph Walther, a doctoral student in the Quantum Optoelectronics Group at ETH Zurich, together with four colleagues, has used a new concept to develop by far the smallest electrically pumped laser in the world. This could one day revolutionise chip technology.

The laser is 30 micrometres, i.e. 30 thousandths of a millimetre, long and 8 micrometres high, and emits light with a wavelength of 200 micrometres. That makes it considerably smaller than the wavelength of the light it emits – a major scientific breakthrough. Normally, lasers cannot be smaller than the wavelength of the light they emit. In a conventional laser, light waves cause an optical resonator to oscillate, just like acoustic waves oscillate the soundbox of a guitar. There, the light waves, in simple terms, travel between two reflectors. However, the reflectors must be bigger than the wavelength of the laser.

Christoph Walther and other members of the team around their doctoral supervisor Jérôme Faist, Professor and head of the Quantum Optoelectronics Group, have developed an entirely new concept for lasers. Taking inspiration from electronics, they do not use an optical resonator but an electric oscillating circuit consisting of an inductor and two capacitors. The light is effectively "captured" in it and induced into self-sustaining electromagnetic oscillations on the spot using an optical amplifier.

This method means the size of the resonator is no longer limited by the wavelength of the light and can in principle be scaled down to any size. This makes microlasers interesting to chip manufacturers as an optical alternative to transistors, as it could considerably speed up the exchange of data on microprocessors.

→ www.qoe.ethz.ch

Fewer traffic jams and CO_2 emissions thanks to intelligent traffic lights

01 – In the future, self-controlling traffic lights could prevent traffic jams and help motorists to save petrol and reduce emissions. In the procedure developed by ETH Professor Dirk Helbing with colleagues from the TU Dresden and subsequently patented, traffic lights are fitted with sensors which continuously record traffic levels. With the help of special processors and mathematical algorithms, the traffic lights can calculate the future traffic flow. This means that the time for which they stay green can be optimised so that drivers have to wait for as short a time as possible. A pilot study in Dresden produced very good results: if the intelligent traffic lights exchange information about traffic levels and change synchronously with adjacent ones along a stretch of road, journey times can be reduced by up to 30%.

→ www.soms.ethz.ch/research/index

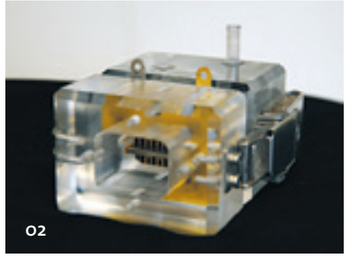
Producing fine chemicals with no waste products from fuel cells

02 – Researchers in the group led by Hansjörg Grützmacher, Professor at the Laboratory of Inorganic Chemistry, together with colleagues in Italy, have developed a new organometallic fuel cell. It converts alcohols or sugars from sustainable raw materials, via an intermediate stage, into acids and so generates CO2-free electrical energy. Using this apparatus, chemists can, for example, produce lactic acid without generating any waste.

What is special about this fuel cell is the anode, which has an embedded molecular rhodium complex. This serves as the catalyst for various reactions, during which it forms and changes progressively. In this way the metal complex can convert various different substances. The development of this fuel cell is an important step forward towards sustainable chemistry and clean electricity.

→ www.lac.ethz.ch


01


02


03

New fungus threatens ash trees

03 – In 2010, researchers at the Institute of Integrative Biology described a new type of fungus which is responsible for the dying off of ash trees that has been occurring recently in Switzerland. The fungus spread rapidly from Eastern Poland to Central Europe and occurred for the first time in Switzerland in 2008 – it is now widespread there north of the Alps. The fungus affects ash trees of all ages, which eventually die. Scientists believed that the harmful fungus was the species Hymenoscyphus albidus, which has been known since 1851. However, ETH doctoral student Valentin Queloz discovered that a different species is responsible for the damage and described it as H. pseudoalbidus.

Herbariums show that H. pseudoalbidus has existed alongside H. albidus for a long time. However, it is unclear whether the newly described species has always caused disease. ETH researchers are therefore investigating the population structure of the fungus.

HCFC ban noticeably affecting the ozone layer

Hydrochlorofluorocarbons (HCFCs) make a major contribution to damaging the ozone layer and are important greenhouse gases. The Montreal Protocol in 1987 aimed to reduce the release of HCFCs – for example from aerosol cans. It was already believed that the protocol was having an effect and helping the ozone layer, which protects us from cancer-causing UV radiation, to regenerate. Now, for the first time, this has been proved by researchers at the Institute for Atmospheric and Climate Science at ETH Zurich, by carrying out statistical analyses on long-term measurements taken around the world. These show that the thickness of the ozone layer is increasing again worldwide. Nevertheless, the hole in the ozone layer over the South Pole will not close up again until 2070 or 2080.

→ www.iac.ethz.ch/groups/peter

Encouraging young companies

Transferring knowledge and technology into society is one of ETH Zurich's primary responsibilities. It supports young companies spawned by the university, sets up links with business and enters into strategic alliances with industry.

In 2010, 1902 young people completed their Master studies or gained a doctorate at ETH Zurich. Many of those will go on to occupy important positions in business and society in the future. According to a study carried out in 2007, a third of the senior managers in Swiss industry graduated from ETH Zurich. That means that ETH Zurich is training more of the country's leaders than any other university. It is through well-trained graduates that most of the knowledge transfer from the university into industry takes place.

One important reason why ETH graduates are in demand is precisely because the university pays attention to the needs of industry. In 2010, the annual ETH-Industry Dialogue on the Future was held for the tenth time. Representatives from the two Swiss Federal Institutes of Technology discussed future developments with leading personalities from industry and politics. Under the title "What kind of academic support does Swiss industry require?", participants worked on concrete proposals in the fields of materials science, medical technology, energy and micro- and nanotechnology which could help secure the success of these sectors in Switzerland in the long term.

Spin-off companies

There is no shortage of entrepreneurial spirit at ETH Zurich. Some young people start up their own companies even while they are studying or taking their doctorate. Since 2006 alone, over 100 spin-off companies have been established at ETH Zurich. The university supports the next generation of entrepreneurs with its technology transfer office, ETH transfer. This helps them with setting up a company and finding investors. ETH Zurich also helps its researchers to protect their intellectual property by using patents and licences. Take, for example, the founders of the company Arktis Radiation Detectors: these young researchers developed a detector which can distinguish between harmful radioactive materials and harmless ones. Company founder Rico Chandra worked on the basic principles of the device when he was an ETH doctoral student at the Institute for Particle Physics at CERN. ETH Zurich was impressed by the idea and the commercial potential of the technology, registered the patent and paid the fees. ETH Zurich now holds the property rights, and the spin-off has a licence for exclusive use. The company is currently negotiating with various companies and government organisations in the USA. The first big order is expected to be placed in 2011.

There is no rulebook for how to set up a successful spin-off company. However, young entrepreneurs can look to existing successful spin-offs from ETH Zurich as a guide. To encourage interaction between them, in 2010 for the first time Roland Siegwart, ETH Vice President Research and Corporate Relations, invited all ETH spin-off companies to a special event. Over 60 founders of new companies took the opportunity to share their experiences with colleagues.

Young companies have potential

Thomas Knecht, ETH graduate and former director of McKinsey Switzerland, recognised that it was worthwhile supporting new companies as much as ten years ago. Together with ETH Zurich, he persuaded ten Swiss companies to invest ten million francs each in a fund, for ten years. Along with ABB, Hilti, Schindler and Sulzer, these were Nestlé, Novartis, Suva and the banks CS, Pictet and ZKB. And so the Venture Incubator was born. Since its foundation, the investment company has invested 117 million Swiss francs in 35 young companies and created about 750 jobs. By selling shares in the companies it supported, it made 59 million francs, which in turn is being invested in the financing of more new companies.

In 2010, Venture Incubator celebrated its tenth anniversary at ETH Zurich. To mark the anniversary, the investors and institutions involved decided to convert the fund into a permanent commitment, an Evergreen Fund.

Partnerships

Partnerships are an important channel for knowledge transfer. In 2010 ETH Zurich signed an agreement on cooperation with the Walt Disney Company. Since April, 30 computer scientists have been working at Disney Research Zurich (DRZ) at ETH Zurich, under the leadership of Markus Gross, Professor of Computer Science. At the only research laboratory run by the Walt Disney Company outside the USA, the scientists are researching the future of video, computer-aided film technology and the animation of images and faces. These animations are used in various sectors of industry round the world. In 2010, the DRZ won the Tell Award, a prize awarded annually to recognise major investment in innovative projects by North American companies in Switzerland.

Successful ETH spin-off: Optotune develops special lenses which perfectly mimic the human eye and can be used for cameras in ultra-thin mobile phones.

Successful young ETH entrepreneurs

The number of prizes and awards which were won by young ETH entrepreneurs in 2010 is proof of how well ETH spin-offs are doing.
The Swiss Innovation Forum has been presenting the Swiss Technology Award since 1987, in order to give the most innovative ideas the chance to enter the market quickly. In 2010, the awards in all categories went to ETH spin-offs. The company Malcisbo won in the Seed category. It produces a new generation of vaccines based on sugars. The aim is to vaccinate hens against the campylobacter bacterium, which is responsible for most cases of food poisoning worldwide. The award in the Start-up category was won by the founders of Optotune. They develop special lenses which perfectly mimic the human eye. The lenses can be used, among other things, in endoscopies and for cameras in ultra-thin mobile phones. HeiQ Materials AG was the winning company in the Maturity stage category. This ETH spin-off took only a very short time to develop a textile fleece material called Oilguard. The fleece mats can absorb six times their own weight in oil and so can help combat pollution after oil spills.
In 2010, three ETH spin-offs won the "Venture Kick" competition, giving them each 130,000 francs in start-up capital: Malcisbo, Climeworks and Habtronics. And the CTI Medtech Award, worth 10,000 francs, went to a spin-off compliant concept for a special hospital bed to prevent bedsores.
A good example of the success of ETH spin-off companies is Sensirion, one of the world's leading manufacturers of industrial sensors in Stäfa. Having won the first Venture competition in 1998, it won the Ernst & Young Entrepreneur of the Year Award in 2010.

→ www.transfer.ethz.ch/index_EN
→ www.ventureincubator.ch

ETH Zurich as an enterprise

Qualitative growth and rising student numbers place high demands on **infrastructure and staff.** The **responsible use of resources** is an important priority, and not only when it comes to campus development.
Excellent **financial management** is also called for in the job of providing reliable finance for outstanding performance in education and research.

Intensive construction work

The rapidly rising student numbers, the planned increase in professorships and therefore the growing demand for space are presenting the real estate management at ETH Zurich with a genuine challenge. Over the coming years, the university must increase its available space accordingly.

At the end of 2010, over 16,000 students and doctoral students were registered at ETH Zurich, a quarter more than in 2005 (→ Page 10 ff.). This growth has brought the infrastructure for certain programmes, such as Architecture and Mechanical Engineering, to the limits of their capacity. For the first time, lectures for the Mechanical Engineering course had to be broadcast to a second lecture theatre. To relieve this difficult situation requires immediate measures such as renting additional premises, but also new buildings and greater efficiency in renovations. Additional premises are also required for the planned new professorships.

ETH Zurich will have to invest considerably more in real estate in future if it is to keep up with the still growing demand. New sources of funding are needed in addition to financing from the public purse (→ Page 32 ff.). In this context, a comparison of the increase in space at other Swiss universities over the last three decades shows that the rate of growth at the two Swiss Federal Institutes of Technology has been extremely modest. Whereas the space per student at other universities has grown by 14 percent on average, at ETH Zurich it has fallen by the same amount.

Major projects bring relief

For the years up to 2016, no fewer than 17 new buildings and upgrades, requiring investments of over 1 billion francs, are planned or already underway under ETH Zurich's scope of responsibility. Close to the ETH Main Building, the Oberer Leonhard office block is being built, on which work advanced rapidly during 2010. The dismantling work is finished and the preparatory excavation work has been completed. From 2013, the building will provide urgently needed space for engineers in the city centre, including 400 workstations, and a seminar and continuing education centre.

At the ETH Science City campus on the Hönggerberg, the Life Science Platform, a building for teaching and researching in the biomedical sciences, has taken visible shape. From 2012, the new building will provide more than 400 workstations, mainly in laboratories, in an area covering 6700 square metres. The animal experimentation area will be able to house up to 40,000 rodents, kept in compliance with strict international regulations. About half of all ETH departments will benefit from this new infrastructure. The Life Science Platform is not only intended for use by ETH researchers but is also available to external scientists from the university sector or from industry, for partnership projects. This strengthens links with industry and drives forward knowledge and technology transfer. The building breaks new ground not only in terms of sharing scientific knowledge but also in its energy supply: it will be the first ETH laboratory building to meet the Minergie Eco® standard and will be connected to the earth storage system which is currently being set up on the Hönggerberg campus. (→ Page 30 ff.)

New building in Lugano is at the heart of the national computing strategy

The foundation stone for the new Swiss National Supercomputing Centre CSCS in Lugano-Cornaredo was laid in autumn 2010. This will form the core infrastructure for the national Strategy for High Performance Computing and Networking which was launched in 2007 and will mark the start of a new era in computing in Switzerland. The building, with 11,700 square metres of main usable space and 55 office workstations, will be ready for occupation during 2012. By then, the CSCS should have a petaflop computer, which will be one of the most powerful supercomputers in the world. The new building will also set new standards in terms of energy efficiency. For example, the entire computing rooms will not be cooled, as is normally the case, but just the computers themselves. They will be cooled using water from Lake Lugano at a temperature of six degrees. The office block of the CSCS is intended to be a certified Minergie building and the waste heat from the computers will be made available for public use at no charge. ETH Zurich is investing about 80 million francs in the new building.

"Expanding and renewing the infrastructure is essential for the continuing development of ETH Zurich over the coming years."

Roman Boutellier, Vice President Human Resources and Infrastructure

Artist's impression of the planned new Oberer Leonhard building, with view from the Polyterrasse. From 2013, the building will provide urgently needed space for engineers on the city-centre campus.

Support for new residential and crèche infrastructure

It is in the interests of ETH Zurich also to help its members with their space requirements beyond education and research. On city-centre site, work began in 2010 on the building of a new crèche by the Foundation for Childcare in the Zurich University Area. The crèche will open in 2011 and offer 48 childcare places.

ETH Zurich is supporting various construction projects in order to help meet the huge demand from students for affordable accommodation. It is expected that work will begin in 2013 on building 400 housing units for students on the Hönggerberg campus. The investors are ETH Zurich and the Zurich Student Housing Foundation. The same foundation is also responsible for a project to build 180 residential units on Bächlerstrasse in Zurich-Affoltern. The foundation stone was laid here in 2010 and the flats should be ready for occupation in 2011.

→ www.ressourcen.ethz.ch/real_estate/index_EN

A new approach to catering at ETH

Almost 25,000 people from 80 countries work and study at ETH Zurich every day. In addition, there are academic visitors attending conferences and congresses at the university – and they all need to be fed. Serving around 180 different meals every week in 19 facilities, ETH Zurich offers the widest choice of catering of any university in Switzerland. In recent years, the complete range of services has been examined in the light of rising visitor numbers, changing consumer requirements and expectations and also the level of direct and indirect subsidy from ETH Zurich. A new catering concept was produced describing how to provide varied, healthy and sustainable food at ETH Zurich and showing how management structures could be simplified, partner organisations integrated in the system, and financial risks reduced.

Step by step towards increased competition

Last year, ETH Zurich signed an entirely revised framework contract with its long-standing provider of catering services SV (Schweiz) AG. The aim of the new approach is to make the range of options more clearly differentiated, while continuing to offer students and employees a reasonably priced, subsidised basic service. Under the new contract, the individual catering facilities accept more commercial responsibility, and in return can determine their own opening hours, product range and prices to suit the customers, within set limits.

New services at the city-centre and Science City campuses

The new catering concept takes account of the different situations and catering requirements at the two ETH campuses, the city-centre site and Science City on the Hönggerberg. At the city-centre site, there is a dense network of catering facilities at ETH Zurich, in close proximity to competing services belonging to the University of Zurich and in the nearby city. By contrast, visitor surveys show that 85 percent of people travelling to the Hönggerberg every day eat in the catering facilities on the campus, mainly because there are no other alternatives at all in the immediate vicinity. Consequently, different local strategies have been adopted for the two sites. Both sites are following the trend towards international, freshly prepared dishes.

In July 2010, the Alumni Lounge was opened in Science City, built thanks to a donation from the ETH Alumni Association. During term time, the catering facility is open until 10 p.m., to suit the eating and working habits of the researchers and students. Whether you want muesli, tomato salad, ginger soup or pasta and mince: in the Alumni Lounge everything is served in a preserving jar.

When the D-GESS department moved into the former computing centre, the new G-ESSbar was created: since last August it has been offering, in addition to what was available previously, a daily changing set meal, fresh salads and hot snacks. In the ETH Main Building, the Polysnack has been renovated. Since September 2010, this small café has been serving fresh pasta and pizza. In 2011, other ETH Zurich catering facilities will be offering appealing new ranges of food at the city-centre site: the Clausiusbar will be a Pan-Asian restaurant serving vegetarian and wok dishes, with daily changing dishes from India, Thailand, China and Japan. The Gloriabar, another small café, will also reopen serving a wider range of grilled food and pasta. Guests will be able to put together all their meals to suit their individual taste and budget.

Catering facility at the Science City campus: ETH Zurich offers the widest range of catering facilities of any university in Switzerland.

→ www.gastro.ethz.ch/index_EN

An attractive and safe environment

ETH Zurich is very concerned for the well-being of its staff and students. Having highly motivated and well-trained staff, and encouraging a respectful approach in an environment where diversity is the norm, forms the basis for the university's success.

More places for apprentices

Sound basic training is what produces good staff. That is why an apprenticeship at ETH Zurich is very highly regarded. The number of people completing the training has risen steadily in recent years: while in 2004 36 apprentices successfully celebrated the end of their training, in 2010 there were 47.

For about 60 years now, ETH Zurich has been training young people in 13 different trades – for example as electronics technicians, design engineers or laboratory technicians. The university runs its own training laboratories for Chemistry, Biology, Electronics and Physics. Here, and in the training workshop, which also belongs to the university, apprentices can build up a great deal of practical experience. The appeal of the training at ETH Zurich is reflected in the number of applicants: last year about 1000 young people applied for the 51 apprenticeships on offer.

Encouraging development

ETH Zurich also attaches great importance to continuing education for its employees. For example, employees in management, staff and support functions can now take a sabbatical abroad. By offering this "time out" from their regular duties, the university is encouraging the specialist, social and personal development of its outstanding employees and giving them the opportunity to broaden their horizons and gain new ideas for their work at ETH Zurich.

Last year eight employees took advantage of the opportunity to spend two to six months working either at one of the four outposts of the Swiss organisation for science, technology and culture (swissnex) in Boston, San Francisco, Shanghai or Singapore, or at one of the member universities of the International Alliance of Research Universities (IARU), to which ETH Zurich also belongs.

First gender monitoring report

One particular challenge in the academic environment is how to guarantee equality of opportunities for men and women. A Gender Monitoring Report produced by ETH Zurich in 2010 recorded how the proportion of women at the different stages of an academic career had changed between 2000 and 2009. It revealed the so-called "leaky pipeline" that is typical for universities: whereas at least 30 percent of the students are women, among full and associate professors the proportion of women is only about 8 percent – although the "leakiness" occurs at different rates in different departments. This detailed analysis of the proportion of women will now be used as the basis for developing effective measures for achieving equality.

Motivated, well-trained staff and a respectful approach form the basis for the university's success.

A respectful approach

ETH Zurich owes its success not only to researchers but also to motivated employees from Switzerland and elsewhere. Respect and preservation of personal integrity provide fertile ground for excellent results. We are reminded of this by the updated "Respect" campaign under the patronage of ETH President Ralph Eichler, which was first launched six years ago. With the campaign, ETH Zurich wants to set a benchmark for a university with no discrimination, no sexual harassment, no bullying and no threats or violence. If anyone does feel they are suffering from a lack of respect, there are competent points of contact at the university for all problem areas.

→ https://www.pa.ethz.ch/index_EN
→ www.respekt.ethz.ch/index_EN
→ www.equal.ethz.ch
→ www.lehrling.ethz.ch

Sustainability established as the guiding principle

In the last year, ETH Zurich has continued to embed a sustainable approach even more firmly in its education, research and university activities. In dialogue with external interested parties and the general public, it has also been able to find new ways of protecting the environment and resources.

For ETH Zurich, sustainability is an important strategic responsibility, across the board. In the coordinating office ETH Sustainability, the university has an expert agency to initiate projects and form a network of specialists. In 2010, the Executive Board, together with 19 other leading universities, signed up to the "International Sustainable Campus Network Charter". This commits the universities to follow guidelines on sustainability in their construction work, campus development and the integration of infrastructure, research and education.

Sustainable campus: Science City

Something which attracted a great deal of attention in specialist circles was the initiative by the Department of Architecture on zero emissions architecture. Because, in view of the climate problem, CO_2 emissions will have to be cut far more drastically than was at first thought, architects are demanding that the house of the future should have an emission-free energy supply. One of the ways this can be achieved is by consistently using renewable energies and by exploiting the great progress that has been made in building technologies. For example, solar panels have been developed at ETH Zurich which produce both heat and electricity at the same time. There is also an earth storage system which makes it possible to store the waste heat that is generated, for example by people and computers, deep inside the earth in summer. In winter, the system feeds the warmth back into the building to heat it. This avoids the use of fossil fuels. The buildings on the Science City campus are gradually being connected to such an earth storage system. Since 2009, over 300 geothermal probes have been sunk 200 metres into the ground, and underground storage tanks constructed.

As well as to high energy efficiency, ETH Zurich also attaches great importance in its new buildings to using the most environmentally friendly materials, for example in the construction of the new Life Science Platform in compliance with the Minergie Eco® label. The HPZ building on the Hönggerberg, dating from 1969, is currently being refurbished according to the principle of zero emissions architecture. As part of a research project run by the Chair of Building Systems, the HPZ building is being fitted with windows made of innovative, temperature-controlling glass, and an intelligent ventilation system. Close by, the HPP practical physics building is also being upgraded; this should reduce its energy consumption by 60 percent.

ETH Zurich is taking many other steps to increase the sustainability of its infrastructure: technical adjustments and the reduction of stand-by losses are helping to reduce energy consumption still further. The ideas developed by students and employees at the second Ecoworks Workshop begin directly with people's behaviour. Now the three best projects are to be implemented. For example, a network of members of ETH is being created which hopes, by launching joint campaigns and with the support of a web application, to save about 30 tonnes of CO_2 in a year. A system is also being set up for hiring out electric bicycles for people commuting between the city-centre and Hönggerberg sites.

Sharing knowledge about sustainability and putting it into practice

In 2010, ETH students of Architecture, Environmental Engineering and Economics were studying the question of what sustainability means for rapidly growing cities in developing countries. Specifically, at the ETHiopia Summer School they worked with Ethiopian students to build the prototype of a sustainable residential building in the Ethiopian capital Addis Ababa. The Sustainable Urban Dwelling Unit (SUDU) offers the poorer members of the population of Ethiopia an intelligent alternative to their normal accommodation made of corrugated steel. SUDU is a perfect example of ETH Zurich's commitment to sustainability: it combines interdisciplinary research with local skills and resources and takes account of the needs of the population.

Exhibition and dialogue about sustainability

ETH Zurich is the leading house for the Competence Center Environment and Sustainability of the ETH Domain (CCES), which was set up in 2006 and has about 600 associated researchers. This competence centre is working on the scientific principles for sustainable development in its main areas of interest and disseminates them in society. A showcase for this interdisciplinary research came in the form of the CCES Latsis Symposium 2010 called "Research in Environment and Sustainability – Insights and Conclusions", which took place at ETH Zurich in November 2010. The symposium presented 19 research projects in the fields of climate and environmental change, natural hazards and risks, natural resources, sustainable land use, and nutrition, the environment and health.

Master students and doctoral students want to help farmers in Ghana to replace conventional fertilisers by organic ones in arable farming. The project at the Climate-KIC Summer School received an international SEED Award.

In view of the rapidly growing world population, securing food supplies sustainably is a global challenge. That is why the Executive Board has established a new focus for research in the form of the World Food System Competence Centre (→ Page 14 ff.). The Tropentag (an annual international conference on tropical and subtropical agricultural research and natural resource management) was hosted by ETH Zurich for the first time, organised by the North-South Centre, and was also dedicated to the whole area of food. Under the title "World food system – a contribution from Europe", about 800 experts from over 80 countries discussed how the security and quality of food supplies could be sustainably developed and improved in tropical and subtropical regions.

→ www.sustainability.ethz.ch/index_EN
→ www.cces.ethz.ch
→ www.umwelt.ethz.ch
→ www.seed.ethz.ch
→ www.ecoworks.ethz.ch/index_EN

The success calls for efficient financial management

In recent years, increases in funding have not kept pace with the dynamic growth of ETH Zurich. By taking many different measures, the financial management team last year succeeded in providing the necessary resources for education, research and infrastructure. In the longer term, only additional resources and an integrated financial planning system will help.

ETH Zurich is enjoying tremendous success. The growing student numbers and the huge number of research projects that have been won competitively provide impressive proof of this. Thanks to its ability to focus its education and research on the problems that are relevant to society, the university has further consolidated its leading international position. However, this successful trend is accompanied by a growing need for finance, to overcome shortfalls in the infrastructure and maintain the quality of the education provided. Continuous increases in efficiency and tapping into new sources of third-party funding are not in themselves able to make up the difference sustainably. Rather, what is needed is growth in real terms, and assured for the long term, in the global budget based on the federal financial contribution.

In 2010, ETH Zurich's budget appropriations amounted to 1359 million francs (up 4 percent on 2009). Of that, 1082 million francs were accounted for by the federal financial contribution (incl. the real estate investment credit). The total expenditure financed by third-party funding rose to 277 million francs. Especially what is called secondary funding, i.e. funding for research that is obtained competitively from the Swiss National Science Foundation, the EU, the CTI and federal research contracts, was again unusually high, up 12 percent on the previous year.

"To secure our academic development, we must fully exploit all potential sources of financing."

Robert Perich, Vice President Finance and Controlling

Innovative research projects need infrastructure

ETH Zurich is one of the most prestigious research universities in the world. Every year, scientists at ETH Zurich apply successfully for national and international research funding (→ Page 14 ff.). Whereas in the last ten years the federal financial contribution (primary funding) has increased by only an average of 0.9 percent per year when adjusted for inflation, the volume of project-based secondary and third-party funding obtained competitively has more than doubled in the same period. However, this success cuts both ways: the money acquired in this way is specifically earmarked for individual research projects and so is not available for other purposes, most importantly education. Even for the research projects, it generally only covers immediate staffing costs for the researchers involved, and some material costs. However, it does not help to bear the cost of the infrastructure which is essential for the successful completion of a project, especially in the experimental sciences. This includes premises with modern laboratory workstations and specialist scientific apparatus. Calculations based on full costs show that project sponsorship only covers 55 percent of what such a project actually costs. The remaining 45 percent are indirect (infrastructure) costs. There is therefore additional expenditure equating to 80 percent of the amount promised in project sponsorship.

Admittedly, nowadays most project sponsorship includes what is called an overheads supplement, but this usually by no means covers the actual costs. For example, the overheads rate for the Swiss National Science Foundation is currently 15 percent. This means that the extra infrastructure costs have to be funded from the basic financing provided by the federal government (primary funding). However, this then leads to shortages elsewhere, particularly in education.

How to maintain the standard of education with continuing growth in student numbers

The continuing rapid growth in student numbers (→ Page 10 ff.) is proof that the national and international appeal of ETH Zurich as a high-profile centre of education remains as strong as ever. To maintain its quality standards in education, ETH Zurich needs more lecturers and supervisors. Severe problems with capacity on certain courses are making the organisation and conduct of classes extremely difficult. On all fronts, the demand for lecture theatres, student workspaces and places for practical work in laboratories is increasing. All these extra tasks have to be financed.

Setting priorities and efficient financial management

In view of the existing space constraints, a top priority is to renew and expand the infrastructure (→ Page 26 ff.). How to make the substantial investment required with the available resources is a big challenge for the financial managers of the university and is forcing cutbacks in other areas. In order to keep the finances on an even keel in the medium term, a long-term integrated financial planning system is essential, combined with the best possible management of resources at all levels. In 2010, the Executive Board introduced a number of measures to slow down rising costs. For example, all departments and administrative areas are receiving less money for 2011; budgets for basic financing were cut by 2.5 percent.

Individual steps also help with savings

During 2010, numerous internal services and operational processes were examined for their potential for cost-cutting and improvement. For example, the university's own vehicle fleet was largely sold off; in future these services will be obtained from an external provider. The contracts with the suppliers and operators of catering services were also renegotiated (→ Page 28). There are targeted efforts underway in IT to make use of any existing potential for synergy: software and hardware will now be bought and operated in bulk, on a cross-departmental basis. Finally, the purchasing of goods and services will be more centrally planned and coordinated, bringing a noticeable reduction in procurement costs.

Beacon of hope from donations

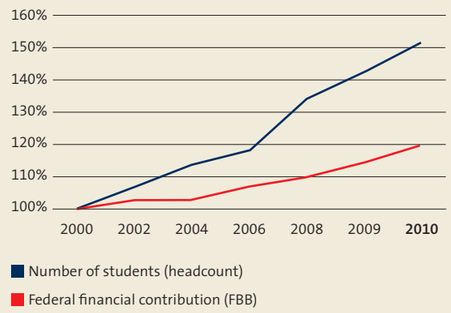
It is not least thanks to additional third-party funding in the form of donations that ETH Zurich is able to recruit new professors in forward-looking areas of research. A special role in this is played by the ETH Zurich Foundation, which, as an independent foundation under private law, obtains funds for the university from private individuals, companies and organisations. In 2010, four new professorships and three assistant professorships were set up thanks to the successful work of the ETH Zurich Foundation.

Maintaining standards of excellence

Improved financial management and extra third-party funding have helped in the short term to circumvent the structural shortfalls in financing that were appearing. Further moderate increase of project-based secondary and third-party funding, as supplementary financing, will undoubtedly also help ETH Zurich to expand and strengthen its research activities in future and, in some cases, speed up planned investment or research projects. However, if ETH Zurich is to maintain its leading position in international competition in the future, it will continue to be dependent on solid basic funding from primary sources. What is needed is growth in real terms, and assured for the long term, in the global budget based on the federal financial contribution.

→ www.fc.ethz.ch

Growth in student numbers and the federal financial contribution (indexed as of 2000)



Source: Annual Reports of the ETH Board

Growth in student numbers of +53% since 2000 must be set against growth in the federal financial contribution of only 20% in the same period.

Social commitment of ETH Zurich

ETH Zurich performs many **services** on behalf of the federal government and is responsible for **cultural facilities** in the form of museums and archives. To make its expertise accessible to society at large, it maintains a close **dialogue with the general public,** relying increasingly for that purpose on electronic knowledge platforms.

Increasing knowledge – sharing knowledge

ETH Zurich performs numerous important services. One of these is to ensure that there is a steady flow of new knowledge into society. In order to make its expertise widely accessible, ETH Zurich is relying more and more on electronic knowledge platforms.

ETH Zurich is not only a first-rate centre for education and research, but it also uses its expert knowledge to provide services for society in general. ETH expertise is in demand: in 2010, with the breakthrough of the east tunnel of the Gotthard Base Tunnel, a major milestone was reached in one of the most important construction projects of the century, and experts from ETH Zurich are involved in it in all kinds of ways (→ Page 39). Again in recent crisis situations, ETH experts have been able to be of assistance, for example when the eruption of an Icelandic volcano brought global air traffic temporarily to a standstill (→ Page 38). The Swiss Seismological Service performs a constant public service task on behalf of the federal government, while the Swiss National Supercomputing Centre CSCS in Manno/Lugano is developing and delivering technical and scientific supercomputing services for the academic world.

Climate research and economics for everyone

A key theme of the many and varied services which the university provides for the general public is to make relevant knowledge widely accessible. In this, electronic knowledge platforms of all kinds are becoming more and more important. In its first year, the ETH climate blog brought together climate experts from ETH Zurich, industry and society on a publicly accessible platform. The general public had the opportunity not only to share in the climate knowledge of the experts but also to take part in the discussion with their own contributions. The blog entries are now also published by "news.ch" and "Beobachter online".

As a consequence of the financial crisis, demand by the general public for economic expertise has increased hugely. In order to be able to make its knowledge available to society even more easily than before, the Swiss Institute for Business Cycle Research KOF at ETH Zurich (KOF) launched the Internet platform "Ökonomenstimme" (Voice of Economists). Since March 2010, economists have been presenting the results of their research to the German-speaking public on this platform. It works closely with media partners such as the "Handelsblatt", "Neue Zürcher Zeitung" and "Die Presse" and with the English-language economists' platform "Vox" in Great Britain and its equivalents in France, Italy, Spain and the Netherlands.

"Digital knowledge platforms make knowledge available to all."

Ralph Eichler, President of ETH Zurich

ETH Library Knowledge Portal

One of the key knowledge hubs is the ETH Library (ETH-Bibliothek). Its services and resources are also available to the general public. By setting up its new Knowledge Portal on the Internet, the ETH Library is responding to the changed information needs and working methods in the academic world and the expectations of what are called "digital natives", young people who have grown up with digital technologies. The portal provides a central point of access allowing searches for electronic and printed documents in all kinds of information resources.

Search engine technology is used to query different information sources at the same time – a total of about 29 million documents. These include all the stock of the NEBIS library network which lists the holdings of about 90 different libraries, the document server ETH E-Collection, the Online Image Archival Database and the Online Archival Database. Furthermore, the Digital Article Database Service DADS provided by the Technical Information Center of Denmark is used to search the metadata for about 25 million electronic journal articles. The portal also incorporates the retro.seals.ch platform, giving access to full-text versions of about 100 journals in digitised format. Over the next few years, other information services will be added to the Knowledge Portal, making it the main, all-inclusive search tool for ETH Zurich and the general public.

However, it is not only digital searching which has been expanded. The ETH Library is also specifically preparing for the future of the electronic library. The aim is to make more and more content available digitally. As an important centre of expertise, the ETH Library is providing vital assistance in a number of projects with the digitisation of books, journals, images and archive material. For example, it is working with the C.G. Jung Institute on digitising a valuable collection of books on alchemy. The ETH Library plays a national role in the E-lib.ch project. This cooperation project, with about 20 subprojects, is preparing for the Electronic Library of Switzerland. The leadership and coordination of the whole project is based at the ETH Library. The ETH Library has also been commissioned to carry out a digital data preservation project designed to secure the data of ETH Zurich for the future.

The new Knowledge Portal: digital collections, search platforms and sorting by subject area allow quick access to digitised documents.

Max Frisch Archive ready for the 100th anniversary

The Max Frisch Archive at the ETH Library also greatly strengthened its electronic presence on the Internet during 2010. In this way, the archive is preparing for the forthcoming 100th anniversary of the birth of Max Frisch in 2011, which will be marked by a number of exhibitions and special events. Since March 2010, the new archive database has allowed people to search the holdings of the archive. Then in December an image database went online, containing about 3500 photographs so far for which the content and copyrights have been indexed. This visual access enables both researchers and the wider public to take a new look at the life and works of Max Frisch.

→ http://blogs.ethz.ch/klimablog
→ www.oekonomenstimme.org
→ www.library.ethz.ch/en
→ www.mfa.ethz.ch/en

Library Statistics

Overall holdings	7,617,000
of which individual works and journal volumes	2,858,000
of which current printed journals	5,330
Electronic documents	277,000
of which licensed electronic journals	13,000
of which e-books	63,000
of which e-collection	24,000
Borrowed	282,000
Articles from journals (copies sent)	112,000
E-collection hits	2,025,000
Electronic journal hits (extrapolation)	3,619,000
Database hits (extrapolation)	752,000

As of 31.12.2010

Eyjafjallajökull: ash measurements confirm the official decision

In April, the ash-laden eruption of the Icelandic volcano Eyjafjallajökull brought air traffic in the northern hemisphere to a standstill for days. While everyone in Europe was loudly debating whether or not the flight ban was justified on the basis of modelling of the ash clouds, ETH scientists from the Institute for Atmospheric and Climate Science were the first to use sophisticated measuring equipment to determine the concentration of ash particles in the ash clouds over continental Europe. The measurements taken by the team led by ETH Professor Thomas Peter showed that the closing down of the air space to aircraft was not an excessively cautious move. In the night from 16 to 17 April 2010, one of the probes, at four kilometres up in the air, measured about 80 micrograms of volcanic particles per cubic metre of air, with an estimated average diameter of about 3 micrometres. A few days later, the researchers even detected a concentration of up to 600 micrograms per cubic metre of air. To compare: on average over the year, the concentration of fine dust in Zurich is about 50 micrograms per cubic metre. The researchers came to the conclusion that, to make a scientifically sound decision, tests would have to be carried out on aircraft engines to find out what volume of volcanic particles they could withstand. Without working out a limit value in this way, the air space could not be opened up with such a concentration of particles, because the risk was too great. If the aerosols (minute particles) of glass-like ash got into the jet engines of the aircraft, they could be melted by the tremendous heat there and stick to the turbines, which would cause malfunctions.

ETH scientists calculated the concentration of ash particles in the ash clouds from the volcano Eyjafjallajökull.

ETH expertise

To carry out the measurements, the scientists released measuring balloons into the sky which penetrated the clouds of aerosols. Secured to the balloons were backscatter cloud probes developed by ETH Zurich, the first of their kind in the world. The probes, the size of a cigarette packet, can emit light on two wavelengths. The light is deflected back by the ash/glass particles and measured by the probe. By analysing the backscattered light, the scientists are able to estimate the number density and size of the aerosol particles. The product of these two figures provides the concentration of ash/glass particles in the atmosphere.

→ www.iac.ethz.ch/groups/peter

40 years of training and research for developing countries

In November, the Postgraduate Study Programme on Developing Countries (NADEL) celebrated its 40th anniversary. On the continuing education courses run by NADEL, including the Master of Advanced Studies, university graduates are trained to work with developing countries. Some courses are specifically aimed at specialists already working in the field of partnership with developing countries. The postgraduate programme is part of the Department of Humanities, Social and Political Sciences (D-GESS) at ETH Zurich, and, in addition to providing education, it also conducts research, mainly on economic and social science aspects of working with developing countries. NADEL employees also carry out scientific consultancy work for development organisations. Over the past 40 years, more than 600 new specialists have been trained on the postgraduate courses at NADEL (and its predecessor INDEL). 700 people have participated in individual continuing training courses and about 250 students have completed a Certificate of Advanced Studies. NADEL currently employs 18 staff, 10 lecturers and an ever-growing pool of over 60 guest lecturers from Switzerland and elsewhere.

→ www.nadel.ethz.ch/index_EN

Gotthard breakthrough: a success for ETH Zurich too

The breakthrough of the east tunnel of the Gotthard Base Tunnel took place on 15 October 2010. This marked one of the most important milestones in this major construction project of the century. Since the late 1990s, research groups from ETH Zurich have been closely involved in the building of the two tunnels between Erstfeld and Bodio, alongside the developer AlpTransit Gotthard AG (ATG) and dozens of engineering companies. Georgios Anagnostou, Professor in Underground Construction at the Institute for Geotechnical Engineering, is a member of the AlpTransit Expert Advisers Group and assists project managers on matters relating to the tunnelling. The findings of his predecessor, Kalman Kovári, and of the Construction Technology working group, led to the development of a range of new measuring instruments, calculation procedures and testing techniques which made a vital contribution to the success of the project.

Kovári and Anagnostou advised ATG, among other things, on the notorious Tavetsch Intermediate Massif, a 1.1 kilometre long geological fault zone beneath Sedrun. Ten to fifteen million years ago, the kakirites there were crushed under enormous pressure, so that now the rock crumbles in your hand. At one time, critics of the tunnel regarded the Intermediate Massif as one of the main reasons why the project would fail. Anagnostou's team helped ATG by carrying out laboratory tests as the construction work proceeded. By using modelling calculations, the researchers were able to judge how the rock would behave when the tunnel was driven through it. It was only thanks to these that it was possible to pass through the Tavetsch Intermediate Massif safely.

For two tunnel boring machines to meet requires very accurate surveying – and the expertise of ETH Zurich.

Predicting torrents and correcting deflections

Simon Löw, Professor of Engineering Geology at the Geological Institute at ETH Zurich, an expert in the flow of ground water during tunnelling, is still advising ATG now that the breakthrough has been made. During the months before the breakthrough, up to 20 litres of water a second were flowing from sometimes barely visible crevices in the east tunnel near Faido. Such quantities are not a problem for the miners. It was a different matter during the digging in Erstfeld: there up to 400 litres of water a second were flooding into the tunnel. In the early 1990s, Löw and his researchers had calculated the flows which could be expected, and were therefore able to estimate in advance how much water could be expected in certain sections of the mountain.

For two tunnel boring machines to meet in the middle of a mountain requires very careful surveying. Hilmar Ingensand, Professor at the Institute of Geodesy and Photogrammetry at ETH Zurich, advised ATG on navigating the tunnel boring machines, partly with the use of an inertial measuring system developed by Ingensand with colleagues from the TU Munich. By using fixed points on the surface, the researchers were able to transmit the direction of travel for the tunnel boring machine via the inertial measuring system down the 800 metre shaft in Sedrun into the tunnel and to monitor and confirm the gyroscope measurements used as the tunnelling advanced. Four tunnel boring machines were used for the two parallel tunnels. There were two in the north near Amsteg and Erstfeld and two in the south near Bodio and Faido. The 3000-tonne monsters were continuously directed and navigated along the ideal route by the surveying experts using laser beams.

The tunnel, the longest in the world at 57 kilometres, is expected to go into operation at the end of 2017; it will significantly shorten journey times at the heart of Europe.

→ www.tunnel.ethz.ch/index_EN
→ www.engineeringgeology.ethz.ch
→ www.geometh.ethz.ch

Bringing expert knowledge to public debate

ETH Zurich contributes its extensive knowledge to public debates. Internationally, it is an important ambassador for Switzerland. For example, at the World Exhibition in Shanghai in 2010, it was one of the Swiss institutions and companies demonstrating our country's expertise in the field of sustainability.

How to make cities environmentally friendly and pleasant places to live in is one of the great challenges of the day. That is why the theme of the 2010 World Exhibition in Shanghai was "Better City, Better Life". ETH Zurich, the Chinese Academy of Sciences and swissnex China took up the subject and hosted a conference called "Future Cities" in Shanghai. On the Swiss side, the organisations involved included the Federal Office for the Environment, the ETH Board, EAWAG, the industry association Swissmem and the Holcim Foundation. At the same time, in the Expo Pavilion, there was an exhibition about the new Monte Rosa Hut.

New focus for research on the world food system: talks between scientists and industry representatives.

Contributions to debate by ETH Zurich

ETH Zurich was also represented at the World Economic Forum (WEF) in Davos in February 2010. At a workshop session, the ETH Professors Marc Angélil and Ralph Müller, together with two professors from EPF Lausanne, presented research results from the two universities on the subject of the ageing society. The WEF was also the occasion for a meeting of the Global University Leaders Forum (GULF), comprising 23 leading universities from nine countries.

The European Research Area and the role of excellence at universities were subjects under discussion at a meeting at the European Commission in Brussels in mid-October 2010. ETH President Ralph Eichler and Roland Siegwart, Vice President Research and Corporate Relations, talked to such figures as Robert-Jan Smits, Director-General of DG Research at the European Commission, about new developments in research and innovation.

The Europa Forum 2010 in Lucerne also considered the themes of education, research and innovation. President of the Swiss Confederation Doris Leuthard pointed out in her address that Switzerland would have to offer better conditions in terms of location than other countries if it was to hold its own in the global competition for talent. In the podium discussion which followed, ETH President Ralph Eichler explained how Swiss universities were able to recruit the best brains thanks to their high degree of autonomy. In this context he referred to the importance of public budget funding.

Guests at ETH Zurich

ETH Zurich itself also provides platforms for public debate. For example, the question of budget resources was discussed at a panel event at ETH Zurich, at which Mauro Dell'Ambrogio, State Secretary for Education and Research, gave the opening address. Pleasing news for ETH Zurich was that Dell'Ambrogio believed it was possible that the federal government could in future take over the infrastructure costs that are incurred when the two Swiss Federal Institutes of Technology are successful in obtaining third-party funding (→ Page 32 ff.). A disillusioning picture of the outcome of the Bologna Reform was painted at a platform discussion by representatives of university lecturers' associations in Germany, Austria and Switzerland. In particular, there has been no increase in mobility among students in Europe.

At an international event following the Climate Change Conference in Copenhagen in December 2009, the U.S. Congressman Jim Sensenbrenner took part in a debate with ETH researchers on strategies to combat climate change.

In June 2010, the visit by the former Secretary General of the UN, Kofi Annan, attracted a large audience. He received the Richard R. Ernst Medal in the ETH Main Building in front of 2000 guests. In his address, Mr Annan spoke about the role of science in society. In view of the problems facing us, he said a new Copernican Revolution was needed in the interests of global sustainability.

Earthquake simulator moves into *focus*Terra

01 – After spending three years touring Switzerland to make people aware of the dangers of earthquakes, since January 2010 the earthquake simulator has been a permanent exhibit at the *focus*Terra museum at ETH Zurich. The Federal Office for the Environment had the earthquake simulator developed with support from the Building Insurance of the Canton of Fribourg and the Foundation for Structural Dynamics and Earthquake Engineering, and it was then built in the USA: it is a room weighing nearly three tonnes, which is shaken at the command of a computer. The computer sends recorded signals from a real earthquake, up to a magnitude of 8, to an electric motor. That makes the room, which rests on 48 wheels, shake. Depending on the strength of the simulated earthquake, flower-pots may fall from the shelves and vases topple over.

→ www.focusterra.ethz.ch/museum/simulator/index_EN

Strong presence in Shanghai

02 – ETH Zurich had a unique opportunity to highlight its activities internationally and, especially, in the host country China, by appearing at Expo 2010 in Shanghai. Together with the Chinese Academy of Sciences and swissnex China, ETH Zurich hosted the "Future Cities" conference in the Swiss Expo Pavilion, on the theme of the World Exhibition, "Better City, Better Life". The subjects addressed included water management, sustainable building, mobility and air quality. An exhibition about the new Monte Rosa Hut brought the subject of sustainable building alive for visitors to the Expo. The conference and the exhibition were opened on 13 September 2010 by the Chinese Minister of Water Resources Lei Chen and Swiss Federal Councillor Moritz Leuenberger, in the role of patron. The two ministers expressed their satisfaction at the partnership between two leading global scientific institutions on this subject.

→ www.swisspavilion.ch

Living Science City becomes an established meeting place

03 – Since 2003, under the name Science City, ETH Zurich has been developing the Hönggerberg site into a place where science and the general public can meet ("Treffpunkt"). With the opening of the Sports Centre in 2009 and the Alumni Lounge in 2010, two major projects have been completed. With its popular events, the Treffpunkt Science City scheme has once again attracted countless visitors to the Hönggerberg. With over 3500 visitors, the guided tours were further expanded. The project team has also implemented the winning suggestion from an ETH Ideas Competition: an autumn market selling produce from the local area. Science has even become more visible: students have designed colourful seating for the outside areas, produced using the industrial robot belonging to the Professorship Gramazio & Kohler. The European Foundation for Culture, Pro Europa, presented Science City and its promoter Professor Gerhard Schmitt with the 2010 European Cultural Award for Science.

→ www.sciencecity.ethz.ch

ETH Zurich – names and facts

Detailed **figures** about finance, staffing and students give a picture of the past year. **Honours and prizes** express recognition for outstanding work. With **new professors** and **donations,** ETH Zurich is on course for a successful future.

Development of ETH Zurich

In the autumn semester of 2010, **6021** students began courses at ETH Zurich. That is over twice as many **new admissions** as ten years ago. The total number of **students** rose again to **16,342** (headcount). This means that 53 percent more young people are studying at ETH Zurich today than in the year 2000. Since students can register for more than one programme, the number of enrolments is even higher, at 17,172. ETH Zurich's **budget appropriations** amounted to **1359 million francs**. Of that, 1082 million francs came from the federal financial contribution. The increase in student numbers by 53 percent since 2000 must be set against a rise in the federal financial contribution of only 20 percent in the same period. On the following pages you can find detailed statistics and further explanatory remarks.

Students	2000	2006	2007	2008	2009	2010
New admissions, registrations (details from page 46)	**2,614**[1]	**3,917**	**4,433**	**5,314**	**6,073**	**6,021**
Percentage women	*28.0%*	*32.0%*	*30.3%*	*31.5%*	*32.2%*	*31.6%*
Percentage foreigners	*26.1%*	*30.0%*	*30.3%*	*37.6%*	*37.6%*	*40.1%*
Bachelor students	0	2,002	1,994	2,167	2,443	2,450
Master students	0	729	1,278	1,455	1,871	1,860
Diploma students	1,717	18	2	0	0	0
Visiting/exchange students	98	127	112	461	459	474
Doctoral students	613	770	745	922	939	957
MAS/MBA students	186	271	302	309	361	280
Students, headcount (details from page 47)	**10,693**[1]	**12,689**	**13,233**	**14,310**	**15,378**	**16,342**
Percentage women	*25.1%*	*29.3%*	*29.7%*	*30.4%*	*30.6%*	*30.9%*
Percentage foreigners	*20.3%*	*24.1%*	*26.6%*	*31.0%*	*33.2%*	*34.9%*
Total registrations	10,779	13,274	13,997	15,093	16,228	17,172
Bachelor students	0	6,320	6,821	7,134	7,628	8,101
Master students	0	1,248	2,284	2,987	3,701	4,235
Diploma students	8,130	2,429	1,408	848	463	220
Visiting/exchange students	83	88	112	345	355	322
Doctoral students	2,262	2,794	2,907	3,205	3,396	3,521
MAS/MBA students	304	395	465	574	685	773
Student-faculty ratio	32.1	35.4	35.9	38.5	39.6	39.6
Graduations (details from page 49)	**1,890**[1]	**2,379**	**2,932**	**3,171**	**3,410**	**3,382**
Percentage women	*25.1%*	*29.8%*	*29.2%*	*28.3%*	*29.7%*	*31.2%*
Bachelor degrees	0	381	838	1,086	1,203	1,283
Master degrees	0	271	425	861	1,143	1,257
Diplomas	1,191	932	884	445	174	18
Doctorates	523	569	572	566	651	650
Diplomas for continuing education programmes	176	226	213	213	239	174
Personnel (details from page 52)						
Staff, headcount	**7,453**	**8,697**	**8,726**	**9,049**	**9,572**	**9,809**
Total full-time equivalents	5,464	6,463	6,560	6,741	7,111	7,284
Percentage women	*26.4%*	*29.1%*	*29.6%*	*30.3%*	*30.4%*	*30.7%*
Professors	333	359	368	372	388	413
Scientific staff	3,390	3,822	3,935	4,109	4,364	4,479
Technical, IT and administrative staff	1,624	2,152	2,126	2,123	2,212	2,241
Apprentices	117	130	131	138	146	150
Finances (details from page 54)						
Expenditure (in million CHF)	**1,058.9**	**1,172.7**	**1,217.1**	**1,263.8**	**1,306.9**	**1,359.3**
Federal financial contribution (in million CHF)	914.9[2]	983.6	965.5	1,001.4	1,039.3	1,081.8[3]
Third party resources (in million CHF)	144.0	189.1	251.6	262.4	267.5	277.4

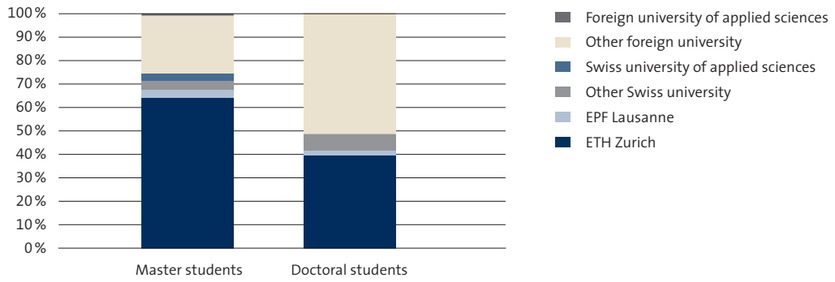
[1] Students in 2000–2008: excludes physical education and sports teacher as well as professional officer training, which end with a Federal Diploma.

[2] Federal financial contribution in 2000: incl. funding from other federal agencies amounting to CHF 4.1 million.

[3] Federal financial contribution in 2010: advance funding of CHF 12.4 million in connection with implementing the HPCN strategy/the new CSCS building will not be used until 2011.

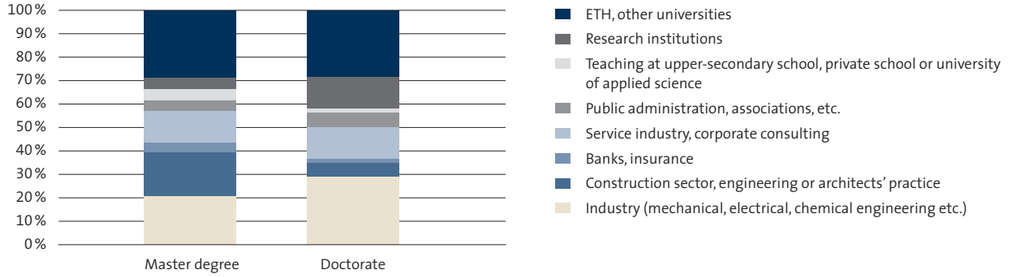
Where Master and doctoral students at ETH Zurich came from (percentages, in the 2010 autumn semester)

Nearly two-thirds of the Master students at ETH Zurich took their Bachelor degrees at ETH Zurich. About 25 percent begin a Master programme at ETH Zurich, having graduated from a foreign university. Well over half of doctoral students come to ETH Zurich from a foreign university. The specific countries of origin are listed on Page 48.

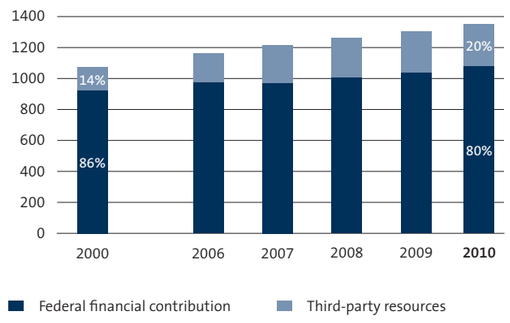


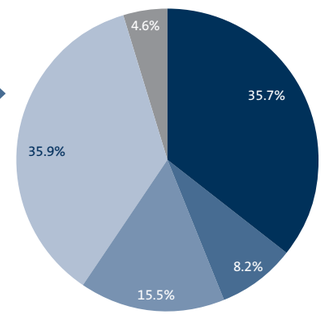
Where the 2010 ETH graduates were working, 2 to 3 months after graduating

The ETH Zurich employment statistics for 2010 show the jobs taken up by graduates 2 to 3 months after graduating. Graduates with a Master degree working at ETH or other universities are largely doctoral students, while most of the graduates with doctorates working in these institutions (and in research institutions) are engaged in research as post-docs. More information about degrees is available on Page 49.



Financing of total expenditure





Origin of expenditure funded by third parties

- National organisations (research sponsorship)
- Research contracts from federal offices (federal research contracts)
- European research programmes (framework programmes)
- Partnerships with business, other third-party funding
- Endowments and legacies

New students

	Total		Bachelor students		Master students		Visiting/exchange students		Doctoral students		MAS/MBA students[1]	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Total registrations	**6,073**	**6,021**	**2,443**	**2,450**	**1,871**	**1,860**	**459**	**474**	**939**	**957**	**361**	**280**
Percentage women	*32.2%*	*31.6%*	*31.0%*	*30.3%*	*32.9%*	*30.3%*	*30.9%*	*31.2%*	*32.1%*	*33.9%*	*38.0%*	*43.9%*
Percentage foreigners	*37.6%*	*40.1%*	*19.1%*	*21.0%*	*35.8%*	*36.0%*	*94.3%*	*96.8%*	*63.5%*	*66.8%*	*33.5%*	*46.4%*
Programmes												
Architecture and Building Sciences	**1,250**	**1,193**	**537**	**580**	**420**	**357**	**109**	**79**	**86**	**102**	**98**	**75**
Architecture	715	654	296	303	267	196	75	53	19	32	58	70
Civil Engineering	274	299	154	164	64	75	11	15	45	45	0	0
Environmental Engineering	170	167	70	88	56	55	10	5	14	14	20	5
Geomatics and Planning	91	73	17	25	33	31	13	6	8	11	20	0
Engineering Sciences	**1,869**	**1,836**	**835**	**793**	**587**	**568**	**159**	**177**	**284**	**295**	**4**	**3**
Mechanical Engineering	818	790	465	438	182	180	62	64	109	108	0	0
Information Technology and Electrical Engineering	385	393	177	157	87	100	35	43	86	93	0	0
Biosciences and Engineering	76	77	0	0	61	49	0	0	15	28	0	0
Interdisciplinary Engineering Sciences	88	85	0	0	88	85	0	0	0	0	0	0
Computer Science	381	355	147	153	134	112	46	48	50	39	4	3
Materials Science	121	136	46	45	35	42	16	22	24	27	0	0
Natural Sciences and Mathematics	**1,895**	**1,835**	**809**	**784**	**557**	**568**	**96**	**117**	**324**	**307**	**109**	**59**
Mathematics	294	293	129	111	100	124	24	25	30	28	11	5
Computational Science and Engineering	33	41	12	17	15	23	1	0	5	1	0	0
Physics	373	414	158	176	103	107	29	29	64	66	19	36
Chemistry	218	240	69	63	47	69	20	33	71	68	11	7
Chemical Engineering	67	78	25	31	27	22	0	0	15	25	0	0
Interdisciplinary Sciences	74	67	56	49	15	14	0	0	3	4	0	0
Pharmaceutical Sciences	205	201	97	112	64	62	9	4	35	23	0	0
Biology	391	312	150	113	114	83	12	24	93	86	22	6
Human Movement Sciences	240	189	113	112	72	64	1	2	8	6	46	5
System-oriented Natural Sciences	**694**	**770**	**244**	**280**	**209**	**259**	**32**	**38**	**185**	**181**	**24**	**12**
Earth Sciences	154	171	40	33	68	95	10	5	31	35	5	3
Environmental Sciences	312	337	114	126	86	101	12	19	100	91	0	0
Forest Sciences	2	0	0	0	0	0	0	0	2	0	0	0
Agricultural Sciences	86	110	27	48	22	25	3	7	33	30	1	0
Food Sciences	140	152	63	73	33	38	7	7	19	25	18	9
Management and Social Sciences	**365**	**387**	**18**	**13**	**98**	**108**	**63**	**63**	**60**	**72**	**126**	**131**
Management, Technology and Economics	267	256	0	0	72	72	60	57	40	41	95	86
Humanities, Social and Political Sciences	80	118	0	0	26	36	3	6	20	31	31	45
Professional Officer	18	13	18	13	0	0	0	0	0	0	0	0

[1] Students taking the teaching diploma for grammar schools or the MAS in Secondary and Higher Education are shown in the "MAS/MBA students" category. These two programmes certify graduation from a teacher training course.

Students

Students can enrol on more than one course at the same time. This is why the number of enrolments is higher than the number of people (headcount). For the purposes of the headcount, students are only counted on their main course (e.g. as Master students if they have enrolled on both Bachelor and Master courses).

	Total		Bachelor students		Master students		Diploma students		Visiting/exchange students		Doctoral students		MAS/MBA students[1]	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Headcount	**15,378**	**16,342**	**7,037**	**7,483**	**3,701**	**4,233**	**395**	**191**	**355**	**322**	**3,388**	**3,507**	**502**	**606**
Percentage women	*31%*	*31%*	*30%*	*30%*	*31%*	*31%*	*40%*	*38%*	*28%*	*25%*	*30%*	*32%*	*36%*	*40%*
Percentage foreigners	*33%*	*35%*	*18%*	*19%*	*34%*	*36%*	*11%*	*13%*	*94%*	*96%*	*61%*	*63%*	*34%*	*35%*
Total registrations	**16,228**	**17,172**	**7,628**	**8,101**	**3,701**	**4,235**	**463**	**220**	**355**	**322**	**3,396**	**3,521**	**685**	**773**
Programmes														
Architecture and Building Sciences	**3,106**	**3,462**	**1,767**	**1,987**	**767**	**931**	**43**	**6**	**89**	**55**	**306**	**338**	**134**	**145**
Architecture	1,796	1,934	1,054	1,112	453	576	36	4	59	31	102	104	92	107
Civil Engineering	735	876	454	564	130	150	2	0	11	13	138	149	0	0
Environmental Engineering	373	440	199	244	108	129	4	2	9	3	33	44	20	18
Geomatics and Planning	202	212	60	67	76	76	1	0	10	8	33	41	22	20
Engineering Sciences	**5,013**	**5,268**	**2,517**	**2,641**	**1,193**	**1,317**	**64**	**33**	**117**	**115**	**1,111**	**1,146**	**11**	**16**
Mechanical Engineering	2,081	2,272	1,262	1,389	383	436	18	9	48	50	370	388	0	0
Information Technology and Electrical Eng.	1,180	1,162	556	547	228	231	19	12	30	27	347	345	0	0
Biosciences and Engineering	143	190	5	23	113	114	0	0	0	0	25	53	0	0
Interdisciplinary Engineering Sciences	146	183	0	0	146	183	0	0	0	0	0	0	0	0
Computer Science	1,066	1,075	510	516	259	272	25	11	29	29	232	231	11	16
Materials Science	397	386	184	166	64	81	2	1	10	9	137	129	0	0
Natural Sciences and Mathematics	**5,095**	**5,239**	**2,342**	**2,447**	**974**	**1,111**	**264**	**132**	**80**	**80**	**1,155**	**1,135**	**280**	**334**
Mathematics	706	740	353	360	156	218	41	15	19	14	94	96	43	37
Computational Science and Engineering	116	128	76	78	32	42	0	0	1	0	7	8	0	0
Physics	1,005	1,079	460	500	174	211	54	22	24	23	238	243	55	80
Chemistry	620	623	201	186	75	108	29	14	17	25	274	257	24	33
Chemical Engineering	187	197	93	93	39	39	0	0	0	0	55	65	0	0
Interdisciplinary Sciences	193	193	151	148	24	27	1	0	0	0	17	18	0	0
Pharmaceutical Sciences	528	547	304	327	118	127	6	2	7	2	93	89	0	0
Biology	1,069	1,074	352	397	210	202	91	58	11	14	358	342	47	61
Human Movement Sciences	671	658	352	358	146	137	42	21	1	2	19	17	111	123
System-oriented Natural Sciences	**2,241**	**2,350**	**944**	**972**	**504**	**574**	**90**	**49**	**21**	**24**	**634**	**679**	**48**	**52**
Earth Sciences	467	516	164	173	143	171	6	2	9	5	131	146	14	19
Environmental Sciences	1,066	1,077	439	428	236	257	65	36	6	12	319	344	1	0
Forest Sciences	6	3	0	0	0	0	5	3	0	0	1	0	0	0
Agricultural Sciences	302	311	123	135	39	52	9	4	2	2	123	113	6	5
Food Sciences	400	443	218	236	86	94	5	4	4	5	60	76	27	28
Management and Social Sciences	**773**	**853**	**58**	**54**	**263**	**302**	**2**	**0**	**48**	**48**	**190**	**223**	**212**	**226**
Management, Technology and Economics	570	598	0	0	219	233	2	0	45	45	129	144	175	176
Humanities, Social and Political Sciences	145	201	0	0	44	69	0	0	3	3	61	79	37	50
Professional Officer	58	54	58	54	0	0	0	0	0	0	0	0	0	0

[1] Students taking the teaching diploma for grammar schools or the MAS in Secondary and Higher Education are shown in the "MAS/MBA students" category. These two programmes certify graduation from a teacher training course and replace the Certificate of Teaching Ability. Students on the Certificate of Teaching Ability course are shown in the "Diploma students" category.

Foreign students by nationality in autumn 2010

Foreign-educated students are people of other nationalities who lived abroad before commencing their studies. They are therefore foreigners who come to Switzerland for the purpose of studying.

	2010		Bachelor students		Master students		Diploma students		Visiting/exchange students		Doctoral students		MAS/MBA students	
	Total	*in %*		*in %*		*in %*		*in %*		*in %*		*in %*		*in %*
Total	**5,214**	**100.0**	**1,113**	**100.0**	**1,403**	**100.0**	**20**	**100.0**	**308**	**100.0**	**2,159**	**100.0**	**211**	**100.0**
EU	**3,800**	***72.9***	**1,000**	***89.8***	**848**	***60.4***	**16**	***80.0***	**214**	***69.5***	**1,576**	***73.0***	**146**	***69.2***
Germany	2,249	*43.1*	676	*60.7*	488	*34.8*	9	*45.0*	56	*18.2*	945	*43.8*	75	*35.5*
Austria	302	*5.8*	127	*11.4*	48	*3.4*	4	*20.0*	10	*3.2*	99	*4.6*	14	*6.6*
Italy	258	*4.9*	27	*2.4*	35	*2.5*	0	*0.0*	18	*5.8*	173	*8.0*	5	*2.4*
France	144	*2.8*	20	*1.8*	48	*3.4*	1	*5.0*	11	*3.6*	60	*2.8*	4	*1.9*
Luxembourg	142	*2.7*	89	*8.0*	32	*2.3*	1	*5.0*	0	*0.0*	18	*0.8*	2	*0.9*
Greece	133	*2.6*	8	*0.7*	58	*4.1*	0	*0.0*	0	*0.0*	50	*2.3*	17	*8.1*
Netherlands	77	*1.5*	2	*0.2*	22	*1.6*	0	*0.0*	25	*8.1*	27	*1.3*	1	*0.5*
Sweden	77	*1.5*	4	*0.4*	6	*0.4*	0	*0.0*	46	*14.9*	21	*1.0*	0	*0.0*
Poland	63	*1.2*	6	*0.5*	12	*0.9*	0	*0.0*	3	*1.0*	34	*1.6*	8	*3.8*
Romania	54	*1.0*	7	*0.6*	21	*1.5*	0	*0.0*	1	*0.3*	23	*1.1*	2	*0.9*
Spain	52	*1.0*	11	*1.0*	10	*0.7*	0	*0.0*	9	*2.9*	18	*0.8*	4	*1.9*
Great Britain	36	*0.7*	2	*0.2*	7	*0.5*	0	*0.0*	6	*1.9*	20	*0.9*	1	*0.5*
Belgium	27	*0.5*	2	*0.2*	8	*0.6*	0	*0.0*	5	*1.6*	11	*0.5*	1	*0.5*
Others	186	*3.6*	19	*1.7*	53	*3.8*	1	*5.0*	24	*7.8*	77	*3.6*	12	*5.7*
Rest of Europe	**394**	***7.6***	**72**	***6.5***	**150**	***10.7***	**2**	***10.0***	**18**	***5.8***	**131**	***6.1***	**21**	***10.0***
Turkey	130	*2.5*	31	*2.8*	60	*4.3*	0	*0.0*	2	*0.6*	35	*1.6*	2	*0.9*
Russia	74	*1.4*	3	*0.3*	18	*1.3*	0	*0.0*	3	*1.0*	44	*2.0*	6	*2.8*
Liechtenstein	56	*1.1*	29	*2.6*	10	*0.7*	2	*10.0*	1	*0.3*	11	*0.5*	3	*1.4*
Republic of Serbia	39	*0.7*	2	*0.2*	19	*1.4*	0	*0.0*	1	*0.3*	11	*0.5*	6	*2.8*
Others	95	*1.8*	7	*0.6*	43	*3.1*	0	*0.0*	11	*3.6*	30	*1.4*	4	*1.9*
Asia	**671**	***12.9***	**30**	***2.7***	**258**	***18.4***	**1**	***5.0***	**49**	***15.9***	**306**	***14.2***	**27**	***12.8***
China	246	*4.7*	18	*1.6*	104	*7.4*	1	*5.0*	15	*4.9*	101	*4.7*	7	*3.3*
India	147	*2.8*	1	*0.1*	66	*4.7*	0	*0.0*	3	*1.0*	70	*3.2*	7	*3.3*
Iran	74	*1.4*	0	*0.0*	21	*1.5*	0	*0.0*	1	*0.3*	49	*2.3*	3	*1.4*
Korea	33	*0.6*	5	*0.4*	14	*1.0*	0	*0.0*	1	*0.3*	11	*0.5*	2	*0.9*
Japan	28	*0.5*	0	*0.0*	4	*0.3*	0	*0.0*	14	*4.5*	8	*0.4*	2	*0.9*
Others	143	*2.7*	6	*0.5*	49	*3.5*	0	*0.0*	15	*4.9*	67	*3.1*	6	*2.8*
America	**275**	***5.3***	**7**	***0.6***	**118**	***8.4***	**1**	***5.0***	**15**	***4.9***	**122**	***5.7***	**12**	***5.7***
United States of America	91	*1.7*	1	*0.1*	40	*2.9*	1	*5.0*	7	*2.3*	40	*1.9*	2	*0.9*
Canada	49	*0.9*	0	*0.0*	21	*1.5*	0	*0.0*	3	*1.0*	25	*1.2*	0	*0.0*
Mexiko	38	*0.7*	1	*0.1*	24	*1.7*	0	*0.0*	0	*0.0*	10	*0.5*	3	*1.4*
Columbia	30	*0.6*	0	*0.0*	14	*1.0*	0	*0.0*	1	*0.3*	15	*0.7*	0	*0.0*
Brazil	27	*0.5*	3	*0.3*	5	*0.4*	0	*0.0*	2	*0.6*	14	*0.6*	3	*1.4*
Others	40	*0.8*	2	*0.2*	14	*1.0*	0	*0.0*	2	*0.6*	18	*0.8*	4	*1.9*
Africa	**55**	***1.1***	**2**	***0.2***	**21**	***1.5***	**0**	***0.0***	**9**	***2.9***	**19**	***0.9***	**4**	***1.9***
Australia and New Zealand	**19**	***0.4***	**2**	***0.2***	**8**	***0.6***	**0**	***0.0***	**3**	***1.0***	**5**	***0.2***	**1**	***0.5***

Degrees

	Bachelor degrees				Diplomas and Master degrees			
	2009	2010			2009	2010		
	Total	Total	Women	Foreigners	Total	Total	Women	Foreigners
ETH Zurich Total	**1,203**	**1,283**	**398**	**196**	**1,317**	**1,275**	**386**	**369**
Programmes								
Architecture and Building Sciences	**234**	**294**	**101**	**40**	**243**	**201**	**61**	**51**
Architecture	128	181	77	29	145	87	29	38
Civil Engineering	59	65	8	6	46	54	10	7
Environmental Engineering	34	34	10	5	30	30	13	1
Geomatics and Planning	13	14	6	0	22	30	9	5
Rural Engineering and Surveying	0	0	0	0	0	0	0	0
Engineering Sciences	**387**	**392**	**33**	**65**	**422**	**415**	**48**	**146**
Mechanical Engineering	170	181	15	43	124	142	8	41
Information Technology and Electrical Engineering	115	96	4	13	96	79	2	13
Biosciences and Engineering	0	0	0	0	20	39	11	21
Interdisciplinary Engineering Sciences	0	0	0	0	15	38	8	29
Computer Science	72	88	7	7	144	95	11	33
Materials Science	30	27	7	2	23	22	8	9
Natural Sciences and Mathematics	**379**	**363**	**144**	**73**	**424**	**424**	**169**	**103**
Mathematics	43	45	10	10	69	53	13	14
Computational Science and Engineering	14	11	1	2	10	12	0	4
Physics	66	76	15	24	75	70	5	19
Chemistry	35	38	7	8	30	33	7	11
Chemical Engineering	15	13	1	4	11	21	4	11
Interdisciplinary Sciences	7	14	3	6	15	12	4	6
Pharmaceutical Sciences	39	53	41	9	43	54	42	10
Biology	90	48	25	8	94	98	50	26
Human Movement Sciences	70	65	41	2	77	71	44	2
System-oriented Natural Sciences	**190**	**218**	**120**	**18**	**170**	**173**	**90**	**36**
Earth Sciences	37	40	21	5	57	52	17	15
Environmental Sciences	89	112	55	10	68	80	42	16
Forest Sciences	0	0	0	0	0	0	0	0
Agricultural Sciences	25	26	12	0	20	14	9	2
Food Sciences	39	40	32	3	25	27	22	3
Management and Social Sciences	**13**	**16**	**0**	**0**	**58**	**62**	**18**	**33**
Management, Technology and Economics	0	0	0	0	47	57	17	29
Humanities, Social and Political Sciences	0	0	0	0	11	5	1	4
Professional Officer	13	16	0	0	0	0	0	0
Physical Education and Sports Teacher	0	0	0	0	0	0	0	0

Doctorates

	2009 Total	2010 Total	Women	Foreigners
ETH Zurich Total	**651**	**650**	**208**	**390**
Department				
Architecture and Building Sciences	**55**	**41**	**9**	**28**
Architecture	17	16	4	9
Civil, Environmental and Geomatic Engineering	38	25	5	19
Engineering Sciences	**191**	**205**	**40**	**116**
Mechanical Engineering	71	58	4	32
Information Technology and Electrical Engineering	70	76	16	41
Computer Science	28	32	3	16
Materials Science	22	36	17	25
Biosystems	0	3	0	2
Natural Sciences and Mathematics	**268**	**250**	**84**	**159**
Mathematics	26	14	4	6
Physics	48	57	10	35
Chemistry and Applied Biosciences	101	94	29	62
Biology	93	85	41	56
System-oriented Natural Sciences	**100**	**123**	**63**	**66**
Earth Sciences	15	20	10	16
Environmental Sciences	43	59	29	27
Agricultural and Food Sciences	42	44	24	23
Management and Social Sciences	**37**	**31**	**12**	**21**
Management, Technology and Economics	28	20	8	12
Humanities, Social and Political Sciences	9	11	4	9

Certificates of continuing education programmes

Continuing education programmes

The aim of continuing education Master programmes is to give greater depth or interdisciplinary breadth to specialist skills; they may lead to a change of profession.

	2009 Total	2010 Total	Women	Foreigners
ETH Zurich Total	**239**	**174**	**61**	**90**
MAS Architecture	29	28	12	24
MAS Building Project Leadership	0	9	3	5
MAS Landscape Architecture	6	0	0	0
MAS Urban Design	14	12	9	11
MAS Hydraulic Engineering[1]	28	1	1	0
MAS Sustainable Water Resources	0	7	3	7
MAS Spatial Planning	17	1	1	0
MAS Finance[1]	17	0	0	0
MAS Medical Physics	4	11	1	2
MAS Nutrition and Health	8	5	4	1
MAS Work + Health	9	8	2	2
MAS Management, Technology and Economics	63	47	7	16
MBA Supply Chain Management	19	16	3	14
MAS Development and Cooperation (NADEL)	3	19	9	1
MAS Intellectual Property	9	8	5	7
MAS Security Policy and Crisis Management	13	2	1	0

[1] The MAS in Hydraulic Engineering is offered in cooperation with EPF Lausanne, and the MAS in Finance in cooperation with the University of Zurich; participants are enrolled at EPF Lausanne and the University of Zurich respectively.

Continuing education certificates and diplomas

The aim of certificate and diploma courses is to give greater depth or interdisciplinary breadth to specialist skills. They are intended for university graduates who are in employment and are seeking further professional development or specialisation.

Continuing education certificates	74	108	37	34
Continuing education diplomas	17	2	1	1

Teacher training

The following diplomas and certificates certify graduation from a teacher training course. These corresponding training courses have replaced the Certificate of Teaching Ability course.

Certificate of Teaching Ability	122	199	104	16
Teaching diplomas for grammar schools/MAS SHE	6	22	13	0
Certificates of Teaching Ability	7	15	8	2

Staff by discipline

The number of staff is shown in full-time equivalents (FTE) as at the end of the year and is based on the current organisational structure at ETH Zurich, even for the previous year. Due to the rounding up to the nearest integer, the line and column totals may contain rounding differences.
The breakdown by discipline reflects an internal management point of view. For internal cost control purposes, expenditure is divided into three categories: core financing and additional financing, which comes mainly from the federal financial contribution; other funds, financed entirely by third parties.

	2009			2010		
	Total	Core and additional finances	Other funds	Total	Core and additional finances	Other funds
Grand total	**7,111**	**5,513**	**1,598**	**7,284**	**5,548**	**1,735**
Total teaching and research	**6,098**	**4,512**	**1,586**	**6,241**	**4,529**	**1,712**
Departments	**5,921**	**4,387**	**1,534**	**6,060**	**4,404**	**1,656**
Architecture and Building Sciences	**807**	**665**	**142**	**829**	**669**	**160**
Architecture	348	311	37	345	307	38
Civil, Environmental and Geomatic Engineering	458	353	105	484	362	122
Engineering Sciences	**1,704**	**1,231**	**473**	**1,772**	**1,235**	**536**
Mechanical Engineering	538	397	141	592	420	172
Information Technology and Electrical Engineering	483	328	155	470	307	163
Computer Science	358	267	91	364	263	101
Materials Science	214	163	51	211	155	56
Biosystems	112	76	36	135	90	44
Natural Sciences and Mathematics	**1,932**	**1,448**	**484**	**1,985**	**1,484**	**500**
Mathematics	236	195	42	236	184	52
Physics	490	396	93	507	394	113
Chemistry and Applied Biosciences	634	467	167	661	513	148
Biology	572	390	182	581	393	188
System-oriented Natural Sciences	**993**	**715**	**278**	**979**	**701**	**279**
Earth Sciences	251	162	89	261	162	98
Environmental Sciences	407	324	83	395	312	83
Agricultural and Food Sciences	335	229	106	323	226	97
Management and Social Sciences	**484**	**328**	**156**	**496**	**315**	**181**
Management, Technology and Economics	254	188	65	264	185	79
Humanities, Social and Political Sciences	230	140	91	231	130	101
Extra-departmental teaching and research units[1]	**177**	**126**	**52**	**181**	**125**	**56**
CSCS Manno	44	40	4	53	47	6
Functional Genomics Center Zürich	14	13	2	13	12	1
Swiss Seismological service (SED)	56	25	31	57	23	35
Further teaching and research units, others	63	48	15	57	43	14
Total Executive Board, central authorities and infrastructure divisions[2]	**1,012**	**1,000**	**12**	**1,042**	**1,019**	**23**
Infrastructure divisions	881	879	2	897	888	8
Central authorities and other staff	132	122	10	146	131	15

[1] This groups together the research units as described in the ordinance concerning the organisation of ETH Zurich and further teaching and research units.

[2] The Center for Higher Education (formerly an Infrastructure Division) and ACAP (formerly under further teaching and research units) were dissolved as of 1.1.2010. Their former employees are now incorporated in the Executive Board staff offices and the associated responsibilities are carried out by new staff units.

Staff by function

	2009	2010		Change from previous year	
	Total	Total	*Percentage Women*	in FTE	*in %*
Grand total	**7,111**	**7,284**	***30.7***	**173**	***2.4***
of which temporary positions	4,895	5,006	*30.2*	111	*2.3*
Total teaching and research	**6,098**	**6,241**	***29.4***	**143**	***2.4***
of which temporary positions	4,748	4,846	*29.5*	98	*2.1*
Professorships	384	409	*10.7*	24	*6.4*
Full / Associate professorships	323	344	*7.8*	21	
Assistant professorships	61	64	*26.0*	3	
Scientific Staff	4,362	4,476	*26.9*	114	*2.6*
Senior Scientists	144	152	*10.1*	9	
Senior assistants, research and teaching associates	614	581	*20.5*	–33	
Scientific research assistants II and post doctoral students	955	1,019	*28.9*	65	
Scientific research assistants I	2,371	2,433	*28.0*	62	
Teaching/research assistants	279	290	*32.9*	12	
Technical and administrative staff	1,230	1,235	*44.3*	5	*0.4*
Technical and IT staff	765	770	*22.1*	5	
Administrative staff	465	465	*80.9*	0	
Apprentices	122	122	*33.6*	0	
Total Executive Board, central authorities and infrastructure divisions*	**1,012**	**1,042**	***38.3***	**30**	***2.9***
of which temporary positions	147	160	*49.4*	13	*8.9*
Professorships	4	4	*25.0*	0	
Scientific staff	2	4	*0.0*	1	
Technical and IT staff	475	474	*12.8*	–1	
Administrative staff	508	533	*60.9*	25	
Apprentices	24	28	*46.4*	4	
***Staff in infrastructure divisions**	**881**	**896**	***36.5***	**14**	***1.8***
Corporate Communications	27	27	*48.4*	0	*1.5*
Rectorate	58	59	*68.0*	1	*1.1*
Library	187	193	*60.1*	6	*3.4*
Finance and controlling	68	66	*41.1*	–2	*–2.5*
Real estate	314	317	*24.0*	3	*1.1*
IT services	189	193	*15.1*	4	*2.2*
Human resources	39	41	*62.0*	2	*6.2*

Overall view of expenditure

in CHF 1000

	2006	2007	2008	2009	2010	*Change from previous year in %*
Total expenditure	**1,172,661**	**1,217,086**	**1,263,802**	**1,306,889**	**1,359,255**	***4.0***
Overall expenditure (excl. Investments)	980,094	1,036,018	1,079,783	1,136,366	1,168,367	*2.8*
personnel expense	708,159	740,641	764,838	827,433	859,042	*3.8*
materials expense	271,935	295,377	314,945	308,932	309,325	*0.1*
Investments	192,568	181,068	184,019	170,523	190,888	*11.9*
Investments in building (property of the Confederation)	131,119	108,515	109,960	79,960	100,000	*25.1*
Movables (incl. buildings owned by ETH Zurich)	61,449	72,553	74,059	90,563	90,888	*0.4*
Federal financial contribution	**983,550**	**965,471**	**1,001,401**	**1,039,343**	**1,081,834**[1]	***4.1***
Overall expenditure (excl. investments)	799,912	810,914	852,808	885,374	907,015	*2.4*
personnel expenses	588,965	618,134	627,069	672,287	687,488	*2.3*
materials expenses	210,947	192,780	225,738	213,087	219,528	*3.0*
Investments	183,638	154,556	148,593	153,969	174,819	*13.5*
Investments in building (property of the Confederation)	131,119	93,515	86,400	79,960	100,000	*25.1*
Movables (incl. buildings owned by ETH Zurich)	52,520	61,041	62,193	74,009	74,819	*1.1*
Third-party funding	**189,111**	**251,615**	**262,401**	**267,546**	**277,421**	***3.7***
Overall expenditure (excl. investments)	180,181	225,104	226,975	250,992	261,351	*4.1*
personnel expenses	119,194	122,507	137,769	155,147	171,554	*10.6*
materials expenses	60,987	102,597	89,207	95,845	89,797	*–6.3*
Investments	8,929	26,512	35,425	16,554	16,069	*–2.9*
Investments in building (property of the Confederation)	0	15,000	23,560	0	0	*0.0*
Movables (incl. buildings owned by ETH Zurich)	8,929	11,512	11,865	16,554	16,069	*–2.9*

[1] Federal financial contribution in 2010: advance funding of CHF 12.4 million in connection with implementing the HPCN strategy/the new CSCS building in Lugano will not be used until 2011.

Origin expenditure of third-party resources

Total expenditure of third-party resources	**189,111**	**251,615**	**262,401**	**267,546**	**277,421**	***3.7***
National organisations (research sponsorship)	63,892	70,876	76,067	86,280	99,122	*14.9*
Research contracts from federal offices (federal research contracts)	21,807	20,912	23,140	23,443	22,873	*–2.4*
European research programmes (Framework Programmes)	21,039	26,929	34,042	37,245	42,914	*15.2*
Partnerships with business, other third-party funding	67,812	93,888	73,759	92,842	99,668	*7.4*
Endowments and legacies	14,560	39,011	55,393	27,736	12,845	*–53.7*

Expenditure by discipline

The breakdown by discipline reflects an internal management point of view. For internal cost control purposes, expenditure is divided into three categories: core financing and additional financing, which comes mainly from the federal financial contribution; other funds, financed entirely by third parties.

in CHF 1000

	2010				Use of funds by type of expenditure		
	Total	Core finances	Additional finances	Other funds	Personnel	Materials	Invest-ments
Grand total	**1,359,255**	**944,496**	**141,411**	**273,348**	**859,042**	**309,325**	**190,888**
Total teaching and research	**893,632**	**552,096**	**88,071**	**253,465**	**685,785**	**150,674**	**57,174**
Departments	**843,544**	**524,801**	**81,931**	**236,812**	**662,616**	**135,870**	**45,058**
Architecture and Building Sciences	108,825	77,714	8,507	22,604	89,875	16,388	2,563
Architecture	47,860	36,525	3,413	7,922	38,869	8,242	748
Civil, Environmental and Geomatic Engineering	60,966	41,190	5,094	14,682	51,006	8,146	1,814
Engineering Sciences	**232,171**	**147,642**	**17,280**	**67,249**	**183,021**	**35,842**	**13,308**
Mechanical Engineering	70,554	40,094	7,907	22,552	56,152	9,894	4,508
Information Technology and Electrical Engineering	60,633	36,694	3,402	20,537	50,909	7,864	1,860
Computer Science	45,065	30,990	2,948	11,126	39,169	5,063	833
Materials Science	29,419	18,788	2,939	7,692	23,236	4,352	1,830
Biosystems	26,501	21,075	84	5,342	13,555	8,668	4,278
Natural Sciences and Mathematics	**294,056**	**176,800**	**32,998**	**84,257**	**219,979**	**53,179**	**20,897**
Mathematics	34,689	25,587	2,903	6,199	31,669	3,002	18
Physics	76,616	47,258	7,767	21,591	54,510	15,419	6,687
Chemistry and Applied Biosciences	97,420	58,700	14,110	24,610	71,307	16,439	9,674
Biology	85,331	45,256	8,218	31,858	62,494	18,319	4,518
System-oriented Natural Sciences	**143,019**	**85,497**	**18,940**	**38,583**	**112,982**	**21,802**	**8,235**
Earth Sciences	38,682	20,505	5,616	12,560	29,993	5,364	3,324
Environmental Sciences	56,817	38,134	7,678	11,004	47,975	7,010	1,832
Agricultural and Food Sciences	47,521	26,858	5,645	15,018	35,014	9,428	3,078
Management and Social Sciences	**65,473**	**37,147**	**4,206**	**24,119**	**56,758**	**8,659**	**56**
Management, Technology and Economics	33,360	19,785	1,744	11,831	29,139	4,171	50
Humanities, Social and Political Sciences	32,113	17,362	2,463	12,288	27,619	4,488	6
Extra-departmental teaching and research units, others	**50,089**	**27,295**	**6,140**	**16,653**	**23,169**	**14,804**	**12,116**
Total executive board, central authorities, infrastructure divisions and building investments	**465,622**	**392,400**	**53,339**	**19,883**	**173,257**	**158,651**	**133,714**
Executive Board, central authorities and infrastructure divisions	365,622	292,400	53,339	19,883	173,257	158,651	33,714
Investments in buildings (Investment credit)	100,000	100,000					100,000

Environmental statistics

ETH Zurich has a modern system for measuring energy data. The data is collected at 15-minute intervals at thousands of measuring points and saved on a central server. Data collection has a long tradition at ETH Zurich. This means that many data is available going back to 1990. This data collection process serves ETH as an early warning system. As soon as one consumer's figures vary too widely from the norm, specific analytical processes can be launched and corrective measures taken very quickly. For a number of years, the figures have shown a clear trend towards a rise in power consumption, whereas fewer fossil fuels are being burnt on the ETH sites (natural gas and oil). This is leading to a significant decrease in the direct CO_2 emissions at ETH Zurich. By looking at long-term trends, it is possible to detect changes in consumption or to assess and monitor the effectiveness of new supply systems (such as the geothermal storage system).

	2006	2007	2008	2009	2010
Electricity	GWh				
Total electricity consumption	**103.0**	**102.5**	**107.9**	**109.8**	**113.1**
Total produced on site	**10.7**	**4.0**	**6.2**	**3.5**	**2.3**
Production from combined heat and power unit (CHP)	10.5	3.8	6.0	3.3	2.1
Production from photovoltaic cells	0.2	0.2	0.2	0.2	0.2
Total electricity purchased (EWZ)	**92.3**	**98.5**	**101.7**	**106.3**	**110.8**
Electricity purchased for buildings	81.6	87.9	89.3	94.0	96.6
Electricity purchased for Walche heat pump	10.7	10.6	12.4	12.3	14.2
Heating	GWh				
Total heat consumption of ETH Zurich (net energy)	**73.3**	**58.8**	**54.8**	**52.8**	**51.1**
Total heat produced (net energy)	101.0	83.8	82.9	80.7	81.9
Sale of heat to third parties (net energy)	–27.7	–25.0	–28.1	–27.9	–30.8
Total heat produced (net energy incl. external purchasers)	**101.0**	**83.8**	**82.9**	**80.7**	**81.9**
District heating	19.9	15.7	16.0	16.7	11.7
Walche heat pump	27.6	28.2	30.8	26.4	33.9
Fossil fuels					
Gas (excl. gas for CHP electricity)	53.3	48.3	40.0	40.4	38.5
Oil	8.4	0.0	0.0	0.0	0.0
Non-fossil fuels					
Woodchips	0.6	0.5	0.6	0.7	0.7
From heat recovery	5.1	4.7	9.6	10.6	10.9
Losses during conversion	–13.9	–13.6	–14.1	–14.0	–13.8
Relative amounts					
Electricity consumption [kWh/FTE[1]], excl. power for heat pump	7,035	6,842	6,682	6,392	6,176
Heat consumption/energy-consuming area [kWh/m²]	122	101	89	85	83
Total energy consumption/FTE [kWh/FTE]	12,619	11,220	10,516	9,853	9,369
Total energy consumption/energy-consuming area [kWh/m²]	275	260	243	242	242

[1] Students count as 0.68 FTE

Emissions of CO_2 equivalents	tonnes CO_2eq				
Total CO_2eq emissions	**24,904**	**21,421**	**23,613**	**23,902**	**25,258**
Direct CO_2eq emissions					
Gas and district heating	11,578	8,853	8,840	8,178	7,806
Oil	576	0	0	0	0
Coolants (recorded once in 2009)	n.a.	n.a.	n.a.	62	62
Indirect CO_2eq emissions					
Purchased current (EWZ/EKZ)	1,446	1,316	1,377	1,445	1,462
Commuter traffic (recorded once in 2008)	n.a.	n.a.	1,714	1,714	1,714
Business travel	11,304	11,252	11,682	12,503	14,214

Research sponsorship and knowledge transfer

ETH Zurich participates successfully in national and international research sponsorship programmes. Project applications are assessed by the research sponsoring organisations under strict procedures. Depending on the resources that are available and the quality of the applications, they approve between 10 and 40 percent of the projects that are submitted. In the ever tougher competition for external funding, ETH Zurich enjoys an above-average success rate compared with other universities. 'Ambizione' is a scheme to support talented young scientists (advanced post-docs) at Swiss universities. EU awards to central bodies (research generally, CSCS) are not included in this list (2009 CHF 7.9 million, 2010 CHF 1.2 million).

Approved research projects in 2010

in CHF 1000	Architecture and Civil Engineering	Engineering Sciences	Natural Sciences and Mathematics	System-oriented Natural Sciences	Management and Social Sciences	Total	
	2010	2010	2010	2010	2010	2009	2010
Swiss National Science Foundation (SNSF)							
Total SNSF	**6,881**	**18,047**	**43,520**	**14,896**	**5,730**	**88,161**	**89,073**
Project sponsorship	**3,642**	**11,470**	**27,631**	**12,942**	**3,753**	**63,760**	**59,438**
Individual sponsorship	**1,611**	**2,414**	**9,959**	**1,308**	**1,456**	**19,546**	**16,748**
of which SNSF-sponsored professorships	1,440	1,510	6,545		609	10,091	10,103
of which Ambizione		889	2,671	1,079	810	3,427	5,449
Programme-based research	**1,621**	**4,111**	**5,927**	**164**	**491**	**2,903**	**12,314**
International cooperation	**7**	**52**	**3**	**482**	**30**	**1,951**	**573**
Commission for Technology and Innovation (CTI)							
Project sponsorship incl. contribution from industry	**2,534**	**31,006**	**4,499**	**3,098**	**3,118**	**31,829**	**44,255**
Engineering Sciences	1,091	17,400				9,631	18,491
Nano- and Microtechnologies		6,617	627			7,520	7,244
Life Sciences		4,034	3,872	3,098		7,786	11,003
Enabling Sciences	1,443	2,955			3,118	6,892	7,517
Research sponsorship under the 7th EU Framework Programme							
Total EU	**992**	**22,922**	**32,865**	**15,702**	**642**	**66,317**	**73,122**
Cooperation	**390**	**15,187**	**3,002**	**1,643**	**642**	**17,633**	**20,863**
Health		350	1,897			668	2,247
Food, Agriculture and Biotechnology			838	616			1,454
ICT		13,438			642	7,587	14,080
NanoMatPro						3,120	
Energy	210	727				1,118	937
Environment	102			1,027		4,929	1,129
Transport	78	671				211	749
Regions of knowledge			267				267
Ideas		**3,449**	**22,768**	**10,065**		**45,335**	**36,282**
ERC Advanced Grant		3,449	12,896	6,034		37,449	22,379
ERC Starting Grant			9,872	4,031		7,886	13,903
Capacity		**69**	**1,277**	**1,842**			**3,188**
Research infrastructures		69	1,277	1,842			3,188
People	**602**	**4,217**	**5,818**	**2,152**		**3,349**	**12,789**
People/Marie Curie Actions	602	4,217	5,818	2,152		3,349	12,789

Partnership with private industry	2006	2007	2008	2009	2010
Number of spin-offs	16	21	23	24	20
Patents registered	84	79	64	78	63
Cooperation agreements (> CHF 50,000)	225	259	239	270	292

Honours and prizes for members of ETH

A

Prof. Dr. Rudolf Aebersold, D-BIOL, Herbert A. Sober Lectureship, development of methods in analytical protein chemistry and proteomics, ASBMB Awards Committee, Bethesda, MD, USA;

Otto Naegeli Prize for the promotion of medical research, development of methods in analytical protein chemistry and proteomics, Otto Naegeli Foundation, Zurich, Switzerland

Prof. Dr. Charalampos Anastasiou, D-PHYS, ERC Starting Grant, European Research Council, Brussels, Belgium

Prof. Dr. Marc Angélil, D-ARCH, Swiss Solar Prize 2010, International Union for Conservation of Nature (IUCN), Gland, Switzerland

B

Prof. Dr. Nenad Ban, D-BIOL, Heinrich Wieland Prize, for exceptional research, Boehringer Ingelheim Foundation, Heidesheim, Germany;

accepted as Corresponding Member of the Croatian Academy of Sciences and Arts, Zagreb, Croatia

Prof. Dr. David Basin, D-INFK, Recognition of Service Award ACM, contribution to ACM ASIA CCS 2010 Conference, Association for Computing Machinery (ACM), New York, NY, USA;

IBM Open Collaboration Faculty Award, Zurich Information Security Center (ZISC), IBM Research, Zurich, Switzerland

Prof. Dr. Thomas Bernauer, D-GESS, elected President of Dept. IV of the Swiss National Science Foundation, Swiss National Science Foundation, Bern, Switzerland;

elected Non-North American Member of Governing Council of ISA 2012–13, International Studies Association, Tucson, AZ, USA

Prof. Dr. Jürgen Biela, D-ITET, Isao Takahashi Power Electronics Award, for Outstanding Achievement in Power Electronics, IPEC, Sapporo, Japan

Prof. Dr. Jeffrey W. Bode, D-CHAB, Hirata Memorial Lectureship and Gold Medal, Nagoya University, Nagoya, Japan; Novartis Lectureship Award, Novartis Pharma AG, Basel, Switzerland

Prof. Dr. Helmut Bölcskei, D-ITET, Vodafone Innovation Prize 2010, for the development of the "Single-tree search soft sphere decoding" method, Vodafone Foundation for Research in Mobile Communications, Düsseldorf, Germany

Prof. Dr. Colombo R. Bolognesi, D-ITET, Golden List of Referees (Electron Device Letters), for Refereeing of Scientific Articles, IEEE, Electron Device Society, Piscataway, NJ, USA

Prof. Dr. Sebastian Bonhoeffer, D-UWIS, ERC Advanced Grant, European Research Council, Brussels, Belgium

Prof. Peter Bösiger, D-ITET, Fellow of the Society, for his scientific achievements, International Society for Magnetic Resonance in Medicine, Berkeley, CA, USA

Prof. Alfredo Brillembourg, D-ARCH, and Prof. Hubert Klumpner, the 2010 Ralph Erskine Award, for dedicated work, Ruth and Ralph Erskine Fund, Stockholm, Sweden

C

Dr. Nicolai Cramer, D-CHAB, ERC Starting Grant, European Research Council, Brussels, Belgium

D

Prof. Dr. Emanuela Del Gado, D-MATL, SNSF-sponsored professorship, for her project "Design the response of heterogeneous materials: a revolution at the nano-scale", Swiss National Science Foundation, Bern, Switzerland

Prof. Dr. em Freddy Delbaen et al., D-MATH, 2010 David Garrick Halmstad Prize, The Actuarial Foundation, Schaumburg, IL, USA

Dr. Nathanael Delmotte, D-BIOL, Ernst Bayer Prize, German Chemical Society, Frankfurt am Main, Germany

Prof. Andrea Deplazes, D-ARCH, and Bearth & Deplazes Architekten AG, special prize for design and architecture / Swiss Mountain Award, for the design of the Carmenna chair-lift in Arosa, Seilbahnen Schweiz, Bern, Switzerland;

Swiss Solar Prize in the category "New Buildings and Refurbishment of Buildings" for the new SAC Monte Rosa Hut, Swiss Solar Agency, Zurich, Switzerland;

2010 Green Good Design Award, new SAC Monte Rosa Hut, the Chicago Athenaeum, USA

Prof. Dr. Michael Detmar, D-CHAB, ERC Advanced Grant, European Research Council, Brussels, Belgium

Prof. Dr. François Diederich, D-CHAB, Clayton Heathcock Lecturer, pioneering studies in molecular recognition and advanced carbon-rich materials, University of California, Berkeley, CA, USA;

Cram Memorial Lecturer, pioneering studies in molecular recognition and advanced carbon-rich materials, University of California, Los Angeles, CA, USA

Prof. Dr. Petra S. Dittrich, D-CHAB, Analytica Research Prize, Microfluidics for Bioanalytics, GBM Roche Diagnostics GmbH, Mannheim, Germany

Prof. Dr. Silvia Dorn, D-AGRL, Fellow of the International Society of Horticultural Sciences, for outstanding contributions to Horticultural Sciences worldwide, International Society of Horticultural Sciences, Leuven, Belgium

E

Prof. Dietmar Eberle, D-ARCH, Austrian State Prize 2010 for Architecture and Sustainability, for the new HIT research and service building, Federal Ministry of Agriculture, Forestry, Environment & Water Management, Vienna, Austria;

6th Voralberg Hypo Construction Prize 2010, Nordwesthaus Hypo, Landesbank Voralberg, Austria;

2010 award for good construction, Diakonie Düsseldorf, BDA Düsseldorf, Germany

Prof. Dr. Paul Embrechts, D-MATH, First IABE Chair and Member Honoris Causa, Belgian Institute of Actuarial Sciences, Leuven, Belgium

PD Dr. Werner Eugster, D-AGRL, Editor's Citation for Excellence in Refereeing, Journal of Geophysical Research Bio-Geosciences, American Geophysical Union, Washington, DC, USA

F

Prof. Dr. Elgar Fleisch, D-MTEC, and Prof. Dr. Frédéric Thiesse and Dr. Jasser Al-Kassab, Stafford Beer Medal, Operational Research Society, London, UK;

EHI Research Prize for Best Cooperation, EHI Retail Institute e.V., ECR Academic Alliance and GS1 Germany GmbH, Germany

G

Prof. Dr. Daniel W. Gerlich, D-BIOL, Award for Cancer Research from the Dr. Ernst Th. Jucker Foundation, Thalwil, Switzerland

Prof. Dr. Rudolf Glockshuber, D-BIOL, elected member of EMBO, European Molecular Biology Organization, Heidelberg, Germany

PD Dr. Jörg Goldhahn, D-MAVT, and Zach Lerner, KPMG Inspiration Grant, research project: Early recognition of malfunctions in joint prostheses, KPMG, Zurich, Switzerland

Prof. Dr. Alan Green, D-ERDW, SEG Honorary Lecturer, SEG, Tulsa, OK, USA

Prof. Dr. Markus Gross, D-INFK, Tell Award for significant investment in technology and innovation, Greater Zurich Area AG, Zurich, Switzerland;

2010 Technical Contribution Award, European Associations of Computer Graphics, Goslar, Germany

Prof. Dr. Lino Guzzella, D-MAVT, and Dr. Christopher Onder, Dr. Christian Dönitz and Christoph Voser, 2010 Watt d'Or award for best energy projects, Swiss Federal Office of Energy SFOE, Bern, Switzerland;

KPMG Inspiration Grant, research project: Hybrid pneumatic engine, KPMG, Switzerland

The climate geologist **Gerald Haug,** Professor at the Geological Institute, was awarded the Max Rössler Prize for his outstanding scientific work.

H

Prof. Dr. Richard Hahnloser, D-PHYS, ERC Advanced Grant, European Research Council, Brussels, Belgium

Prof. Dr. Gerald Haug, D-ERDW, Max Rössler Prize, ETH Zurich Foundation, Zurich, Switzerland

Prof. Dr. Ari Helenius, D-BIOL, Bijvoet Medal, University of Utrecht, Utrecht, Netherlands;

The Lester Krampitz Lecture, University of Cleveland, Medical School, Cleveland, OH, USA

Prof. Dr. Andreas Hierlemann, D-BSSE, ERC Advanced Grant, European Research Council, Brussels, Belgium

Prof. Dr. Juraj Hromkovic, D-INFK, CS4HS Grant (Computer Science for High School) for ABZ Zurich, Google, USA;

accepted by the Academia Europaea, London, UK

I

Prof. Dr. Atac Imamoglu, D-PHYS, Charles H. Townes Award, seminal contribution to electromagnetic induced transparency, etc., The Optical Society (OSA), Washington, DC, USA

J

Prof. Dr. Andrew Jackson, D-ERDW, Edward Bullard Lecture at the American Geophysical Union, American Geophysical Union, Washington, DC, USA

Prof. Dr. Rolf Jeltsch, D-MATH, Doctor Honoris Causa of the Vietnamese Academy of Science and Technology, in recognition of his lifetime work and his support for mathematicians in developing countries, Vietnamese Academy of Science and Technology, Hanoi, Vietnam;

Bolsa Cientista Convidado, numerical methods and simulation for hyperbolic conservation laws, FCT Foundation for Science and Technology, Lisbon, Portugal

Ulrike Kutay, Professor at the Institute of Biochemistry, received the valuable Alexander von Humboldt Prize, which is combined with an appointment to the University of Würzburg. The researcher has decided to remain at ETH Zurich.

K

Prof. Dr. Helmut G. Katzgraber, D-PHYS, Teaching Excellence Award, Texas A&M University, College Station, TX, USA

Dr. Boris Kaus, D-ERDW, ERC Starting Grant, European Research Council, Brussels, Belgium

Prof. Dr. Thorsten Kleine, D-ERDW, Clarke Medal for outstanding contribution to cosmochemistry, Geochemical Society, St. Louis, MO, USA

Prof. Dr. Leonhard Kleiser, D-MAVT, Fellow of the American Physical Society, pioneering contributions to the development of computational fluid dynamics, American Physical Society, College Park, MD, USA

Prof. Hubert Klumpner, D-ARCH, and Prof. Alfredo Brillembourg, the 2010 Ralph Erskine Award, for dedicated work, Ruth and Ralph Erskine Fund, Stockholm, Sweden

Lian Pin Koh, D-UWIS, SNSF-sponsored professorship, Swiss National Science Foundation, Bern, Switzerland

Prof. Dr. Johann W. Kolar, D-ITET, Fellow IEEE, contributions to three-phase PWM converter systems, IEEE, USA

Benoît Kornmann, D-BIOL, SNSF-sponsored professorship, Swiss National Science Foundation, Bern, Switzerland

Prof. Dr. Donald Kossmann, D-INFK, Google Faculty Research Award, research in the area of unstructured search on structured data, Google, USA;

Association for Computing Machinery (ACM) Fellow Innovations in Industry, Association for Computing Machinery (ACM), New York, NY, USA

Prof. Dr. Bradley Kratochvil et al., D-MAVT, NIST Mobile Microrobotics Challenge – winning 2 challenges, NIST Organizing Committee, USA

Prof. Dr. Daniel Kressner, D-MATH, John Todd Award for excellent young mathematicians working in numerical analysis, Oberwolfach Foundation, Oberwolfach-Walke, Germany

Prof. Dr. Niels Kuster, D-ITET, IEEE Fellow, for his contributions to the area of near-field exposures and dosimetry for radiofrequency fields in biomedical research, IEEE, USA

Prof. Dr. Ulrike Kutay, D-BIOL, EMBO membership, EMBO, Heidelberg, Germany;

Humboldt Professorship, Alexander von Humboldt Foundation, Bonn, Germany

L

Niels Lehmann, D-MAVT, and Moritz Meenem, KPMG Inspiration Grant, research project: Easing the strain on urban traffic by means of flexible, individual electronic mobility, KPMG, Switzerland

Zach Lerner, D-MAVT, and Prof. Dr. Jörg Goldhahn, KPMG Inspiration Grant, research project: Early recognition of malfunctions in joint prostheses, KPMG, Zurich, Switzerland

Prof. Dr. Jean-Christophe Leroux, D-CHAB, Life Sciences Award Debiopharm, Lausanne, Switzerland

Prof. Dr. Gideon Levy, D-MAVT, FAME Award, outstanding researcher in the field of freeform/additive fabrication, Society of Manufacturing Engineers, Dearborn, MI, USA

Prof. Dr. Jörg F. Löffler, D-MATL, Adjunct Professor, globally renowned research in the field of metallic glass, WPI-AIMR, Tohoku University, Japan

Mathieu Luisier, D-ITET, SNSF-sponsored professorship, Swiss National Science Foundation, Bern, Switzerland

Prof. Dr. John Lygeros, D-ITET, Fellow, for contributions to hybrid and stochastic systems and applications, IEEE, USA

M

Prof. Dr. Isabelle Mansuy, D-BIOL, member of the Research Council, appointed member of the Swiss National Science Foundation, Bern, Switzerland;

appointed individual member of SAMW, Swiss Academy of Medical Sciences, Basel, Switzerland

Prof. Dr. Josep Lluís Mateo, D-ARCH, IV NAN 2010 Award, project "the Factory", office building in Paris, TPI Group, Spain;

Aplus 2010 Award for office building architecture, WTC office building in Cornellà, Barcelona, Grupo Vía magazine, Spain

Moritz Meenem, D-MAVT, and Niels Lehmann, KPMG Inspiration Grant, research project: Easing the strain on urban traffic by means of flexible, individual electronic mobility, KPMG, Switzerland

Prof. Dr. Frédéric Merkt, D-CHAB, Carus Medal awarded by the Leopoldina German Academy of Sciences, Leopoldina National Academy of Sciences, Halle, Germany;

William F. Meggers Award, Optical Society of America (OSA), Washington, DC, USA;

Fellow of the Optical Society of America, Optical Society of America (OSA), Washington, DC, USA;

Carus Prize, City of Schweinfurt, Germany

Prof. Dr. Raffaele Mezzenga, D-AGRL, John H. Dillon Medal, American Physical Society, College Park, MD, USA

Prof. Dr. Manfred Morari, D-ITET, Hendrik W. Bode Lecture Prize 2010, IEEE Control Systems Society, USA

Prof. Dr. Ryan O. Murphy, D-GESS, Research Equipment, Swiss National Science Foundation, Bern, Switzerland

N

Prof. Dr. Bradley J. Nelson, D-MAVT, elected to the IEEE Robotics and Automation Society Advisory Committee, IEEE Robotics and Automation Society, Evanston, IL, USA;

elected Fellow ASME, American Society of Mechanical Engineering, New York, NY, USA;

ERC Advanced Grant, European Research Council, Brussels, Belgium

Prof. Dr. Markus Niederberger, D-MATL, Fellow of the Royal Society of Chemistry, Royal Society of Chemistry, London, UK

O

Dr. Christopher Onder, D-MAVT, and Prof. Dr. Lino Guzzella, Dr. Christian Dönitz and Christoph Voser, 2010 Watt d'Or award for best energy projects, Swiss Federal Office of Energy SFOE, Bern, Switzerland;

KPMG Inspiration Grant, research project: Hybrid pneumatic engine, KPMG, Switzerland

Prof. Dr. Dani Or, D-UWIS, elected Fellow of the American Geophysical Union, American Geophysical Union (AGU), Washington, DC, USA

P

Prof. Dr. Vikram G. Panse, D-BIOL, European Research Council Starting Grant Award, European Research Council, Brussels, Belgium;

SNSF-sponsored professorship, Swiss National Science Foundation, Bern, Switzerland

Prof. Dr. Michele Parrinello, D-CHAB, Foreign Member, the National Academy of Sciences, Washington, DC, USA

Prof. Dr. Matthias Peter, D-BIOL, ERC Advanced Grant, European Research Council, Brussels, Belgium

Dr. Paola Picotti, D-BIOL, SNSF-sponsored professorship, Swiss National Science Foundation, Bern, Switzerland

Prof. Dr. Bernhard Plattner, D-ITET, appointed Adjunct Professor, Communication University of China, Beijing, China

Dr. Christian Erik Pohl, D-UWIS, Ramamoorthy and Yeh Transdisciplinary Distinguished Achievement Award, The Academy of Transdisciplinary Learning and Advanced Studies, Lubbock, TX, USA

Prof. Dr. Marc Pollefeys, D-INFK, Google Faculty Award, Google, USA

Q

Prof. Dr. Martin Quack, D-CHAB, elected 1st Chairman of the German Bunsen Society for Physical Chemistry, German Bunsen Society for Physical Chemistry, Frankfurt a.M., Germany

Prof. Dr. Ursula Quitterer, D-CHAB, selected for inclusion in Who's Who in the World 2011 (28th Edition), Marquis Who's Who, New Providence, NJ, USA

R

Dr. Olivier Raineteau, D-BIOL, Schellenberg Prize, International Foundation for Research in Paraplegia, Zurich, Switzerland

Prof. Dr. Markus Reiher, D-CHAB, The Outstanding Young German Scientist Award Lectureship, Lise Meitner Center, Jerusalem, Israel

Prof. Dr. Renato Renner, D-PHYS, ERC Starting Grant, European Research Council, Brussels, Belgium

Prof. Dr. Timothy J. Richmond, D-BIOL, Wilbur Cross Medal, Yale University, New Haven, CN, USA

Prof. Dr. Hans Richner, D-UWIS , nominated honorary member of the Swiss Meteorological Society, Zurich, Switzerland

Prof. Dr. Timothy Roscoe, D-INFK, IBM Faculty Award, IBM, USA

Dr. Devesh Rustagi, D-UWIS, KFW Award/1st Young Academics Award, KfW Development Bank, Frankfurt a.M., Germany

The man behind the Science City university campus project, **Gerhard Schmitt,** Professor of Architecture at ETH Zurich, was awarded the European Cultural Award for Science.

S

Bianca Sarbu, D-GESS, Junior Fulbright Award 2011–2012, U.S. Fulbright Commission, Washington, DC, USA

Prof. Dr. Paul Schmid-Hempel, D-UWIS, ERC Advanced Grant, European Research Council, Brussels, Belgium

Prof. Dr. Gerhard Schmitt, D-ARCH, 2010 European Cultural Award for Science for Science City ETH Zurich, Pro Europa, Berlin, Germany

Prof. Dr. Gisbert Schneider, D-CHAB, appointed Honorary Adjunct Professor, Goethe University, Frankfurt a.M., Germany

Prof. Dr. Pius A. Schubiger, D-CHAB, Gold Medal for Lifetime Achievements, University of Padua, Italy

Prof. Dr. Thomas C. Schulthess, CSCS, Third Gordon Bell Prize, the Swiss HPC Service Provider Community, Manno, Switzerland

Prof. Dr. Christoph Schwab, D-MATH, ERC Advanced Grant, European Research Council, Brussels, Belgium

Prof. Dr. Marianne Sommer, D-GESS, National Latsis Prize, Swiss National Science Foundation, Bern, Switzerland

Prof. Dr. Didier Sornette, D-MTEC, 2010 Lorenz Lecturer, AGU American Geophysical Union, Washington, DC, USA

Prof. Dr. Wendelin J. Stark, D-CHAB, Whitby Award, American Association for Aerosol Research, Mt. Laurel, NJ, USA;

Smoluchowski Award, Association for Aerosol Research (GAeF), Germany

Prof. Dr. Aldo Steinfeld, D-MAVT, appointed member of SATW – Swiss Academy of Engineering Sciences, Zurich, Switzerland;

Fellow Research and Education, ASME – American Society of Mechanical Engineers, New York, NY, USA

Prof. Dr. Markus Stoffel, D-BIOL, elected to the National Research Council, Swiss National Science Foundation, Bern, Switzerland

Michael Strasser, D-ERDW, SNSF-sponsored professorship, Swiss National Science Foundation, Bern, Switzerland

Prof. Dr. Shana J. Sturla, D-AGRL, ERC Starting Grant, European Research Council, Brussels, Belgium

T

Dr. Marina Tanasova, D-AGRL, postdoctoral Award for Cancer Research, Susan G. Komen for the Cure Foundation, Dallas, TX, USA

Prof. Dr. Lothar Thiele, D-ITET, appointed member of Academia Europaea, Academia Europaea, London, UK

Udo Thönnissen, D-ARCH, European Prize for Public Space 2010, Cangas harbour area, Vigo (Spain), Centre of Contemporary Culture in Barcelona

Dr. Claudio Thoma, D-BIOL, and Dr. Alberto Toso, Pfizer Research Prize, Pfizer Foundation Research Prize, Zurich, Switzerland

Dr. Alberto Toso, D-BIOL, and Dr. Claudio Thoma, Pfizer Research Prize, Pfizer Foundation Research Prize, Zurich, Switzerland

Prof. Dr. Matthias Troyer, D-PHYS, Fellow of the American Physical Society, American Physical Society, College Park, MD, USA

V

Prof. Guenther Vogt, D-ARCH, Schulthess Garden Prize 2010, Swiss Heritage Society SHS, Zurich, Switzerland

Christoph Voser, D-MAVT, and Dr. Christopher Onder, Prof. Dr. Lino Guzzella and Dr. Christian Dönitz, 2010 Watt d'Or award for best energy projects, Swiss Federal Office of Energy SFOE, Bern, Switzerland;

KPMG Inspiration Grant, research project: Hybrid pneumatic engine, KPMG, Switzerland

W

Prof. Dr. Robert Weismantel, D-MATH, 2010 IBM Faculty Award, IBM TJ Watson Research Center, Cambridge, MA, USA

Prof. Dr. Helmut Weissert, D-ERDW, Distinguished Lecturer ECORD 2010-2012, European Consortium for Research Ocean Drilling, Paris, France

Rebecca Welge, D-GESS, Knowledge Transfer Prize, NCCR Democracy, Zurich, Switzerland

Prof. Dr. Caspar Wenk, D-AGRL, Henneberg Lehmann Prize, Henneberg Lehmann Foundation of the DVT, Bonn, Germany

Prof. Dr. Philipp Werner, D-PHYS, IUPAP Young Scientist Prize in Computational Physics, International Union of Pure and Applied Physics, London, UK

Prof. Dr. Sabine Werner, D-BIOL, Alfred Marchionini Memorial Lecture, Alfred Marchionini Foundation, Reinbek near Hamburg, Germany

Dr. Lenny Winkel, D-UWIS, SNSF-sponsored professorship, Swiss National Science Foundation, Bern, Switzerland

Prof. Dr. Kurt Wüthrich, D-BIOL, Foreign Member of the Royal Society, The Royal Society, London, UK;

Ralph and Helen Oesper Award, University of Cincinnati, OH, USA;

Luigi Sacconi Memorial Lecture, named lectureship, University of the Arts in Florence, Florence, Italy

Z

Prof. Dr. Renato Zenobi, D-CHAB, Honorary Professorship, Chinese Academy of Sciences, Beijing, China;

Mayent/Rothschild Fellowship, Institut Curie, Paris, Frankreich;

Honorary Adjunct Professorship, Hunan University, China;

Honorary Professorship Research Achievements, Changchun University of Chinese Medicine, Changchun, China

Dr. Ekkehard Zwicker, D-MAVT, EURON/EUROP Technology Award for Alstom and ETH Zurich/EPF Lausanne, European Robotics Technology Platform/European Robotics Research Network

Awards for ETH Zurich spin-off companies

Amphiro, Venture 2010 Business Plan Competition, Venture, Zurich Airport, Switzerland

Bioversys GmbH, CTI Label Award, most promising start-up company, the Confederation's Innovation Promotion Agency CTI, Bern, Switzerland

ChocoWinS, Venture Cup, best science spin-off, Venture Cup, Gothenburg, Sweden

Climeworks GmbH, Venture Kick, Venture Kick, St. Gallen, Switzerland

greenTEG GmbH, Start-up Prize from the W.A. de Vigier Foundation, Solothurn, Switzerland

HeiQ Materials AG, Swiss Technology Award, spin-off HeiQ Materials AG, Swiss Innovation Forum, Gwatt, Switzerland

Malcisbo AG, Venture Kick for spin-off Malcisbo AG, Venture Kick, St. Gallen, Switzerland; Swiss Technology Award, Seed Category, Swiss Innovation Forum, Gwatt, Switzerland

Mirasense AG, Venture Kick, St. Gallen, Switzerland

nanotion AG, Start-up Prize from the W.A. de Vigier Foundation, Solothurn, Switzerland

Optotune AG, Swiss Technology Award, Start-up Category, spin-off Optotune AG, Swiss Innovation Forum, Gwatt, Switzerland

Pearltec AG, Start-up Prize from the W.A. de Vigier Foundation, Solothurn, Switzerland

ProteoMedix AG, Venture Kick, St. Gallen, Switzerland

Honours at the ETH Day 2010

Industry and foundation prizes

ABB Research Prize
Dr. Ronny Pini, D-MAVT
"Enhanced coal bed methane recovery finalized to carbon dioxide storage"

Georg A. Fischer Prize
Dr. Stefano Oberti, D-MAVT
"Micromanipulation of small particles within micro-machined fluidic systems"

Heinrich Hatt-Bucher Prizes
Stefan Hung, D-BAUG
"SBB bridge over the River Emme"

Silvan Michael Gut, D-BAUG
"Comparison of the ecological sustainability of timber-framed building and high-rise building with regard to their static system"

Dario Geisseler, D-BAUG
"Trials with slotted masonry elements"

Hilti Prize
Dr. Antonio Tricoli, D-MAVT
"Gas sensitive nanostructured films by direct flame synthesis and deposition"

IBM Research Prize
Dr. Michele Ceriotti, D-CHAB
"A novel framework for enhanced molecular dynamics based on the generalized Langevin equation"

Plastics Technology Prize
Mario Studer, D-MAVT
"Concept development for viscoelastic interface insulation"

Latsis Prize
Dr. Mario Agio, D-CHAB
for his important contributions in the field of theoretical nano optics, in particular for his work on fluorescence in plasmonic nanoantennae and in strongly focused light fields

Otto Jaag Water Protection Prize
Dr. Linda Corinna Roberts, Institute of Biogeochemistry and Pollutant Dynamics
"Arsenic dynamics in groundwater irrigated and seasonally flooded paddy soils in Bangladesh"

Zurich Dissertation Prize
Dr. Oliver Schneider, D-MTEC
"Adding enterprise value – mitigating investment decision risks by assessing the economic value of supply chain initiatives"

Golden Owl of the VSETH
(Award for excellence in teaching)

The Golden Owl is a sympathy prize awarded to faculty members of ETH Zurich by the students. Each year, VSETH, ETH Zurich's student association, confers the award to particularly committed lecturers in appreciation of their excellent teaching. One person per department can be awarded the prize.

Dr. Markus Stauffacher, D-AGRL
Prof. Dr. Philippe Block, D-ARCH
Prof. Dr. Alessandro Dazio, D-BAUG
Dr. Roland Gebert-Müller, D-BIOL
Prof. Dr. Niko Beerenwinkel, D-BSSE
Prof. Dr. Markus Reiher, D-CHAB
Dr. Rainer Kündig, D-ERDW
Prof. Dr. Felix Bosshard, D-GESS
Prof. Dr. Peter Widmayer, D-INFK
PD Dr. Hannes P. Lubich, D-ITET
Prof. Dr. Max-Albert Knus, D-MATH
Prof. Dr. Dieter Schlüter, D-MATL
Prof. Dr. Raffaello D Andrea, D-MAVT
Prof. Dr. Georg von Krogh, D-MTEC
Prof. Dr. Antony John Lomax, D-PHYS
Prof. Dr. Thomas Peter, D-UWIS

Credit Suisse Award for Best Teaching
Prof. Dr. Alessandro Dazio, D-BAUG

The new honorary doctors, Prof. Marinus C.M. van Loosdrecht, Prof. Jinghai Li, Prof. Jean Zinn-Justin, Prof. Gilles Brassard, ETH Rector Prof. Heidi Wunderli-Allenspach, Prof. Norbert Peters, Prof. Helmut Schwarz and Prof. Charles H. Bennett.

Honorary doctors at ETH Zurich

Prof. Dr. Ir. Marinus Cornelis Maria van Loosdrecht, Delft University of Technology, Netherlands, for his definitive and fundamental contributions to the field of environmental biotechnology and for his numerous large-scale translations of the latest scientific findings into resource-conserving technologies, especially in the field of wastewater treatment.

Prof. Dr. Dr. Jinghai Li, Chinese Academy of Sciences, Beijing, China, in recognition of his pioneering scientific contribution to multi-scale modelling, in the design and optimisation of complex systems, especially in the field of sustainable energy production, and also for his leadership qualities in the scientific partnership between China and Switzerland.

Prof. Dr. Jean Zinn-Justin, Atomic Energy Commission, France, for new applications for the renormalisation group theory.

Prof. Dr. Gilles Brassard, Université de Montréal, Canada, in recognition of his fundamental contributions to quantum information, in particular for the discovery of quantum cryptography and teleportation.

Prof. Dr.-Ing. Dr. h.c. Dr.-Ing. E.h. Norbert Peters, Rhineland-Westphalian Technical University Aachen, Germany, for his fundamental and pioneering work on turbulent combustion and its realisation in practical applications, in particular for his development of the "laminar flamelet" concept and his outstanding contributions to the systematic reduction of complex mechanisms in reaction kinetics.

Prof. Dr. Drs. h.c. Helmut Schwarz, Technische Universität Berlin, Germany, for his use of the mass spectrometer as a chemical laboratory and for establishing gas-phase organometallic chemistry.

Prof. Dr. Charles H. Bennett, Thomas J. Watson Research Center, Yorktown Heights, USA, in recognition of his fundamental contributions to quantum information, in particular for the discovery of quantum cryptography and teleportation.

New professors*

Full professors

a) New appointments

Prof. Dr. Jeffrey W. Bode, for Synthetic Organic Chemistry (1.1.2010), D-CHAB, formerly Associate Professor at the University of Pennsylvania, Philadelphia, PA, USA

Prof. Dr. Antoine Bommier, for Integrative Risk Management and Economics (1.8.2010), D-MTEC, formerly Director of Research at CNRS and at the Toulouse School of Economics, France

Prof. Alfredo Brillembourg, for Architecture and Urban Design (1.7.2010), D-ARCH, formerly Founding Director of Urban-Think Tank in New York, NY, USA, and Caracas, Venezuela

Prof. Dr. Christophe Copéret, for Chemistry of Surfaces and Interfaces (1.11.2010), D-CHAB, formerly CNRS Research Director at the University of Lyons, France

Prof. Dr. Timothy I. Eglinton, for Biogeosciences (1.7.2010), D-ERDW, formerly Senior Scientist at the Marine Chemistry and Geochemistry Department, Woods Hole Oceanographic Institution, Woods Hole, MA, USA

Prof. Dr. Robert J. Flatt, for Building Materials in Construction (1.9.2010), D-BAUG, formerly Principal Scientist and Head of Corporate Research on Inorganic Materials with Sika Technology AG in Zurich

Prof. Fabio Gramazio, for Architecture and Digital Fabrication (1.10.2010), D-ARCH, formerly Assistant Professor for Architecture and Digital Fabrication

Prof. Dr. Norbert Hungerbühler, for Mathematics and Education (1.8.2010), D-MATH, formerly full Professor in Mathematics at the University of Fribourg

Prof. Hubert Klumpner, for Architecture and Urban Design (1.7.2010), D-ARCH, formerly Founding Director of Urban-Think Tank in New York, NY, USA, and Caracas, Venezuela

Prof. Matthias Kohler, for Architecture and Digital Fabrication (1.10.2010), D-ARCH, formerly Assistant Professor for Architecture and Digital Fabrication

Prof. Dr. Daniel Jobst Müller, for Biophysics (1.4.2010), D-BSSE, formerly Professor for Cellular Machines at the Technische Universität Dresden, Germany

Prof. Dr. David J. Norris, for Materials Engineering (1.6.2010), D-MAVT, formerly Professor for Chemical Engineering and Materials Science at the University of Minnesota, Minneapolis, MN, USA

Prof. Dr. Javier Pérez-Ramírez, for Catalysis Engineering (1.1.2010), D-CHAB, formerly ICREA Research Professor at the Institute of Chemical Research of Catalonia in Tarragona, Spain

Prof. Dr. Markus Püschel, for Computer Science (1.9.2010), D-INFK, formerly Professor at the Department of Electrical and Computer Engineering at Carnegie Mellon University in Pittsburgh, PA, USA

Prof. Dr. Gebhard Franz Xaver Schertler, for Structural Biology (1.1.2010), D-BIOL, formerly Senior Scientist and Group Leader at the MRC Laboratory of Molecular Biology in Cambridge, UK

Prof. Dr. Gisbert Schneider, for Computer-Assisted Drug Design (1.1.2010), D-CHAB, formerly full Professor at the Johann Wolfgang Goethe University in Frankfurt a. M., Germany

Prof. Dr. Nicola A. Spaldin, for Materials Theory (1.11.2010), D-MATL, formerly Professor at the University of California, Santa Barbara, CA, USA

Prof. Dr. Olivier Voinnet, for RNA Biology (1.11.2010), D-BIOL, formerly Research Director at the CNRS Plant Molecular Biology Institute in Strasbourg, France

Prof. Dr. Rainer Wallny, for Experimental Particle Physics (1.10.2010), D-PHYS, formerly Associate Professor at the University of California, Los Angeles, CA, USA

Prof. Dr. Achim Walter, for Crop Science (1.9.2010), D-AGRL, formerly Deputy Director of the Institute for Chemistry and Dynamics of the Geosphere at the Jülich Research Centre, Germany

Prof. Dr. Robert Weismantel, for Mathematics (Operations Research) (1.5.2010), D-MATH, formerly Professor (C4) for Mathematical Optimisation at the Otto von Guericke University Magdeburg, Germany

b) Promotions

Prof. Dr. Wolf-Dietrich Hardt, for Microbiology (1.6.2010), D-BIOL, formerly Associate Professor for the same subject area

Prof. Dr. Stefanie Hellweg, for Ecological System Design (1.4.2010), formerly Associate Professor for the same subject area

Prof. Dr. John Lygeros, for Control and Computation (1.1.2010), D-ITET, formerly Associate Professor for the same subject area

Prof. Dr. Edoardo Mazza, for Mechanics (1.1.2010), D-MAVT, formerly Associate Professor for the same subject area

Prof. Dr. Robert Riener, for Sensomotoric Systems (1.6.2010), D-MAVT, formerly Associate Professor for the same subject area

Prof. Dr. Janos Vörös, for Bioelectronics (1.1.2010), D-ITET, formerly Associate Professor for the same subject area

Associate professors (new appointments)

Prof. Dr. Bryan T. Adey, for Infrastructure Management (1.1.2010), D-BAUG, formerly Vice President and co-founder of Infrastructure Management Consultants in Zurich

Prof. Dr. Charalampos Anastasiou, for Theoretical Particle Physics (1.6.2010), D-PHYS, formerly Assistant Professor (tenure track) for Theoretical Particle Physics

Prof. Dr. Jürgen Biela, for Power Electronic Systems (1.8.2010), D-ITET, formerly Research Associate

Prof. Dr. Volker Hoffmann, for Sustainability and Technology (1.6.2010), D-MTEC, formerly Assistant Professor (tenure track) for Sustainability and Technology

Prof. Dr. Roger Schibli, for Radiopharmacy (1.1.2010), D-CHAB, formerly Assistant Professor (tenure track) for Therapeutics Technologies

Prof. Dr. Konrad Schindler, for Photogrammetry (1.8.2010), D-BAUG, formerly Junior Professor at the Technische Universität Darmstadt, Germany

Prof. Dr. Ralph Spolenak, for Nanometallurgy (1.6.2010), D-MATL, formerly Assistant Professor (tenure track) for Metallic Systems for Microcomponents

Prof. Dr. Jeroen A. van Bokhoven, for Heterogeneous Catalysis (1.1.2010), D-CHAB, formerly SNSF-sponsored professor

Prof. Dr. Andreas J. Wallraff, for Solid State Physics (1.1.2010), D-PHYS, formerly Assistant Professor (tenure track) for Solid State Physics

Prof. Dr. Christian Wolfrum, for Translational Nutrition Biology (1.4.2010), D-AGRL, formerly Assistant Professor for Obesity Research

Prof. Dr. Samuel C. Zeeman, for Plant Biochemistry (1.6.2010), D-BIOL, formerly Assistant Professor for Plant Biochemistry

Assistant professors (new appointments)

Prof. Dr. Claus M. Azzalin, for Genome Stability (ERC) (1.2.2010), D-BIOL, formerly SNSF-sponsored Professor for Genome Stability

Prof. Dr. Yaakov Benenson, for Synthetic Biology (tenure track) (1.6.2010), D-BSSE, formerly Bauer Fellow & Principal Investigator at the FAS Center for Systems Biology at Harvard University, Cambridge, MA, USA

Prof. Dr. Eleni Chatzi, for Structural Mechanics (1.8.2010), D-BAUG, formerly Researcher at Columbia University in New York, NY, USA

Prof. Dr. Matthias Christandl, for Quantum Information Theory (SNSF) (1.6.2010), D-PHYS, formerly Junior Professor at the Ludwig Maximilian University Munich, Germany

Prof. Dr. Emanuela Del Gado, for Microstructure and Rheology of Construction Materials (SNSF) (1.7.2010), D-BAUG, formerly Research Associate at D-MATL

Prof. Tom Emerson, for Architecture and Design (1.8.2010), D-ARCH, formerly Director and co-founder of 6a Architects in London, UK

Prof. Dr. Christian Franck, for High Voltage Engineering (tenure track) (1.1.2010), D-ITET, formerly Head of the "High voltage systems" group at the ABB Research Centre in Baden-Dättwil

Prof. Dr. Jonathan Home, for Experimental Quantum Optics and Photonics (tenure track) (1.9.2010), D-PHYS, formerly post-doctoral researcher at the National Institute of Standards and Technology in Boulder, CO, USA

Prof. Dr. Boris J. P. Kaus, for Computational Geodynamics (ERC) (1.12.2010), D-ERDW, formerly Senior Assistant and Scientist

Prof. Dr. Heinz Wolfgang Köppl, for Systems Theory in Biology (SNSF) (1.9.2010), D-ITET, formerly post-doctoral student at EPFL

Prof. Dr. Salomé Leibundgut-Landmann, for Infection Immunology (SNSF) (1.1.2010), D-BIOL, formerly SNSF-sponsored Professor for Infection Immunology

Prof. Dr. Johannes Muhle-Karbe, for Mathematical Finance (1.10.2010), D-MATH, formerly University Assistant at the University of Vienna, Austria

Prof. Dr. Christoph Rüdiger Müller, for Energy Science and Engineering (tenure track) (1.1.2010), D-MAVT, formerly Research Fellow at the University of Cambridge, UK

Prof. Dr. Vikram Govind Panse, for Ribosome Biogenesis and Quality Control (SNSF) (1.8.2010), D-BIOL, formerly group head

Prof. Dr. Justin I. Read, for Astrophysics (SNSF) (1.10.2010), D-PHYS, formerly Lecturer at the University of Leicester, UK

Prof. Dr. Arno Schlüter, for Architecture and Sustainable Building Technologies (1.10.2010), D-ARCH, formerly Scientist, Research and Education

Prof. Dr. Franziska Schoenebeck, for Physical Organic Chemistry (1.2.2010), D-CHAB, formerly post-doctoral Fellow at the University of California, Los Angeles, CA, USA

Prof. Dr. Jing Wang, for Industrial Ecology (tenure track) (1.8.2010), D-BAUG, formerly Research Assistant Professor at the University of Minnesota in Minneapolis, MN, USA

Prof. Dr. Hans Jakob Wörner, for Physical Chemistry (SNSF) (1.9.2010), D-CHAB, formerly post-doctoral student at the Steacie Institute for Molecular Sciences in Ottawa, Canada

Adjunct professors

Prof. Dr. Gretchen Bernasconi-Green, D-ERDW, employed as Senior Lecturer at the Institute of Geochemistry and Petrology

Prof. Dr. Andrea Frangi, D-BAUG, employed as Scientist and Lecturer

Prof. Dr. Taras Gerya, D-ERDW, employed as Scientist and Lecturer

Prof. Dr. Manfred P. Heuberger, D-MATL, employed as Scientist and Lecturer

Prof. Dr. Juliane Hollender, D-UWIS, employed as Scientist and Lecturer

Prof. Dr. Hubert Kaeslin, D-ITET, employed as Head of the Microelectronic Design Center and Lecturer

Prof. Dr. Theo A. Tervoort, D-MATL, employed as Scientist and Lecturer

Prof. Dr. Ayodhya Nath Tiwari, D-ITET, employed as Scientist and Lecturer

Prof. Dr. Eilika Weber-Ban, D-BIOL, employed as Scientist and Lecturer

Prof. Dr. Martin Wild, D-UWIS, employed as Scientist and Lecturer

* New in post in 2010
For abbreviations of departments: Organisation Page 70

Donations

Once again in 2010, numerous companies, foundations and private individuals (especially ETH graduates) have given donations to support innovation and research at ETH Zurich. ETH Zurich is grateful to all its donors for their valuable contributions and for their confidence.

Companies

ABB Schweiz AG, Alpiq AG, Alstom (Schweiz) AG, Ammann Group Holding AG, Arbeitsgemeinschaft Prof. Hugel AGPH, Avaloq Evolution AG, AXA Research Fund, Axpo AG, Basler & Hofmann AG, Biotronik AG, BKW FMB Energie AG, Bühler AG, CKW Centralschweizerische Kraftwerke AG, Coop, Credit Suisse, Dätwyler/Distrelec, Dow Europe GmbH, Dr. Heinz Jäckli AG, EGL AG, EKZ Elektrizitätswerke Kanton Zürich, EOS Holding SA, Ernst Basler + Partner AG, ewz Elektrizitätswerk Stadt Zürich, Franke Artemis Group, Geberit Holding AG, Glencore International AG, Google Inc., Gruner AG , Gübelin AG, Hilti AG, Holcim, Huber+Suhner AG, Implenia AG, Johnson Matthey & Brandenberger AG, Kaba Holding AG, Knecht Holding AG, Metall Zug AG, Mineral Consult AG, Nestlé SA, Omya International AG, Pfizer AG, Philips AG, Plastic Omnium, PPCmetrics AG, SGS, Shell Exploration & Production, Siemens Schweiz AG (BT Division), Sika Technology AG, Stump ForaTec AG, Swiss Re, Swisscom AG, Syngenta, The Boston Consulting Group AG (Switzerland), Xstrata (Schweiz) AG, Zürcher Kantonalbank, ZZ Wancor.

Organisations and foundations

Accenture-Stiftung, Arthur Waser Stiftung, Avina Stiftung, Baugarten Stiftung, Bonizzi-Theler Stiftung, Credit Suisse Foundation, Emil Barell-Stiftung zur Ausbildung von Chemie-Ingenieuren, Entwicklungsfonds Seltene Metalle, Erdöl-Vereinigung, Ernst Göhner Stiftung, European Calcified Tissue Society, European Life Scientist Organization e.V., FIFA, Fondation Claude et Giuliana, Gebert Rüf Stiftung, Georg und Bertha Schwyzer-Winiker Stiftung, Gesellschaft zur Förderung der Forschung und Ausbildung in Unternehmenswissenschaften an der ETH Zürich, Gottfried und Julia Bangerter-Rhyner-Stiftung, GVZ Gebäudeversicherung Kanton Zürich, Hamasil Stiftung, Hasler Stiftung, Hirschmann-Stiftung, Holcim Foundation for Sustainable Construction, Interkantonaler Rückversicherungsverband, Jacobs Stiftung, Klaus Tschira Stiftung, Kühne Stiftung, Lotteriefonds des Kantons Zürich, Lucius und Annemarie Burckhardt Stiftung, Max Rössler Fonds der Stiftung Empiris, Medicor Foundation, Misrock-Stiftung, Nagra, Naturstein-Verband Schweiz, Novartis Stiftung, Novartis Stiftung für medizinisch-biologische Forschung, Oncosuisse, Opo-Stiftung, Prof. Otto Beisheim-Stiftung, Promedica Stiftung, RMS Foundation, Rudolf Chaudoire Stiftung, Rütli Stiftung, Sawiris Foundation for Social Development, Schweizerische Stiftung für die Erforschung der Muskelkrankheiten, Schweizerischer Baumeisterverband (SBV), Schweizerischer Pool für Erdbebendeckung, Starr International Foundation, Staub/Kaiser-Stiftung, Stiftung Jüdische Zeitgeschichte an der ETH Zürich zur Sicherung und Erschliessung historischer Quellen in der Schweiz, Stiftung Mercator Schweiz, Stiftung Professor Dr. Max Cloëtta, Stiftung zur Förderung der Denkmalpflege, Swiss Bridge – Stammbach Foundation, Swiss Network for International Studies, swisselectric, swissnuclear, swisstopo, the cogito foundation, UBS Optimus Foundation, Velux Stiftung, Vontobel-Stiftung, Walter Haefner Stiftung, Werner Siemens-Stiftung, Wilhelm Sander-Stiftung, Wolfermann-Nägeli-Stiftung, Z Zurich Foundation.

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Vincent Albers, Johanna Buchmann, Michel Cornaz, Dr. Peter Eckardt, Prof. Dr. Peter Fricker, Dr. Max Gsell, Dr. Emanuel Hafner, Prof. Dr. Jörg Hugel, Jacqueline Imhof, Günter Kelm, Dr. Christoph J. Kerez, Prof. Dr. Ferdinand Piëch, Dr. Max Rössler, Peter Scartazzini, Christiane and Nicolaus Weickart, Maximilian Winkler.

Donors of gifts of 5000 francs or more are listed by name, but we are equally grateful to all our unnamed supporters.

Supporting research and innovation

The aim of the ETH Zurich Foundation is to support education and research at ETH Zurich. It is thanks to donations to the ETH Zurich Foundation that innovative strategic projects can be realised quickly and efficiently. The independent, non-profit-making organisation is managed by an unpaid Board of Trustees, of which Jürgen Dormann is the president.

Strategic initiatives

Focus on talent

Thanks to private donations, the Excellence Scholarship Programme is able to provide performance-based grants to encourage more talented young people taking Master courses.

World Food System

A network of researchers from different disciplines and a new competence centre have been set up to help solve the problem of how to feed the world, at local and global level.

Medical engineering

By innovating, encouraging more promising young scientists and expanding its infrastructure, ETH aims to over-come the healthcare challenges of the future.

Integrated risk management

Research is being expanded and integrated in the interdisciplinary field of risk and security.

Electrical energy initiative

Additional professorships in the field of energy supply, transmission and storage will help to promote a better climate and more efficient energy supply.

Sustainable construction

Thanks to additional expertise in research and education, the cities of the future, settlement areas and landscapes can be made more sustainable.

Quantum science and the information society

Private sponsorship is giving a big boost to quantum research.

By making a donation, donors can specifically support a strategic initiative or, by making non-earmarked contributions, give ETH Zurich the option of supporting particularly important projects as required.

→ www.ethz-foundation.ch

«Meet the Talent»: In April 2010 Master Students of the «Excellence Scholarship Programme» and Donors met for mutual exchange.

Organisation chart

Ombudsmen

Executive Board

President
Prof. Dr. Ralph Eichler

Rector
Prof. Dr. Heidi Wunderli-Allenspach

Vice President Research and Corporate Relations
Prof. Dr. Roland Siegwart

Vice President Finance and Controlling
Dr. Robert Perich

Vice President Human Resources and Infrastructure
Prof. Dr. Roman Boutellier

University Assembly

16 Departments in five disciplines

Architecture and Civil Engineering

Architecture
D-ARCH

Civil, Environmental and Geomatic Engineering
D-BAUG

Engineering Sciences

Mechanical and Process Engineering
D-MAVT

Information Technology and Electrical Engineering
D-ITET

Computer Science
D-INFK

Materials Science
D-MATL

Biosystems Science and Engineering
D-BSSE

Natural Sciences and Mathematics

Mathematics
D-MATH

Physics
D-PHYS

Chemistry and Applied Biosciences
D-CHAB

Biology
D-BIOL

System-oriented Natural Sciences

Earth Sciences
D-ERDW

Environmental Sciences
D-UWIS

Agricultural and Food Sciences
D-AGRL

Management and Social Sciences

Management, Technology and Economics
D-MTEC

Humanities, Social and Political Sciences
D-GESS

Competence centres for key areas of research

At ETH Zurich
Digital Design and Modeling (CC-DDM)
Electromagnetics (SEREC)
Energy Science (ESC)
Materials Research (MRC)
Micro and Nano Sciences (MNSP)
North-South Centre
Socio-Enonomic Crises (CCSS)
Teaching and Learning (EducETH)

In the ETH Domain
Energy and Mobility (CCEM-CH)
Environment and Sustainability (CCES)
Materials Science (CCMX)

With other institutions
Climate Systems Modeling (C2SM)
Finance (CCFZ)
History of Knowledge (CC-HK)
Metabolic Diseases (CC-SPMD)
Neurosciences (ZNZ)
Plant Sciences (PSC)

As of 31.12.2010

ETH Zurich Executive Board

Prof. Dr. Roman Boutellier, Dr. Robert Perich, Prof. Dr. Heidi Wunderli-Allenspach, Prof. Dr. Ralph Eichler, Prof. Dr. Roland Siegwart.

Roman Boutellier (1950) has been Professor for Technology and Innovation Management at ETH Zurich since 2004 and Vice President Human Resources and Infrastructure since October 2008. From 1999 until his appointment at ETH, he was President and CEO of SIG Holding AG, while at the same time serving as Adjunct Professor for Technology Management at the University of St. Gallen.

Robert Perich (1961), who has a doctorate in Business Administration, has been Head of the Finance and Controlling division at ETH Zurich since 2003 and, since October 2008, Vice President Finance and Controlling. Before that, he worked for eleven years in the financial services industry, most recently as CFO and member of the Executive Board of the Private Banking Switzerland division of a leading Swiss bank.

Heidi Wunderli-Allenspach (1947) was appointed Assistant Professor for Biopharmacy at ETH Zurich in 1986. From 1992 she was an Associate Professor and, since 1995, has been Full Professor in the same specialist field. During this time she had various university management responsibilities, including as Director of Studies and Head of Department. Heidi Wunderli-Allenspach has been Rector of ETH Zurich and deputy to the President since September 2007.

Ralph Eichler (1947) was elected Associate Professor in 1989 and, since 1993, has been Full Professor for Experimental Physics at ETH Zurich. From 1995 to 1997 he headed an international partnership of about 400 researchers at the German Electron Synchrotron (DESY), and from 2002 he was Director of the Paul Scherrer Institute (PSI). Ralph Eichler has been President of ETH Zurich since September 2007.

Roland Siegwart (1959) has been Full Professor for Autonomous Systems at ETH Zurich since July 2006 and Vice President Research and Corporate Relations since January 2010. From 1996 he was Professor for Autonomous Microsystems at the École Polytechnique Fédérale de Lausanne (EPFL); before that, he worked in industry for many years and was co-founder of a number of spin-off companies at ETH Zurich.

Comments to the picture series “student projects”

From lecture theatre into real life

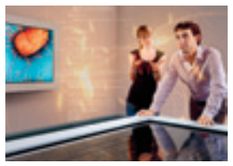
ETH Zurich is the higher education institution of choice for future decision-makers in science, business and society. Many successful entrepreneurs, scientists and engineers began their careers by studying at ETH. Even during their studies, students can build up research and practical experience at an early stage, and learn to take an approach that is both interdisciplinary and entrepreneurial. One of the ways in which they can do this is by becoming involved in one of the many fascinating research projects, some of which are illustrated in this year’s Annual Report. As a higher education institution, ETH Zurich promotes an understanding of ethical and cultural values. Consequently, ETH graduates see themselves not only as highly qualified experts but also as people who are willing to take responsibility in society.

“Rezero” – the balancing ballbot (Title picture)
A “ballbot” is a robot which moves about not on wheels but on a ball. This makes it able to move with great agility and smoothness and even to tilt round bends. The prototype “Rezero” demonstrates for the first time the full potential range of movement of a ballbot, at high speeds and steeply inclined. It is also able to respond to its surroundings and so to interact with a small group of people. “Rezero” was developed by students as part of what is called a focus project at ETH Zurich, and could in future be used as a service robot or mobile information platform or in the entertainment industry.
→ www.rezero.ethz.ch

“Ready-to-live” – interactive clothing (Pages 8/9)
Modern technology can bring clothing to life. In a joint project by the Electronics Laboratory at ETH Zurich and the Swiss Textile College, electrical engineering and design students have produced an unusual fashion collection. Sensors built into the garments react to movement and generate visual and acoustic effects. This means there is constant interaction between the garment, the wearer and the environment. These unique creations, which skilfully combine fashion design with technology, were presented to the public at a diploma fashion show.
→ www.ready-to-live.ethz.ch

“Alcedo” – the flying avalanche search device (Pages 24/25)
The flying drone “Alcedo” helps the emergency services to rescue people buried by avalanches as quickly as possible, by searching and marking their position entirely automatically. This takes the strain off the rescuers: instead of having to search, they can call for help and save their energy for the rescue. Thanks to its lightweight and compact design, “Alcedo” can be carried by each member of a ski touring group. “Alcedo” is a student project at ETH Zurich that has been completed. It came about in partnership with industrial designers from the Zurich University of the Arts. The drone was implemented as a prototype.
→ www.alcedo.ethz.ch

“Packed” – the computer-generated cardboard pavilion (Pages 34/35)
The cardboard construction “Packed” was produced for an exhibition in Shanghai showcasing works by Swiss and Chinese artists and designers. Three ETH students designed the pavilion as part of their Master thesis for the Chair of Computer-Aided Architectural Design. To test their draft version against criteria such as illumination, stability and spatial qualities, the students programmed their own digital tools. This project shows how the whole architectural design process, from identifying the basic shape through production to logistics, can benefit from linking IT and architecture.
→ www.packed-pavilion.blogspot.com



“E. lemming” – the bacterium controlled by light (Pages 42/43)
ETH students in the Departments of Biosystems Science and Engineering in Basel and Computer Science in Zurich have succeeded in constructing what is probably the smallest living robot in the world. By using modified cells, the movements of a single E. coli bacterium can be controlled by light pulses. To achieve this, the students changed the chain of chemical reactions which is responsible for what is called chemotaxis in the bacteria. For this project, the ETH team won first place in the “Information processing” category of the international student competition iGEM2010.
→ www.2010.igem.org/Team:ETHZ_Basel

Imprint

Publisher: ETH Zurich, Corporate Communications

Project manager: Karin Köchle

Editors: Roland Baumann, Beat Gerber, Christine Heidemann, Karin Köchle, Thomas Langholz, Martina Maerki, Peter Rüegg, Samuel Schlaefli, Norbert Staub, Simone Ulmer, Felix Würsten

Layout: formerei gmbh, Sergeant AG

Picture series: (Pictures on cover and on pages 8/9, 24/25, 34/35, 42/43): Alexander Sauer/Scanderbeg Sauer Photography, Andreas Fiersbach

Pictures taken in the Value Lab, research laboratory for virtual design and planning in architecture.

Pictures: Christian Aeberhardt, AlpTransit Gotthard AG, Gerry Amstutz, Carlo Arrigoni, Oliver Bartenschlager, Thomas Baumgartner, John Bavosi/Keystone, Maximilien Brice/CERN, Marco D’Alessandro, Monika Estermann, European Southern Observatory (ESO), Fawad Kazi Architekt GmbH, Federal Office for the Environment (FOEN), Thórdís Högnadóttir/Institute of Earth Sciences Reykjavik/Iceland, Philippe Hollenstein, Heidi Hostettler, Lindsey Howe, Karl-Heinz Hug, Tom Kawara, Susi Lindig, Giulia Marthaler, Valentin Queloz, Peter Rüegg, Swiss Institute of Bioinformatics (SIB), Science Photo Library/Keystone, Jürg Waldmeier

Translation: Syntax Übersetzungen AG, Zurich

Printing: Swissprinters Zürich AG

Circulation: 3000

The Annual report can be obtained in German or English from:
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