

## Strategic Objectives

On the basis of its national responsibility and leading international status, ETH Zurich intends to bolster its position as an "international research university". This development will be led by the four subject areas Sciences and Mathematics, Engineering Sciences, System-oriented Sciences and Architecture and Building Sciences, which, together with the Humanities, Social & Political Sciences, define the identity of the university.

The Departments of ETH Zurich find themselves in a state of constant flux. The previous Departments of Forest Sciences and Environmental Sciences merged on 1st January 2004 to form the Department of Environmental Sciences, and the Department of Industrial Management & Manufacturing will be reorganised during 2004.

Against the background of the individual Departments' financial autonomy, it is becoming ever more important for the dynamics of ETH to nurture and optimise interdisciplinary initiatives, objectives and communications, for which interdepartmental incentives, promotional schemes and targets are required. By the summer of 2004, for example, an ETH-wide strategy will have been developed in the subject area biotechnology, bioengineering and biosystems with the aim of setting common objectives and priorities. Interdepartmental image development is also an important focus of academic planning in view of a long-term overall strategy.

ETH Zurich has set itself the objective of appointing and training world-leading scientists, both male and female, and attracting the best-qualified students from within Switzerland and abroad.

To achieve this, ETH Zurich has already implemented extensive reform of the study programs it offers to fulfil the terms of the Bologna Declaration. Now that the Bachelor's programs are up and running, attention has turned to the Master's programs. These will start from the winter semester 2005/2006. ETH Zurich is committed to providing its students with excellent specialist education and outstanding all-round leadership skills.

ETH Zurich's Innovation Initiatives program has created a tool for targeted promotion of future Centres of Competence in Research. This Innovation Initiatives program arose out of the experience gained from the areas of future strategic focus, which ended at the end of 2003. ETH Zurich encourages targeted, innovative research methods and infrastructure. ETH Zurich's research infrastructure has in particular been found to provide a real competitive edge and it is therefore central to the future progress of ETH Zurich to keep up the development of this infrastructure. Those involved in the planning of the Hönggerberg campus are therefore already looking well beyond the completion of the third extension phase in autumn 2004. The plan is to develop the campus into a living part of the city of Zurich, where science and the public meet in new ways. As well as research and service buildings, there will be living accommodation for students, a guest-house, shops and sports and leisure facilities. In addition, ETH Zurich is already working on plans to remodel the university area in the city centre. Strategic marketing by the university management is intended to make further potential interested parties aware of ETH Zurich's strengths in teaching, research and service provision. If ETH Zurich is to maintain its national and international status as a leading university and enhance its already high standard, additional funding is required. Only then will it be possible for ETH Zurich to continue to fulfil its complex role as an important player in politics, economics and society and to make a decisive contribution to Switzerland's long-term development and future viability. Federal funding therefore has to increase if resource planning is to be carried out with any degree of certainty. An increasing proportion of third-party funding and monies from private individuals and corporations offers ETH flexibility and entrepreneurial latitude.

## Executive Summary

ETH Zurich made "culture of science" its theme for 2003. Information campaigns and events provided a context for scientists and interested members of the public to address the culture of scientific objectivity in day-to-day research. One of the results was a paper on research culture at ETH which, together with a brochure from the US National Academies of Science on responsible conduct, has been distributed to all researchers at ETH. A series of discussions entitled "Debating Science Culture – a self-examination on money, culture and quality" also began in the 2003/2004 winter semester.

Biology in Zurich enjoys an excellent reputation. The Institutes and professorships at ETH Zurich, together with those at the University of Zurich and the University Hospital Zurich are among the leaders in their field in Europe. This position was confirmed by the final report of the international team of experts which evaluated the Biology Department at ETH Zurich. The "Life Science Zurich" network, which includes ETH Zurich, the University of Zurich and the University Hospital Zurich, provides the biological sciences in Zurich with a common platform to strengthen cooperation and promote dialogue between scientists and the worlds of business and politics. The implementation of academic reform continued apace in 2003, with 18 out of 22 programs already following the staged model of Bachelor's and Master's degrees. Proposals for the development of the Master's study programs are at the consultation stage. Academic reform is also pursuing the declared objective of bringing the initial years of study in related disciplines closer together in order to facilitate a change of discipline. The system-oriented natural sciences have provided a copy book example of how to achieve this objective. Students in the agricultural, earth, food and environmental sciences now start their courses with a common foundation year. ETH Zurich's Innovation Initiatives program has created a tool for responding quickly and unconventionally to new areas of scientific interest on a competitive basis, the intention being to launch two new initiatives each year. These innovation projects can run for a maximum of three years. The first round saw the approval of three projects on glycomics, quantum computing and compact energy sources, each receiving annual funding of around CHF250,000.

At the end of the November 2003, an international team of experts evaluated the ETH World program. With ETH World, ETH Zurich is building a virtual space which enables communication and cooperation independently of time and space. The international experts focused primarily on the future direction of ETH World and made recommendations as to how the program's objectives could be put into practice even more effectively. Peers have rated ETH World as a good and successful program. At its annual media conference in May 2003, ETH Zurich unveiled its vision of "Science City", the construction and development project for Hönggerberg. The plan is to expand ETH Hönggerberg into a high-tech campus which will become a living part of the city of Zurich, making Science City not only a place for academic study and work but also a residential and leisure area for more than 10,000 people.

**Dear Reader** The international higher education landscape in which ETH Zurich is operating will be undergoing fundamental change over the next 30 years. At the end of this process, continental Europe will have a few outstanding universities and many average ones, a phenomenon that can already be observed in the English-speaking world. This differentiation correlates with the dominant role played by the USA in science and technology and the continuing excellence of Great Britain's top universities. ETH Zurich has set itself the target of being one of Europe's top three universities and among the world's top ten and it is already heading in the right direction, as was confirmed in 2003 by an international ranking of 2000 universities carried out by Shanghai Jiao Tong University. According to this ranking, ETH Zurich is in fifth place in Europe (after four British universities) and in 25th place worldwide (trailing one Japanese, 19 North American and four British universities). What do we have to do to improve? Our international presence must be stronger and more sustained. We must become better known, not only discreetly among scientists and decision makers, but also internationally among the general public.

What does an international presence mean? We need to commit ourselves more thoroughly to and win greater exposure for our hallmarks – quality, intellectual honesty, partnership, stamina and finishing power. And we need to do this in our global research themes, in the design and management of major projects, in our participation in influential scientific and science policy committees as well as at major events.

The number of times a unique career path is opened up by the particular professional and personal options offered by ETH Zurich and the pride expressed about being associated with this institution of higher learning are also measures of the quality of ETH. Our university has international renown, as is reflected by the quality of our professorial staff, our doctoral candidates and postdoctoral students. We want to build systematically on this international reputation, especially at the graduate level. We want to become still more international and systematic in future in our recruitment of talented young students aiming to do a Master's degree or a doctorate. Can we nevertheless remain fair and fulfil our responsibilities towards the people we attract and the expectations we create? Here, too, we still have work to do.

Moreover, funded as we are by the Swiss taxpayer, is it possible for us to focus to such a great extent on our international activities? Only if we actually deliver the services promised and by doing so create clear added value for Switzerland and its inhabitants as well. If our contribution is acknowledged internationally and also benefits Switzerland, this strengthens our international presence and enhances our image at home. In any event, ETH must be an international institution with strong national foundations. Just as ETH was the focal point for science and technology at the inception of the Swiss Confederation, I envisage the ETH of the future playing an active role in the shaping of the new Europe, indeed a new world, but also firmly rooted in Switzerland. Our Science City project is the best symbol of this future – international in its outlook, but steadfast in its commitment to the city and Canton of Zurich and to Switzerland.

ETH was conceived in the 19th century, at the birth of the Swiss Confederation, but, simultaneously with a new world order, it is entering a new phase in its history. We welcome this future; with our staff, students and professors we can face the future with confidence and eagerness. Thank you, all of you, for your great dedication and your impressive work in 2003.

Olaf Kübler  
President, ETH Zurich

## More autonomy for ETH Zurich

**The revised ETH Law gives more autonomy to the institutions within the ETH domain, and thus also to ETH Zurich. However, this brings with it additional obligations. One new feature is that the President of ETH Zurich now has a seat on the ETH Board.**

The partially revised ETH Law will come into force on 1st January 2004, so ensuring that the new legal basis for the ETH domain is in force from the very beginning of the coming legislative period of 2004–07. The main objective of the revision is to strengthen the autonomy of the ETH domain and its institutions, with the latter newly acquiring a performance mandate and an overall budget. The law also acknowledges the active role universities play in exploiting knowledge, for instance allowing ETH Zurich to be directly involved in companies marketing technologies it has developed and opening up the way to the transfer of intellectual property rights and, conversely, the acquisition of shares in companies. The Presidents of ETH Zurich and of EPF Lausanne and a director of a research institute are now represented on the ETH Board. An additional clause has also been inserted into the ETH Law under the name “Lex Wüthrich”. This allows outstanding researchers to continue working at ETH Zurich after reaching retirement age. The regulations governing the ETH domain, which are the central implementing regulations of the ETH Law, have been totally revised. These will be supplemented at a later point with regulations about the financing of losses. Additional adjustments will be necessary with regard to pension arrangements, rules of procedure of the ETH Appeals Commission and the regulations governing the research institutes and ETH Zurich and EPF Lausanne.

**Expert knowledge in demand.** 2003 was an eventful year which saw ETH Zurich’s expert knowledge much in demand. Before, during and after the Iraq war, five experts from ETH Zurich and the University of Zurich’s joint Center for International Studies were available to answer questions from the media, and offered their assessments of how the situation in Iraq would develop. ETH experts were also called upon to assess the authenticity of video and audio documents purporting to be from Osama Bin Laden. Another important topic was the hot summer. ETH experts answered questions on matters of climate, permafrost and glaciers, for instance when part of a glacier broke off in the Bernese Oberland, causing inundation in the valley below. ETH specialists were furthermore available to provide expert opinions on a wide range of topics including urban development in the north of Zurich, electrosmog caused by mobile phones, and stress in the workplace.

**Sustainability at ETH Zurich.** ETH Zurich intends to strengthen its activities in the field of sustainable development. To this end, on 1st January 2003 it founded ETHags, a Center for Sustainability at ETH Zurich. Focal points of the Center’s activities were the launch of various sustainable development initiatives, specific projects, in particular the project commissioned by the office furniture manufacturer USM, and intensive teaching and education work. ETHags’ first sustainability seminar took place on 1st October. Cooperative projects were also initiated, for instance with the University of Zurich’s Center for Corporate Responsibility and Sustainability. Cooperation with and management of the international office of the Alliance for Global Sustainability was also strengthened. In addition, three student initiatives (myclimate, project 21 and seed) are being actively supported.

## Biology at the cutting edge

**Biological research in Zurich enjoys an excellent reputation. The Institutes and professorships at ETH Zurich, together with those at the University of Zurich and the University Hospital Zurich are among the leading players in Europe.**

Biology, or more broadly the Life Sciences, is well represented at ETH Zurich. For instance, in addition to the Biology Department professorships from the Departments of Agriculture and Food Science, Chemistry and Applied Biosciences, Industrial Management and Manufacturing, Information Technology and Electrical Engineering, Physics, Environmental Sciences, Materials Science and Humanities, Social and Political Sciences are all involved in the “Life Science Zurich” initiative. This initiative is supported by the University of Zurich, the University Hospital Zurich and ETH Zurich. The interdisciplinary cooperation between engineering sciences, natural sciences and medicine has thus been given a name. Biomedical technology is one example of a field benefiting from such cooperation, reflected for instance in the development and refinement of diagnostic procedures such as MRI. Other examples are sports physiology and neuroinformatics. In total, the ETH Zurich Institutes and professorships involved in “Life Science Zurich” have over 1500 staff. In addition, ETH Zurich is involved in three centres of excellence (Plant Sciences, Center for Neurosciences, Functional Genomics Center), which employ around 1000 staff, while another 3000 staff work at the University of Zurich. Enormous staff resources are therefore available to Biology in Zurich for both teaching and research.

**Quantity and quality.** An international team of experts evaluated the Biology Department of ETH Zurich in November 2002 and classified it as good to very good. The experts found that the Department was pursuing international cutting-edge research, that the current curriculum for the biology study program was excellent and provided the students with an exceptional degree of motivation and that altogether Biology at ETH Zurich, together with the Institutes and professorships at the University of Zurich and at University Hospital Zurich, led the way not only in Switzerland but also throughout Europe.

**Dialogue with the outside world.** “Life Science Zurich”, initiated in the autumn of 2001 by ETH Zurich and the University of Zurich, also aims at promoting dialogue between scientists, society and the world of politics. The project has in the meantime become firmly established. The website [www.lifescience-zurich.ch](http://www.lifescience-zurich.ch) is its central feature, serving as an information source but also providing important networking functions and offering a basis for dialogue with the general public. For instance, people finishing their degree studies can apply directly for various doctoral programs. Secondary school classes can register for a tour of an Institute. In addition, Life Science experts will answer questions from interested lay-persons. Dialogue with the outside world is also reinforced other than via the Web. For instance, on “Organ Donation Day” on 6th September, interested parties and those personally affected were able to meet with researchers in Zurich city centre and enter into discussion with them.

## Culture of Science

**ETH Zurich made culture of science its motto for 2003. Information and events were intended to make researchers and the general public more aware of the culture of scientific objectivity.**

The culture of scientific objectivity is the inalienable heritage of every scientific research endeavour and every university. This culture must not only be protected but also constantly developed further; modern science must no more ignore the culture of objectivity than the modern state may disregard human rights. The impulse to uncover and decipher nature’s secrets stems from an unquenchable thirst for knowledge. Success requires a logical imagination, experimental skill, suitable equipment, a lot of conscientious work and luck. The stakes are very high, so there is always the temptation to take short cuts and help fate along a bit. However, this puts the culture of objectivity at risk and seriously threatens scientific credibility. To ensure that researchers at ETH are and remain aware of this problem, the university made the culture of science its theme for the year, creating and organising information and events designed to draw attention to the topics involved.

**Rules for best scientific practice.** As part of the program, a workgroup was set up to formulate ETH Zurich’s stance with regard to research culture. The workgroup produced a paper which is intended to raise the awareness of researchers and to make them reconsider certain attitudes, dealing as it does with the ethical responsibility of scientists. This responsibility includes a critical examination of scientific results and their social consequences. The paper on research culture was distributed to all of ETH Zurich’s researchers together with the brochure “On Being a Scientist – Responsible Conduct in Research”. The brochure, published by the US National Academies of Science, illustrates possible critical situations and provides specific examples. Readers are encouraged to develop their own thoughts on the culture of science. The workgroup also developed a procedure applicable when improper conduct is suspected amongst ETH Zurich’s researchers. This came into force at the start of 2004.

**Debating Science Culture.** In the context of the activities relating to the culture of science, the Collegium Helveticum organised a series of discussions in the winter semester 2003/2004, entitled “Debating Science Culture – a self-examination on money, culture and quality”. Every two to three weeks, representatives from the worlds of science, business, politics and the media voiced their opinions on subjects such as research funding, paradigms and consultation. Their ideas were then discussed in a plenary session. These events, which were attended by around 150 individuals, were supplemented by an Internet forum. The series of discussions will be continued in the summer semester 2004.

## Master's programs in preparation

**In the winter semester 2003/2004, students in 18 out of 22 study programs started studying for their Bachelor's degrees. The Master's programs are now being prepared, with the guidelines for the design of the programs under review. The Swiss University Conference has given its response to the central question of admission criteria to master's programs.**

Since 1999 ETH Zurich has been working on implementing the Bologna Declaration and thus on introducing Bachelor's and Master's programs. As a first step, the year before last, seven diploma programs were revised and converted into Bachelor's programs. A further eleven study programs followed suit in the winter semester 2003/2004. 18 out of 22 study programs now follow the staged model and the remaining four will be adapted accordingly in autumn 2004. An exception is made by the Department of Industrial Management & Manufacturing, which will offer Master's programs from autumn 2005 in replacement of the present advanced courses. Autumn 2005 will see the start of the first big wave of Master's programs. Between now and then, however, guidelines have to be drawn up and regulations have to be revised. The relevant proposals were worked out in 2003 and are currently at the review stage, due for completion in spring 2004. The program drawn up is an integrated Master's and Doctorate program for outstanding students which will allow them to complete their doctorate more quickly. It will be targeted particularly at students aiming for a doctorate.

An important question for Master's studies is the admission criteria. A response was provided in December 2003, when the Swiss University Conference adopted guidelines on this matter. These state that anyone who has a Bachelor's degree from a Swiss university has a right to admission to the university's Master's programs in the appropriate subject without having to satisfy any additional requirements. However, this does not make it any easier for Swiss universities to strive for the highest quality standards.

**Electronic enrolment very popular.** In the winter semester 2002/2003, students were for the first time able to enrol electronically at ETH Zurich. 23 percent used the new service then, but already a year later the figure rose to 67 percent. Since the winter semester 2003/2004, ETH Zurich's lecture timetable has been available online only. All other useful information about courses is still available in printed form in an academic guidebook. The online version of the lecture timetable has the advantage over the printed edition of being continually amendable and therefore always up-to-date.

**IDEA League awards mobility grants.** The four universities in the IDEA League (Imperial College London, TU Delft, RWTH Aachen and ETH Zurich) have introduced grants for vertical mobility, to promote mobility between universities as defined in the Bologna Agreement. Three students from each university will have the opportunity to continue their education, e.g. Master's studies, at another IDEA university. Grants will be paid by the host university.

## A joint start for basic subjects

**A stated aim of ETH Zurich's academic reform is to bring related subjects together in the early years so that it is easy to move between them. The system-oriented sciences have provided a copy book example of how to achieve this objective. Students in the agricultural, earth, food and environmental sciences now start their courses with a common foundation year.**

Agricultural, earth, forest, food and environmental sciences are system-oriented sciences. Common to all of them is the observation of complex natural systems and their interaction with people. It was therefore natural to adopt a joint approach to tackling the revision of these study programs required under the Bologna Agreement. In the winter semester 2003/2004, the first Bachelor's students started their studies in the system-oriented sciences. With the switch to the staged model of Bachelor's and Master's degrees, the teaching content of the basic subjects has become even more firmly directed towards the requirements of the system-oriented sciences and the structure of the study programs was revised accordingly. For instance, the forest sciences study program is now integrated in the environmental sciences Bachelor's program. Altogether, four study programs are now on offer.

**Common foundation year.** ETH Zurich's academic reform has made it possible to move freely between the four study programs after the first year without any loss of time. The four study programs remain partially linked up in the second year as they share some classes. At the same time, studies start to become more program-specific. In the third year, the students decide what aspect of their study programs they wish to focus on. In the agricultural science program, for example, they will focus on agricultural sciences and agricultural and resource economics. In earth sciences, the focus will be on geology, geophysics and climate and water. In environmental sciences, the prime topics are atmosphere and climate, aquatic systems, terrestrial systems, anthroposphere and forestry and landscape. The Bachelor's degree gives students a firm, well-endowed scientific foundation, consisting of a broad basis in natural sciences and supplemented by social-science elements, as well as an in-depth study of one particular area of the system-oriented natural sciences.

**A high degree of flexibility.** The central points of ETH Zurich's academic reform, based on the requirements of the Bologna Agreement, are flexibility and mobility. It is also intended that academic achievements be recognised in related disciplines, thus simplifying a switch of subjects. With joint classes in the first and second years, ETH Zurich's system-oriented natural sciences have adopted a particularly sensible approach to the concept of flexibility.

### Encouraging innovative teaching

**Broad-based planning.** The central body involved in designing the joint parts of the Bachelor's study programs was an interdepartmental teaching commission. It included two students from each department, as well as the presidents of the departmental teaching commissions and the academic coordinator, constituting a small body with good connections with the individual departments and also the student body. Working groups were formed to work on content. The most difficult planning task was determining the relative weight given to the basic subjects. In total, 70 people were involved in finding common denominators for these subjects, resulting in promising broad-based solutions.

**The Filep Fund supports ETH Zurich in developing innovative teaching projects. Most of the projects financed so far are related to the use of new media.**

The Executive Board established the Filep Fund in the year 2000 to provide funding for teaching-related projects, as a way of supporting innovative teaching projects and improving teaching in general. The Filep Fund, which had an initial allocation of CHF 2 million per year and which now has CHF 3 million at its disposal, met with considerable interest. Since it was established in 2000, a good 60 projects have been supported, most of which relate to the use of new media in teaching. One project, Evaluna, was intended to evaluate the Filep Fund itself. The resultant recommendations have been included in the most recent call for projects and propose that more projects are encouraged which are targeted at general improvements in teaching, e.g. in the context of study program reform. Half of the projects have already come to an end and many of them have been successfully incorporated into teaching practice, for instance the Geobotanical Institute's Virtual Field Trip and the Institute of Scientific Computing's project "Information Processing for Domain Scientists".

**Virtual Excursion.** "Virtual Excursion" is intended to complement existing botanical teaching for natural scientists using new media. While conventional field trips allow unparalleled opportunities for direct examination of plants and vegetation, "Virtual Excursion" gets round the limitations of this form of teaching. Time and space are no longer obstacles and with a couple of clicks of the mouse students can "roam" from one end of Switzerland to the other, examining annotated ground profiles in situ without any physical exertion. This multimedia teaching module utilises visualisation techniques such as virtual reality panoramas, 3D object movies or blue-screen video compositing, and makes a significant contribution to a modern university teaching environment. Guided by specific questions, the students learn at their own pace and absorb their course content on their own initiative.

**Computer science for natural scientists.** An understanding of the concepts behind information and communications technology (ICT) only produces useful ICT competence if, at the same time, time is devoted to practising elementary computer skills. "Information Processing for Domain Scientists" encourages the use of applications in teaching which impart such ICT skills to students of natural sciences. Within the context of Blended Learning in basic teaching, the project supports traditional lectures with interactive learning modules built around an application guide, so allowing practical learning of computing concepts to a high didactic level. Around 300 students work independently and unsupervised on these modules each semester, deriving practical skills directly from newly learned concepts. Lecturers and tutors are no longer bombarded with standard questions and problems, while at the same time the students gain in self-confidence and expertise in ICT-related matters. Regular evaluations of six different application guides have shown that the method is very popular and motivating.

## Fostering innovation

**ETH Zurich created the Innovation Initiatives program in order to foster new areas of scientific interest. Three projects were approved in the first round.**

With the Innovation Initiatives (INIT) program, ETH Zurich has introduced a way of fostering new areas of scientific interest on a competitive basis. The Executive Board gave the go-ahead in May. Proposals submitted by researchers will be reviewed by the Commission for Innovation Initiatives. The intention is to launch two or so new initiatives each year, these projects being funded for a maximum of three years. After this period, the project can be continued with its own budget or become one of ETH's established tasks, for example forming the basis for a new professorship. The projects receive annual funding of around CHF250,000. INIT's function is to provide incentives for innovation; the projects themselves must be devised by the research groups. Three projects were approved in the first round: "Glyco INIT: The Zurich Glycomics Initiative", "QSIT – Quantum Systems for Information Technology" and "Ultra-High-Energy-Density Converters for Portable Power". The Glyco INIT project gives ETH Zurich the opportunity to conduct cutting-edge research into glycomics. It provides the Functional Genomics Center Zurich with another focal research area. QSIT is making progress in the rapidly developing field of quantum computing. The aim of Ultra-High-Energy-Density Converters for Portable Power is to develop compact energy sources with a typical power of 100 W. Such devices are of great economic interest and are a major technical challenge.

**SCSC with new management and more autonomy.** On 1st July 2003, the physicist Marie-Christine Sawley took over management of the Swiss Centre for Scientific Computing (SCSC) from Michele Parrinello, who resigned as Director in March 2003. As General Manager, Marie-Christine Sawley is responsible for services, scientific computing and operational matters at SCSC. In close collaboration with the Vice-President for Research, an ETH Board working party defined the responsibilities for the new management and also specified the future strategic orientation of SCSC. Since the start of 2004, the Centre has been an autonomous unit with an overall budget within ETH Zurich. Before joining SCSC, Marie-Christine Sawley worked in the Technology Transfer Directorate at EPF Lausanne. Michele Parrinello has taken on an important role in the Computer Science Faculty at the Università della Svizzera Italiana.

**European research programmes and COST.** Researchers at ETH Zurich have been very active for some years in the EU's Framework Programmes and in COST projects. These two research programmes are an ideal platform for cooperating with different research teams at a European level. During 2003, ETH Zurich research groups participated in over 150 current EU projects within the 5th Framework Programme, in 33 COST research contracts and 31 COST coordination contracts.

The first calls for proposals for the 6th Framework Programme, which has been allocated a total budget of EUR 17.5 billion, were issued in December 2002. The first cooperation contracts were concluded in late 2003/early 2004; here too, many ETH research groups were involved. From 1 January 2004, Switzerland will have Associated Country status in the 6th Framework Programme. This means, among other things, that Swiss research groups will in future also be able to coordinate projects. Euresearch Zurich supports ETH researchers from the filing of a proposal to the completion of the project. Euresearch Zurich's aim is to ensure that participation by ETH Zurich researchers continues at a high level.

## Functional nanoparticles

**Novel materials for a broad range of applications can be made from nanoparticles. At the Particle Technology Laboratory, development is under way on processes which will allow low cost production of tailor-made nanoparticles.**

Nanoparticles are the basic building blocks for novel materials which have particular mechanical, optical, electrical, magnetic, thermal, chemical or biological properties. Researchers in the Particle Technology Laboratory are working on the development of high temperature gas phase processes for their synthesis. Their aim is to enable the low cost production of metallic and ceramic nanoparticles with a high level of purity and precisely controlled properties. These processes, which are also known as flame aerosol processes, have achieved outputs of up to 1 kg/h even on a laboratory scale. As a consequence, sufficient quantities of nanoparticles are now available to make some of the tantalising prospects offered by nanotechnology a reality. One example of such a flame aerosol process is flame spray pyrolysis, with which a wide range of nanoparticles can be produced. It is even possible to manufacture noble metal nanoparticles, on oxide supports, which have applications as enantioselective Pt/Al<sub>2</sub>O<sub>3</sub> catalysts in the pharmaceuticals industry.

**"Tailor-made" particles.** Many catalytically active nanoparticles have been developed in collaboration with the Chemical Engineering Laboratory. These exhibit higher selectivities or greater activities than conventional catalysts. Two applications are the selective epoxidation of olefins and the removal of NO<sub>x</sub> from combustion off-gases. Another example is nanocrystalline cerium oxide which is used not only as a catalyst, but also as an abrasive for polishing wafers in microelectronics. Spherical silicon oxide particles with a diameter of 50–100 nanometres may be used in polymer composite materials for novel dental fillings. Carbon coated silicon oxide nanoparticles, on the other hand, are used in abrasion-resistant tyres, while carbon coated titanium oxide particles improve charge transfer in battery electrodes. The simultaneous synthesis and embedding of 1–8 nanometre ZnO quantum dots into a glass matrix has resulted in UV filters whose absorption characteristics are dependent on particle size. It has proved possible to produce metastable titanium oxide compounds by rapidly freezing particle growth in the flame using a nozzle expansion technique. These particles (5–10 nanometres in diameter) can be used in cosmetics or gas sensors.

## Studying rock deformation in the lab

Researchers at the laboratory for experimental deformation and physical properties of rocks aim at understanding the tectonic behaviour of our planet, in particular the relationships between forces, deformation, and geological strain rates.

How do mountains form? Where should high-intensity earthquakes be expected? Such are the fundamental questions addressed by researchers at the laboratory for experimental deformation and physical properties of rocks. Since time is the major obstacle to comprehending geological processes, experimental work is key to devising time-independent rheological laws that may be applied to natural forces and deformation. The ETH laboratory has special deformation equipment which can reproduce pressure and temperature conditions of up to 800 MPa and 1500°C, which match those prevailing in the upper mantle of the Earth. Varying these conditions makes it possible to investigate changes in rock properties during geologic processes (e.g. deformation, melting etc.) in order to document quantitatively the dynamics of the earth. Prototype equipment installed in the laboratory is able to achieve a shear strain as high as 50, which is equivalent to shearing a 1 cm cube of rock to form a bar half a meter in length and 1 cm thick without breaking the rock.

**Shear strength of crustal and mantle rocks.** The rocks investigated in recent years are natural and synthetic marbles, quartz and olivine aggregates, namely rocks which frequently occur in the Earth's crust and mantle. It has been possible to demonstrate that these crustal and mantle rocks suffer 20 to 30% weakening after large shear deformation. Subsequent investigation of rock textures by electron microscopy shows that rocks become softer while their internal fabric, i.e. the preferred orientation of their constitutive minerals, is rotated in directions favourable for steady deformation. This softening of the rock is sufficient to stabilise the deformation into narrow shear zones very similar to those found in naturally occurring rocks that were deformed during the formation of mountains and graben systems.

## Search for quantum computer bits

In quantum computers, data will be stored in “qubits”. Researchers at the Laboratory for Solid State Physics are using spin, the internal angular momentum of electrons, as the qubit.

A conventional computer operates in accordance with the laws of classical physics. Data is stored in bits which have a value of “0” or “1”. Data processing is fundamentally different in “quantum” computers. Bits become quantum bits or qubits. According to the laws of quantum mechanics, these qubits can simultaneously assume a value of “0” and “1”. There is an increasing number of problems which quantum computers could solve much more efficiently than conventional computers, such as code-breaking or secure data transmission. There are currently many experimental quantum systems which can be manipulated in a controlled manner and used for switching operations. This involves controlling and understanding individual or a few qubits. Researchers at the Laboratory for Solid State Physics are working on quantum “rings”, in which the number of electrons can be precisely adjusted, giving rise to what is known as a single-electron transistor.

**Electron spin as qubit.** Electrons, like light, have wave properties and, for this reason, the phenomenon of interference may also be exploited with quantum rings. The superposition of many subwaves and the resulting interference is part of the computing process in a quantum computer. Coherence is the ability to interfere. In a system governed by quantum mechanics, the problem is that coherence can very easily be destroyed by making a measurement. Electrons have spin, i.e. an internal angular momentum. Spin is a possible qubit because it can assume two states (spin-up and spin-down). Spin is coherent for substantially longer time scales than, for instance, charge. The experimental challenge which the ETH researchers have set themselves is to measure and manipulate this spin in the solid state and to make it usable as a qubit.

## Simple surface gradient method

Chemical gradients on surfaces are of great interest for a variety of different problems. A group in the Laboratory for Surface Science and Technology has developed a simple method for producing such gradients.

Gradients make it possible to carry out many investigations in parallel, since innumerable chemically or morphologically different surfaces can be tested simultaneously. Chemical gradients are thus not only useful as a research tool, but are also of interest for a number of different applications extending from micro-scale fluid mechanics through nanotribology to the development of biosensors. However, producing such gradients has hitherto been relatively complex and limited to small dimensions or confined areas. A group working in Laboratory for Surface Science and Technology has developed a simple, kinetically controlled method for gradient fabrication. By means of a linear motion drive, a silicon surface coated with gold is very slowly immersed in a very dilute solution containing thiols with methyl end groups. The surface is then saturated in a solution of thiols with hydroxyl end groups, thus giving rise to a gradient characterised by changing wettability.

**Applications in cellular biology or nanotribology.** Using the method, it is also possible, in a very straightforward way, to produce gradients with differing chemical or biochemical properties. One possible application is in cell biology. By means of gradient surfaces, one can investigate the mobility of individual cells as a function of receptor density. Using a gradient can also simplify and accelerate investigations in nanotribology, i.e. the investigation of friction on a molecular scale as a function of surface chemistry, as each surface comprises a series of continuously changing properties.

## Interdisciplinary dynamics: a planning challenge

**The main focal points of the Planning and Logistics office in 2003 were the activities of the Planning Commission in connection with interdepartmental planning, the establishment of the new Finances and Controlling Directorate and the start of a wide-ranging employee consultation exercise.**

Given the increasing departmental autonomy, the principal overall planning objective is to optimise interdepartmental communication and interdisciplinary dynamics through the introduction of extra incentives and promotional schemes. The Planning Commission and the Planning and Logistics office thus spent 2003 working on the interfaces and points of overlap between the various departments. The primary concern with regard to the development of biotechnology, bioengineering and the science and technology of biosystems was to identify the common objectives of the departments involved.

The particular dynamics and plethora of initiatives in this field have set in motion the development of an overall ETH strategy involving almost a fifth of all ETH professorships. By the summer of 2004, ETH will have identified its over-arching objectives, distinguishing characteristics and priorities. Another important theme of this year's planning was the definition of the optimum interplay between the social science and business study fields and their integration into the natural and engineering science-dominated ETH.

**ETH domain real estate management evaluated.** The peer review of ETH domain real estate management has shown ETH Zurich to be doing well. According to the report, ETH Zurich is in a very good position in terms of its buildings and property. Particular praise was reserved for the way in which the various offices of the real estate department not only worked together as a team but also related to the ETH Board. The evaluation took place in the first six months of 2003 and covered the Buildings, Organisation, Services and Real Estate Offices.

**New Finances and Controlling Directorate.** Having achieved independence in accounting terms means that ETH Zurich is largely autonomous in the administering of its budget funds. This autonomy has resulted in new and altered requirements, which have led to a restructuring of the Finances and Controlling offices and the creation of the position of Finances and Controlling Director. The Finances and Controlling Directorate is divided into the newly formed Controlling Department and the two units of the former Finance Office, the Accounting and Financial Services departments. The Finances and Controlling Directorate is responsible for financial planning and budgeting, reporting and controlling, information management, accounting, purchasing and other financial services. Major projects for the first phase are, among other things, the development of a management information system and reorganisation of the budgeting process, which in particular relates to the budget autonomy applicable to all departments from 2004.

**Enrolment in the Publica Pension Fund.** A central theme in the personnel office in 2003 was the switch from the Federal Pension Fund to the Publica Pension Fund. The change-over to the defined contribution scheme for fixed-term employees and the introduction of private insurance for employees working irregular hours and those paid on an hourly basis are forward-looking changes to ETH Zurich's occupational benefits scheme.

The enrolment of professors in the Publica Fund is a positive countermeasure to the disturbing developments in the pension system. The regulations which took effect on 1st January 2004 provided ETH's professors with a new employment contract. The four-year term of office has been replaced by an indefinite contractual relationship which brings professors' employment conditions into line with those of ETH's other employees.

**Staff consultation begun.** An employee consultation exercise has been underway at ETH Zurich since December 2002. This Executive Board initiative is being carried out by the Personnel Office in close cooperation with the individual departments and central authorities. Each department and each unit of the central authorities is being individually consulted and given the opportunity to raise questions specific to its area of activity. The consultation exercise is intended to pinpoint areas where action has to be taken as a basis for development processes within the various units and ETH as a whole. In a pilot phase which ran in April and May 2003, the Personnel Office and the Biology Department were consulted. The reception given to the consultation exercise was basically positive. The pilot consultations also showed that the chosen procedure takes full account of requirements such as confidentiality. All units will have been consulted by the end of 2004.

**Joint purchasing begun.** February 2003 saw the approval of the implementation program for the "New Generation Procurement in the ETH domain" project. Since then implementation has begun, with the initiative entitled "KoBe ETH+ - Coordinated procurement activities among the institutions of the ETH domain and selected partner organisations". The procurement focus team is in charge of coordination, under the chairmanship of Peter Walde, head of the ETH Zurich Services Office. The purpose of KoBe ETH+ is to find additional forms of voluntary cooperation without impairing the autonomy of the individual institutions, and to identify and apply potential ways of reducing costs and other ways of optimising procurement. In addition to setting up Strategic Coordination Groups for an exchange of information and experience within the various departments, specific implementation projects were launched, e.g. in the area of travel, and potential electronic procurement tools investigated. All network partners are called upon to initiate further activities.

## Science City: culture of the mind – and place for living

**ETH Zurich is planning to expand ETH Hönggerberg into a high-tech campus which will become a living part of the city of Zurich, making Science City a place not only for academic study and work but also a residential and leisure area for more than 10,000 people.**

Despite its green spaces, duck pond and the chairs set out in front of the various eating places, the overwhelming impression given by ETH Hönggerberg at the moment is one of dour efficiency. The future attractiveness of the site for teaching and research is closely linked with the attractiveness of the surrounding environment. The Science City project is intended to give the university environment the feel of being an integral part of the city.

**Learning and conference centre as landmark.** Science City is a university development and building project for ETH Hönggerberg and as such is part of ETH Zurich's overall strategic concept regarding infrastructure. The goal of the project is to improve conditions for teaching and research and to enhance the urban status of the Hönggerberg site. In addition to the buildings for teaching and research and a high-tech infrastructure, the plans also include student housing, a guest-house, restaurants, shops and leisure centres. Existing day nurseries and sports facilities are to be upgraded. A "Learning and Conference Centre", with rooms for conferences, events, exhibitions, a big auditorium and a library, will be stand as a symbol for the ETH of the 21st Century. Science City is a university city with links to the entire world, where around 10,000 people will be working and living. The foundation stone is to be laid in 2005, and Science City is to be completed by 2015. The project will be funded principally by donations, a ground-breaking new approach to funding in Switzerland.

## Successful evaluation of ETH World

**Focussing on people.** Science City is not just a practical project, it is also a vision. The project focuses very much on people, not only on people from ETH, who research, teach, learn and provide services in Science City, but also on people living in the neighbouring districts and visitors from the centre of Zurich and the surrounding region who come to Science City to encounter the world of science. The parameters within which Science City can be developed are in part already given, for instance in that it has to be built within the existing boundaries. The Master Plan devised by ETH professor of architecture Andrea Deplazes has set the initial framework for the construction and development project.

### Science City – an opportunity for wide participation.

How Science City will ultimately look and precisely what other features are needed to make Höggerberg a meeting point for science and society are issues that are as yet unresolved. Science City is therefore providing ETH Zurich and its staff and students and other interested parties from outside the university with a unique opportunity to develop the vision further and make it into a concrete project ready for ETH's anniversary year in 2005 – a project which can then be realised step by step over the years to come.

**At the end of November, ETH World, ETH Zurich's program to establish a comprehensive virtual infrastructure for communications, cooperation and knowledge transfer, was the subject of an international peer review. The review was intended above all to provide input for the future direction of ETH World and suggestions for improving implementation of the program's objectives. The peer group evaluated ETH World as a fundamentally good and successful program.**

ETH World aims to establish a virtual space for communication and cooperation independent of time and place. It is also a tool for developing research, teaching, learning and services at the highest level. Like all successful tools, it will contribute to changing the processes and structures it was developed to support. Since it began in the year 2000, ETH World has triggered numerous developments which have since gained an irreversible momentum. In 2003, more than 3600 laptops were for instance sold within the framework of the Neptun project, facilitating access to ETH's virtual learning and research space in conjunction with the wireless LAN project. So far, some 30 projects have been supported under the ETH World umbrella. Two years remain until the completion of the program at the end of 2005, with several projects awaiting implementation. A review was carried out at the beginning of November by an international group of top-flight experts.

**Important input from the peer review.** The group concentrated in particular on the future direction of ETH World, giving indications as to how best implement the program's objectives. During their evaluation, the group of experts came to the conclusion that ETH World is fundamentally a good and successful program. According to their findings, it demonstrates the potential of information and communications technologies for ETH Zurich, stimulates awareness of digital needs and ensures that ETH as a technological institution is a world leader in the use of ICT. ETH World has shown considerable impact with its infrastructure projects such as "Neptun – personal laptops for students" and wireless LAN, and a number of exciting suggestions have been made which will be put into practice. The experts also praised the organisation and management of the program. However, there were some points of criticism too. These related for example to the potential offered by the broad base of users in the ETH World projects, a potential hitherto untapped. In addition, the experts suggested setting strategic, ETH Zurich-wide objectives for ICT use in teaching, research and services. This was a particular challenge to the Executive Board, who have already taken up these critical points and started involving the ETH community in identifying strategies.

## Development planning for university area

**The Canton and the city of Zurich have joined together with the universities and research facilities in the city centre to plan the university area. A master plan is under preparation.**

Zurich is the heart of Switzerland's largest and most significant economic region. It is an attractively located, cosmopolitan city with a vibrant, intellectually stimulating cultural, business and scientific life, with a variety of quarters that have nevertheless retained their distinctive features. There is an ongoing dialogue between the city and its educational institutions, especially the universities and research facilities which have their headquarters in the university area between the old town and Zürichberg. The following institutions got together in 2001 to jointly plan the development of the university area in the centre of Zurich: the building authorities of the Canton of Zurich and the city of Zurich, including the town planning office, the education directorate, including the University of Zurich, the Zurich teacher training college, the secondary school and vocational training office and the Rämibühl cantonal school, the health directorate, including the University Hospital, and ETH Zurich. The building authorities of the Canton of Zurich have taken on the lead role.

**Masterplan concept selected.** In various workshops, the representatives of the participating institutions discussed with the three commissioned planning teams the objectives and the instructions to be given to the planners and then monitored and reported on the individual projects as they progressed. The model on which the masterplan is to be based has been available since the autumn of 2002 and in June 2003 the Zurich Cantonal Government approved a grant of CHF 450,000 for the drafting of the masterplan. ETH Zurich and the city of Zurich have also contributed to the costs. The masterplan will serve as a coordination and management tool for the next 15 to 25 years, covering town planning, traffic development and use and land management of the university area. The "City campus" concept drawn up by the VUES SA planning team under the leadership of ETH professor Christophe Girot was selected as the masterplan.

## Represented with voting rights on the ETH Board

The election of Dr. Kristin Becker van Slooten, who had been proposed by the University Assemblies of ETH Zurich and EPF Lausanne, as a member of the ETH Board was the high point of 2003, which was marked by the upcoming entry into force of the new ETH Law. This Law specifies that the two University Assemblies propose to the Federal Council a candidate who is to become a full member of the ETH Board. A joint workgroup from both University Assemblies prepared a charter describing the profile and tasks of such a person and regulating the proposal procedure. A joint selection commission consisting of one representative of each relevant interest group at the two universities selected a total of nine candidates and invited three of them for interview. The commission finally proposed for election Dr. Kristin Becker van Slooten, a biologist at the School of Architecture, Civil and Environmental Engineering (ENAC) at EPF Lausanne and a member of the non-professorial academic staff. Both University Assemblies supported this nomination unanimously and, on 15 October 2003, the Federal Council elected Kristin Becker to the ETH Board.

The entire process in which an accepted selection procedure was established and a candidate finally selected who is seen as representative by the majority of University Assembly members may be regarded as exemplary. This process also resulted in each university getting to know the other better, so that both are now more aware not only of what they have in common but also where their differences lie.

## Participation has a future

Conversion of the Personnel Committee into the Personnel Commission took place in 2002 and was an important political decision. The Executive Board of ETH has approved rules making the participation of the Personnel Commission a part of the life of the university. The newly elected members of the Personnel Commission assumed their duties at the beginning of 2003. With the new representative on the ETH Board, Dr. Kristin Becker van Slooten, the Personnel Commission will also in future have an indirect personnel representative on the Board via the University Assemblies of ETH Zurich and EPF Lausanne.

The mandate of the Commission is to participate actively and decisively wherever the interests of the administrative and technical staff are affected by reorganisation and any revision of regulations and guidelines. The Personnel Commission will, however, also participate creatively in forward-looking projects such as the upcoming 150th Anniversary of ETH Zurich.

**Staff concerns.** In addition to carrying out numerous consultation procedures regarding regulations and guidelines, the Personnel Commission also addressed staff concerns. Some were addressed in open and constructive discussions with Prof. Gerhard Schmitt, the Vice-President of Planning and Logistics with responsibility for the Personnel Commission. Specifically, the Personnel Commission referred to the effects on staff when professorships are eliminated. Personnel Commission members demanded that any measures to be taken must be implemented in such a manner as to limit their social impact. There are two important outstanding items which the Personnel Commission will carry over into 2004 and still merit attention: the lack of formal job descriptions for many staff and the lack of privacy protection for computer records.

Personnel Commission members called on the Executive Board to take action on two further concerns: longer consultation periods must be allowed and better internal communications are required. The Executive Board promised that the results of the staff survey and the reorganisation of the security service would be properly communicated during the first few months of 2004.

## VSETH sailing close to the wind

2003 was an exciting and successful year for the ETH Zurich Students' Association (VSETH), marked by a change of generations on the executive committee, the sudden flare-up of discussion about student fees and work on a new student centre.

The first priority for the new executive committee team was to make contacts. VSETH represented the interests of students in a constructive dialogue both with ETH Zurich and on a national level with the association of Swiss university student bodies (VSH). Particular emphasis was placed on participating in various committees and collaborating with other special interest groups.

**Discussion of student fees.** VSETH was surprised by the discussion of an increase in student fees. A workgroup addressing this explosive topic carried out a survey of students. Thanks to its participation in an ETH Board workgroup, VSETH was able to make the results of this survey known to the ETH Board too.

Over the past year, a committee pursued the task of securing a successor to the student centre at 19 Leonhardstrasse. Thanks to the committee's hard work, it proved possible in 2003 to submit both a statement of requirements and a scenario for the CAB building. VSETH welcomes the promised creation of a new student centre in the CAB building and is working towards equipping it during 2005.

**Open air cinema on Höggerberg.** VSETH represented ETH Zurich at the Student Fair in Geneva and celebrated its 140 years of existence in a fitting manner with an open air cinema on Höggerberg. The major successes of the last year were made possible by the voluntary commitment of many highly motivated helpers in subject associations, commissions and workgroups. VSETH would like to take this opportunity to thank them once again.

During 2004, VSETH will participate in the project management of the “Science City” development. VSETH will also press on with the debate around the fundamental principles of student finances, now at Swiss national level, and involve itself in decision-making processes.

### **ETH governance and competitiveness**

In line with its decision to focus on ETH Zurich’s competitiveness in 2002 to 2004, the Conference of Lecturers devoted a major part of its efforts in 2003 to ETH governance reforms. The revision of the ETH Law has provided an opportunity to take a fresh look at ETH Zurich’s internal governance system. The Conference of Lecturers was especially active regarding two issues of particular importance to ETH competitiveness: maintaining the office of Rector in addition to a President and fostering individual contacts between Professors and the ETH President.

**Model with President and Rector.** It is essential for ETH Zurich to have a management structure that not only enables effective decision-making by the Executive Board, but also ensures that the Board’s decisions are accepted. The Conference of Lecturers accordingly welcomed the increased powers granted to the ETH President, which will facilitate the implementation of the kind of decisive, even unpopular measures that may be required in an increasingly competitive environment. However, such measures will not amount to much if they are not supported by the whole of ETH. This presupposes, among other things, that ETH’s Professors are able to identify with their Executive Board. The Conference of Lecturers therefore successfully pressed for a Rector, proposed by ETH Professors, to continue to be elected as a member of the Executive Board. Some may argue that the co-existence of a President and a Rector cannot be reconciled with the model of an all-powerful CEO. This is a model that may work well in a corporate environment, but unlike a business corporation, ETH is, to use the words of Harvard University President Lawrence H. Summers, “a place where the authority of ideas, rather than the idea of authority reigns supreme”.

**Strategic discussions.** As a second step, the Conference of Lecturers has also proposed that regular strategic meetings be held between each Professor and the ETH President. The Executive Board has responded by instituting “position discussions” which are to take place immediately after the regular Department evaluations. Such one-to-one discussions will promote mutual understanding of activities which are under way and will also provide a forum for the critical assessment of both the particular Professor’s and the President’s projects – the ultimate goal being to strengthen mutual support among all concerned.

2004 will provide an opportunity to move from purely internal to external competitiveness issues, as the Conference of Lecturers is planning to draft proposals regarding benchmarks and other indicators that could play an important part in evaluating ETH Zurich’s competitiveness internationally.

**ETH day – focal points for the future.** Incorporating the humanities and social sciences into all curricula, implementing academic reform in line with the Bologna model and developing ETH Hönggerberg into “Science City” are three focal points for the future development of ETH Zurich. Such were the words of Prof. Konrad Osterwalder, ETH Rector, on ETH day 2003 in his speech to 600 guests from the worlds of science, business and politics.

**Four new honorary doctors, one guest of honour.** On ETH day in 2003, the Rector, Prof. Konrad Osterwalder awarded honorary doctorates to four scientists:

Adrian Bejan in recognition of his ground-breaking contributions to modern thermodynamics and heat transfer, for his analysis of classical modes of thought, for the central part he played in the development of various design methods and for his commitment to the promotion of European culture.

Karl Hess in recognition of his fundamental contributions to semiconductor transport theory.

Gabor A. Somarjai in recognition of his many pioneering papers relating to surface chemistry and catalysis, in particular for the development of in situ surface analysis and for the profound insights he has obtained using this technique.

Hans-Peter Wiendahl in recognition of his entire scientific work relating to industrial logistics, manufacturing requirements planning and factory planning.

Thomas von Waldkirch was awarded the title of Permanent Guest of Honour in recognition of his valuable contribution and personal commitment to promoting technology-based startup companies, so ensuring that scientific and technological findings bear economic fruit.

Photo 1

**Prizes awarded by industry and foundations.**

Asea-Brown-Boveri research prize: Oliver Trachsel

Georg-Fischer prize: Dr. Kevin Boomsma

Plastics engineering prize: Urs Gonzenbach

Heinrich-Hatt-Bucher prizes: Savvas Ciriacidis,

Barbara Achermann and Franziska Manetsch

Latsis prize: Dr. Thomas Koop

Otto-Jaag water conservation prize: Simon Denoth

**Medals for outstanding dissertations.** Department of Architecture: Nadine Koller; Department of Civil, Environmental and Geomatics Engineering: Markus Gresch, Hans Seelhofer, Roland Zeller; Department of Mechanical and Process Engineering: Andreas Ehram, Mathias Giger, Daniel Meyer; Department of Information Technology and Electrical Engineering: Mathieu Luisier, Ernesto Wandeler, Michèle Wigger; Department of Computer Science: Richard M. Keiser; Department of Materials: Tobias Balmer; Department of Industrial Management and Manufacturing: Christian A. Schwarz, Matteo Taormina; Departments of Mathematics and Physics: Robert T. König, Lorenz Meier; Department of Chemistry and Applied Biosciences: Barbara Christen, Gabriela J. Marti; Department of Biology: Roland D. Türk, Marco Würsch; Department of Environmental Sciences: Thierry Corti, Christian Niederer; Department of Agriculture and Food Sciences: Romain Beuret, Ludmila Brich; Department of Forest Sciences: Roland Wöhr.

**Willi-Studer prizes for the best final degree examination results.** Department of Architecture: Maximilian Zinnecker; Department of Civil, Environmental and Geomatics Engineering: Markus Gresch, Roland Zeller; Department of Mechanical and Process Engineering: Daniel B. Rusch; Department of Information Technology and Electrical Engineering: Ernesto Wandeler; Department of Computer Science: Christoph A. Steiger; Department of Materials: Sara M. Morgenthaler; Department of Industrial Management and Manufacturing: Philipp K. Barmettler; Departments of Mathematics and Physics: Maik A. Berchtold, Stefan Beerli, Michael E. Bergdorf, Robert T. König, Matthias M. Schmid, Manuel Th. Walser; Department of Chemistry and Applied Biosciences: Barbara Christen, Stefan P. Ottiger; Department of Biology: Katharina Quirin; Department of Earth Sciences: Cathy Hohenegger; Department of Environmental Sciences: Christian Niederer; Department of Agriculture and Food Sciences: Mylène Cosandey-Thiébeaud, Bruno Studer; Department of Forest Sciences: Roland Wöhr.

**Celebration for Nobel Prize winner.** Nobel Prize winner Kurt Wüthrich was the focus of a glittering celebration when some 800 guests gathered on 16th January in the physics building on the Hönggerberg campus to mark the final of many events organised in response to the award of the Nobel Prize to Kurt Wüthrich.

Photo 2

**CEC Symposium.** ETH Zurich and ALSTOM hosted a symposium on research in energy engineering on 28th January. Speakers included senior figures from both organisers as well as representatives of the Swiss Confederation. The importance of cooperation between universities and industry in identifying future solutions for efficient and clean energy production was again underlined. The discussions also highlighted the importance of the government’s role in these matters.

**453 doctorates awarded.** A total of 117 female and 336 male doctoral candidates were awarded their doctorates from ETH Zurich in 2003, somewhat more than half of whom were Swiss nationals. The award ceremonies took place on 31st January and 27th June.

**Brainfair.** Brainfair 2003, which ran from 15th to 22nd March, proved a great success with the public. More than 10,000 visitors attended the opening event, the various panel discussions and lectures, and the open day. This was the fourth time that ETH, the University and the University Hospital Zurich had hosted Brainfair.

Photo 3

**President of the Confederation at ETH.** The President of the Confederation, Pascal Couchepin, visited ETH on 19th March. The purpose of his visit was, as head of the Swiss Federal Department of Home Affairs, to gain some first-hand insight into the activities at ETH Zurich. The agenda for the visit included discussions with representatives of the various institutions in the ETH domain and presentations by researchers.

Photo 4

**Visit by Zurich city council.** On 16th April, six members of Zurich city council visited the new HCI building and the construction site for future sections of the HCI building. The idea for the visit came up during the Nobel Prize celebration for Kurt Wüthrich in January, when Elmar Ledergerber, the Mayor of Zurich, and Prof. Olaf Kübler, ETH President, agreed to develop closer contacts between the city and ETH. The city councillors were welcomed by ETH President Kübler and other members of the Executive Board.

Photo 5

**Annual media conference 2003.** Zurich is becoming one of Europe’s most attractive places to study. In its annual media conference on 7th May, ETH Zurich presented development plans which it wishes to implement jointly with the University and the city and Canton of Zurich. The cornerstones of these plans are the development of Hönggerberg into a “Science City” and making the university area around ETH and the University an ideal place to live, research, teach and experience culture.

Photo 6

**Arethuse named.** 8th May saw the naming of the new research boat “Arethuse” for ETH Zurich’s limnogeology group in the presence of National Council member Barbara Haering, who is also a member of the National Council Commission for Science, Education and Culture. The previous boat, Tethys, sank in unexplained circumstances after a fire in Zürich-Wollishofen harbour in early 2002. The new boat will be used to investigate lake bed sediment in order to draw conclusions about past conditions and predict future developments.

Photo 7

**Collaboration with Costa Rica.** ETH Zurich is pursuing a new strategy for identifying and using pharmaceutical substances from natural sources in collaboration with a developing country. This strategy builds on the “Vireal Lab”, a communication platform which gives the partner direct access to ETH’s high technology resources. The first partner institution is Costa Rica’s Instituto Nacional de Biodiversidad. A declaration of intent was adopted during a workshop which took place from 13th to 16th May at ETH Zurich.

**Hydrogen vehicle success.** ETH Zurich was the first and only team on the starting line of the Shell Eco-Marathon to use a hydrogen-powered vehicle. With an energy efficiency equivalent to 1700 kilometres per 1 litre of motor fuel, PAC-Car came in in eleventh place in the challenge which took place on 18th and 19th May in the south of France. The winning vehicle had an energy efficiency equivalent to 3100 kilometres per 1 litre of motor fuel. Around 170 teams from all over the world took part. PAC-Car is driven by an electric motor, with the electrical energy being produced from hydrogen by a fuel cell. Researchers at ETH Zurich designed the system. The fuel cell is a further development of the PowerPac system developed by ETH Zurich and the Paul Scherrer Institute. The vehicle chassis was designed and constructed at the University of Valenciennes. The project is supported by various industrial partners, while the main sponsor was the Swiss Federal Office of Energy.

Photo 8

**ETH World information lunches.** At the beginning of the summer semester and just before Christmas, ETH staff and students had the opportunity to be updated about the status of the ETH World program at two information lunches. Thanks to video conferencing, the May lunch took place simultaneously in ETH Zurich’s main building and at Höggerberg. The subject of the December event was the international peer review of ETH World.

Photo 9

**Visitor from Singapore.** His Excellency Dr. Ng Eng Hen, Acting Minister of Manpower and Minister of State for Education of Singapore, visited ETH Zurich on 12th and 13th June. His visit included an inspection of the FIRST-Lab and discussions with the Rector, Prof. Konrad Osterwalder, the Vice-President for Research, Prof. Ulrich Suter, and with Nobel Prize winner Richard Ernst.

**Best brand award.** At the “Brand Excellence Swiss Trophy” (BEST) award ceremony, which took place for the first time on 26th June in Zurich, ETH Zurich and EPF Lausanne jointly won a “BEST” in the reputation category, ahead of the newspaper Neue Zürcher Zeitung and the watchmaker Patek Philippe. ETH was honoured for “its contributions to Switzerland as a research location and the international respect its institutions have earned”.

**UNITECH Annual General Meeting.** The 4th Annual General Meeting of the UNITECH International Society in Zurich in early September marked the beginning of the UNITECH year for 75 students from Europe. More than 275 UNITECH stakeholders met up at workshops, lectures, meetings, recruitment events, the Annual General Meeting and last but not least the final party. Two new corporate partners for UNITECH are Sony Corporation and Schott Glas. ETH Rector Prof. Konrad Osterwalder is the President of UNITECH.

Photo 10

**”Long Night of Museums” event in Zurich.** This year, ETH Zurich took part in the “Long Night of Museums” in Zurich. Throughout the night from 6th to 7th September, visitors were able to get a close-up view of geological and mineralogical exhibits from the ice age, while in the collection of prints and drawings premises, they had the opportunity to listen to readings from artists’ books and even contribute themselves to an artist’s book. A night of films in the suburbs was on offer from the Institute for History and Theory of Architecture.

Photo 11

**New student flats.** On 10th September, the Student Housing Foundation opened Bülachhof, a new student residence in northern Zurich, close to the University of Zurich’s Irchel campus. Bülachhof provides an additional 222 rooms of student accommodation in Zurich and, together with the existing Netzwerk residence on Bülachstrasse, forms a new concentration of student accommodation with a total of 488 rooms.

Photo 12

**Information Security Center.** The Zurich Information Security Center (ZISC) is being set up at ETH Zurich as a cooperative venture between ETH and business consortium consisting of Credit Suisse, IBM Zurich Research Laboratory and Sun Microsystems Laboratories. The intention of the ZISC’s founders is to bring fundamental research and real-world applications closer together in order to create better conditions for secure systems, which are essential to the proper functioning of an information society. ZISC is increasingly staging public events, too, starting with public lectures during term time for interested parties from both research and real-world environments and a one week “ZISC Fall School”, the first of which took place from 22nd to 26th September.

**Study weeks for “Gymnasium” pupils.** At the 2003 ETH study week, a joint project between ETH Zurich and the Swiss youth science foundation “Schweizer Jugend forscht”, teenagers had the opportunity to work on a real project with researchers. Around 90 school pupils took advantage of this chance to get to know ETH before possibly coming to study here. The study week took place in the first week of October.

**ETH Zurich in Basel.** The “Systems Biology Switzerland” concept was critically assessed by an international team of experts from 3rd to 5th October. The experts concluded that a new ETH Department of Systems Biology in Basel would provide Switzerland with major opportunities as a location for research, making it possible to combine Basel’s strengths in biomedicine and nanotechnology with ETH Zurich’s skills and the Life Sciences disciplines of the University of Zurich.

**Telescope unveiled.** The world’s largest MAGIC-Cherenkov telescope was formally unveiled on 10th October on the Canary Island of La Palma. The telescope will investigate gamma radiation from distant galaxies and exploding stars at a level of sensitivity which has never before been achieved. Scientists hope to gain new insights into the mystery of dark matter which fills the universe. ETH Zurich is represented in the telescope project by the Institute for Particle Physics.

Photo 13

**Opening of Villa Garbald.** On 13th October representatives of the Canton of Grisons, ETH Zurich and the Garbald Foundation presented the newly renovated Villa Garbald in Castasegna (Grisons) to the public. The architects Miller & Maranta had renovated the building, designed by Gottfried Semper. From next spring Villa Garbald will be used by ETH Zurich as a “think-tank laboratory” and conference centre.

Photo 14

**Science City information lunch.** On 17th and 19th November, information lunches took place in the city centre and at Höggerberg around the subject of “Science City”. Executive Board members Prof. Olaf Kübler and Prof. Gerhard Schmitt presented the project and the vision behind Science City and invited ETH’s staff and students to discuss the issues involved.

Photo 15

**Federal Council elections live.** On 10th December, ETH staff and students were able to watch the Federal Council elections live on their personal computers or on two screens in the main building. Transmission from the Parliament building was made possible by the videostreaming and videoconferencing infrastructure developed at ETH.

Photo 16

**Apprenticeships at ETH.** In 2003, ETH provided training for 119 apprentices in twelve trades. Of the 51 new entrants, seven came from the bankrupt company Gretag. Once again, the majority of those interested applied for administrative training and for training as biology and chemistry laboratory technicians. Just two percent of the applicants for these places could be taken on. ETH therefore needs to continue to give thought to its selection criteria for apprentices, to ensure that the procedure is as fair as possible.

**University sport given legal status.** With the revised ETH Law, which comes into force on 1st January 2004, university sport is given official status. Art. 11, Clause 1 states that “they shall promote university sport”. This legitimises the work put in by the academic sports association of Zurich (ASVZ) since 1939 under the auspices of ETH Zurich and the University of Zurich. ASVZ offers students and employees of the two universities a very varied sports program, which enjoys a high degree of popularity and was assessed as extremely professional in a survey. This success is in part due to the fact that ETH has provided ASVZ with high-quality sports facilities in the form of the Polyterrasse at ETH-Zentrum. By 2007, there should be modern sports facilities at Hönggerberg as well, which will allow ASVZ to make a considerable contribution to sports and leisure at Science City. In the past year, Prof. Marcel Wanner was replaced as ASVZ president by Prof. Hans Geiger (both from the University of Zurich). The training and competitive opportunities provided by ETH paid off handsomely when its female students won the traditional Uni-Poly rowing race – a success denied to the male students for the 12th successive time.

Photo 17

**gta - program of exhibitions.** At the start of the year, the exhibition department of the Institute for History and Theory of Architecture (gta) unveiled the “Stiva da morts” in Vrin, which is the work of ETH assistant professor Gion A. Caminadas. The context-sensitive works of Caminadas have repeatedly attracted international interest and this architectural “monograph” is no exception. The high points of the year were the exhibition and book celebrating the hundredth anniversary of the building material Eternit and the influence the company has had on the Swiss construction industry. The project was developed and implemented in close cooperation with the industry sector and was conceived as a touring exhibition which will travel nationally and internationally. In the autumn and winter, two well-known but very different architectural practices were able to present monographic works: Daniele Marques from Lucerne, who focusses on spatial quality, held a small exhibition in the Architekturfoyer, while Metron, a large and widely experienced firm from Brugg, exhibited in the main hall at ETH-Zentrum. Substantial monographs on both exhibitions have been published by the gta publishing company. The program for the year also included touring exhibitions such as “Alexandre Sarrasin, Engineer”, “45 under 45, Young Japanese architecture”, “Instants from town life, 10 towns in 2002” (video exhibition) and the architectural photographs of Georg Aerni.

Photo 18

**Stories and debates at the Collegium Helveticum.** The symposium “Narrativity in Science”, held from 23rd to 25th June, provided insights into research work of the previous months, focusing on stories as the subtext of scientific research and collective action, as well as narrative methods and strategies in knowledge transfer. Participants included Prof. Hans Rudolf Heinimann and the Hungarian artist Roza El-Hassan, both guests for the winter semester. In the summer semester, two further guests, the author Thomas Hettche and the physicist Ulrike Felt, professor of science studies, entered the debate. The eight members of the Collegium, which is in its last year in its present form, used the project “Starship Semperpreis” to work on new approaches for saving the threatened “Planet Scientia”. The results have been assembled in an unusually designed book (Fakt&Fiktion\_7.0), the first volume in a new series.

In October, after five years’ experience with the Collegium Helveticum, the Executive Board set a new course for the future of the Collegium. Prof. Peter Rieder, interim head since October 2002, will be replaced in the autumn of 2004 by Gerd Folkers, currently professor of Pharmaceutical Chemistry and President of the advisory board of the Collegium Helveticum. In future the Collegium will be borne jointly by ETH and the University of Zurich. Since November, the Collegium has been running a series of discussions in the Audimax auditorium presented by Gerd Folkers and entitled “Debating Science Culture – a self-examination on money, culture and quality”; an important contribution to ETH’s theme of science culture for the year 2003.

The last year of “Kollegiaten” at the Collegium Helveticum: Olivier Senn, Ursula Kundert, Lorenz Leumann, Regula Burri, Daniel Fabian, Oya Atalay Franck, Robert Schlich, Saskia Weiss (from left to right).

Photo 19

**Collection of Prints and Drawings.** In her exhibition “Journey into the twentieth century”, curator Eva Korazija illustrated the most important stages in Swiss graphic art up to the 1950s. Since 1975, the Zurich-born artist Marc-Antoine Fehr, who first became known for his surreal, fantasy-style pictures, has been living in Burgundy. In Pressy he has been working for some years on the huge fantasy picture “Le Grand Moulin” (“The big mill”), finding inspiration for his classical landscapes and interiors in the surrounding environment. In the year 2000 he decided that he would also produce at least one drawing every day, which he would keep until the end of the year. The result, the 366-page “Journal de Pressy”, formed the subject of the second exhibition.

ETH Zurich’s Collection of Prints and Drawings includes a rich collection of artists’ books, two highpoints of this collection being illustrated books produced in Paris around 1900 and the almost complete collection of books by Dieter Roth from the second half of the 20th century. Taken together with the acquisitions made by the Collection over the last twelve years, the exhibition “Pierre Bonnard, Antoni Tàpies, Dieter Roth – A Century of Artists’ Books” was able to give a broad overview of this artistic genre. The exhibition “Italian Woodcuts of the Renaissance and Baroque” gave the Collection of Prints and Drawings its first opportunity to present to the public a wide-ranging overview of its holdings of Italian woodcuts from the period between 1500 and 1800. The exhibition and catalogue continued the scientific cataloguing process begun by Michael Matile with early Italian prints from 1460–1530 and the prints of Lucas van Leyden and his contemporaries.

In addition to the “Journal de Pressy” by Marc-Antoine Fehr, the Collection of Prints and Drawings also acquired works by Fischli/Weiss, Boris Rebetez, Claudio Moser, Olivier Mosset and others. The Collection moreover purchased a set of prints by Verena Loewensberg, the doyenne of the Zurich school of “concrete art”, which it intends to expand and complete in the near future. The Collection also bought additional works by international artists already represented in the Collection, for instance the two American artists Robert Gober and Raymond Pettibon.

Photo 20