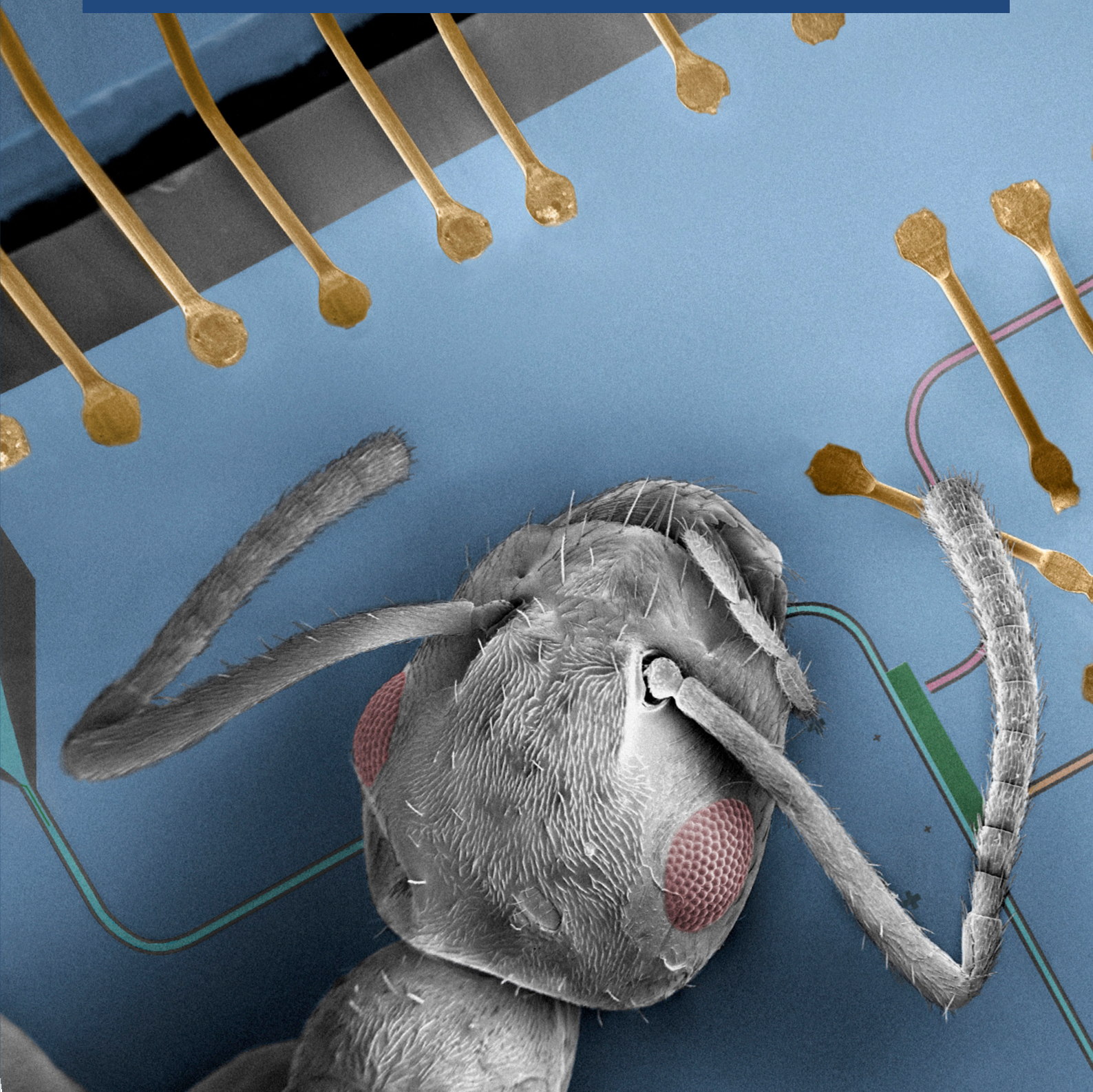
ETH zürich

# Annual report 2013



# At a glance

ETH Zurich is one of the leading international universities for technology and the natural sciences. It is well known for its excellent education, ground-breaking fundamental research and for implementing its results directly into practice. To researchers, it offers an inspiring working environment, to students, a comprehensive education.

Founded in 1855, ETH Zurich today has more than 18,000 students from over 110 countries, including 3,900 doctoral students. About 500 professors currently teach and conduct research in 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. Twenty-one Nobel Laureates have studied, taught or conducted research at ETH Zurich, underlining the excellent reputation of the university.

Transferring its knowledge to the private sector and society at large is one of ETH Zurich's primary concerns. The 80 new patent applications filed each year and the 280 spin-off companies that emerged from the institute between 1996 and 2013 are evidence of ETH Zurich's success in this area. ETH Zurich helps to find long-term solutions to global challenges. The focal points of its research include energy supply, risk management, developing the cities of the future, global food security and human health.

**Statistics 2013**

| | |
|---|---|
| **Students** (headcount) | **18,178** |
| of which Bachelor students | 8,444 |
| of which Master students | 4,778 |
| of which Doctoral students | 3,889 |
| **Professors** (headcount*) | **497** |
| Professors (full-time equivalents) | 466 |
| **Personnel** (full-time equivalents) | **7,914** |
| of which scientific staff | 4,925 |
| **Expenditure** (CHF million) | **1,512** |
| of which federal financial contribution | 1,147 |
| of which third-party funding | **366** |

* Includes externally employed dual professors.





**Title picture:** physicists at the Quantum Device Lab at ETH Zurich have succeeded for the first time in teleporting information in what is called a solid state system. The ant depicted on top of the superconducting circuit illustrates the relative proportions of the macroscopic electrical circuits used for teleportation experiments.

# Sustainable partnerships

Scientists in Zurich have contributed a great deal to the field of quantum physics. In the past, one need only think of names like Einstein, Pauli or Schrödinger to recognise such contributions. Today, about 100 years later, ETH Zurich physicists and engineers are working on the development of quantum devices and, perhaps, Zurich will one day become the cradle of the quantum computer industry.

Quantum physics is just one example of fundamental research that has an immense long-term potential, but exactly where it will lead is entirely unknown. This kind of research is only possible if brilliant minds are able to pursue their ideas freely and independently. It also requires a far-sighted perspective in terms of funding. ETH Zurich has the enormous privilege of freedom in education and research. This privilege is enshrined in the Federal Institutes of Technology Act and allows the university to enjoy generous basic funding from the Swiss federal government.

Also enshrined in the Act is the duty to apply the knowledge that the institution gains and makes it available to society. To meet this responsibility, ETH Zurich encourages its students to think like entrepreneurs. It also supports its researchers in all aspects of collaboration with companies and administrative bodies. ETH Zurich's support helps to ensure that research results lead to new products and services that provide Swiss industry with a competitive advantage.

Today, even in fundamental research that requires a long-term perspective, research cannot be separated from the application of results. This view has been confirmed by an increasing number of decision-makers in companies and other organisations who have a long-term partnership with ETH Zurich. Through their donations to the ETH Zurich Foundation, partner contributions drive forward development and research in strategically important areas. Such partnerships benefit all concerned, but the general public can also raise questions about academic independence. To address the issue of academic independence, the ETH Zurich Foundation has implemented a Code of Conduct under which it operates. Contracts with donors may also be inspected at the office of the Foundation.

In the past year, ETH Zurich was fortunate to receive two especially generous donations, from ETH Zurich alumnus Max Rössler and the Walter Haefner Foundation, to set up the new Institute for Theoretical Studies (ETH-ITS). The ETH-ITS will invite outstanding researchers from all over the world to participate, for up to one year, in research conducted at ETH Zurich. Their work will provide a much-needed boost to theoretical science in Zurich.

Finally, on behalf of ETH Zurich, I am extremely grateful to the taxpayer, private and industrial sponsors and all those who support the university's ideals. I would also like to extend my personal and special thanks to the professors and staff who, after all, are instrumental in facilitating the institution's continued success.

R. Eichler

Ralph Eichler, President of ETH Zurich

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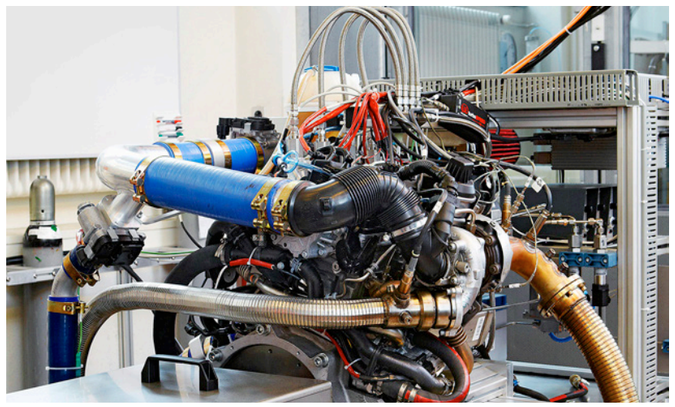

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**1**
**Successful midterm review:** the Singapore-ETH Centre for Global Environmental Sustainability (SEC) has become a top-class research institute. Until the end of September 2013, it was led by Professor Gerhard Schmitt (photo), the new Director is Professor Peter Edwards.
→ Page 15

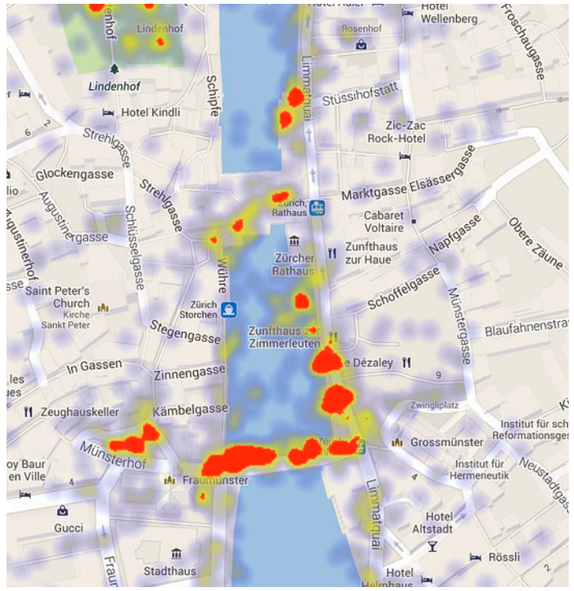
**2**
**Academic celebration:** on 16 November 2013, ETH Zurich celebrated the 158th ETH Day with guests drawn from the fields of research, politics and business. The address was given by Federal Councillor Johann N. Schneider-Ammann, head of the Federal Department of Economic Affairs, Education and Research.
→ Page 31

**3**
**Fast supercomputer:** in April, the Swiss National Supercomputing Centre CSCS in Lugano put the energy-efficient "Piz Daint" supercomputer into operation. With a peak performance of over seven petaflops, it is one of the fastest computers in Europe today.
→ Page 25

**4**
**Natural gas-diesel hybrid engine:** ETH Zurich researchers have converted a conventional diesel engine from a small family car so that it will run on 90 percent natural gas. That means it generates only half as much $CO_2$ and uses only 2.4 litres of fuel for 100 kilometres.
→ Page 19

**5**
**World record:** as part of the 2013 focus projects, a group of Mechanical Engineering students developed "Cieo", a lightweight, aerodynamic tandem. They achieved their aim of building the fastest tandem in the world by reaching a speed record of 83 kilometres per hour.
→ Page 13

**6**
**Worth an Oscar:** Markus Gross, ETH Zurich professor and Director of the Disney Lab, together with three other scientists, received a "Tech Oscar". They developed a process used by leading special effects studios to simulate smoke and explosions in Hollywood films.
→ Page 32 f.

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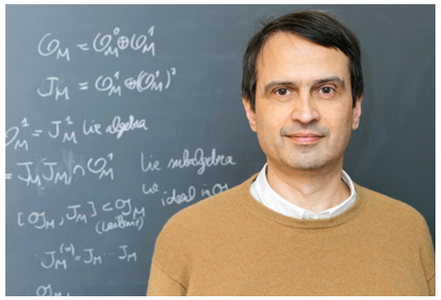


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**1**
**Züri Fäscht app:** at the 2013 Züri Fäscht festival, some 27,000 people used an app developed by ETH Zurich researchers. This collects data to create so-called heat maps that show where there are particularly big crowds at any given time.
→ Page 16

**2**
**Fundamental research:** thanks to generous donations from Max Rössler and the Walter Haefner Foundation, ETH Zurich has been able to establish a new Institute for Theoretical Studies that invites top scientists from all over the world to come to the university for research visits. Its Director is Professor Giovanni Felder.
→ Page 15

**3**
**Science for all:** Scientifica 2013, on the theme of risk, was a big success. Well over 20,000 visitors discovered their own willingness to take risks and heard researchers explain how risks are perceived and where possible dangers are lurking.
→ Page 21

**4**
**Quantum physics:** physicists at ETH Zurich have succeeded for the first time in teleporting information in what is called a solid state system. The information on the superconducting chip is stored and processed according to the laws of quantum physics.
→ Page 16

**5**
**Excellence in research:** Olivier Voinnet (l.), Professor of RNA Biology, received the 2013 Rössler Prize for his findings relating to small RNA molecules. Donor Max Rössler (r.) presented him with the award at the "Thanksgiving" event organised by the ETH Zurich Foundation.
→ Page 32 f.

**6**
**20th anniversary:** equal opportunities for men and women at all levels is an important concern for ETH Zurich. Equal!, the Office of Equal Opportunities, celebrated its 20th anniversary with an exhibition called "Check your Stereotypes".
→ Page 28

# Basic principles of good education

ETH Zurich enjoys an outstanding reputation as an educational institution, both in Switzerland and abroad. The university aims to consolidate this leading position by continuously improving the education it provides. To achieve this goal, departments regularly subject their degree programmes to close scrutiny and continue to develop them, as is currently happening in the areas of environmental sciences and agricultural sciences.

Last year, ETH Zurich produced two important documents to assist lecturers and course managers in their work: The guidelines on "Quality Criteria for Teaching" formulate, in concrete terms and for the first time, those elements which make for a good education. Observation of these guidelines when developing future degree programmes and courses will help to ensure basic principles of quality education are met. The "Guidelines on Grading Written Examinations" specifically address the needs of lecturers. The document identifies how to assess students' performance at ETH Zurich both with consistency and transparency.

ETH Zurich is also breaking new ground in other aspects of education: The university is creating new online courses to supplement traditional face-to-face teaching. Infrastructure has also been developed to facilitate online examinations, even for popular courses with up to 500 students.




By the end of 2013, for the first time there were over 18,000 students enrolled at ETH Zurich.

Student numbers

## More than 18,000 students for the first time

As a renowned educational institution, ETH Zurich continues to be the preferred institution for students. In 2013, 2651 young men and women began their Bachelor studies on one of 23 degree programmes; that represents an increase of 4 percent compared with the previous year. The proportion of foreign students remained about the same as in 2012, at nearly 19 percent, while the proportion of women fell slightly from 31.9 to 30.2 percent.

Once again, the Mechanical Engineering degree programme attracted the most student interest with 465 new students, followed by Architecture with 258 newly admitted students. Demand for the Health Sciences and Technology programme, introduced for the first time in 2011, continues to be high: it recorded 220 new students. There was also high demand for the programmes in Electrical Engineering and Information Technology, Physics, Civil Engineering and Computer Science.

**Master's programmes still popular**

ETH Zurich also attracts a high enrolment for its Master's programmes; student numbers are therefore at a very high level. In total, 2029 students began a Master's course at ETH Zurich. The majority of those students – a total of 1388 men and women – achieved their Bachelor's degree at ETH Zurich. In addition, approximately 2500 candidates from other universities applied for Master's programmes at ETH Zurich; 87 percent of those completed their Bachelor's degrees in other countries. After examination of their dossiers, 1020 of the applicants were accepted from other institutions; of those, 585 commenced their studies at ETH Zurich in 2013.

**Increase in doctoral students**

ETH Zurich also saw an increase in the number of doctoral students: at the end of 2013, the number of candidates for a doctoral programme had risen to 3889 (previous year: 3795, headcount).

Since, overall, more students enrolled than graduated, the total number of students at ETH Zurich increased again in 2013. By the end of the year, for the first time there were over 18,000 students enrolled at the university. This represents an increase of 2.2 percent compared with the previous year, reflecting the continuing long-term growth projected for the university.

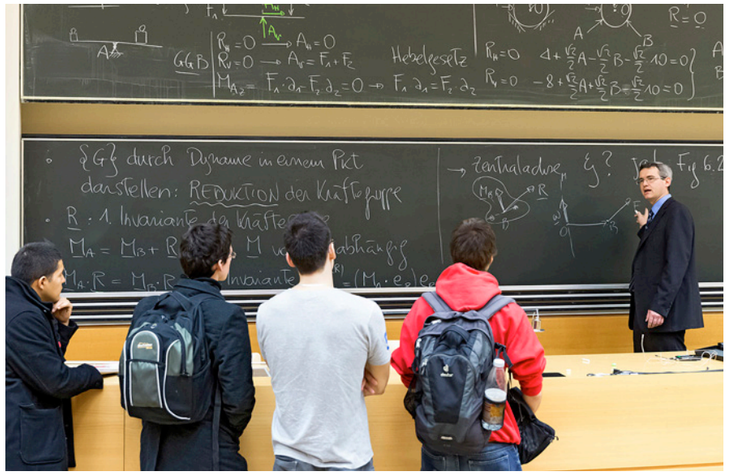
www.ethz.ch/rectorate →

Online courses

## Supplementing face-to-face teaching

Embracing new technology, ETH Zurich is leveraging online educational resources to supplement face-to-face teaching and learning. Since autumn 2013, ETH Zurich has been participating in a pilot project, to offer three innovative online courses based on the worldwide educational trend, MOOC ("massive open online courses"). ETH Zurich has also implemented TORQUE ("tiny, open-with-restrictions courses focused on quality and effectiveness"). Unlike MOOCs, TORQUE courses are always linked to a degree programme at ETH Zurich and are primarily intended for its own students. The courses consist of video sequences and online exercises that students can use independently to prepare for lectures or to study material in greater depth. Two of the three courses teach the basic principles behind the lectures in Economics and Physics II. The third course is an introduction to the statistical software "R".

www.ethz.ch/let-projects →



High-quality courses encourage the students to engage with the material critically and continuously.

Quality criteria

## What makes a good education

In its degree programmes, ETH Zurich faculty convey knowledge through teaching methods based on sound technical and practical expertise. They also teach students how to accept responsibility in their professional lives and how to play a constructive role as independently thinking members of society. These qualities make ETH Zurich graduates highly sought-after in the job market.

Maintaining the quality of its education and teaching requires that ETH Zurich continually improve upon the already high-standards of its programmes and courses. In an effort to respond to the fundamental question, "What criteria define quality teaching?", the Rector's office, with the help of the Study Conference and the Teaching Commission, has formulated an answer in its guidelines on "Quality Criteria for Teaching". The criteria contained in this document constitute a guide for use in the future development of degree programmes and courses.

**Clarity, by design**

Well-designed degree programmes, according to the new guidelines, identify the overall concept and clearly delineate the subject-based and interdisciplinary skills that will be conveyed in the content of its courses. Such design guarantees that students are able to acquire a sound scientific training. A streamlined curricula, with as many elective courses as possible, provides students with an opportunity to specialise. Measuring the quality of degree programmes with an appropriate range of performance assessments is important to the future development of programmes that are consistent with the basic subjects, but remaining open to new technical developments and innovative ideas. The guidelines also indicate that quality teaching includes a curricula that draws students' attention to their responsibilities in relation to society and should be relevant to specific areas of work. Degree programmes that include a regular evaluation and an appropriate infrastructure ensure compliance with ETH Zurich's quality standards.

**Related to the bigger picture**

The guidelines also define quality criteria for particular courses. A high-quality course is aligned with the overall curriculum, based on clearly formulated learning objectives, and uses methods of performance assessment that are appropriate to the learning objectives. The content structure and the methods of course delivery should be appropriate to the learning objectives and the circumstances – for example to the number of students enrolled. Finally, achieving quality on the course level ensures that students are encouraged to engage with the course material critically and continuously.

www.ethz.ch/let-en →
www.ethz.ch/quality-criteria →

ETH Career Center

## Launching students into professional life

ETH Zurich not only advises students on their course of study, but also helps them embark upon their professional life. Working with Telejob, an entity within the Academic Association of Scientific Staff at ETH Zurich AVETH, the Career Center has set up a new job platform called "ETH get hired". The platform advertises not only jobs in academia and industry, but also promotes internship opportunities.

The ETH Career Center app offers a host of tips on career-related matters. In addition to information about the career events at ETH Zurich, users can also, in the "Warm-up" section, pick up some quick tips while they're on the move. For example, users can find out how best to use social media when looking for a job; how to read a job advertisement; compile a professional CV; or how to present yourself successfully in a job interview.

www.eth-gethired.ch →
www.ethz.ch/career-center-app-en →



Departmental trends

## Emphasis on education

Approximately every six years, the departments of ETH Zurich are evaluated by an international team of experts, in the interests of continuously improving the quality of research and education. Now more weight is being attached to education in this process: the newly developed "Quality Criteria for Teaching" are now being used, firstly, by faculty in each individual department to produce their own self-evaluation report. Secondly, the international team of experts will use these criteria to assess the curricula.

D-USYS degree programmes

## Adapting to meet new requirements

ETH Zurich degree programmes are subjected to review at regular intervals. The Environmental Sciences programme is currently engaged in this process. In the first phase of the review, the Department of Environmental Systems Science, using a broad survey mechanism as well as the graduate survey carried out by the Swiss Federal Statistical Office formulated an assessment of modifications that may be required in this degree programme. In a second stage, various working groups will use the findings of the surveys and assessment to propose improvements to the programme.

The Agricultural Science programme is also under review, after new appointments were made to four of the nine professorships in 2013. Lecturers, students and external experts participated in a retreat to define the areas of the programme that require restructuring. Four working groups will now formulate some possible measures to include the key areas of biotechnology and agricultural economics. The challenge for ETH Zurich is in training both specialists for the local job market and experts on global nutrition issues for an international market.

www.ethz.ch/d-usys-programmes →

Examinations

## Guide to effective grading

The quality of education can be measured not only in terms of content and structure, but also by how performance is assessed in examinations. Particular importance is attached to grading, since this determines what level of performance is judged to be satisfactory. In order to help the lecturers who are responsible for grading, the Educational Development and Technology unit (LET), the Study Conference, and the relevant Prorector, have produced "Guidelines on Grading Written Examinations". These set out the principles on which grades are assigned at ETH Zurich. The guide illustrates examples of what constitutes "best practices" in grading. One important point is the grading scale which needs to be calculated according to predefined criteria to ensure that an individual student's grade is not effected by the performance of other students.

**Demand for online examinations**

ETH Zurich is playing a really pioneering role when it comes to online examinations. On the one hand, these allow new formats for examinations to be used and, on the other, they lessen the workload for lecturers, especially on courses with high student numbers. In response to the growing demand for online examinations, ETH Zurich has implemented a 170 workstation examination room in the main building, staggered the scheduling and use of other rooms to accommodate online examinations for up to 500 students. In 2013, three times as many students took examinations online than in the previous year.

ETH Zurich is also being innovative in the software system it uses for examinations. The online examinations are conducted on the Moodle e-learning platform, an innovative technology also used in everyday teaching sessions. For example, lecturers can use the platform to make course materials available to students. Moodle therefore affords students used to working with this platform a familiar examination environment.

In addition to the Moodle e-learning platform, subject-specific third-party applications are also used in examinations. For example, students can use these tools to rewrite programming code, do statistical calculations or produce CAD drawings. Even though there is a certain risk of technical problems occurring with these third-party applications, they enable subject-specific skills to be tested.

www.ethz.ch/online-examinations →

## Recognising top performance

The Excellence Scholarship & Opportunity Programme is made possible by donations provided to ETH Zurich Foundation. With the programme, ETH Zurich awards an annual performance-based scholarship to the top 2 to 3 percent of newly enrolled Master's students. Selected for this year's award are: Materials Science student Philippe Knüsel from Switzerland; physicist Sophie Chauvin from France; and cartographer Marianna Serebryakova from Russia (l. to r.). A total of 38 scholarships were awarded in 2013. Fifteen scholarships were awarded to Swiss students and the remaining 23 scholarships were awarded to students from 15 other countries.

www.ethz.ch/excellence-scholarships →


What will the sustainable cities of the future look like? That was the question addressed by the ETH Sustainability School in Singapore.

Summer Schools

## Finding solutions for the future

How can an ever-growing world population be fed healthily and sustainably? This was the question addressed by the two-week Summer School organised by the World Food System Center in mid-August at the Gut Rheinau organic farm near Schaffhausen. Twenty-four students from 15 countries tackled the topic, as well as gaining a first-hand insight into the work of an organic farm. In lectures and workshops, and also on excursions and in group work, the students learned about various aspects of sustainable agricultural production and how foodstuffs are processed. The aim of the Summer School was to help students understand the globally interconnected nature of the food system and, through intercultural and interdisciplinary exchange, to formulate some suggested solutions for the future.

It was in an entirely different setting that the fourth ETH Sustainability Summer School took place on the subject of "Future Cities – Networks and Grammars". From the end of June to mid-July at the Future Cities Lab in Singapore, 29 students from a wide range of different disciplines and nationalities had the chance to work with experts on case studies on the theme of urban planning and network design. The task for the student teams was to plan homes for 150,000 inhabitants, workplaces for 70,000 people and an integrated transport system.

www.ethz.ch/worldfoodsystem →
www.ethz.ch/eth-sustainability-en →

Golden Owl

## The best lecturers

Once again on ETH Day in 2013, the students gave awards to those lecturers who had proved especially outstanding in their commitment during courses organised by their departments. This time, awards went to the following lecturers:

Professor Philip Ursprung (D-ARCH), Professor Alexander Puzrin (D-BAUG), Professor Wolf-Dietrich Hardt (D-BIOL), Professor Sai Reddy (D-BSSE), Professor Antonio Togni (D-CHAB), Professor Andreas Fichtner (D-ERDW), Dr. Marcus Matthias Keupp (D-GESS), Dr. Urs Meyer (D-HEST), Dr. Frank Kagan Gürkaynak (D-INFK), Professor Vanessa Wood (D-ITET), Professor Stephan Wagner (D-MTEC), Dr. Stephan Peter Kaufmann (D-MAVT), Professor Markus Niederberger (D-MATL), Professor Michael Eichmair (D-MATH), Professor Matthias Gaberdiel (D-PHYS), Professor Heini Wernli (D-USYS).

The Credit Suisse Award For Best Teaching 2013 went this year to Professor Günther Dissertori (D-PHYS), who won the Golden Owl in 2005 and 2009.

www.ethz.ch/owl →

ETH on the road

## Dialogue with secondary schools

From October to April each year since 2004, ETH Zurich has visited secondary schools in Switzerland with its "ETH on the road" event. To date, the university has presented its range of courses at more than 60 schools. Over two days, a hands-on exhibition and talks by ETH Zurich lecturers show the school children and teachers the kind of subjects in which ETH Zurich focuses and the opportunities that it can offer budding students. The university also uses the visits as a way of maintaining a dialogue with schools and the general public. For example, in April at the Lycée-Collège des Creusets in Sion, there was a public debate in which not only ETH Zurich Rector Lino Guzzella, but also Swiss National Council member Christophe Darbellay and Aldo dalla Piazza, President of the Swiss Grammar School Rectors' Conference, participated.

www.ethz.ch/unterwegs →

EPF Lausanne

## Even closer networking

Every year, professors and administrative managers at EPF Lausanne meet to share ideas at the "Journées Scientifiques et Pédagogiques". This year, the event took place in September at ETH Zurich – with ETH Zurich professors involved, too. For both universities, it was a good opportunity to strengthen their ties. ETH Zurich Rector Lino Guzzella and Philippe Gillet, Vice President of Academic Affairs at EPF Lausanne, agreed that they would like to work more closely together in future. For example, they hope to make exchanges easier for students and researchers.



Master's thesis

## A fluorine-free jacket

Water-resistant and breathable clothes often contain problematic fluorine compounds. For his Master's thesis ETH Zurich student Mario Stucki developed a breathable material that does not contain fluorine and is competitive in the market. Instead of using polytetrafluoroethylene as the starting material he used a fluorine-free polymer that is not harmful to people's health. He impregnated this with tiny nanoparticles of lime that he then dissolved out using acid. This created a fine-pore synthetic membrane with a similar structure to the membranes in breathable textiles. Tests in the laboratory showed that the new material is just as water-resistant and breathable as conventional products. Practical tests have also demonstrated that it can be processed. Stucki proved this by working with a Zurich-based textile company and a designer to produce a jacket out of the fluorine-free fabric.

www.ethz.ch/fluorine-free-jacket →

ETH EduApp

## Growing in popularity

The interactive ETH EduApp that gives students useful information for their everyday studies and supports teaching sessions by allowing mobile communication and interaction is becoming more and more popular with students and lecturers demonstrated by the growing number of downloads and usage in the classroom. Specialists have also endorsed the app: at its annual conference, the Society for Media in Science gave the EduApp its Best Paper Award. When Version 2 went live, the range of functions had been extended following feedback from users. For example, at the request of lecturers, the clicker function that allows questions to be asked during a lecture was more clearly differentiated.

www.ethz.ch/edu-app-en →

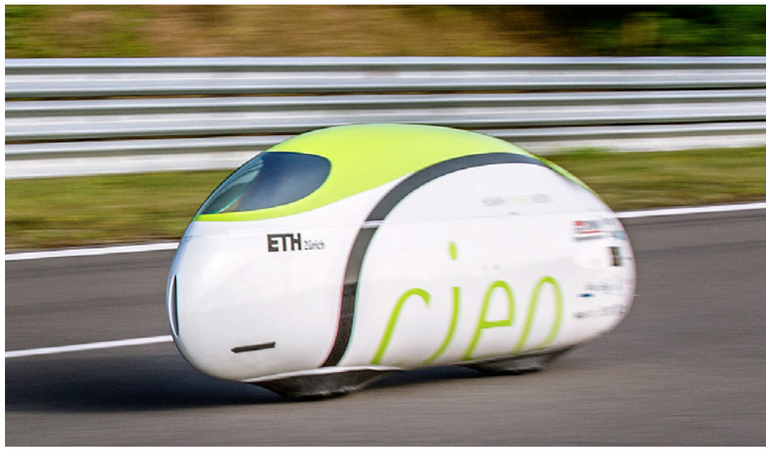
Focus projects

## Setting a world record on a tandem

The Department of Mechanical and Process Engineering presented their focus projects to the general public, an opportunity representing the culmination of two semesters of independent work with colleagues on developing a product. This year, the projects were devoted to the theme of mobility: a remote-controlled puppet carried by a hexacopter; a flying robot that can take off vertically and hover like a helicopter, but covers distances as efficiently as a glider; and the futuristic tandem "Cieo" – these were some of the innovative ideas that excited the general public in the ETH Zurich Main Hall.

After the presentation, the developers of Cieo celebrated a very special success: at the end of July, the team and their five racing cyclists set a new world record at the DEKRA Test Oval in Germany with their special vehicle made of a carbon fibre composite. Cieo covered a distance of 83 kilometres in an hour, so breaking the previous world record, which dated from 1980, by 8.5 kilometres. This was made possible by the special design of the tandem: the two drivers sit – squeezed into an aerodynamic shell – half-lying on top of one another in the vehicle.

www.cieo.ch →




The Cieo focus project team set a new speed record with their futuristic tandem.

Academic Motorsports Club

## A glittering season

The Academic Motorsports Club Zurich (AMZ) can look back on a season full of highlights. With their electric racing car "Julier", the student team from ETH Zurich and the University of Lucerne won two first-place and two second-place prizes in four races in the overall evaluation. Their victory in the first race at Silverstone (UK) was particularly noteworthy: for the first time in the history of the competition, an electric car kept pace throughout the competition with its combustion engine counterparts. Thanks to their successes in the 2013 season, the AMZ team is now ranked number 1 in the "Formula Student" world rankings. About 450 teams from all over the world took part in the race, the largest student engineering competition. Not only is the technical performance of the racing cars assessed, but also other aspects such as teamwork, practicality, the marketing concept and resource-efficient manufacture.

www.amzracing.ch →

# Future milestones

By enhancing its existing research facilities and establishing new ones, ETH Zurich has laid strategically important groundwork over the past year to ensure its future sustainability. The generous private donations of two alumni paved the way for setting up the Institute for Theoretical Studies, thus transforming the visionary idea of creating a think tank at ETH Zurich into reality. The new institute will invite the world's top scientists from the fields of mathematics, theoretical sciences and theoretical computer science to spend some time conducting research in Zurich.

The new Competence Center for Materials and Processes deals with both fundamental and applied research. This interdisciplinary research centre was formed as a result of a merger between the former Materials Research Center and the Micro and Nano Science Platform and thus pools together the university's expertise in materials research. Meanwhile, research in the field of health has undergone further development under the "Hochschulmedizin Zürich" ("Zurich University Medicine") association. One of the key strategic focal areas of this initiative is personalised medicine. Finally, ETH Zurich is also bolstering its research activities in the area of deep geothermal energy by establishing a new chair.

Over the past three years, the Singapore-ETH Centre for Global Environmental Sustainability (SEC) has developed into a top-class research institute. At this centre, 200 researchers and Master's students are currently working together on an interdisciplinary basis to investigate sustainable urban development. The SEC is now a recognised flagship initiative for ETH Zurich in one of the world's up-and-coming regions.



New institutions

## Cutting-edge research

ETH Zurich embarked upon some strategically important projects in the course of last year: in June it set up the Institute for Theoretical Studies (ETH-ITS) to boost its fundamental research activities. With this institute, ETH Zurich can now invite the world's leading scientists in the fields of mathematics, theoretical sciences and theoretical computer science to spend up to a year conducting research in Zurich. Enabling visiting scientists to interact with researchers and students will not only benefit ETH Zurich; it will also enrich Switzerland's university landscape as a whole.

As a centre for fundamental research, ETH-ITS is at the start of the scientific value creation chain. Further along the value chain, however, is the more application-oriented Competence Center for Materials and Processes, founded in October 2013. In concrete terms, the purpose of this centre is to develop and gain an understanding of new materials and processes for applications in areas such as medicine or the computer industry.

ETH Zurich and the University of Zurich are going to set up a "Personalised Medicine" competence centre in 2014. The aim of this centre will be to pool expertise in genome-based biomedical sciences on a cross-institutional basis. Part of the "Hochschulmedizin Zürich" ("Zurich University Medicine") initiative, which forms a network between university medical research and university hospitals, has been further developed as a result.

Thanks to a donation to the ETH Zurich Foundation, the university has finally been able to establish a new chair in deep geothermal energy and start carrying out research into this highly promising energy technology.

www.ethz.ch/eth-its →
www.ethz.ch/materials-processes →
www.ethz-foundation.ch →

ERC Grants

## 18 researchers awarded EU funding

With nine ERC Starting Grants, four ERC Consolidator Grants and five ERC Advanced Grants awarded to ETH Zurich researchers in 2013, the university has once again achieved excellent results from its applications for funding from the European Research Council. No other Swiss university enjoyed such a high success rate with the projects they submitted, nor did any receive more Starting Grants than ETH Zurich in this round of funding awards. The ERC Starting Grant scheme provides promising and talented young scientists with up to 1.8 million Swiss francs in financial support for their research projects over a period of five years. Researchers awarded an ERC Advanced Grant receive between three and four million Swiss francs in funding over the same period.

http://erc.europa.eu →

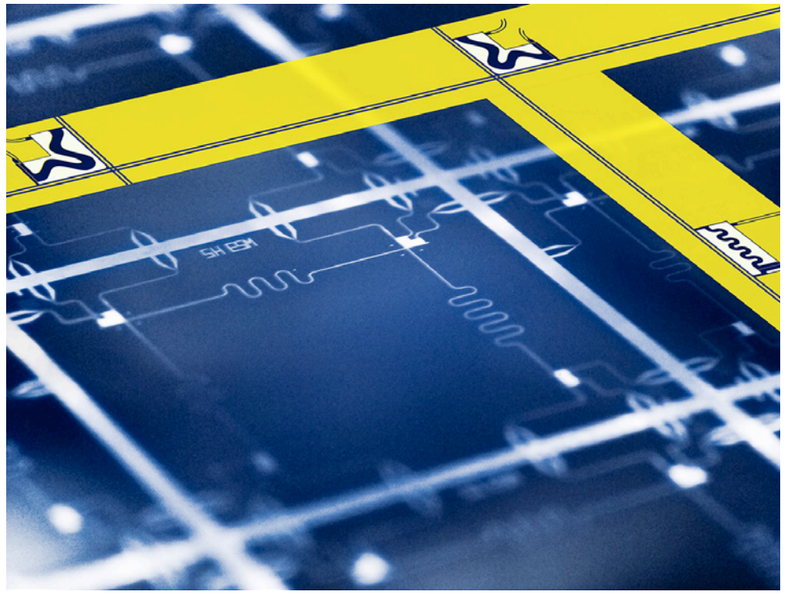
Singapore-ETH Centre

## Successful midterm review

Over the past three years, the Singapore-ETH Centre for Global Environmental Sustainability (SEC) has developed into a top-class research institute. This was confirmed by a midterm review in autumn 2013, when a panel of internationally renowned scientists, industry representatives and local authorities examined the status of the SEC's first research project, the Future Cities Laboratory (FCL), in an international context. The panel also assessed the progress made in implementing the visions and strategies of the FCL through the research activities carried out to date and the extent to which they would be supported by future research projects and resources.

www.ethz.ch/future-cities-lab →

Gerhard Schmitt, Professor of Information Architecture at ETH Zurich, was Director of the Singapore-ETH Centre until the end of September 2013.



Electronic circuits used for the quantum teleportation experiment performed by the Quantum Device Lab.

Quantum physics

## Teleportation by electronic circuit

For the first time, physicists at ETH Zurich have successfully teleported information in a so-called solid state system. A team of researchers led by Andreas Wallraff achieved this using a chip measuring seven by seven millimetres, similar to a conventional computer chip. The information on this chip, however, is not stored and processed based on the laws of classical physics, but on those of quantum physics.

The researchers managed to "beam" the data across a distance of six millimetres, from one corner of the chip to the opposite one – without transporting any physical particles from the sender corner to the receiver corner.

To do this, the physicists took advantage of the quantum mechanical property of entanglement, whereby the sender and receiver units – small, superconducting circuits in the case of this experiment – establish a link with each other as if by magic. This means that the programmed quantum mechanical information on the sender unit can also be read out at the receiver. Therefore, rather than travelling from point A to point B, in the process of teleportation the information appears at point B and then disappears at point A, when read out at point B.

**Faster than previous systems**

Other scientists have already managed to teleport information over more than one hundred metres, but they did so using optical systems and visible light. Wallraff and his team, however, succeeded in teleporting information for the first time in a system consisting of electronic circuits in their 2013 experiment. This is particularly interesting because circuits of this kind are an important element for the construction of future quantum computers. Another advantage of this system, with a transmission rate of 10,000 quantum bits per second, is that it is significantly faster than most other teleportation systems to date.

Next the researchers intend to try to teleport information from one chip to another. Their long-term plan is to investigate whether electronic circuits can also be used for quantum communication over longer distances. Compared to today's information and communication technologies, which are based on classical physics, quantum information processing offers the advantage of a much higher information density: more information can be stored and it can be processed more efficiently in quantum bits than in the same quantity of conventional bits.

www.ethz.ch/quantum-device →

Faster computers

## Germanium made laser-compatible

Researchers from ETH Zurich, together with scientists from the Paul Scherrer Institute (PSI) and the Politecnico di Milano, have managed to make the semiconductor germanium, which is not normally suitable for use in lasers, into a laser-compatible material. This could enable microprocessor components to communicate using light in future, which would make computers faster and more efficient. Light can transmit signals more quickly than electricity and copper cables. Since silicon, the base material for all computer chips, is not suitable for the construction of lasers, the researchers are focusing on germanium, as it is perfectly compatible with silicon.

To make germanium suitable for use, the researchers have to stretch it. This tension enables the electrons to reach energy levels that are favourable for the generation of light particles, known as photons.

www.ethz.ch/nanometallurgy →

Züri Fäscht app

## Successful analysis of visitor flows

The experiment carried out by ETH Zurich at the 2013 "Züri Fäscht" festival was a great success. Some 27,000 people used the smartphone app developed by researchers from the Wearable Computing Lab to observe the behaviour of large crowds of people. This enabled the scientists to collect over 23 million GPS points during the festival. They used this data to create heat maps showing where particularly large numbers of people were gathered at any given time. They were also able to identify potential hazard hotspots by monitoring the data live. Next the researchers want to model entire flows of movement so that, eventually, they can predict the movements of a crowd of people over several minutes.

www.ethz.ch/wearable-computing →



Gene network

## Implantable slimming aid

Increased blood-fat values are regarded as a risk factor for heart attacks and strokes. A research team led by ETH Zurich Professor Martin Fussenegger from the Department of Biosystems Science and Engineering in Basel has therefore developed an implantable genetic circuit, which constantly monitors the fat levels circulating in the blood. The circuit is mainly composed of human gene components and, in response to excessively high blood-fat levels, it produces a messenger substance that conveys a sense of satiety to the body. It therefore acts as both an early warning system and a form of treatment.

In order to construct this highly complex regulatory circuit, the biotechnologists skillfully combined different genes that produce particular proteins and trigger specific reaction steps. They implanted the construct in human cells and then inserted these into tiny capsules.

The researchers then implanted the capsules into obese mice that had been fed fatty food. Once the gene regulatory circuit had intervened due to the excessive levels of blood-fat, the obese mice ate less and noticeably lost weight. The blood-fat values also returned to normal, eventually prompting the regulatory circuit to stop producing the satiety signal.

**Sensor for different dietary fats**

One major advantage of the new synthetic regulatory circuit is the fact that, rather than simply measuring one sort of fat, it can also measure several saturated and unsaturated animal and vegetable fats in the body at once. However, the circuit cannot simply be transferred to humans and it will take many years to develop a suitable product for this. Nonetheless, Fussenegger can certainly envisage that, one day, obese people with a body mass index well over 30 could have a gene network of this kind implanted to help them lose weight – as a possible alternative to surgical interventions such as liposuction or gastric bands. According to the researchers, the advantage of the implant is that it could be used without any highly invasive operations. Another benefit is that, instead of intervening in the progression of a disease that is difficult to regulate, the implant has a preventive effect and exploits the natural human satiety mechanism.

www.ethz.ch/biotechnology →

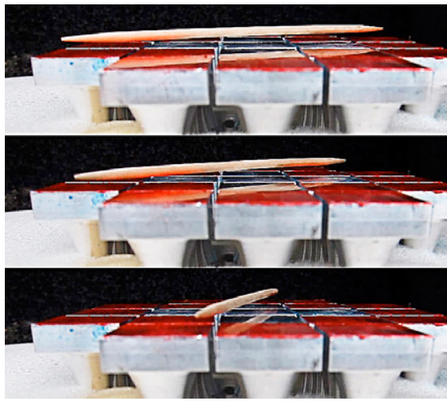
Acoustophoresis

## Floating on sound waves

A team of researchers led by Dimos Poulikakos, Professor of Thermodynamics, has successfully managed to keep particles and droplets of liquid suspended using sound waves – a process known in the scientific world as acoustophoresis. For the first time, they succeeded in using this method to control the movement of objects on a two-dimensional level, merge droplets together, trigger chemical or biological reactions and even rotate elongated objects such as toothpicks in the air.

Previously scientists had only managed to produce this kind of "contactless" movement in the air with the aid of magnets or by placing objects in liquids. This meant that materials had to have certain optical, electrical or magnetic properties in order to be moved in this way, which limited the options available. By contrast, sound waves offer the possibility of suspending various objects regardless of their characteristics.

According to information provided by the researchers there is a wealth of application possibilities for this process especially in biochemistry and pharmaceutics. For example, it could be used to carry out experiments involving the processing and subsequent analysis of particles or droplets of a starting material. Following a step-by-step procedure, the researchers could mix tiny amounts of substances without subjecting them to chemical changes triggered by contact with a surface.



Sound waves are used to suspend a toothpick in the air.

www.ethz.ch/acoustophoresis →

Report

## Real estate bubbles investigated

As part of a CTI project, a team of scientists led by Didier Sornette, Professor of Entrepreneurial Risks at ETH Zurich, joined forces with the online comparison service comparis.ch to investigate whether there is a risk of real estate bubbles developing in Switzerland and where they might arise. They summarised their results in a report that, rather than focusing exclusively on the current situation, comments on the future development of the real estate market. The first part of the analysis was published in January 2013, with the second part following in August.

The researchers analysed over a million advertisements displayed by comparis.ch for houses and flats on the real estate market between 2005 and the end of June 2013, incorporating the asking prices into a mathematical model.

In the first analysis, the researchers found clear signs of speculative bubbles based on overvalued properties in eleven regions of Switzerland. Contrary to expectations, these were not urban centres and regions known for high property prices, but areas nearby. Within six months, the number of "critical" regions fell to three, thus confirming the prediction Sornette had made in January that the situation would ease over the course of the year.

The model on which the analysis was based had already been used by the researchers to successfully predict the burst of the real estate bubble in the USA in 2007, as well as the burst of the oil bubble in 2008.

www.ethz.ch/entrepreneurial-risks →

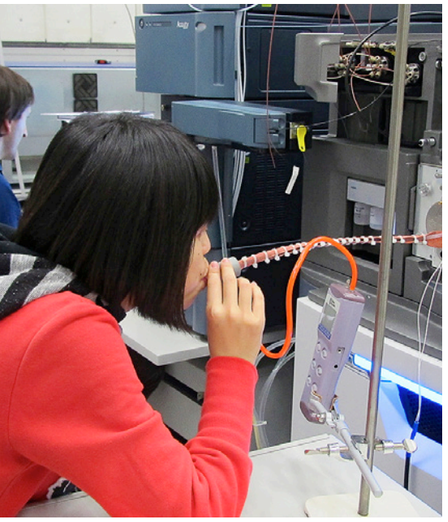
New analysis methods

## Diagnosing disease in exhaled air

Doctors today analyse blood and urine to find indicators of disease based on the molecules dissolved in these fluids. However, researchers from ETH Zurich and the University Hospital Zurich are now proposing to add breath to this conventional diagnostic arsenal with the help of methods that use high-resolution real-time analysis. More specifically, a team of scientists led by ETH Zurich researcher Renato Zenobi has demonstrated that human breath has a characteristic "fingerprint". To do this, they used mass spectrometry to examine the breath of test subjects and discovered that the volatile components in the breath of each individual differ in a characteristic way. Now the researchers are working with doctors from the Pneumology Clinic at the University Hospital Zurich to investigate the breath fingerprints of individual persons and, using the same technique, to find the characteristic fingerprints of conditions such as lung diseases.

The new analysis method would offer certain advantages over the use of blood and urine samples: a breath fingerprint can be identified within seconds and there is no need to subject patients to unpleasant needle injections to take blood.

www.ethz.ch/breath-analysis →



Using a mass spectrometer, the ETH Zurich researchers analysed the spectrum of molecules in exhaled breath.

Energy metabolism

## Niacin, the fountain of youth

Who would not want to live a long and healthy life? A well-known substance could help in this respect, as a team of researchers led by Michael Ristow, a professor of energy metabolism at ETH Zurich, has demonstrated using roundworms. Vitamin $B_3$ – also known as niacin – and its metabolite nicotinamide in the worms' diet extended their lifespan by approximately one tenth. According to Ristow, this is caused by free radicals, that are formed when nicotinamide is modified by the metabolism. Based on his experiments, the researcher has concluded that small amounts of free radicals and the oxidative stress triggered by them have a health-boosting effect, thus disagreeing with the view held by many of his peers. In earlier studies on humans, Ristow demonstrated that the health-enhancing effect of endurance sports is mediated via an increase in the formation of free radicals – and that antioxidants, which are also present in fruit, vegetables and certain vegetable oils, abolish this effect. According to Ristow, niacin brings about a similar metabolic condition and tricks the body into believing that it is engaging in sporting activity, even when it is not actually the case.

www.ethz.ch/energy-metabolism →

Roundworms, which measure just one millimetre in length, live longer when fed niacin.

Obesity

## Converting bad fat

There are two types of fat cells in the body: white fat cells function as energy stores, which increase when sufficient food has been consumed and store energy in the form of fat. Brown fat cells, on the other hand, burn energy to produce body heat. Using mice as an example, a team of researchers led by Professor Christian Wolfrum has now demonstrated, for the first time, that white fat cells can be converted to brown ones and vice versa depending on temperature. In cooler temperatures, the laboratory mice formed brown fat cells in their white fat tissue. When they were then exposed to warmer temperatures, the tissue turned white again. This finding could potentially form the basis for new treatments against obesity.

www.ethz.ch/nutrition-biology →

Nanoantioxidant

## Antioxidant with a long shelf life

Scientists from ETH Zurich have developed a patented nanomaterial that protects other molecules from oxidation. Unlike many similar active substances in the past, the ETH Zurich researchers' antioxidant has a long shelf life, which makes it ideal for industrial applications. The nanoantioxidant is also temperature-resistant and could, for example, be used to make pasteurised food keep longer or to protect polymers that are produced at high temperatures. The nanoantioxidant is composed of the naturally occurring antioxidant gallic acid combined with a silicon oxide nanoparticle, which prevents the gallic acid molecules from latching onto one another and thus losing their effect.

www.ethz.ch/antioxidant →



$CO_2$ emissions

## Quick action is more cost-effective

The faster greenhouse gas emissions are reduced, the easier it will be to limit global warming to two degrees and the less it will cost to achieve this goal. Delaying action to after 2020, however, would push up the costs of climate protection measures sharply. This conclusion was reached by a comprehensive study in which ETH Zurich was heavily involved.

The study also reveals that some viable options are already no longer available and, if we are to have a good chance of achieving the two-degree objective, there are key technologies that our society cannot forego. These include, for example, carbon capture and storage technology, which separates off $CO_2$ and stores it underground. Without this procedure, energy consumption would have to be drastically reduced. The study also notes that land-intensive – and therefore controversial – climate protection schemes such as reforestation and the cultivation of biofuels are essential.

www.ethz.ch/climate-research →

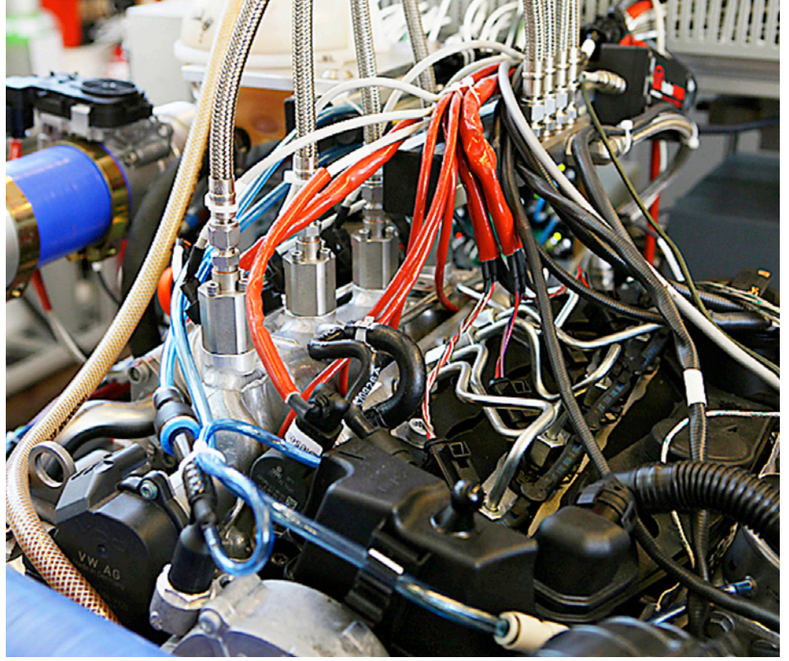
Spatial planning

## Innovative planning process

The Limmat Valley is one of the most densely populated areas of Switzerland, yet – until now – there has been no long-term spatial development plan for the valley as a whole. The affected communities, regions, cantons and the federal government therefore launched the PeRL ("Perspektive Raumentwicklung Limmattal" – "Limmat Valley spatial development outlook") project in 2013, with scientific support from the Chair of Spatial Development at ETH Zurich.

Based on an innovative new planning process – an "ideas competition" – four teams drew up plans for how the Limmat Valley should be spatially developed in the period up to 2050 and outlined which steps would need to be taken. The best solutions were put forward to political decision-making bodies at the end of 2013 in the form of concrete recommended action plans.

www.ethz.ch/spatial-development →



$CO_2$ emissions were significantly reduced with the new natural gas-diesel hybrid engine.

Hybrid engine

## Clean and economical

Scientists at the Institute for Dynamic Systems and Control have developed a natural gas-diesel hybrid engine that emits just 56 grams of $CO_2$ per kilometre into the environment – a two- or threefold reduction on today's emission levels. This is possible because natural gas produces relatively low emissions. The researchers converted a conventional diesel engine from a small family car so that it could run on 90 percent natural gas. Instead of a spark plug, as is standard with natural gas engines, the engine is ignited with a small amount of diesel injected directly into the cylinder.

Not only is the engine economical, it is also clean. Its equivalent fuel consumption is less than 2.4 litres per 100 kilometres. The centrepiece of the innovative electronic combustion control system is a sensor, that measures the pressure in the cylinders. Using complex control algorithms, scientists were able to continuously adapt the amount and timing of the diesel injections, enabling the engine to run with the greatest possible efficiency. The researchers also connected the natural gas-diesel engine to a small electric engine to further reduce consumption. However, the hybrid engine could also be installed in a vehicle without electric hybridisation, which would be crucial for industrial production in larger quantities. The intention is for the engine to be ready to go into series production in five years' time.

www.ethz.ch/gas-diesel-hybrid →

New catalyst

## Generating power from alcohol and water

Generating electricity from alcohol could become a real possibility in future thanks to a new molecule developed by researchers from ETH Zurich. If this molecule is added to a mixture of methanol and water, as a catalyst, the mixture reacts to form molecular hydrogen and carbon dioxide ($CO_2$). Unlike most other methods used previously, the new catalyst makes this reaction possible even at temperatures below 100 degrees Celsius and under atmospheric pressure.

The catalyst could be used, for example, as an active component in electrodes in a fuel cell. This would make it possible to use a mixture of water and methanol directly as a liquid fuel for generating electricity. Previous catalysts became inefficient over time because they became clogged up with the toxic by-product carbon monoxide. However, it would also be conceivable to apply the chemical reaction in reverse: molecular hydrogen could be added to $CO_2$ to produce methanol that could be used as a fuel.

www.lac.ethz.ch →

# Lively exchange

Imparting knowledge and maintaining a dialogue with society, industry and politics is important to ETH Zurich. It therefore held a number of events in 2013 that offered scientists the opportunity to present their work and discuss it with the public. One such event that received a positive public response was "Scientifica", which explored the topic of risk: more than 20,000 visitors in attendance at the event were inspired by the research conducted at both ETH Zurich and the University of Zurich.

The aim of the "ETH Spatial Planning Talk" was to engage in discussion with experts from the worlds of science, industry and politics. This talk addressed a number of topics, including questions about innovative landscape development and sustainable urban architecture and how these might look in the future. The "ETH-Klimarunde" event, on the other hand, involved an interested public audience in a discussion with experts from the university about the new UN climate report.

ETH Zurich also enjoyed success last year in terms of transferring knowledge and putting technology into practice: an encouraging number of ETH Zurich spin-off enterprises were awarded prizes. The university also opened its second "Innovation and Entrepreneurship Lab" (ieLab) on the Hönggerberg campus. The ieLab is designed to bring together young talents from ETH Zurich, entrepreneurs and partners from industry.

Aside from research and education, ETH Zurich also performs important functions for society. The Swiss Seismological Service, for example, plays a significant role in keeping Switzerland safe by monitoring seismic activity via its measuring network. Meanwhile, the KOF Swiss Economic Institute celebrated its 75th anniversary in 2013. It regularly publishes company surveys and economic forecasts that are relevant to Switzerland's economic development.



Research in dialogue

## Climate and spatial planning

In October, ETH Zurich held events on two topics that are of interest to the general public. At the "ETH Spatial Planning Talk", for example, experts from science, industry and politics speculated on what living space will be like in the future. They explored questions such as what innovative landscape development and sustainable urban architecture might look like in Switzerland. The participants agreed that new living and working space should primarily be created through high-quality inward consolidation rather than further expansion of settlements. The manner in which this principle is put into practice, however, varies significantly from canton to canton: as the presentations by Jean-Michel Cina, member of the Cantonal Council of Valais, and Hans-Peter Wessels, member of the Cantonal Council of Basel-Stadt, demonstrated, these two cantons follow very different spatial planning strategies.

At the "ETH-Klimarunde" event, that took place shortly before the talk on spatial planning, experts discussed the new UN climate report with an interested public audience. The discussion brought to light a dilemma facing scientists:


Ralph Eichler, President of ETH Zurich, opened the dialogue on the UN climate report.

to retain its credibility, climate research has to deal with uncertainties, but uncertainty is precisely the element that strikes a nerve with the general public and decision-makers. The consensus, among the participants at the event, was that the solution lies in an on-going dialogue. The researchers sought to encourage this dialogue not just in the panel discussion, but also in round table conversations. The experts and guests agreed that multidisciplinary exchange must be developed further as concrete solutions are needed in addition to scientific findings.

www.ethz.ch/klimarunde-2013 →
www.ethz.ch/raumplanungsgespraech-2013 →

Flying the flags for the first time: Scientifica made a striking impact on the Zurich cityscape too in 2013.

Scientifica 2013

### A resounding success

In its third incarnation, the Scientifica event – this time on the theme of risk – once again proved a resounding success: on the last weekend in August, well over 20,000 visitors attended the event, discovered their own willingness to take risks and listened to researchers from ETH Zurich and the University of Zurich explain where possible dangers are lurking. The event explored a wide variety of topics across more than 40 exhibition stands and just as many short lectures, with subjects ranging from finance, climate change and earthquakes to lasers, salmonella and nanoparticles.

www.scientifica.ch →

Pioneers in Sustainability

## Combining a career and sustainability

How can people be successful in their professional careers and remain committed to sustainability at the same time? This is the question tackled by the new "Pioneers in Sustainability" series of events organised by ETH Sustainability in cooperation with Collegium Helveticum and the think tank W.I.R.E. At the first two events, two notable personalities presented their work: Mathis Wackernagel, who – as President of Global Footprint Network – has, for years, played a significant role in steering the debate on sustainability, and Reto Ringger, founder of Globalance Bank, who is an active advocate of sustainable finance. The events are primarily targeted for students, who not only have the opportunity to meet some extraordinary people, but are also encouraged to develop their own ideas on how to combine career success with sustainability.

www.ethz.ch/pioneers-in-sustainability-en →


ETH Zurich opened a second "Innovation and Entrepreneurship Lab" on the Hönggerberg campus in August 2013.

ieLabs

## New lab for life science pioneers

Following the successful launch of the Innovation and Entrepreneurship Lab (ieLab) on its Zentrum campus, ETH Zurich opened another ieLab on the Hönggerberg campus in 2013. The ieLab offers young scientists the opportunity to develop initial prototypes to test the viability of setting up their own spin-off ventures. While the upcoming young researchers working on the Zentrum site are primarily involved in engineering sciences or information and communication technology (ICT), the approximately 30 laboratory and 20 office workspaces available in the new Molecular Health Sciences Platform on the Hönggerberg are designed specifically for young life scientists.

**Pioneer Fellows and spin-off founders**
Many of the researchers working in the ieLab are Pioneer Fellows or founders of newly launched spin-off enterprises. Since 2010, ETH Zurich's Pioneer Fellowship programme has provided funding for students on the basis of their Master's or doctoral thesis. The Grants are awarded to individual or pairs of researchers intending to develop a highly innovative product or service that can be used commercially and/or for the benefit of society. A total of 38 students have received a grant since the start of the programme, with ten such grants awarded in 2013. Five of the twelve spin-off companies set up by Fellows from the ieLab, to date, were launched in the year under review.

**Support and exchange**
The young entrepreneurs in the Innovation and Entrepreneurship Lab particularly appreciate the support they receive from coaches – experienced and successful businessmen and women. Coaches help founders to develop the strategic focus of their companies, establish partnerships and alliances with industry and handle external investors effectively. The Pioneer Fellows also find the opportunity to exchange ideas with other spin-offs in the ieLab and the mutual support they receive through regular networking events in the ieLab beneficial.

In close cooperation with ETH transfer, the programmes and services provided by the Innovation and Entrepreneurship Lab are designed to facilitate the availability of research findings to industry and society more quickly, so that their commercial value can be exploited to the full.

www.ethz.ch/ielab-en →
www.ethz.ch/pioneer-fellowships →

"Venture" competition

## New funding body

Since holding its inaugural business plan competition in 1998, "venture" has developed into an indispensable initiative. Every two years, it provides support for young entrepreneurs, both within and outside universities, in setting up their own companies. Two thousand teams have taken part in the competition since it was first launched and more than 600 companies have emerged from it. Five hundred of these businesses are still going today, providing jobs for over 5000 people.

The latest round of the successful business plan competition got underway in 2013, this time with the "venture foundation" as a new funding body. Thomas Knecht, who was still Managing Director of McKinsey Switzerland at the time, set up "venture" in collaboration with ETH Zurich. The foundation was established by Knecht Holding AG and ETH Zurich last year to secure the initiative's long-term future. McKinsey & Company Switzerland and the Commission for Technology and Innovation (CTI) are represented on the foundation's board.

www.venture.ch →

Industry Day

## Interacting with industry

In 2013, ETH Zurich researchers once again had the opportunity to engage in a stimulating exchange of opinions with industry representatives at the Industry Day. A total of 260 participants from industry came to meet ETH Zurich professors and representatives of ETH Zurich spin-offs to find out about the latest projects and technologies emerging from the university's workshops and laboratories. In his welcome speech, President of Swissmem Hans Hess emphasised the importance of new, innovative products for industry. Roland Siegwart, ETH Zurich's Vice President Research and Corporate Relations, used the findings from a study to demonstrate that cooperating with industry at an early stage pays dividends. ETH Zurich is therefore keen to continue putting its scientists in contact with industry as early as possible.

www.ethz.ch/industryrelations-en →



Patent

## Liposomes replace animal testing

Researchers from ETH Zurich have filed a patent application for a method to test the biological activity of one of the strongest toxins known to man, botulinum neurotoxin. If the procedure is adopted by the pharmaceutical industry, it could save the lives of half a million mice per year.

Botulinum neurotoxin (BoNT) is a notorious foodborne poison. However, it has also been successfully used to alleviate chronic conditions and ailments and, under the brand name "Botox", to smooth out wrinkles. Given the potential risks of using botulinum neurotoxin, the toxicity of every batch of any therapeutic agent containing BoNT must be tested using the mouse LD50 test, that determines the dosage at which half of the animals die. However, the new test system developed by ETH Zurich in collaboration with the Spiez Laboratory does not require any laboratory animals or living cells: it measures the toxic activity of the neurotoxin with the aid of artificially produced lipid membrane vesicles, known as liposomes.

www.ethz.ch/food-microbiology →

Smart meter

## Saving energy in the shower

A team of researchers under the Chair of Information Management at ETH Zurich joined forces with the ETH Zurich spin-off Amphiro to develop a smart meter. This device measures water and energy consumption in the shower and displays this information in real time.

What started out as a prototype based on an innovative idea is now being mass-produced and sold by the spin-off company Amphiro. It got off to a successful start thanks to an order for 7000 devices from the Zurich municipal electricity company ewz. In a study funded by the Swiss Federal Office of Energy, scientists from ETH Zurich and the University of Lausanne were able to demonstrate that the consumption of hot water fell by 20 to 25 percent on average in the participating households.

www.amphiro.com →

Award winners

## Successful ETH Zurich spin-offs

ETH Zurich spin-off enterprises once again received numerous awards in 2013. The most lucrative, the Swiss young entrepreneurs' prize, for example, went to the ETH Zurich spin-off Newscron. Alongside four other start-up companies, Newscron was also honoured with a development award from the W.A. de Vigier Foundation worth 100,000 Swiss francs. The company received this prize for its smartphone app, which enables users to compile their own personalised newspaper, containing the daily news items that interest them, without having to navigate several news websites.

ETH Zurich start-ups Glycemicon, 3db Access and ReHaptix were delighted to be awarded 130,000 Swiss francs in starting capital by the private funding initiative Venture Kick (not to be confused with the "venture" business plan competition). Glycemicon is developing a drug for preventing and treating diabetes, while 3db Access is working on tamper-proof locking systems for cars. ReHaptix is launching a device for testing the motor function of arms and hands onto the market.

The ETH Zurich spin-off Sensirion was launched as part of the first "venture" competition – now the company employs 500 people worldwide.

**Four top-ten rankings**
The third edition of rankings published by the Institute for Young Entrepreneurs (IFJ) show just how well companies affiliated with ETH Zurich performed last year: 25 ETH Zurich spin-offs are listed among the top 100 most successful start-ups in Switzerland and four of them made it into the top ten.

Marc Gitzinger and Marcel Tigges lead the ETH Zurich spin-offs with their company BioVersys AG taking second place in the rankings. The two biochemists specialise in molecular switches known as transcription factors that determine whether or not an attacked pathogen will fight off an antibiotic.

InSphero, ranked fifth, produces tiny amounts of tumour and liver tissue the size of a pinhead. These can be used by scientists, for example, to test whether a substance will attack the liver.

The company Dacuda, known for its scanner mouse, was ranked seventh, followed by Getyourguide AG with its online platform featuring outings, tours and adventure trips for every holiday destination imaginable.

Sensirion, celebrating its 15th anniversary in 2013, exemplifies the success story of ETH Zurich's spin-offs. Launched as a start-up by Moritz Lechner and Felix Meyer at ETH Zurich in 1998, Sensirion is now a global market leader in the microsensor sector and employs 500 people across the world.

www.ethz.ch/ spin-offs-en →
www.venturekick.ch →
www.startup.ch/top100 →

High-calibre guests (left to right): Hans Hess, President of Swissmem; Josef Ackermann, former President of the Board of Directors of the Zurich Insurance Group; Jan-Egbert Sturm, Director of KOF; Christoph Schär, a professor at the Institute for Atmospheric and Climate Science, and MC Alenka Ambroz.

KOF Swiss Economic Institute

# Keeping up with the Swiss economy for 75 years

The KOF Swiss Economic Institute at ETH Zurich is the oldest and one of the most prestigious institutes for economic research in Switzerland. On 23 September it held a celebration to mark its 75th anniversary. More than 400 guests were in attendance, including the speakers: Federal Councillor Johann N. Schneider-Ammann, Thomas Jordan, Chairman of the Swiss National Bank, and Josef Ackermann, former President of the Board of Directors of the Zurich Insurance Group. The speeches were followed by a panel discussion, in which Swissmem President Hans Hess, ETH Zurich climate researcher Christoph Schär, KOF Director Jan-Egbert Sturm and Josef Ackermann talked about the effectiveness of forecasts in times of uncertainty.

The institute now known as KOF was founded in 1938 as the Institut für Wirtschaftsforschung (Economic Research Institute). As Swiss businesses and politicians faced the experiences of the global economic crisis and the looming threat of the Second World War they realised that there was a lack of statistical data available for economic and political planning. By surveying businesses, the institute's first director Eugen Böhler laid the foundation for work still conducted by KOF today. KOF now regularly surveys more than 11,000 companies in Switzerland about their business situation and their expectations. In doing so, it has kept its finger on the pulse of the Swiss economy for 75 years, forecasting economic developments in the country, investigating national economic issues of social relevance and advising politicians, businesses and associations.

In preparation for tackling the challenges of the future, KOF is stepping up its scientific work in the field of public finance. It is also extending its activities to include the key area of educational system research.

www.ethz.ch/kof-en →

ETH Library

# Seven million titles

Seven million titles from 140 libraries available in one unique catalogue: since early April, users of the ETH Library have also been able to take advantage of this extensive, multidisciplinary range of resources. This is because the catalogues from the libraries of the University of Zurich and numerous other libraries have been incorporated into the NEBIS network catalogue. The NEBIS library network now covers around 140 libraries from universities, universities of applied sciences, research institutes and other organisations from every language region. The expansion of this network, which is expected to continue over the next few years, is intended to benefit both Zurich as a centre of scientific research and the general public.

www.ethz.ch/library →



Swiss Seismological Service

# Top research combined with public service

The Swiss Seismological Service (SED) is a competent, independent specialist institute that plays an essential role in ensuring that authorities and the general population are notified immediately and kept fully informed in the event of an earthquake. Last year, the importance of this service was stressed by incidents such as the earthquake in Sargans, which reached a magnitude of 4.1 and the seismic monitoring carried out for the St. Gallen geothermal energy project. As demonstrated in Basel in 2006, the findings from St. Gallen indicated that controlling seismicity caused by human activity is arguably the greatest challenge involved in the exploitation of deep geothermal energy.

Combining cutting-edge research with a highly valued public service is a key priority for Stefan Wiemer, who was named Professor of Seismology and Director of the SED in 2013. Wiemer had been running the SED on an interim basis since the start of 2012, following the departure of his predecessor Domenico Giardini. The ETH Board confirmed his appointment as Director in May 2013.

Dense networks of state-of-the-art seismological monitoring stations, providing data for earthquake surveillance and further-reaching scientific investigations, form the basis for combining services and research. In January 2013, the Federal Council approved the programme of earthquake mitigation measures marking the second phase in the expansion of the Swiss strong motion network. The SED plans to expand its monitoring stations to 70 new stations by 2018, with funding from the Federal Office for the Environment. It has also begun work on modernising its highly sensitive broadband monitoring network with the help of loan funding from an ETH Zurich stimulus programme. The first step is to replace the recording devices, some of which are 20 years old.

www.ethz.ch/sed-en →

CSCS

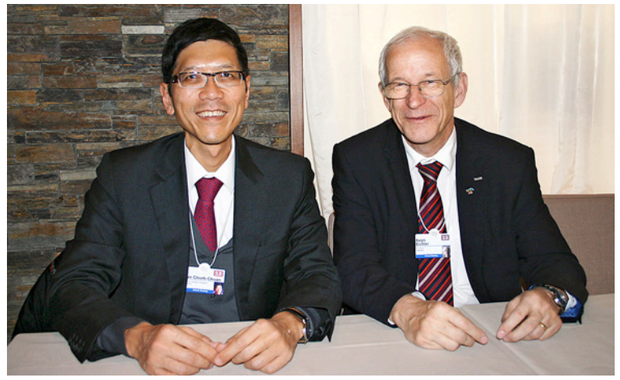
# New supercomputer up and running

In April, the Swiss National Supercomputing Centre (CSCS) in Lugano put the new "Piz Daint" supercomputer into operation. Since this time, it has undergone further upgrades and can now reach a peak performance of over seven petaflops, making it one of the fastest computers in Europe. The upgrades involved replacing one of the two conventional CPU processors on each of the compute nodes with a graphical processing unit (GPU). GPU processors offer fewer functions, but these are optimised for numerical calculations, which means that they can perform calculations not only more quickly, but also more efficiently. The new hybrid system is the first of its kind and one of the most energy-efficient in the world.

Initial tests have shown that a climate simulation can run three times faster on the "Piz Daint" nodes than it can on the same number of nodes in an older supercomputer, "Monte Rosa". The new hybrid system also operates almost three times more energy-efficiently than the same type of computer equipped with CPU processors only – and seven times more efficiently than "Monte Rosa". To make the most of the possibilities offered by the new computer architecture, the application programmes need to be adapted. This challenge is being dealt with as part of the High-Performance and High-Productivity Computing (HP2C) initiative, which involves a collaboration between software developers from various disciplines, mathematicians and computer scientists.

The launch of the new supercomputing infrastructure at the CSCS means that the national High-Performance Computing and Networking (HPCN) strategy has now been successfully.

www.cscs.ch →



Professor Tan Chorh Chuan, President of the National University of Singapore, and Ralph Eichler, President of ETH Zurich, meet at the World Economic Forum.

International cooperation

# Leading the way in Asia

As "Leading House" for the bilateral research cooperation with China, South Korea and Japan, ETH Zurich plays an important ambassadorial role for Switzerland as a centre for science and higher education. Over the next few years, this function is expected to expand to include more countries in the Asia-Pacific region. In mid-February 2013, Mauro Dell'Ambrogio, State Secretary for Education, Research and Innovation, and ETH Zurich President Ralph Eichler signed a performance agreement to this effect for the period from 2013 to 2016.

ETH Zurich also plays a leading role in the International Alliance of Research Universities (IARU): ETH Zurich President Ralph Eichler has been Chairman of this alliance, which has linked ten of the world's top universities, since the beginning of 2013.

www.ethz.ch/bilateral-programmes →

# Transparent and efficient management

ETH Zurich believes it has a duty to handle its financial resources economically and with due care. To meet this responsibility, it relies on transparent accounting practices and endeavours to make its administrative procedures as efficient as possible. An essential tool, in this regard, is the ETHIS management system which – now in its second version – has proved once again to simplify processes.

ETH Zurich has drawn up a Compliance Guide that provides an overview of the key regulated areas. The guide is designed to help managers and their staff maintain the university's prestigious reputation by avoiding inaccuracies.

Equal opportunities and sustainability are also important issues at ETH Zurich. The university established Equal!, the Office of Equal Opportunities, 20 years ago to enable men and women to enjoy equal opportunity at all levels. Five years ago, it also set up ETH Sustainability as a central hub for coordinating sustainability activities. Today, ETH Zurich plays a leading role in this area and is one of the few universities to have integrated sustainability issues into every aspect of its operations.

In 2013, ETH Zurich also embarked on further construction and development projects: the structural work for the new "Oberer Leonhard" building was completed on the Zentrum campus, while operations also commenced at the new test facility for the Laboratory of Hydraulics, Hydrology and Glaciology (VAW) and the new Molecular Health Sciences Platform on the Hönggerberg campus.



Governance

## Information and Orientation

In 2013, ETH Zurich once again saw an increase in the number of students and researchers, which is reflected in its key financial figures: the university's overall expenditure in 2013 came to 1512 million Swiss francs (up by 3.1 percent compared to 2012). A total of 1147 million Swiss francs (76 percent) of this expenditure was covered by the federal financial contribution (FFC), with the remaining 366 million Swiss francs coming from third-party funding.

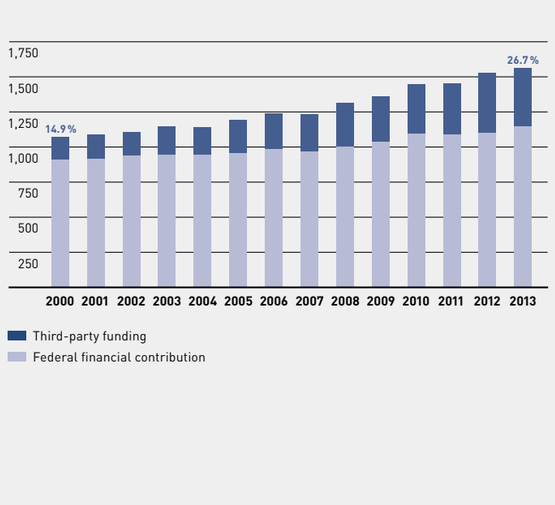
The growth of the university was absorbed relatively well in financial terms thanks to an amendment passed by Parliament to the ERI Dispatch for 2013–2016, that ensures that federal funding for ETH Zurich will increase consistently over the four years of the current ERI period. ETH Zurich's financial situation also benefited from the fact that the university enjoyed great success in obtaining third-party funding, particularly in the form of highly sought-after EU grants awarded to ETH Zurich researchers.

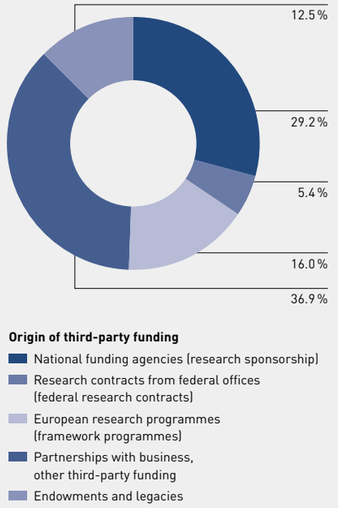
It is important for ETH Zurich to handle its financial resources economically while, at the same time, minimising the administrative burden on professors. An essential tool in this regard is the ETHIS information and support system, which maps numerous business processes. The second version of this tool, successfully launched in 2013, offers an increased functionality over the previous version. For example, an inventory database listing some 40,000 devices at ETH Zurich has been integrated into the system, as have the dossiers for scientific projects. The new version of ETHIS also features a customised user interface. This means that the display can be adapted to provide staff within the departments with the relevant information they need to fulfil their responsibilities.

Managerial staff at ETH Zurich also received useful support in the form of the Compliance Guide, published in summer 2013. The guide provides a helpful overview of the key regulated areas in which improper application could potentially damage the university's reputation. These areas include fundamental aspects such as: personnel management, finance, procurement and IT security. It also includes research-specific elements such as: technology transfer, data protection or animal testing.

www.ethz.ch/finances-controlling →

### Development and structure of ETH Zurich's income




A look at the changes in ETH Zurich's income shows the growing importance of third-party funding. This is mainly earmarked funding and primarily benefits research. When it comes to the education provided, or developing the infrastructure, on the other hand, it is usually not possible for third-party funding to replace the basic funding from the federal government. That is why steady growth in the federal financial contribution is absolutely essential if ETH Zurich is to be sustainably financed.

ETH Zurich Foundation

# Transparent guidelines

Private donations play an instrumental role in enabling ETH Zurich to apply ideas with a lot of future potential to research and education as quickly as possible. As a non-profit-making foundation, the ETH Zurich Foundation accepts donations from companies, foundations and private individuals. Following a targeted approach, it uses these funds to promote the university's strategic initiatives in research and education.

Financial contributions of this kind are handled according to a transparent set of rules. The key principles relating to this are set out in a Code of Conduct drawn up by the ETH Zurich Foundation and brought into force in October 2013. The rules specify, for example, the conditions under which private donations must comply and the criteria for passing funds on to the university.

www.ethz-foundation.ch →

ETH Sustainability

# Committed to sustainability

Sustainability has been a key issue at ETH Zurich for more than 20 years. This is why, five years ago, the university placed the newly created coordination centre for sustainability, ETH Sustainability, under the direct responsibility of the President. The aim of ETH Sustainability is to increase and publicise ETH Zurich's contribution towards sustainable development. It links key stakeholders and initiatives in this area at the university and implements its own initiatives and activities.

ETH Zurich is one of the few universities to have integrated sustainability into every aspect of its operations – from education and research to its dialogue with society and specific measures implemented on campus.

ETH Zurich's second Sustainability Report offers an in-depth insight into its sustainability activities. In addition to presenting key figures related to energy and the environment, it sets out specific objectives and reports on the progress achieved. As sustainability reporting becomes increasingly important, ETH Zurich is well equipped for the future with its exemplary reporting structure.

www.ethz.ch/sustainability →

LIMES Day for Schoolgirls

## Encouraging girls to go into engineering

In mid-January, 70 schoolgirls aged between 15 and 17 came to ETH Zurich to learn about the fields of mechanical and electrical engineering. During talks and laboratory tours, the girls had the chance to discover what topics researchers were currently working on, showing particular interest in the areas of product design, biomechanics and nanoelectronics. This "LIMES Day for Schoolgirls" event was organised by the "Ladies in Mechanical and Electrical Studies" student committee.

www.ethz.ch/limes →

Equal opportunities

# Promoting equal opportunities

Offering equal opportunities to men and women at all levels is an important concern for ETH Zurich. It has been 20 years since the university established Equal!, the Office of Equal Opportunities, which now reports directly to the President. Since 2010, Equal! has published an annual gender monitoring report that provides information about the proportion of women at various levels in the academic hierarchy. The office also campaigns for a further increase in the number of women specifically at professorial levels, but also among the student body.

In the autumn, Equal! held an exhibition entitled "Check Your Stereotypes" to mark its 20th anniversary. Using numerous examples, this event illustrated which stereotypes are particularly relevant in terms of making study or career choices and how gender stereotypes and careers are linked.

www.ethz.ch/equal-en →



New building on the Zentrum campus

## Topping-out ceremony on Leonhardstrasse

A striking gateway to the university district is currently being erected at the upper end of Leonhardstrasse – the first new building to be constructed on the Zentrum campus in 20 years. The staggered high-rise building with ten upper floors is intended to provide urgently needed office and laboratory space for research and educational purposes, as well as a seminar centre. The completion of the structural work, after a process lasting approximately three years, was marked with a topping-out ceremony on 2 September. The façade and interior work are now expected to be finished by summer 2014. In the future, the 450 workspaces available in the "Oberer Leonhard" building will be used by researchers from the KOF Swiss Economic Institute and staff affiliated with various professorships from the Department of Mechanical and Process Engineering.

Hönggerberg campus

## Expansion continues

In July 2013, it was finally time for the Laboratory of Hydraulics, Hydrology and Glaciology (VAW) to move from its previous premises on Gloriastrasse into the new test facility on the Hönggerberg campus. This facility was the first of five new building projects planned by ETH Zurich for the campus to go into operation. Construction work is already underway on the stair-like HCP office complex that is being built in front of the eye-catching HCI building with its five "fingers". In addition to seminar rooms and places to study, this new building will offer workspaces for 260 people.

Progress was also achieved in terms of the preparation work for three other planned building projects in 2013, paving the way for the actual construction work to begin in 2014. One of these projects involves the construction of five student residences, two of which will provide accommodation for 400 students. A private investor, as the owner of the buildings, is constructing the residences. A competition for investors interested in constructing and running the three other buildings (with accommodation for a total of 500 students) according to ETH Zurich's plans was launched in autumn 2013.

The construction of the Arch-Tec-Lab is also due to begin shortly. This innovative education and research centre, which was developed by ETH Zurich professors as part of a research project, will feature new technologies based on the university's own research.

www.ethz.ch/projects-hoenggerberg →

Life sciences

## New centre for biomedicine

After four years of building work, the Molecular Health Sciences Platform was officially opened on the Hönggerberg campus in mid-March. This new education and research centre is intended to reinforce ETH Zurich's core expertise in health sciences. Around a dozen research teams have already been working in the new building since autumn 2012, investigating molecular processes that play a key role in, for example, the development of tumours, diabetes, brain diseases or inflammatory disorders. The centrepiece of the new platform is the ETH Phenomics Center. This centre, which complies with the latest international standards in the species-appropriate breeding, welfare and treatment of mice used for experimental research, consolidates ETH Zurich's laboratory animal facilities in a central location.

www.ethz.ch/molecular-health-sciences →

The "Dozentenfoyer" restaurant in the main building was also reopened in 2013 following renovation work. As well as a revamped interior, guests can expect a varied menu selection.

Catering

## Extending the catering range

As student enrolment increases, ETH Zurich's catering operations will soon reach full capacity based on its "Catering and Retail" site strategy. The university is, therefore, continuously expanding the range of catering facilities available on its two campuses. The "Dozentenfoyer" restaurant in the main building was reopened in 2013 with a new catering service concept. However, there is still a need for more catering facilities on the Hönggerberg campus, where student residences as well as new laboratory, teaching and office buildings are being built. The refurbished chemistry canteen and cafeteria, now transformed into "FUSION meal & coffee", opened in early 2014. Outside mealtimes this facility also provides 350 extra workspaces for students. The physics canteen, which is more than 30 years old, is also undergoing a renovation and is due to be reopened in 2015 as a "food market".

www.ethz.ch/catering →

# An inspiring environment

In the specialist areas of ETH Zurich, celebrating notable success is a regular event. This is due, in part, to the commitment of the many outstanding scientists working at the university. Just how successful ETH Zurich researchers are is reflected in the numerous honours and prizes that they win for their scientific work.

The number of grants from the European Research Council (ERC) is another measure of success in research at ETH Zurich: in 2013, nine professors were awarded an ERC Starting Grant, and five received one of the prestigious ERC Advanced Grants. This means that last year, once again, ETH Zurich was very successful with its applications.

These successes are made possible due to the inspirational working environment that the university offers its scientists. This is precisely one reason that ETH Zurich is able to continue to attract talented young researchers as new professors. These new appointments lay the foundations, in terms of staff, for future research successes.

Numerous donations received by ETH Zurich from the private sector also contribute to the positive research environment. Thanks to generous donations from companies, foundations, institutions and private individuals, the university is able to open up promising new areas of research and thus secure its leading rank among the world's universities.



Honorary doctors Dr. Peter Jenni, Prof. Noga Alon, Prof. Eric A. Brewer and Prof. Jillian F. Banfield with ETH Zurich Rector Prof. Lino Guzzella and Honorary Councillors Georg Schoop, Dr. h. c. René Braginsky, Martin Haefner and Dr. Max Rössler (from left).

## Honorary doctors at ETH Zurich

By awarding honorary doctorates, ETH Zurich honours individuals for their outstanding scientific work and recognises their important contribution to science, education and practical applications or to the synthesis of research and practical work.

On the 2013 ETH Day, the Rector of ETH Zurich awarded honorary doctorates to the following:

**Prof. Dr. Noga Alon**
for his fundamental contributions to Discrete Mathematics and Theoretical Computer Science, and in particular for the further development and establishment of the probabilistic method.

**Prof. Dr. Jillian F. Banfield**
in recognition of her pioneering work in the field of Geomicrobiology and her interdisciplinary research at the interface between Environmental Sciences, Earth Sciences and Microbial Ecology.

**Prof. Dr. Eric A. Brewer**
for his fundamental contributions to Computer Science, and in particular for his contributions to designing and implementing scalable distributed systems on the Internet.

**Dr. Peter Jenni**
in recognition of his outstanding contributions to the planning, construction and leadership of the ATLAS experiment at the Large Hadron Collider (LHC) at CERN.

## Honorary Councillors at ETH Zurich

The title of Honorary Councillor is awarded to individuals who either promote key scientific work or areas of work at ETH Zurich or support the university as a whole.

On the 2013 ETH Day, the Rector of ETH Zurich made the following individuals Honorary Councillors:

**Dr. h. c. René Braginsky**
for his extraordinary personal commitment to promoting education and research at ETH Zurich, in particular supporting the Archives of Contemporary History, Medical Engineering and Neurosciences.

**Martin Haefner**
for his extraordinary personal commitment to promoting education and research at ETH Zurich, in particular supporting the setting up of the ETH Zurich Foundation and the creation of the Institute for Theoretical Studies.

**Dr. Max Rössler**
for his extraordinary personal commitment to promoting education and research at ETH Zurich, in particular supporting outstanding professors, and contributing to asset management for the ETH Zurich Foundation and setting up the Institute for Theoretical Studies.

**Georg Edwin Felix Schoop**
for his pioneering work on developing a land use policy based on ecosystem services in densely populated urban areas and for his great commitment to sharing experience and knowledge with students and practitioners in Switzerland and abroad.

# Honours and prizes for members of ETH Zurich

## A

**Prof. Dr. Markus Aebi,** D-BIOL, Karl Meyer Award 2013, Society for Glycobiology, USA

**Dr. Adrian Alder,** D-BIOL, Strasburger Prize, German Botanical Society, Germany

**Prof. Dr. Gustavo Alonso,** D-INFK, IEEE Fellow, IEEE Advancing Technology for Humanity, USA

## B

**Adrian Bailey,** D-CHAB, Swiss Foreign Government Award, Foreign Commission of Scholarships, Switzerland

**Prof. Dr. Nenad Ban,** D-BIOL, GN Ramachandran Memorial Lecture, Indian Biophysical Society, India

Honorary Member of the Indian Biophysical Society, India

**Prof. Dr. David Basin,** D-INFK, Velux Visiting Professorship Award, Denmark

**Prof. Dr. Niklas Beisert,** D-PHYS, ERC Consolidator Grant, European Research Council, Belgium

New Horizons in Physics Prize, Fundamental Physics Prize Foundation, Russia

**Prof. Dr. Jeffrey W. Bode,** D-CHAB, Fellow of the Royal Chemistry Society, UK

Visiting Professor, Nagoya University, Japan

**Prof. Dr. Helmut Bölcskei,** D-ITET, IEEE Information Theory Society Distinguished Lecturer, IEEE Information Theory Society, USA

**Prof. Alfredo Brillembourg,** D-ARCH, Development Research Grant, State Secretariat for Economic Affairs (SECO), Switzerland

**Prof. Dr. Nina Buchmann,** D-USYS, SNSF project, ICOS-Switzerland, Switzerland

**Prof. Dr. Marc Burger,** D-MATH, Fellow of the American Mathematical Society (AMS), USA

Member of the Leopoldina German Academy of Sciences, Germany

## C

**Prof. Dr. Marcella Carollo,** D-PHYS, Winton Research Prize, Winton Capital Management, UK

**Prof. Dr. Lars-Erik Cederman,** D-GESS, Global Fellowship, Peace Research Institute Oslo, Norway

**Prof. Dr. Daniel L. Chen,** D-GESS, ERC Consolidator Grant, European Research Council, Belgium

**Prof. Dr. Matthias Christandl,** D-PHYS, ERC Starting Grant, European Research Council, Belgium

**Prof. Dr. Demetrious Christodoulou,** D-MATH, Honorary Plaque, Hellenic Mathematical Society, Greece

**Prof. Dr. Constance Ciaudo,** D-BIOL, Distinguished Young Investigator Award, Federation of European Biochemical Societies (FEBS), European Union

**Prof. Dr. Christophe Copéret,** D-CHAB, Lemieux Lectureship, University of Ottawa, Canada

## D

**Prof. Dr. Tobias Delbrück,** D-ITET, IEEE Fellow, IEEE Operations Center, USA

**Dr. Alberto Del Pia, D-MATH,** Herman Goldstine Postdoctoral Fellowship in Mathematical Sciences, IBM, USA

**Prof. Dr. Andrew de Mello,** D-CHAB, The Analytical Scientist Power List 2013, The Analytical Scientist, UK

**Prof. Dr. Consuelo De Moraes,** D-USYS, elected Fellow of the American Association for the Advancement of Science (AAAS), USA

Elected Fellow of the Entomological Society of America, USA

**Prof. Dr. François Diederich,** D-CHAB, CQMF Lectureship, Université Laval, Canada

## E

**Prof. Tom Emerson,** D-ARCH, Erich Schelling Medal, Schelling Architecture Foundation, Germany

**Prof. Dr. Stefanie Engel,** D-USYS, Alexander von Humboldt Professorship, Alexander von Humboldt Foundation, Germany

**Dr. Tobias Jürgen Erb,** D-BIOL, election and appointment as member of Die Junge Akademie, Germany

SGM Encouragement Award 2013, Swiss Society of Microbiology, Switzerland

## F

**Prof. Dr. Jérôme Faist,** D-PHYS, ERC Advanced Grant, European Research Council, Belgium

**Prof. Dr. Gerd Folkers,** D-CHAB, honorary membership of the Swiss Pharmacists' Association Pharmasuisse, Switzerland

## G

**Prof. Dr. Bruno Alfred Gander,** D-CHAB, Fellow of the Swiss Society of Pharmaceutical Sciences, Switzerland

**Prof. Dr. Ludwig J. Gauckler,** D-MATL, Distinguished Life Member Award, American Ceramic Society, USA

**Prof. Dr. Cesare Gessler,** D-USYS, Honorary Member of IOBC, Switzerland

**Dr. Gregor Johann Golabek,** D-ERDW, Karl Zoeppritz Prize, German Geophysical Society, Germany

**Prof. Dr. Markus Gross,** D-INFK, Karl Heinz Beckurts Prize, Karl Heinz Beckurts Foundation, Germany

Konrad Zuse Medal for Computer Science, German Computer Science Society, Germany

Scientific and Technical Achievement Award, Academy of Motion Picture Arts & Sciences, USA

**Prof. Dr. Gudela Grote,** D-MTEC, President of EAWOP, Netherlands

**Prof. Dr. Wilhelm Gruissem,** D-BIOL, Shang Fa Yang Memorial Lecture, Academia Sinica, Taiwan

**Prof. Dr. Detlef Günther,** D-CHAB, Einstein Visiting Fellow, Einstein Foundation, Berlin, Germany

Thousand Talents Program, Wuhan University, China

**Prof. Dr. Isabel Günther,** D-GESS, Best Practice Award for Cooperation between Research and Practice, PEGNet – Kiel Institute for the World Economy, Germany

## H

**Prof. Dr. Willi Hermann Hager,** D-BAUG, honorary membership, International Association for Hydro-Environment Engineering and Research (IAHR), Spain

**Prof. Dr. Michael Hagner,** D-GESS, Göttingen University Address, Georg August University Göttingen, Germany

**Prof. Dr. Ari Helenius,** D-BIOL, Silver Medal of the European Society of Virology, France

**Prof. Dr. Donald Hilvert,** D-CHAB, Boehringer-Ingelheim Lecture, University of British Columbia, Canada

**Dr. Sandra Hofmann Boss,** D-HEST, ERC Starting Grant, European Research Council, Belgium

Marie Curie Career Integration Grant, European Research Council, Belgium

**Prof. Dr. Jonathan Home,** D-PHYS, SAOT Young Researcher Award, Friedrich Alexander University Erlangen-Nuremberg, Germany

**Dr. Matthias Huss,** D-BAUG, Young Investigator Award, American Geophysical Union, Cryosphere Division, USA

## I

**Prof. Dr. Lucio Isa,** D-MATL, SNSF-sponsored professorship, Swiss National Science Foundation (SNSF), Switzerland

## J

**Prof. Dr. Rolf Jeltsch,** D-MATH, University Fellow of Hong Kong Baptist University, Hong Kong

## K

**Prof. Dr. James W. Kirchner,** D-USYS, Ralph Alger Bagnold Medal, European Geosciences Union, European Union

**Laura Klüpfel,** D-USYS, Bernd Rendel Prize, German Research Association, Germany

**Prof. Hubert Klumpner,** D-ARCH, Development Research Grant, State Secretariat for Economic Affairs (SECO), Switzerland

**Prof. Dr. Benoît Kornmann,** D-BIOL, ERC Starting Grant, European Research Council, Belgium

**Prof. Dr. Petros Koumoutsakos,** D-MAVT, ERC Advanced Grant, European Research Council, Belgium

Gordon Bell Prize 2013, ACM, USA

**Prof. Dr. Maksym Kovalenko,** D-CHAB, Ruzicka Prize 2013, ETH Zurich, Switzerland

**Prof. Dr. Georg von Krogh,** D-MTEC, Research Fellow, University of Cambridge Judge Business School, UK

## L

**Prof. Dr. Hansjürg Leibundgut,** D-ARCH, Honorary Member of the Swiss Academy of Engineering Sciences (SATW), Switzerland

**Prof. Dr. Jürg Leuthold**, D-ITET, Fellow of IEEE, USA

**Prof. Dr. Mathieu Luisier,** D-ITET, ERC Starting Grant, European Research Council, Belgium

## M

**Stephanie Macdonald,** D-ARCH, Erich Schelling Medal, Schelling Architecture Foundation, Germany

## Award-winning research

In 2013, the European Research Council (ERC) has awarded ERC Advanced Grants to five researchers at ETH Zurich. From top: Jérôme Faist, Professor at the Institute for Quantum Electronics; Petros Koumoutsakos, Professor at the Computational Science and Engineering Laboratory; David J. Norris, Professor at the Institute of Process Engineering; Lukas Novotny, Professor at the Photonics Laboratory; Andreas Wallraff, Professor at the Quantum Device Lab.

**Prof. Dr. Jiři Matoušek,** D-INFK, elected member of Academia Europaea, UK

**Prof. Dr. Friedemann Mattern,** D-INFK, elected member of the Academia Europaea, UK

**Prof. Dr. Ueli Maurer,** D-INFK, Vodafone Innovation Award for Mobile Communications, Vodafone Foundation, Germany

**Dr. Lynne Bridget McCusker,** D-MATL, Edith M. Flanigan Award, Honeywell UOP, USA

**Prof. Dr. Frédéric Merkt,** D-CHAB, elected member of the Berlin-Brandenburg Academy of Sciences, Germany

Elected Fellow of the European Physical Society, France

**Prof. Dr. Bertrand Meyer,** D-INFK, Ershov Lecture, Russian Academy of Sciences, Russia

**Prof. Dr. Raffaele Mezzenga,** D-HEST, Biomacromolecules/Macromolecules Young Investigator Award, American Chemical Society, USA

**Prof. Dr. Ákos Moravánszky,** D-ARCH, honorary membership of the Széchenyi Academy of Letters and Arts, Hungarian Academy of Sciences, Hungary

**Prof. Dr. Daniel J. Müller,** D-BSSE, Co-Director of the NCCR Molecular Systems Engineering, Swiss National Science Foundation (SNSF), Switzerland

## N

**Kohei Nakajima,** D-MAVT, Hakubi Award, Kyoto University, Japan

**Prof. Dr. Reinhard Nesper,** D-CHAB, Professorship II, University of Oslo, Norway

**Prof. Dr. David J. Norris,** D-MAVT, ERC Advanced Grant, European Research Council, Belgium

**Prof. Dr. Lukas Novotny,** D-ITET, ERC Advanced Grant, European Research Council, Belgium

## O

**Prof. Dr. Dani Or, D-USYS,** Birdsall-Dreiss Lectureship, GSA Geological Society of America, USA

Helmholtz International Fellow Award, Helmholtz Association, Germany

**Prof. Dr. Annette Oxenius,** D-BIOL, honorary membership of the Scandinavian Society of Immunology, Denmark

## P

**Dr. Salvador Pané Vidal,** D-MAVT, ERC Starting Grant, European Research Council, Belgium

**Prof. Dr. Michele Parrinello,** D-CHAB, Pitzer Lecture, Ohio State University, USA

**Prof. Dr. Javier Pérez-Ramírez,** D-CHAB, Andrew Main Lecture Award, University of Alberta, Canada

Young Researcher Award, EFCATS, Spain

**Prof. Dr. Adrian Perrig,** D-INFK, ERC Consolidator Grant, European Research Council, Belgium

**Prof. Dr. Paola Picotti,** D-BIOL, ERC Starting Grant, European Research Council, Belgium

**Prof. Dr. Bernhard Plattner,** D-ITET, Chair Professor of 2013–2015, International Professor Workshop, International League of Higher Education in Media and Communication, China

**Prof. Dr. Marc Pollefeys,** D-INFK, Prix de Boelpaepe 2013, Académie royale des Sciences, des Lettres et des Beaux-Arts de Belgique, Belgium

**Prof. Dr. Dimos Poulikakos,** D-MAVT, ASME Heat Transfer Division 75th Anniversary Medal, USA

**Prof. Dr. Klaas P. Prüssmann,** D-ITET, Annual Lauterbur Lecture, International Society for Magnetic Resonance in Medicine, USA

## Q

**Prof. Dr. Martin Quack,** D-CHAB, corresponding member of the Academy of Sciences of Göttingen, Germany

Weizmann Lecture, Swiss Society of the Friends of the Weizmann Institute of Science, Switzerland

## R

**Prof. Dr. Timothy Roscoe,** D-INFK, Association for Computing Machinery (ACM) Fellow, USA

**Dr. Diego Rossinelli,** D-MAVT, Gordon Bell Prize 2013, ACM, USA

**Prof. Dr. Jennifer Rupp,** D-MATL, elected member for Chemistry, European Academy of Science, Belgium

Guest associate professorship, Kyushu University, Japan

Guest associate professorship, International Institute for Carbon-Neutral Energy Research, I2CNER, Japan

## S

**Dr. Sergio José Sanabria Martín,** D-BAUG, Gold Medal, International Academy of Wood Science (IAWS), Germany

**Dr. Claudia Schillings,** D-MATH, Junior Fellowship Membership, International Association of Applied Mathematics and Mechanics (GAMM), Germany

**Dr. Angela Schöllig,** D-MAVT, Dimitris N. Chorafas Foundation Award, USA

**Prof. Dr. Frank Schweitzer,** D-MTEC, ISI Fellow, Institute for Scientific Interchange (ISI) Foundation, Italy

**Prof. Dr. Martin Schweizer,** D-MATH, SFI Distinguished Service Senior Chair, Swiss Finance Institute (SFI), Switzerland

**Prof. Dr. Klaus Theo Seeland,** D-USYS, Honorary Member, Iranian Society of Range Management, Iran

**Prof. Dr. Sonia Seneviratne,** D-USYS, ERC Consolidator Grant, European Research Council, Belgium

Fellow, AGU American Geophysical Union, USA

James B. Macelwane Medal, AGU American Geophysical Union, USA

**Prof. Dr. Kristina Shea,** D-MAVT, Fellow of the ASME, American Society of Mechanical Engineers, USA

**Prof. Dr. Roland Siegwart,** D-MAVT, IEEE Inaba Technical Award for Innovation Leading to Production, IEEE Robotics and Automation Society, USA

**Prof. Dr. Ruth Signorell,** D-CHAB, Adjunct Professorship, University of British Columbia, Canada

Dean's Distinguished Scholar, University of British Columbia, Canada

E.W.R. Steacie Memorial Fellowship 2011-2013, Natural Sciences and Engineering Research Council of Canada, Canada

**Prof. Dr. Olga Sorkine-Hornung,** D-INFK, Intel Early Career Faculty Award, USA

**Prof. Dr. Didier Sornette,** D-MTEC, American Association for the Advancement of Science Fellow, USA

**Prof. Dr. Nicola Spaldin,** D-MATL, Fellow of the American Association for the Advancement of Science (AAAS), USA

**Prof. Dr. Sarah M. Springman,** D-BAUG, Honorary Doctor of Science, University of Bath, UK

**Prof. Dr. Tanja Stadler,** D-USYS, ERC Starting Grant, European Research Council, Belgium

Zonta Prize, Zonta Club Switzerland and Liechtenstein

**Prof. Dr. Aldo Steinfeld,** D-MAVT, ASME Heat Transfer Memorial Award, American Society of Mechanical Engineers, USA

Farrington Daniels Award, International Solar Energy Society, USA

75th Anniversary Medal of the ASME Heat Transfer Division, American Society of Mechanical Engineers, USA

**Prof. Dr. Markus Stoffel,** D-BIOL, elected to Scientific Advisory Board of the German (Leibniz) Diabetes Center, Germany

RNA Biology and Disease, successful application announced, NCCR, Switzerland

**Prof. Dr. Bruno Studer,** D-USYS, FP7-People-Marie Curie Career Integration Grant, Belgium

**Prof. Dr. Michael Struwe,** D-MATH, admitted to the German National Academy of Sciences, Leopoldina, Germany

Fellow of the American Mathematical Society (AMS), USA

**Prof. Dr. Benjamin Sudakov,** D-MATH, Fellow of the American Mathematical Society (AMS), USA

**Prof. Dr. Julia Sutanto,** D-MTEC, INFORMS ISS Design Science Award, INFORMS Information Systems Society (ISS), USA

**Timothy Sykes,** D-USYS, the Biotechnology Prize, University of Essex, UK

## T

**Prof. Dr. Lucie Tajcmanová,** D-ERDW, ERC Starting Grant, European Research Council, Belgium

**Prof. Dr. Savas Tay,** D-BSSE, ERC Starting Grant, European Research Council, Belgium

**Prof. Dr. Gerhard Tröster,** D-ITET, Global Agenda Councils, WEF, Switzerland

## U

**Dr. Kai M. Udert,** D-BAUG, award for the advancement of engineering education at the University of KwaZulu-Natal, South Africa

## V

**Prof. Dr. Sara van de Geer,** D-MATH, corresponding member of the Dutch Royal Academy of Science, Netherlands

Member of the National Academy of Sciences Leopoldina, Germany

President Elect, General Assembly of the Bernoulli Society, Hong Kong

**Prof. Dr. Viola Vogel,** D-HEST, Distinguished Lecture, Department of Biomedical Engineering at Columbia University, USA

Distinguished Lecture, Emergent Behaviors of Integrated Cellular Systems (EBICS), University of Illinois, USA

## W

**Prof. Dr. Andreas Wallraff,** D-PHYS, ERC Advanced Grant, European Research Council, Belgium

**Prof. Dr. Bernhard Wehrli,** D-USYS, Outreach Lecturer, European Association of Geochemistry, Geochemical Society, France

**Prof. Dr. Helmut Jürg Weissert,** D-ERDW, Jean-Baptiste Lamarck Medal, European Geosciences Union, Austria

**Prof. Dr. Helma Wennemers,** D-CHAB, Fellow of the Royal Society of Chemistry, UK

**Prof. Dr. Wendelin Werner,** D-MATH, Ahlfors Lectures, Harvard University, USA; Greene family lecture series, UCLA, USA

**Prof. Dr. Hans Jakob Wörner,** D-CHAB, admitted to Die Junge Akademie, Germany

Broida Prize, 32nd International Symposium on Free Radicals, Germany

Nernst-Haber-Bodenstein Prize, German Bunsen Society for Physical Chemistry, Germany

**Prof. Dr. Kurt Wüthrich,** D-BIOL, Honorary Member of the Brazilian Academy of Sciences (ABC), Brazil

Theodor Bücher Medal, Federation of European Biochemical Societies, Belgium

**Prof. Dr. Mario Valentin Wüthrich,** D-MATH, Honorary Professor, University of London, UK

Swiss Finance Institute Professor, Switzerland

## Z

**Prof. Dr. Michael Bruce Zimmermann,** D-HEST, International Endocrinology Award 2013, American Association of Clinical Endocrinologists (AACE), USA

For abbreviations of departments, see www.ethz.ch/departments →

# New professors

## Full professors

**New appointments**

**Prof. Dr. Chiara Daraio,** for Mechanics and Materials (1.1.2013), D-MAVT, formerly Professor of Aeronautics and Applied Physics at the California Institute of Technology in Pasadena, USA

**Prof. Dr. Pietro Gambardella,** for Magnetism and Interface Physics (1.1.2013), D-MATL, formerly Research Professor at the Institució Catalana de Recerca i Estudis Avançats and Group Leader / Associate Professor at the Catalan Institute of Nanotechnology and at the Universitat Autonoma de Barcelona, ES

**Prof. Dr. Laura Heyderman,** for Mesoscopic Systems (1.1.2013), D-MATL, formerly Head of the Magnetic Nanostructures Group at the Paul Scherrer Institute in Villigen, CH

**Prof. Dr. Tapio Schneider,** for Climate Dynamics (1.1.2013), D-ERDW, formerly Professor of Environmental Science and Engineering at the California Institute of Technology in Pasadena, USA

**Prof. Dr. Michael Ristow,** for Energy Metabolism (1.1.2013), D-HEST, formerly Professor of Nutritional Science at the Friedrich Schiller University Jena, DE

**Prof. Dr. Jörn Piel,** for Microbial Interactions (1.2.2013), D-BIOL, formerly Professor of Biological and Organic Chemistry at the University of Bonn, DE

**Prof. Dr. Marko Köthenbürger,** for Public Economics (1.2.2013), D-MTEC, formerly Associate Professor of Economics at the University of Bern, CH

**Prof. Dr. Christoph Hölscher,** for Cognitive Science (1.2.2013), D-GESS, formerly Assistant Professor at the University of Freiburg, DE

**Prof. Dr. Jürg Leuthold,** for Photonics and Communication (1.3.2013), D-ITET, formerly Head of the Institute of Photonics and Quantum Electronics (IPQ) and Director of the Helmholtz Research Association Institute of Microstructure Technology (IMT) at the Karlsruhe Institute of Technology (KIT), DE

**Prof. Dr. Johan Six,** for Sustainable Agroecosystems (1.3.2013), D-USYS, formerly Professor of Agroecology at the University of California, Davis, USA

**Prof. Dr. Luca Benini,** for Digital Integrated Circuits and Systems (1.4.2013), D-ITET, formerly Professor at the Università di Bologna, IT

**Prof. Dr. Anton Wutz,** for Genetics (1.4.2013), D-BIOL, formerly researcher at the Wellcome Trust Centre for Stem Cell Research at the University of Cambridge, UK

**Prof. Dr. Florian von Wangenheim,** for Technology Marketing (1.4.2013), D-MTEC, formerly Professor of Service and Technology Marketing at the Technische Universität München, DE

**Prof. Dr. Timm Schroeder,** for Cell Systems Dynamics (1.6.2013), D-BSSE, formerly Director of the Stem Cell Dynamics research unit at the Helmholtz Zentrum München, DE

**Prof. Dr. Wendelin Werner,** for Mathematics (1.6.2013), D-MATH, formerly Professor of Mathematics at the Université Paris-Sud, FR

**Prof. Dr. Stefan Wiemer,** for Seismology (1.6.2013), D-ERDW, formerly Director (a. i.) of the Swiss Seismological Service (SED), CH

**Prof. Dr. Pierre Mérel,** for Agricultural Economics (1.6.2013), D-USYS, formerly Associate Professor of Agricultural and Resource Economics at the University of California, Davis, USA

**Prof. Dr. Benjamin Sudakov,** for Mathematics (1.7.2013), D-MATH, formerly Professor of Mathematics at the University of California, Los Angeles, USA

**Prof. Dr. Nicolai Meinshausen,** for Statistics (1.8.2013), D-MATH, formerly Professor of Statistics at the University of Oxford, UK

**Prof. Dr. Consuelo De Moraes,** for Biocommunications and Ecology (1.8.2013), D-USYS, formerly Professor of Entomology at Pennsylvania State University, USA

**Prof. Dr. Anthony Patt,** for Human Environment Systems (1.8.2013), D-USYS, formerly Senior Research Scholar at the International Institute for Applied Systems Analysis in Laxenburg, AT

**Prof. Dr. Susanne Ulbrich,** for Animal Physiology (1.9.2013), D-USYS, formerly Research Associate at the Faculty of Physiology at the Technische Universität München, DE

**Prof. Dr. Michael Ambühl,** for Negotiation and Conflict Management (1.9.2013), D-MTEC, formerly State Secretary at the Federal Department of Finance (FDF) in Bern, CH

**Prof. Dr. Karsten Weis,** for Cellular Dynamics (1.10.2013), D-BIOL, formerly Professor of Cell & Developmental Biology at the University of California, Berkeley, USA

**Promotions**

**Prof. Dr. Pavel Hora,** for Virtual Manufacturing and Forming Technology (1.1.2013), D-MAVT, formerly Associate Professor for the same subject area

**Prof. Dr. Volker Hoffmann,** for Sustainability and Technology (1.6.2013), D-MTEC, formerly Associate Professor for the same subject area

**Prof. Dr. Stefan Bechtold,** for Intellectual Property (1.6.2013), D-GESS, formerly Associate Professor for the same subject area

**Prof. Dr. Kaspar Locher,** for Molecular Membrane Biology (1.8.2013), D-BIOL, formerly Associate Professor for the same subject area

**Prof. Dr. Stefanie Engel,** for Environmental Policy and Economics (1.8.2013), D-USYS, formerly Associate Professor for the same subject area

**Prof. Dr. Isabelle Mansuy,** for Neuroepigenetics (1.8.2013), D-HEST, formerly Associate Professor for Molecular and Cognitive Neurosciences

**Prof. Dr. Michael Siegrist,** for Consumer Behaviour (1.8.2013), D-HEST, formerly Associate Professor for the same subject area

**Prof. Dr. Charalampos Anastasiou,** for Theoretical Particle Physics (1.10.2013), D-PHYS, formerly Associate Professor for the same subject area

## Associate professors

(New appointments)

**Prof. Dr. Marloes H. Maathuis,** for Statistics (1.1.2013), D-MATH, formerly Assistant Professor at ETH Zurich, CH

**Prof. Dr. Reto Knutti,** for Climate Physics (1.1.2013), D-USYS, formerly Assistant Professor (tenure track) at ETH Zurich, CH

**Prof. Dr. Sonia Seneviratne,** for Land-Climate Dynamics (1.1.2013), D-USYS, formerly Assistant Professor (tenure track) at ETH Zurich, CH

**Prof. Dr. Niko Beerenwinkel,** for Computational Biology (1.4.2013), D-BSSE, formerly Assistant Professor (tenure track) at ETH Zurich, CH

**Prof. Dr. Marco Stampanoni,** for X-Ray Imaging (1.6.2013), D-ITET, formerly Assistant Professor (tenure track) at ETH Zurich, CH

**Prof. Dr. Hans Jakob Wörner,** for Physical Chemistry (1.10.2013), D-CHAB, formerly Assistant Professor at ETH Zurich, CH

## Assistant professors

(New appointments)

**Prof. Dr. Manfred Claassen,** for Computational Biology (1.1.2013), D-BIOL, formerly postdoctoral student at Stanford University, USA

**Prof. Dr. Andreas Fichtner,** for Computational Seismology (1.1.2013), D-ERDW, formerly postdoctoral student at the University of Utrecht, NL

**Prof. Dr. Otmar Hilliges,** for Computer Science (1.3.2013), D-INFK, formerly Research Scientist with Microsoft Research in Cambridge, UK

**Prof. Dr. Constance Ciaudo,** for RNAi and Genome Integrity (1.4.2013), D-BIOL, formerly postdoctoral student at ETH Zurich, CH

**Prof. Dr. Markus Holzner,** for Environmental Fluid Mechanics (1.6.2013), D-BAUG, formerly Senior Assistant at ETH Zurich, CH

**Prof. Dr. Giovanni Sansavini,** for Structural Reliability and Risk Analysis (1.6.2013), D-MAVT, formerly postdoctoral student at the Politecnico di Milano, IT

**Prof. Dr. Lucio Isa,** for Interfaces, Soft Matter and Assembly (1.9.2013), D-MATL, formerly Senior Assistant at ETH Zurich, CH

**Prof. Dr. Beat Christen,** for Experimental Systems Biology (1.9.2013), D-BIOL, formerly Senior Research Associate at Stanford University, USA

**Prof. Dr. Lucie Tajcmanová,** for Metamorphic Petrology (1.10.2013), D-ERDW, formerly Marie Curie Fellow at ETH Zurich, CH

## Adjunct professors

**Prof. Dr. Bernd Gärtner,** D-INFK, employed as Lecturer

**Prof. Dr. Ilya Karlin,** D-MAVT, employed as Lecturer

**Prof. Dr. Vassiliki Koubi,** D-GESS, employed as Lecturer

**Prof. Dr. Thomas Lippert,** D-CHAB, employed as Senior Lecturer

**Prof. Dr. Peter Molnar,** D-BAUG, employed as Lecturer

**Prof. Dr. Bernd Nowack,** D-USYS, employed as Senior Lecturer

**Prof. Dr. Hans Martin Schmid,** D-PHYS, employed as Senior Lecturer

**Prof. Dr. Robert W. Sumner,** D-INFK, employed as Lecturer

**Prof. Dr. Diethelm Würtz,** D-PHYS, employed as Senior Lecturer

For abbreviations of departments, see www.ethz.ch/departments →

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**Many companies, foundations, organisations and private individuals are very keen to work with ETH Zurich to strengthen education and research and so make a contribution to supporting Switzerland as a centre for business and ensuring its competitiveness worldwide. On behalf of its researchers and students, ETH Zurich would like to thank all the donors for their contributions and their confidence in the university. Thanks also go to those donors who do not wish to be mentioned by name.**

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FSM Forschungsstiftung Mobilkommunikation
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ETH Zurich President Ralph Eichler with the donors Dr. Max Rössler (l.) and Martin Haefner (r.) after the signing of the agreement.

## New ETH institute thanks to alumni

Thanks to generous donations from the Walter Haefner-Stiftung and Dr. Max Rössler, the ETH Zurich Foundation has enabled the setting up of the Institute for Theoretical Studies.

The Walter Haefner-Stiftung has already supported the ETH Zurich Foundation several times, with its contributions helping to advance forward ETH Zurich's strategic projects. The Foundation is represented by ETH Zurich alumnus Martin Haefner, who graduated in Mathematics from ETH Zurich in 1980. Today he is Executive Chairman of AMAG, the company founded by his father Walter Haefner.

Dr. Max Rössler also studied Mathematics at ETH Zurich and took his doctorate there in 1966. After spending time carrying out research at Harvard University, he worked as a teacher and lecturer at ETH Zurich for about ten years, before moving to the private sector. He first provided generous support to the ETH Zurich Foundation in 2007. Since 2009, ETH Zurich has presented the Rössler Prize to one of its outstanding young professors each year.

# More than 18,000 students

The number of students rose slightly again in 2013 with 6529 students beginning their studies at ETH Zurich last year. This represents an increase of 150 percent over the year 2000. The total number of students – to include doctoral students – has reached over 18,000. This means that 70 percent more young people are studying at ETH Zurich today than in the year 2000.

With regard to the demand and interest in the different courses, the picture remains stable. In addition to the two long-standing front-runners, Mechanical Engineering and Architecture, the new programme in Health Sciences and Technology has now firmly established itself in third place among matriculating Bachelor students. The programmes in Electrical Engineering and Information Technology, Physics, Civil Engineering and Computer Science are also in high demand.

ETH Zurich has experienced some growth in terms of its finances. Overall expenditure in 2013 amounted to 1512 million Swiss francs. This represents an increase of three percent compared to 2012. Seventy-six percent of the expenditure was covered by the federal financial contribution (FFC). The remaining 366 million Swiss francs came from third-party funding.



# Development of ETH Zurich

**Students**

| | 2000 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| **New enrolments**[1] (details from page 42) | **2,614** | **6,073** | **6,081** | **6,333** | **6,305** | **6,529** |
| *Percentage women* | *28.0%* | *32.2%* | *31.8%* | *31.7%* | *31.8%* | *31.8%* |
| *Percentage foreigners* | *26.1%* | *37.6%* | *39.8%* | *40.1%* | *41.2%* | *40.0%* |
| Bachelor students | 0 | 2,443 | 2,450 | 2,562 | 2,549 | 2,651 |
| Master students | 0 | 1,871 | 1,860 | 1,904 | 1,919 | 2,029 |
| Diploma students | 1,717 | 0 | 0 | 0 | 0 | 0 |
| Visiting/exchange students | 98 | 459 | 474 | 492 | 535 | 575 |
| Doctoral students | 613 | 939 | 957 | 1,035 | 993 | 1,000 |
| MAS/MBA students | 186 | 361 | 340 | 340 | 309 | 274 |
| **Students, headcount**[1] (details from page 43) | **10,693** | **15,378** | **16,343** | **17,187** | **17,781** | **18,178** |
| *Percentage women* | *25.1%* | *30.6%* | *30.9%* | *30.8%* | *30.6%* | *30.6%* |
| *Percentage foreigners* | *20.3%* | *33.2%* | *34.9%* | *36.1%* | *36.9%* | *37.1%* |
| Total registrations[2] | 10,779 | 16,228 | 17,172 | 17,887 | 18,375 | 18,743 |
| Bachelor students | 0 | 7,628 | 8,101 | 8,439 | 8,587 | 8,862 |
| *of which with foreign entry qualification*[6] | *0* | *12.7%* | *13.7%* | *14.4%* | *14.3%* | *14.2%* |
| Master students | 0 | 3,701 | 4,235 | 4,563 | 4,702 | 4,778 |
| *of which with foreign entry qualification*[6] | *0* | *31.2%* | *33.2%* | *34.2%* | *35.2%* | *35.4%* |
| Diploma students | 8,130 | 463 | 220 | 1 | 0 | 0 |
| Visiting/exchange students | 83 | 355 | 322 | 362 | 385 | 407 |
| Doctoral students | 2,262 | 3,396 | 3,521 | 3,699 | 3,807 | 3,894 |
| MAS/MBA students | 304 | 685 | 773 | 823 | 894 | 802 |
| Student-faculty ratio | 32.1 | 39.6 | 39.6 | 40.1 | 39.6 | 39.0 |
| **Graduations**[1] (details from page 45) | **1,890** | **3,410** | **3,382** | **3,709** | **4,028** | **4,101** |
| *Percentage women* | *25.1%* | *29.7%* | *31.2%* | *31.4%* | *32.3%* | *30.5%* |
| Bachelor degrees | 0 | 1,203 | 1,283 | 1,304 | 1,447 | 1,447 |
| Master degrees | 0 | 1,143 | 1,257 | 1,506 | 1,650 | 1,847 |
| Diplomas | 1,191 | 174 | 18 | 0 | 0 | 0 |
| Doctorates | 523 | 651 | 650 | 696 | 747 | 579 |
| Diplomas for continuing education programmes | 176 | 239 | 174 | 203 | 184 | 228 |

**Personnel** (details from page 48)

| | 2000 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| **Staff, headcount** | **7,453** | **9,572** | **9,809** | **10,040** | **10,242** | **10,478** |
| of which professors, headcount[3] | 351 | 419 | 446 | 462 | 482 | 497 |
| Total full-time equivalents | 5,464 | 7,111 | 7,284 | 7,501 | 7,662 | 7,914 |
| *Percentage women* | *26.4%* | *30.4%* | *30.7%* | *31.2%* | *31.1%* | *31.6%* |
| Professors | 333 | 388 | 413 | 428 | 449 | 466 |
| Scientific staff | 3,390 | 4,364 | 4,479 | 4,644 | 4,753 | 4,925 |
| Technical, IT and administrative staff | 1,624 | 2,212 | 2,241 | 2,276 | 2,293 | 2,357 |
| Apprentices | 117 | 146 | 150 | 153 | 167 | 166 |

**Finances** (details from page 50)

| | 2000 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| **Expenditure (in million CHF)** | **1,058.9** | **1,306.9** | **1,359.3** | **1,454.8** | **1,466.8** | **1,512.3** |
| Federal financial contribution (in million CHF) | 914.9[4] | 1,039.3 | 1,081.8[5] | 1,101.3[5] | 1,101.0 | 1,146.8 |
| Third-party resources (in million CHF) | 144.0 | 267.5 | 277.4 | 353.5 | 365.8 | 365.6 |

**1** Excludes physical education and sports teacher as well as professional officer training. As a result of the revision of the Regulations for Doctoral Studies, the date for deregistration was changed from December to January, so the number of graduates in 2013 was reduced. **2** Since students can register for more than one programme, the number of enrolments is higher than the headcount. **3** Includes professors employed at another institution. **4** Federal financial contribution in 2000: incl. funding from other federal agencies amounting to CHF 4.1 million. **5** Federal financial contribution in 2010/2011: implementing the HPCN strategy/the new CSCS building was pre-financed with CHF 12.4 million in the year 2010. This advance funding was used in 2011. **6** Foreign-educated students: people of non-swiss nationality who lived abroad before commencing their studies; they are therefore foreigners who come to Switzerland for the purpose of studying.

# New Students

| | Total | | Bachelor students | | Master students | | Visiting/exchange students | | Doctoral students | | MAS/MBA students[1] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
| **ETH Zurich total (registrations)** | **6,305** | **6,529** | **2,549** | **2,651** | **1,919** | **2,029** | **535** | **575** | **993** | **1,000** | **309** | **274** |
| *Percentage women* | *31.8 %* | *31.8 %* | *31.9 %* | *30.2 %* | *30.1 %* | *31.4 %* | *31.6 %* | *33.2 %* | *32.2 %* | *34.1 %* | *40.5 %* | *39.4 %* |
| *Percentage foreigners* | *41.2 %* | *40.0 %* | *18.8 %* | *18.9 %* | *38.5 %* | *36.1 %* | *97.9 %* | *96.2 %* | *70.8 %* | *70.8 %* | *50.2 %* | *43.8 %* |

## Programmes

| | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Architecture and Building Sciences** | **1,193** | **1,220** | **511** | **524** | **372** | **381** | **98** | **127** | **119** | **102** | **93** | **86** |
| Architecture | 614 | 590 | 256 | 258 | 166 | 185 | 57 | 64 | 47 | 30 | 88 | 53 |
| Civil Engineering | 338 | 344 | 171 | 170 | 91 | 97 | 25 | 31 | 51 | 46 | 0 | 0 |
| Environmental Engineering | 165 | 186 | 62 | 76 | 73 | 62 | 9 | 25 | 16 | 14 | 5 | 9 |
| Geomatics and Planning | 76 | 100 | 22 | 20 | 42 | 37 | 7 | 7 | 5 | 12 | 0 | 24 |
| **Engineering Sciences** | **1,986** | **2,130** | **850** | **897** | **654** | **705** | **182** | **214** | **294** | **313** | **6** | **1** |
| Mechanical Engineering | 844 | 886 | 442 | 465 | 239 | 268 | 68 | 56 | 95 | 97 | 0 | 0 |
| Information Technology and Electrical Engineering | 448 | 438 | 193 | 167 | 112 | 106 | 57 | 74 | 86 | 91 | 0 | 0 |
| Biosciences and Engineering | 121 | 127 | 6 | 6 | 76 | 74 | 8 | 12 | 31 | 35 | 0 | 0 |
| Interdisciplinary Engineering Sciences | 87 | 103 | 0 | 0 | 87 | 103 | 0 | 0 | 0 | 0 | 0 | 0 |
| Computer Science | 348 | 432 | 162 | 208 | 104 | 122 | 31 | 53 | 45 | 48 | 6 | 1 |
| Materials Science | 138 | 144 | 47 | 51 | 36 | 32 | 18 | 19 | 37 | 42 | 0 | 0 |
| **Natural Sciences and Mathematics** | **1,721** | **1,716** | **668** | **715** | **524** | **539** | **138** | **121** | **328** | **297** | **63** | **44** |
| Mathematics | 318 | 340 | 117 | 133 | 129 | 131 | 31 | 30 | 31 | 34 | 10 | 12 |
| Computational Science and Engineering | 32 | 40 | 10 | 18 | 20 | 19 | 1 | 1 | 1 | 2 | 0 | 0 |
| Physics | 430 | 419 | 182 | 196 | 115 | 120 | 37 | 29 | 62 | 65 | 34 | 9 |
| Chemistry | 265 | 251 | 64 | 67 | 54 | 44 | 42 | 38 | 98 | 91 | 7 | 11 |
| Chemical Engineering | 72 | 79 | 28 | 37 | 24 | 29 | 0 | 0 | 20 | 13 | 0 | 0 |
| Interdisciplinary Sciences | 91 | 86 | 62 | 61 | 27 | 22 | 0 | 0 | 2 | 3 | 0 | 0 |
| Pharmaceutical Sciences | 169 | 173 | 82 | 76 | 57 | 74 | 9 | 7 | 21 | 16 | 0 | 0 |
| Biology | 344 | 328 | 123 | 127 | 98 | 100 | 18 | 16 | 93 | 73 | 12 | 12 |
| **System-oriented Natural Sciences** | **1,064** | **1,136** | **508** | **501** | **284** | **307** | **55** | **69** | **195** | **214** | **22** | **45** |
| Earth Sciences | 178 | 172 | 52 | 36 | 76 | 71 | 19 | 15 | 29 | 46 | 2 | 4 |
| Environmental Sciences | 279 | 288 | 110 | 114 | 82 | 85 | 10 | 15 | 77 | 74 | 0 | 0 |
| Agricultural Sciences | 113 | 124 | 62 | 59 | 28 | 28 | 6 | 7 | 17 | 30 | 0 | 0 |
| Health Sciences and Technology | 352 | 393 | 217 | 220 | 64 | 75 | 10 | 15 | 48 | 53 | 13 | 30 |
| Food Sciences | 142 | 159 | 67 | 72 | 34 | 48 | 10 | 17 | 24 | 11 | 7 | 11 |
| **Management and Social Sciences** | **341** | **327** | **12** | **14** | **85** | **97** | **62** | **44** | **57** | **74** | **125** | **98** |
| Management, Technology and Economics | 258 | 239 | 0 | 0 | 62 | 60 | 55 | 42 | 42 | 53 | 99 | 84 |
| Humanities, Social and Political Sciences | 83 | 88 | 12 | 14 | 23 | 37 | 7 | 2 | 15 | 21 | 26 | 14 |

**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 | | Visiting/exchange students | | Doctoral students | | MAS/MBA students[1] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
| **ETH Zurich total (headcount)** | **17,781** | **18,178** | **8,137** | **8,444** | **4,702** | **4,778** | **384** | **406** | **3,795** | **3,889** | **763** | **661** |
| *Percentage women* | *30.6 %* | *30.6 %* | *30.4 %* | *30.0 %* | *29.9 %* | *30.3 %* | *29.2 %* | *31.8 %* | *30.4 %* | *30.9 %* | *39.8 %* | *37.7 %* |
| *Percentage foreigners* | *36.9 %* | *37.1 %* | *19.4 %* | *19.4 %* | *37.9 %* | *38.2 %* | *98.2 %* | *93.3 %* | *66.7 %* | *68.3 %* | *38.7 %* | *37.8 %* |
| **Total registrations** | **18,375** | **18,743** | **8,587** | **8,862** | **4,702** | **4,778** | **385** | **407** | **3,807** | **3,894** | **894** | **802** |

## Programmes

| | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Architecture and Building Sciences** | **3,622** | **3,635** | **1,903** | **1,927** | **1,019** | **1,010** | **74** | **103** | **434** | **465** | **192** | **130** |
| Architecture | 1,975 | 1,876 | 1,028 | 1,021 | 595 | 550 | 44 | 55 | 150 | 160 | 158 | 90 |
| Civil Engineering | 955 | 1,013 | 567 | 585 | 192 | 209 | 20 | 22 | 176 | 197 | 0 | 0 |
| Environmental Engineering | 473 | 507 | 241 | 250 | 149 | 162 | 8 | 22 | 63 | 59 | 12 | 14 |
| Geomatics and Planning | 219 | 239 | 67 | 71 | 83 | 89 | 2 | 4 | 45 | 49 | 22 | 26 |
| **Engineering Sciences** | **5,859** | **6,128** | **2,906** | **3,020** | **1,617** | **1,710** | **128** | **140** | **1,188** | **1,241** | **20** | **17** |
| Mechanical Engineering | 2,538 | 2,700 | 1,554 | 1,632 | 546 | 636 | 47 | 33 | 391 | 399 | 0 | 0 |
| Information Technology and Electrical Eng. | 1,297 | 1,294 | 599 | 578 | 275 | 281 | 42 | 48 | 381 | 387 | 0 | 0 |
| Biosciences and Engineering | 312 | 319 | 29 | 16 | 191 | 187 | 5 | 6 | 87 | 110 | 0 | 0 |
| Interdisciplinary Engineering Sciences | 235 | 258 | 0 | 0 | 235 | 258 | 0 | 0 | 0 | 0 | 0 | 0 |
| Computer Science | 1,108 | 1,174 | 561 | 627 | 289 | 271 | 20 | 42 | 218 | 217 | 20 | 17 |
| Materials Science | 369 | 383 | 163 | 167 | 81 | 77 | 14 | 11 | 111 | 128 | 0 | 0 |
| **Natural Sciences and Mathematics** | **4,826** | **4,874** | **2,195** | **2,228** | **1,074** | **1,107** | **91** | **91** | **1,227** | **1,224** | **239** | **224** |
| Mathematics | 858 | 869 | 398 | 385 | 287 | 304 | 22 | 21 | 113 | 122 | 38 | 37 |
| Computational Science and Engineering | 137 | 137 | 78 | 88 | 49 | 41 | 0 | 1 | 10 | 7 | 0 | 0 |
| Physics | 1,154 | 1,152 | 545 | 545 | 231 | 236 | 26 | 21 | 263 | 276 | 89 | 74 |
| Chemistry | 681 | 712 | 201 | 210 | 97 | 94 | 28 | 32 | 317 | 334 | 38 | 42 |
| Chemical Engineering | 197 | 212 | 91 | 105 | 39 | 45 | 0 | 0 | 67 | 62 | 0 | 0 |
| Interdisciplinary Sciences | 227 | 248 | 168 | 188 | 48 | 50 | 0 | 0 | 11 | 10 | 0 | 0 |
| Pharmaceutical Sciences | 542 | 530 | 308 | 315 | 133 | 132 | 6 | 4 | 95 | 79 | 0 | 0 |
| Biology | 1,030 | 1,014 | 406 | 392 | 190 | 205 | 9 | 12 | 351 | 334 | 74 | 71 |
| **System-oriented Natural Sciences** | **3,214** | **3,278** | **1,543** | **1,649** | **725** | **684** | **39** | **40** | **728** | **727** | **179** | **178** |
| Earth Sciences | 509 | 488 | 157 | 152 | 201 | 166 | 13 | 7 | 125 | 148 | 13 | 15 |
| Environmental Sciences | 994 | 938 | 429 | 429 | 265 | 231 | 6 | 10 | 294 | 268 | 0 | 0 |
| Agricultural Sciences | 326 | 340 | 190 | 204 | 48 | 55 | 5 | 5 | 80 | 76 | 3 | 0 |
| Health Sciences and Technology | 913 | 1,025 | 517 | 595 | 115 | 129 | 8 | 8 | 130 | 152 | 143 | 141 |
| Food Sciences | 472 | 487 | 250 | 269 | 96 | 103 | 7 | 10 | 99 | 83 | 20 | 22 |
| **Management and Social Sciences** | **854** | **828** | **40** | **38** | **267** | **267** | **53** | **33** | **230** | **237** | **264** | **253** |
| Management, Technology and Economics | 586 | 552 | 0 | 0 | 177 | 164 | 48 | 31 | 141 | 145 | 220 | 212 |
| Humanities, Social and Political Sciences | 268 | 276 | 40 | 38 | 90 | 103 | 5 | 2 | 89 | 92 | 44 | 41 |

**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 with foreign entry qualifications in autumn 2013

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. The table shows the number of enrolments, by country of residence before studying at ETH Zurich.

| | 2013 | | Bachelor students | | Master students | | Visiting/exchange students | | Doctoral students | | MAS/MBA students | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | in % | | in % | | in % | | in % | | in % | | in % |
| **ETH Zurich total** | **6,182** | **100.0** | **1,262** | **100.0** | **1,691** | **100.0** | **369** | **100.0** | **2,608** | **100.0** | **252** | **100.0** |
| **EU** | **4,399** | **71.2** | **1,119** | **88.7** | **1,114** | **65.9** | **247** | **66.9** | **1,745** | **66.9** | **174** | **69.0** |
| Germany | 2,251 | 36.4 | 662 | 52.5 | 500 | 29.6 | 56 | 15.2 | 954 | 36.6 | 79 | 31.3 |
| Austria | 406 | 6.6 | 185 | 14.7 | 81 | 4.8 | 16 | 4.3 | 107 | 4.1 | 17 | 6.7 |
| Italy | 365 | 5.9 | 56 | 4.4 | 87 | 5.1 | 27 | 7.3 | 177 | 6.8 | 18 | 7.1 |
| Greece | 244 | 3.9 | 8 | 0.6 | 143 | 8.5 | 0 | – | 68 | 2.6 | 25 | 9.9 |
| France | 210 | 3.4 | 29 | 2.3 | 65 | 3.8 | 13 | 3.5 | 97 | 3.7 | 6 | 2.4 |
| Luxembourg | 169 | 2.7 | 104 | 8.2 | 49 | 2.9 | 0 | – | 16 | 0.6 | 0 | – |
| Netherlands | 107 | 1.7 | 3 | 0.2 | 29 | 1.7 | 24 | 6.5 | 47 | 1.8 | 4 | 1.6 |
| Poland | 102 | 1.6 | 28 | 2.2 | 18 | 1.1 | 19 | 5.1 | 34 | 1.3 | 3 | 1.2 |
| Spain | 77 | 1.2 | 8 | 0.6 | 19 | 1.1 | 1 | 0.3 | 46 | 1.8 | 3 | 1.2 |
| Romania | 74 | 1.2 | 4 | 0.3 | 7 | 0.4 | 49 | 13.3 | 13 | 0.5 | 1 | 0.4 |
| Sweden | 71 | 1.1 | 7 | 0.6 | 30 | 1.8 | 1 | 0.3 | 32 | 1.2 | 1 | 0.4 |
| United Kingdom | 69 | 1.1 | 4 | 0.3 | 18 | 1.1 | 9 | 2.4 | 32 | 1.2 | 6 | 2.4 |
| Hungary | 34 | 0.5 | 7 | 0.6 | 4 | 0.2 | 1 | 0.3 | 18 | 0.7 | 4 | 1.6 |
| Others | 220 | 3.6 | 14 | 1.1 | 64 | 3.8 | 31 | 8.4 | 104 | 4.0 | 7 | 2.8 |
| **Rest of Europe** | **442** | **7.1** | **85** | **6.7** | **131** | **7.7** | **17** | **4.6** | **192** | **7.4** | **17** | **6.7** |
| Turkey | 105 | 1.7 | 26 | 2.1 | 30 | 1.8 | 0 | – | 47 | 1.8 | 2 | 0.8 |
| Russian Federation | 100 | 1.6 | 7 | 0.6 | 21 | 1.2 | 3 | 0.8 | 62 | 2.4 | 7 | 2.8 |
| Liechtenstein | 75 | 1.2 | 43 | 3.4 | 21 | 1.2 | 0 | – | 9 | 0.3 | 2 | 0.8 |
| Republic of Serbia | 49 | 0.8 | 1 | 0.1 | 19 | 1.1 | 0 | – | 26 | 1.0 | 3 | 1.2 |
| Others | 113 | 1.8 | 8 | 0.6 | 40 | 2.4 | 14 | 3.8 | 48 | 1.8 | 3 | 1.2 |
| **Asia** | **859** | **13.9** | **32** | **2.5** | **289** | **17.1** | **63** | **17.1** | **441** | **16.9** | **34** | **13.5** |
| China | 331 | 5.4 | 17 | 1.3 | 144 | 8.5 | 13 | 3.5 | 150 | 5.8 | 7 | 2.8 |
| India | 180 | 2.9 | 0 | – | 69 | 4.1 | 3 | 0.8 | 95 | 3.6 | 13 | 5.2 |
| Iran | 82 | 1.3 | 3 | 0.2 | 7 | 0.4 | 0 | – | 68 | 2.6 | 4 | 1.6 |
| Japan | 44 | 0.7 | 0 | – | 3 | 0.2 | 24 | 6.5 | 11 | 0.4 | 6 | 2.4 |
| Others | 222 | 3.6 | 12 | 1.0 | 66 | 3.9 | 23 | 6.2 | 117 | 4.5 | 4 | 1.6 |
| **America** | **383** | **6.2** | **20** | **1.6** | **123** | **7.3** | **30** | **8.1** | **189** | **7.2** | **21** | **8.3** |
| United States of America | 155 | 2.5 | 4 | 0.3 | 54 | 3.2 | 21 | 5.7 | 72 | 2.8 | 4 | 1.6 |
| Canada | 63 | 1.0 | 0 | – | 19 | 1.1 | 4 | 1.1 | 38 | 1.5 | 2 | 0.8 |
| Brazil | 39 | 0.6 | 4 | 0.3 | 18 | 1.1 | 0 | – | 15 | 0.6 | 2 | 0.8 |
| Mexiko | 38 | 0.6 | 6 | 0.5 | 4 | 0.2 | 2 | 0.5 | 23 | 0.9 | 3 | 1.2 |
| Columbia | 32 | 0.5 | 0 | – | 9 | 0.5 | 0 | – | 20 | 0.8 | 3 | 1.2 |
| Others | 56 | 0.9 | 6 | 0.5 | 19 | 1.1 | 3 | 0.8 | 21 | 0.8 | 7 | 2.8 |
| **Africa** | **62** | **1.0** | **2** | **0.2** | **20** | **1.2** | **5** | **1.4** | **33** | **1.3** | **2** | **0.8** |
| **Australia and New Zealand** | **37** | **0.6** | **4** | **0.3** | **14.0** | **0.8** | **7** | **1.9** | **8** | **0.3** | **4** | **1.6** |



# Degrees

| | Bachelor degrees | | | | Master degrees | | | |
|---|---|---|---|---|---|---|---|---|
| | 2012 Total | 2013 Total | Women | Foreigners | 2012 Total | 2013 Total | Women | Foreigners |
| **ETH Zurich total** | **1,447** | **1,447** | **422** | **282** | **1,650** | **1,847** | **561** | **646** |
| **Programmes** | | | | | | | | |
| **Architecture and Building Sciences** | **307** | **293** | **97** | **38** | **330** | **354** | **111** | **89** |
| Architecture | 159 | 149 | 56 | 17 | 177 | 213 | 84 | 66 |
| Civil Engineering | 78 | 85 | 21 | 10 | 68 | 75 | 8 | 8 |
| Environmental Engineering | 55 | 49 | 18 | 11 | 54 | 41 | 13 | 13 |
| Geomatics and Planning | 15 | 10 | 2 | 0 | 31 | 25 | 6 | 2 |
| **Engineering Sciences** | **475** | **508** | **50** | **103** | **483** | **607** | **76** | **243** |
| Mechanical Engineering | 249 | 262 | 18 | 53 | 159 | 188 | 15 | 58 |
| Information Technology and Electrical Engineering | 104 | 111 | 8 | 31 | 72 | 97 | 7 | 20 |
| Biosciences and Engineering | 14 | 25 | 7 | 3 | 49 | 72 | 21 | 41 |
| Interdisciplinary Engineering Sciences | 0 | 0 | 0 | 0 | 72 | 84 | 12 | 60 |
| Computer Science | 80 | 79 | 11 | 11 | 94 | 128 | 12 | 54 |
| Materials Science | 28 | 31 | 6 | 5 | 37 | 38 | 9 | 10 |
| **Natural Sciences and Mathematics** | **377** | **386** | **134** | **115** | **460** | **476** | **187** | **202** |
| Mathematics | 60 | 71 | 15 | 18 | 101 | 97 | 27 | 49 |
| Computational Science and Engineering | 19 | 5 | 1 | 0 | 16 | 25 | 1 | 10 |
| Physics | 83 | 98 | 9 | 49 | 112 | 113 | 26 | 65 |
| Chemistry | 28 | 35 | 17 | 12 | 39 | 44 | 12 | 18 |
| Chemical Engineering | 16 | 18 | 4 | 5 | 24 | 18 | 6 | 10 |
| Interdisciplinary Sciences | 31 | 25 | 8 | 9 | 18 | 19 | 4 | 9 |
| Pharmaceutical Sciences | 64 | 47 | 33 | 6 | 65 | 74 | 60 | 15 |
| Biology | 76 | 87 | 47 | 16 | 85 | 86 | 51 | 26 |
| **System-oriented Natural Sciences** | **270** | **246** | **140** | **26** | **292** | **323** | **158** | **67** |
| Earth Sciences | 42 | 23 | 8 | 2 | 92 | 97 | 34 | 46 |
| Environmental Sciences | 90 | 99 | 55 | 16 | 79 | 107 | 53 | 13 |
| Agricultural Sciences | 22 | 31 | 20 | 2 | 24 | 20 | 8 | 3 |
| Health Sciences and Technology | 73 | 58 | 33 | 1 | 64 | 59 | 37 | 1 |
| Food Sciences | 43 | 35 | 24 | 5 | 33 | 40 | 26 | 4 |
| **Management and Social Sciences** | **18** | **14** | **1** | **0** | **85** | **87** | **29** | **45** |
| Management, Technology and Economics | 0 | 0 | 0 | 0 | 62 | 64 | 16 | 36 |
| Humanities, Social and Political Sciences | 18 | 14 | 1 | 0 | 23 | 23 | 13 | 9 |

# Doctorates and degrees of continuing education

## Doctorates

| | 2012 Total | 2013 Total [1] | Women | Foreigners |
|---|---|---|---|---|
| **ETH Zurich total** | **747** | **579** | **175** | **370** |
| **Department** | | | | |
| **Architecture and Building Sciences** | **55** | **37** | **7** | **27** |
| Architecture | 6 | 6 | 0 | 5 |
| Civil, Environmental and Geomatic Engineering | 49 | 31 | 7 | 22 |
| **Engineering Sciences** | **215** | **154** | **19** | **105** |
| Mechanical Engineering | 62 | 52 | 4 | 30 |
| Information Technology and Electrical Engineering | 58 | 52 | 9 | 38 |
| Computer Science | 63 | 25 | 2 | 14 |
| Materials Science | 26 | 18 | 3 | 16 |
| Biosystems | 6 | 7 | 1 | 7 |
| **Natural Sciences and Mathematics** | **242** | **207** | **61** | **121** |
| Mathematics | 23 | 21 | 2 | 11 |
| Physics | 45 | 41 | 6 | 19 |
| Chemistry and Applied Biosciences | 99 | 89 | 25 | 54 |
| Biology | 75 | 56 | 28 | 37 |
| **System-oriented Natural Sciences** | **182** | **144** | **72** | **91** |
| Earth Sciences | 39 | 12 | 6 | 7 |
| Environmental Systems Science | 113 | 94 | 46 | 61 |
| Health Sciences and Technology | 30 | 38 | 20 | 23 |
| **Management and Social Sciences** | **53** | **37** | **16** | **26** |
| Management, Technology and Economics | 42 | 26 | 8 | 17 |
| Humanities, Social and Political Sciences | 11 | 11 | 8 | 9 |

## Degrees of continuing education

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.

| | 2012 Total | 2013 Total | Women | Foreigners |
|---|---|---|---|---|
| Masters of Adcanced Studies (MAS, MBA) | 184 | 228 | 91 | 121 |
| Diploma of Advanced Studies (DAS) | 2 | 55 | 21 | 19 |
| Certificates of Advanced Studies (CAS) | 94 | 102 | 39 | 31 |

## Teacher training

| The following diplomas and certificates certify graduation from a teacher training course. | 2012 Total | 2013 Total | Women | Foreigners |
|---|---|---|---|---|
| Teaching diplomas for grammar schools/MAS SHE | 48 | 59 | 24 | 2 |
| Teaching Certificate | 15 | 24 | 13 | 0 |

**1** As a result of the revision of the Regulations for Doctoral Studies, the date for deregistration was changed from December 2013 to January 2014. This explains the fall in doctoral graduations to 579; without this change, 754 doctoral students would have graduated in 2013.



# Research sponsorship and knowledge transfer

Research sponsorship organisations approve between 10 and 40 percent of the projects submitted to them. ETH Zurich enjoys an above-average success rate in competing for this funding. It is an attractive place for upcoming young scientists to conduct research. With Ambizione (SNSF) and People Marie Curie (EU), appropriate sponsorship is available for junior researchers (advanced post-docs). EU and SNSF grants to central bodies (Office of Research, SED, CSCS) are not included. At the time of going to press, the funding is not yet known for all the projects that have been approved.

## Approved projects in 2013 (in CHF 1000)

| | Architecture and Civil Engineering | Engineering Sciences | Natural Sciences and Mathematics | System-oriented Natural Sciences | Management and Social Sciences | Total | |
|---|---|---|---|---|---|---|---|
| **Swiss National Science Foundation (SNSF)** | 2013 | 2013 | 2013 | 2013 | 2013 | 2012 | 2013 |
| **Total SNSF** | **7,497** | **17,337** | **40,728** | **20,719** | **6,163** | **95,029** | **92,444** |
| **Project sponsorship** | **4,313** | **11,499** | **25,598** | **11,175** | **3,024** | **67,573** | **55,609** |
| **Individual sponsorship** | **2,334** | **3,384** | **4,887** | **2,814** | **430** | **15,723** | **13,849** |
| of which SNSF-sponsored professorships | 2,109 | 2,095 | 2,534 | 824 | | 9,687 | 7,562 |
| of which Ambizione | | 1,290 | 2,045 | 1,502 | 75 | 5,084 | 4,911 |
| **Programme-based research** | **30** | **1,914** | **7,556** | **3,344** | **2,452** | **11,629** | **15,296** |
| **Cooperation, infrastructure, summer schools, etc.** | **821** | **539** | **2,687** | **3,386** | **257** | **104** | **7,690** |
| **Commission for Technology and Innovation (CTI)** | | | | | | | |
| **Project sponsorship incl. Contribution from industry** | **2,176** | **10,917** | **6,679** | **3,554** | **2,834** | **38,924** | **26,160** |
| Engineering Sciences | 1,067 | 1,543 | 4,469 | | | 15,021 | 7,080 |
| Nano- and Microtechnologies | | 2,554 | 415 | | | 4,342 | 2,969 |
| Life Sciences | | 4,669 | 1,796 | 3,554 | | 13,714 | 10,019 |
| Enabling Sciences | 1,109 | 2,150 | | | 2,834 | 5,847 | 6,093 |
| **Research sponsorships under the 7th EU Framework Programme** | | | | | | | |
| **Total EU** | **610** | **32,317** | **28,233** | **11,873** | **1,926** | **66,784** | **74,960** |
| **Cooperation** | **610** | **13,944** | **4,037** | **5,682** | | **13,627** | **24,273** |
| Health | | | 927 | | | 659 | 927 |
| Food, Agriculture and Biotechnology | | 2,733 | | 73 | | | 2,806 |
| ICT | | 9,168 | 2,087 | | | 9,035 | 11,255 |
| NanoMatPro | | 847 | 515 | 1,066 | | 1,935 | 2,428 |
| Energy | | 1,160 | | 643 | | 665 | 1,802 |
| Environment | 610 | | | 3,540 | | 833 | 4,151 |
| Transport, Space, Intl. Coop., Soc. in Sci. | | 36 | 508 | 360 | | 501 | 905 |
| **Ideas** | | **16,785** | **16,221** | **4,177** | **1,926** | **47,246** | **39,109** |
| ERC Advanced Grant | | 9,073 | 6,945 | | | 33,481 | 16,018 |
| ERC Starting Grant | | 5,425 | 7,085 | 1,815 | | 13,764 | 14,325 |
| ERC Consolidator/PoC Grant | | 2,287 | 2,191 | 2,362 | 1,926 | | 8,766 |
| **Capacity** | | | | | | **502** | |
| Research Infrastructures | | | | | | 502 | |
| **People** | | **1,589** | **7,975** | **2,014** | | **5,410** | **11,578** |
| People Marie Curie | | 1,589 | 7,975 | 2,014 | | 5,410 | 11,578 |

| **Technology transfer statistics** | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|
| Number of spin-offs | 24 | 20 | 22 | 22 | 24 |
| Patents registered | 78 | 63 | 72 | 87 | 103 |
| Cooperation agreements (> CHF 50,000) | 240 | 292 | 285 | 293 | 319 |

# 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 as of 31 December 2013, even for the previous year. The breakdown by discipline reflects an internal management point of view. For internal cost control purposes, expenditure is divided into three categories: core and additional finances, which come mainly from the federal financial contribution; other funds, financed entirely by third parties. Of the 5861 FTE financed by basic funding, 110 FTE were financed by third-party funding.

| | 2012 Total | Core and additional finances | Other Funds | 2013 Total | Core and additional finances | Other Funds |
|---|---|---|---|---|---|---|
| **Grand total** | **7,661.9** | **5,694.5** | **1,967.4** | **7,913.7** | **5,860.7** | **2,053.0** |
| **Total teaching and research** | **6,575.7** | **4,630.4** | **1,945.3** | **6,785.1** | **4,750.9** | **2,034.1** |
| **Departments** | **6,360.2** | **4,497.1** | **1,863.1** | **6,573.1** | **4,600.3** | **1,972.8** |
| **Architecture and Building Sciences** | **923.3** | **744.9** | **178.4** | **947.4** | **726.1** | **221.2** |
| Architecture | 402.9 | 342.2 | 60.7 | 401.6 | 335.5 | 66.1 |
| Civil, Environmental and Geomatic Engineering | 520.4 | 402.7 | 117.7 | 545.8 | 390.6 | 155.1 |
| **Civil, Environmental and Geomatic Engineering** | **1,803.2** | **1,238.4** | **564.8** | **1,888.3** | **1,264.8** | **623.5** |
| Engineering Sciences | 592.0 | 381.3 | 210.6 | 602.0 | 372.4 | 229.6 |
| Mechanical Engineering | 509.0 | 348.7 | 160.2 | 516.1 | 339.8 | 176.3 |
| Information Technology and Electrical Engineering | 329.7 | 234.1 | 95.6 | 352.1 | 253.5 | 98.6 |
| Computer Science | 187.7 | 139.9 | 47.9 | 204.9 | 148.7 | 56.2 |
| Materials Science | 184.8 | 134.3 | 50.5 | 213.3 | 150.5 | 62.8 |
| **Natural Sciences and Mathematics** | **2,027.1** | **1,428.5** | **598.6** | **2,064.5** | **1,455.9** | **608.6** |
| Mathematics | 230.8 | 177.3 | 53.5 | 237.0 | 185.1 | 51.9 |
| Physics | 557.3 | 414.6 | 142.7 | 572.9 | 419.4 | 153.4 |
| Chemistry and Applied Biosciences | 690.2 | 493.4 | 196.8 | 709.5 | 491.5 | 218.0 |
| Biology | 548.8 | 343.1 | 205.6 | 545.1 | 359.9 | 185.2 |
| **System-oriented Natural Sciences** | **1,114.6** | **783.3** | **331.4** | **1,167.5** | **820.3** | **347.2** |
| Earth Sciences | 241.4 | 159.9 | 81.5 | 258.7 | 168.6 | 90.1 |
| Environmental Systems Science | 522.3 | 386.6 | 135.6 | 548.6 | 408.4 | 140.2 |
| Health Sciences and Technology | 351.0 | 236.8 | 114.2 | 360.1 | 243.3 | 116.8 |
| **Management and Social Sciences** | **492.0** | **302.0** | **189.9** | **505.5** | **333.1** | **172.3** |
| Management, Technology and Economics | 263.9 | 180.8 | 83.1 | 278.3 | 201.5 | 76.8 |
| Humanities, Social and Political Sciences | 228.1 | 121.3 | 106.8 | 227.2 | 131.7 | 95.5 |
| **Extra-departmental teaching and research units, others**[1] | **215.5** | **133.3** | **82.2** | **211.9** | **150.7** | **61.3** |
| CSCS | 52.8 | 44.9 | 8.0 | 62.8 | 53.3 | 9.5 |
| Functional Genomics Center Zurich | 13.3 | 12.3 | 1.0 | 16.0 | 14.2 | 1.8 |
| Swiss Seismological service (SED) | 56.3 | 17.6 | 38.8 | 47.0 | 19.0 | 28.0 |
| Further teaching and research units, others | 93.0 | 58.6 | 34.5 | 86.2 | 64.2 | 22.0 |
| **Total Executive Board, central authorities and infrastructure divisions** | **1,086.2** | **1,064.1** | **22.1** | **1,128.7** | **1,109.8** | **18.9** |
| Infrastructure divisions | 923.2 | 909.5 | 13.7 | 955.5 | 943.4 | 12.1 |
| Central authorities and other staff | 163.0 | 154.6 | 8.4 | 173.1 | 166.4 | 6.8 |

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

# Staff by function

| | | | | Change from previous year | |
|---|---|---|---|---|---|
| | 2012 Total | 2013 Total | Percentage women in % | in FTE | in % |
| **Grand total** | **7,661.9** | **7,913.7** | **31.6** | **251.8** | **3.3** |
| of which temporary position | 5,255.8 | 5,364.3 | 30.2 | 108.5 | 2.1 |
| **Total teaching and research** | **6,575.7** | **6,785.1** | **30.2** | **209.4** | **3.2** |
| of which temporary positions | 5,088.5 | 5,211.9 | 29.4 | 123.4 | 2.4 |
| **Professorships** | **445.4** | **462.1** | **12.9** | **16.7** | **3.7** |
| Full/Associate professorships | 365.3 | 384.8 | 9.9 | 19.5 | |
| Assistant professorships | 80.1 | 77.3 | 27.9 | – 2.8 | |
| **Scientific Staff** | **4,748.0** | **4,923.8** | **27.6** | **175.8** | **3.7** |
| Senior Scientists and permanent scientific staff | 239.8 | 244.6 | 13.0 | 4.9 | |
| Senior assistants and temporary scientific staff | 541.8 | 526.0 | 26.2 | – 15.7 | |
| Scientific research assistants II and postdoctoral students | 1,087.0 | 1,181.3 | 28.4 | 94.3 | |
| Scientific research assistants I | 2,589.8 | 2,697.8 | 28.3 | 108.0 | |
| Teaching/research assistants | 289.6 | 274.0 | 34.2 | – 15.6 | |
| **Technical and administrative staff** | **1,254.4** | **1,270.3** | **46.2** | **15.9** | **1.3** |
| Technical and IT staff | 773.8 | 782.2 | 24.1 | 8.4 | |
| Administrative staff | 480.6 | 488.1 | 81.5 | 7.5 | |
| **Apprentices** | **128.0** | **129.0** | **30.2** | **1.0** | **0.8** |
| **Total Executive Board, central authorities and infrastructure divisions*** | **1,086.2** | **1,128.7** | **40.5** | **42.4** | **3.9** |
| of which temporary positions | 167.3 | 152.4 | 55.6 | – 14.9 | – 8.9 |
| **Professorships** | **4.0** | **4.0** | | **0.0** | |
| **Scientific staff** | **4.6** | **1.2** | **58.8** | **– 3.4** | |
| **Technical and IT staff** | **468.4** | **492.0** | **12.3** | **23.6** | |
| **Administrative staff** | **570.3** | **594.5** | **63.6** | **24.2** | |
| **Apprentices** | **39.0** | **37.0** | **48.6** | **– 2.0** | |
| *** Staff in infrastructure divisions** | **923.2** | **955.5** | **38.4** | **32.3** | **3.5** |
| Corporate communications | 23.9 | 25.2 | 56.0 | 1.3 | 5.4 |
| Rectorate | 62.3 | 65.2 | 65.8 | 2.9 | 4.7 |
| Finance and controlling | 70.8 | 77.6 | 53.9 | 6.8 | 9.6 |
| Building and constructions | 57.1 | 57.0 | 33.3 | – 0.1 | – 0.2 |
| Facility Management | 182.1 | 187.2 | 20.2 | 5.1 | 2.8 |
| Library | 212.3 | 215.8 | 61.4 | 3.5 | 1.6 |
| IT services | 212.9 | 225.6 | 13.2 | 12.7 | 6.0 |
| Human resources and services | 101.8 | 101.9 | 47.8 | 0.1 | 0.1 |

# Overall view of expenditure

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

in CHF 1000

| Origin expenditure | 2009 | 2010 | 2011 | 2012 | 2013 | Change from previous year in % |
|---|---|---|---|---|---|---|
| **Total expenditure** | **1,306,889** | **1,359,255** | **1,454,762** | **1,466,810** | **1,512,315** | **3.1** |
| **Federal financial contribution (income)** | **1,039,343** | **1,094,189** | **1,088,947** | **1,101,004** | **1,146,761** | **4.2** |
| Advance funding for implementation of the HPCN strategy/new CSCS building | | – 12,355 | 12,355 | | | |
| **Federal financial contribution (expenditure)** | **1,039,343** | **1,081,834** | **1,101,302** | **1,101,004** | **1,146,761** | **4.2** |
| **Expenditure of third-party resources** | **267,546** | **277,421** | **353,460** | **365,806** | **365,554** | **– 0.1** |
| National organisations (research sponsorship) | 86,280 | 99,122 | 101,042 | 110,881 | 116,012 | 4.6 |
| Research contracts from federal offices (federal research contracts) | 23,443 | 22,873 | 22,781 | 23,804 | 23,323 | – 2.0 |
| European research programmes (Framework Programmes) | 37,245 | 42,914 | 40,019 | 44,789 | 52,887 | 18.1 |
| Partnerships with business, other third-party funding | 92,842 | 99,668 | 166,328 | 167,289 | 147,557 | – 11.8 |
| Endowments and legacies | 27,736 | 12,845 | 23,290 | 19,043 | 25,774 | 35.3 |

| Expenditure by use | 2009 | 2010 | 2011 | 2012 | 2013 | Change from previous year in % |
|---|---|---|---|---|---|---|
| **Total expenditure** | **1,306,889** | **1,359,255** | **1,454,762** | **1,466,810** | **1,512,315** | **3.1** |
| Overall expenditure (excl. investment) | 1,136,366 | 1,168,367 | 1,181,020 | 1,249,599 | 1,280,487 | 2.5 |
| Personnel expenses | 827,433 | 859,042 | 890,991 | 923,254 | 959,961 | 4.0 |
| Materials expenses | 308,932 | 309,325 | 290,029 | 326,345 | 320,526 | – 1.8 |
| Investment expenses | 170,523 | 190,888 | 273,742 | 217,211 | 231,828 | 6.7 |
| Investment credit/co-financing (FBL)[1] | 79,960 | 100,000 | 104,600 | 85,200 | 104,500 | 22.7 |
| Movables, machinery, vehicles, IT equipment | 90,563 | 90,888 | 169,142 | 132,011 | 127,328 | – 3.5 |
| **Basic funding and supplementary funding** | **1,050,424** | **1,085,906** | **1,154,601** | **1,153,652** | **1,178,688** | **2.2** |
| Overall expenditure (excl. investment) | 896,455 | 911,088 | 893,736 | 957,837 | 972,470 | 1.5 |
| Personnel expenses | 672,287 | 687,488 | 701,005 | 721,947 | 749,242 | 3.8 |
| Materials expenses | 224,168 | 223,600 | 192,730 | 235,890 | 223,228 | – 5.4 |
| Investment expenses | 153,969 | 174,819 | 260,865 | 195,816 | 206,218 | 5.3 |
| Investment credit (FBL)[1] | 79,960 | 100,000 | 104,000 | 80,200 | 96,420[2] | 20.2 |
| Movables, machinery, vehicles, IT equipment | 74,009 | 74,819 | 156,865 | 115,616 | 109,798 | – 5.0 |
| **Other resources** | **256,465** | **273,348** | **300,161** | **313,158** | **333,627** | **6.5** |
| Overall expenditure (excl. investment) | 239,911 | 257,279 | 287,284 | 291,762 | 308,017 | 5.6 |
| Personnel expenses | 155,147 | 171,554 | 189,986 | 201,307 | 210,719 | 4.7 |
| Materials expenses | 84,765 | 85,724 | 97,298 | 90,455 | 97,298 | 7.6 |
| Investment expenses | 16,554 | 16,069 | 12,876 | 21,396 | 25,610 | 19.7 |
| Co-financing (FBL)[1] | 0 | 0 | 600 | 5,000 | 8,080 | 61.6 |
| Movables, machinery, vehicles, IT equipment | 16,554 | 16,069 | 12,276 | 16,396 | 17,530 | 6.9 |

**1** FBL = Federal Office for Buildings and Logistics, BBL
**2** Of the investment credit in 2013, CHF 63.9 million was for capitalisable expenses, CHF 32.5 million was spent on maintenance and repairs.

in CHF 1000

| Expenditure by discipline | 2013 Total | Core finances | Additional finances | Other funds | Use of funds by type of expenditure: Personnel | Materials | Investments |
|---|---|---|---|---|---|---|---|
| **Grand total** | **1,512,315** | **1,037,729** | **140,959** | **333,627** | **959,961** | **320,526** | **231,828** |
| **Total teaching and research** | **1,006,922** | **631,647** | **83,180** | **292,094** | **771,022** | **152,528** | **83,371** |
| **Departments** | **912,797** | **562,552** | **77,407** | **272,838** | **741,243** | **129,315** | **42,239** |
| **Architecture and Building Sciences** | **126,502** | **87,610** | **9,351** | **29,541** | **107,125** | **17,205** | **2,173** |
| Architecture | 56,521 | 40,997 | 4,441 | 11,083 | 47,059 | 9,038 | 425 |
| Civil, Environmental and Geomatic Engineering | 69,981 | 46,613 | 4,910 | 18,458 | 60,065 | 8,167 | 1,748 |
| **Engineering Sciences** | **250,967** | **152,115** | **21,204** | **77,648** | **202,531** | **32,324** | **16,113** |
| Mechanical Engineering | 78,873 | 42,710 | 7,254 | 28,910 | 62,957 | 10,000 | 5,917 |
| Information Technology and Electrical Engineering | 66,524 | 40,412 | 4,251 | 21,861 | 54,905 | 8,764 | 2,854 |
| Computer Science | 45,247 | 32,128 | 2,237 | 10,882 | 40,580 | 4,292 | 375 |
| Materials Science | 30,364 | 18,131 | 4,333 | 7,900 | 23,361 | 4,016 | 2,986 |
| Biosystems | 29,959 | 18,734 | 3,130 | 8,094 | 20,728 | 5,251 | 3,980 |
| **Natural Sciences and Mathematics** | **300,057** | **179,248** | **29,369** | **91,440** | **236,228** | **46,173** | **17,656** |
| Mathematics | 35,278 | 26,302 | 2,845 | 6,132 | 33,586 | 1,681 | 11 |
| Physics | 78,986 | 49,017 | 7,173 | 22,796 | 63,433 | 12,184 | 3,369 |
| Chemistry and Applied Biosciences | 103,084 | 61,984 | 11,497 | 29,604 | 79,104 | 16,436 | 7,545 |
| Biology | 82,708 | 41,946 | 7,854 | 32,908 | 60,105 | 15,872 | 6,731 |
| **System-oriented Natural Sciences** | **164,541** | **102,374** | **14,855** | **47,312** | **135,764** | **22,622** | **6,156** |
| Earth Sciences | 40,430 | 22,905 | 4,089 | 13,435 | 32,343 | 5,254 | 2,832 |
| Environmental Systems Science | 75,568 | 52,197 | 5,507 | 17,864 | 64,776 | 9,226 | 1,566 |
| Health Sciences and Technology | 48,544 | 27,272 | 5,259 | 16,013 | 38,644 | 8,143 | 1,757 |
| **Management and Social Sciences** | **70,729** | **41,203** | **2,628** | **26,898** | **59,597** | **10,991** | **141** |
| Management, Technology and Economics | 37,212 | 22,569 | 1,479 | 13,163 | 31,173 | 6,007 | 31 |
| Humanities, Social and Political Sciences | 33,517 | 18,634 | 1,149 | 13,734 | 28,423 | 4,984 | 110 |
| **Extra-departemental teaching and research units, others** | **94,124** | **69,095** | **5,773** | **19,256** | **29,779** | **23,213** | **41,132** |
| **Total Executive Board, central authorities, infrastructure divisions and building investments** | **505,393** | **406,082** | **57,778** | **41,533** | **188,938** | **167,998** | **148,457** |
| Total Executive Board, central authorities and infrastructure divisions | 400,893 | 309,662 | 57,778 | 33,453 | 188,938 | 167,998 | 43,957 |
| Investment credit/co-financing (FBL)[1] | 104,500 | 96,420 | | 8,080 | | | 104,500 |

**1** FBL = Federal Office for Buildings and Logistics, BBL.

# Environmental statistics

ETH Zurich's heating and electricity requirement was slightly higher in 2013 than in 2012. Purchasing additional certificates of origin (Naturemade basic) increased the proportion of energy from renewable sources to 62 percent. The amount of heat recovered from the cooling systems was increased by 2.9 gigawatt hours (GWh) to 11.8 GWh. This means that ETH Zurich covered about 14.2 percent of its heating requirement (including external purchasers) by using the waste heat from cooling systems. Direct $CO_2$ emissions were reduced in 2013 to 5631 tonnes (excluding coolants).

| **Electricity** (in GWh) | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|
| **Total electricity demand** | **109.8** | **113.1** | **111.0** | **111.8** | **113.0** |
| **Percentage from renewable sources** | **94 %** | **89 %** | **23 %** | **24 %** | **62 %** |
| **Total produced on site** | **3.5** | **2.3** | **1.1** | **0.2** | **0.2** |
| Production from combined heat and power unit (CHP), decommissioning 2012 | 3.3 | 2.1 | 0.9 | 0.0 | 0.0 |
| Production from photovoltaic cells | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| **Total electricity purchased** | **106.3** | **110.8** | **109.9** | **111.6** | **112.8** |
| Electricity purchased for buildings | 94.0 | 96.6 | 98.5 | 101.5 | 103.2 |
| Electricity purchased for Walche heat pump | 12.3 | 14.2 | 11.4 | 10.1 | 9.6 |

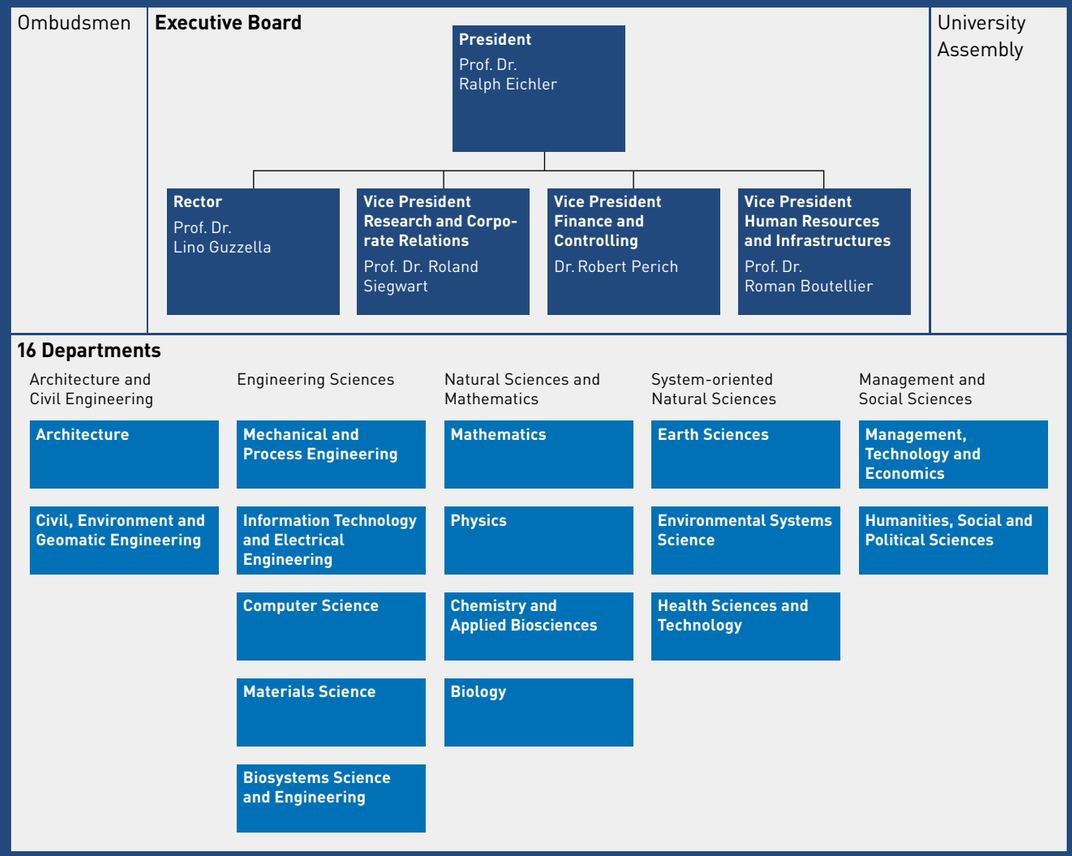
| **Heating** (in GWh) | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|
| **Total heat demand of ETH Zurich (net energy)** | **52.8** | **51.1** | **45.3** | **50.7** | **53.8** |
| **Percentage from renewable sources** | **51 %** | **55 %** | **43 %** | **42 %** | **55 %** |
| Total heat produced (net energy) | 80.7 | 81.9 | 70.7 | 77.9 | 83.1 |
| Sale of heat to third-parties (net energy) | – 27.9 | – 30.8 | – 25.4 | – 27.2 | – 29.2 |
| **Total heat produced (net energy including external purchasers)** | **80.7** | **81.9** | **70.7** | **77.9** | **83.1** |
| District heating | 16.7 | 11.7 | 11.2 | 21.6 | 21.8 |
| Walche heat pump | 26.4 | 33.9 | 31.5 | 27.3 | 26.3 |
| Fossil fuels | | | | | |
| Gas (excluding gas for CHP electricity) | 40.4 | 38.5 | 26.6 | 25.5 | 31.2 |
| Oil | 0.0 | 0.0 | 4.2 | 5.9 | 0.0 |
| Non-fossil fuels | | | | | |
| Woodchips | 0.7 | 0.7 | 0.5 | 0.5 | 0.5 |
| From heat recovery | 6.8 | 6.6 | 7.9 | 8.9 | 11.8 |
| Losses during conversion | – 10.2 | – 9.5 | – 11.1 | – 11.8 | – 8.5 |
| **Relative amounts** [1] | | | | | |
| Electricity demand (kWh/FTE), excl. electricity for heat pump | 6,391.7 | 6,176.1 | 5,880.7 | 5,826.2 | 5,780.6 |
| Heat demand/energy-consuming area(kWh/m²) | 84.8 | 82.5 | 73.1 | 80.2 | 83.0 |
| Total energy demand/FTE (kWh/FTE) | 9,852.7 | 9,369.3 | 8,554.9 | 8,732.5 | 8,789.4 |
| Total energy demand/energy-consuming area (kWh/m²) | 241.5 | 242.0 | 233.9 | 241.1 | 242.6 |

| **Emissions of $CO_2$ equivalents** (tonnes $CO_2$ eq.) | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|
| **Total $CO_2$ eq. emissions** | **23,902** | **25,258** | **23,652** | **25,773** | **26,487** |
| Direct $CO_2$ eq. emissions | | | | | |
| Gas and district heating | 8,178 | 7,806 | 4,937 | 4,655 | 5,620 |
| Oil | 0 | 0 | 1,109 | 2,088 | 11 |
| Coolants (recorded once in 2009) | 62 | 62 | 62 | 62 | 62 |
| Indirect $CO_2$ eq. emissions | | | | | |
| Purchased electricity (according to environmental declaration) | 1,445 | 1,462 | 1,609 | 1,606 | 1,585 |
| Commuter traffic (recorded once in 2008) | 1,714 | 1,714 | 1,714 | 1,714 | 1,714 |
| Business travel | 12,503 | 14,214 | 14,221 | 15,648 | 17,495 [2] |

**1** Students count as 0.68 FTE. **2** The emission factors for business trips were updated in 2013.
Rented smaller premises and premises outside the canton of Zurich are not included in the multi-year comparisons.



# Organisation




As of 31 December 2013

## Corporate Governance

**Remuneration**

In 2013, the salaries of the five members of the Executive Board, including the employer's social security contributions, came to 2.02 million francs (last year 2 million francs), with the highest salary being 0.43 million francs (last year 0.44 million francs). The total sum includes 0.44 million francs for the employer's social security contributions (last year 0.42 million francs).

**Secondary employment**

Ralph Eichler: Member of the Board of Directors of Belenos Clean Power Holding AG

Lino Guzzella: Member of the Board of Directors of Kistler Holding AG

Roland Siegwart: Member of the Board of Directors of Komax AG, Member of the Board of Trustees of Gebert Rüf Stiftung

Robert Perich: None

Roman Boutellier: Member of the Board of Directors of Georg Fischer AG, Member of the Board of Directors of Appenzeller KB, Chairman of the Board of Directors of Ammann BauAusrüstung AG, Member of the Board of Directors of Rychiger AG, Member of the Board of Trustees of Vontobel-Stiftung

As of 31 December 2013

**Imprint**

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