

2005

Annual report



ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Development of ETH Zurich

Graduations	1995	2000	2005
of which diplomas, Bachelor, Master	1 357	1 191	1 262
of which doctorates	422	523	506
of which NDS, MSA and MBA	136	176	233
Total	1 915	1 890	2 001

Students	1995	2000	2005
of whom undergraduates, Bachelor students, Master students	9 234	9 030	9 672
of whom doctoral candidates	2 210	2 262	2 674
of whom MSA and MBA	273	304	359
Total	11 627	11 596	12 705

Personnel (in FTE)	1995	2000	2005
of which professorships	330	333	349
of which scientific staff	3 400	3 271	3 588
of which other staff	777	835	1 116
Total	5 319	5 344	6 009

Finances (in CHF million, real 2005)	1995	2000	2005
Expenditure excl. investment in buildings	982.2	936.0	1045.8
of which budget resources	841.2	802.7	866.0
of which third party res.	141.0	133.3	179.8
Investment in buildings	86.6	169.4	111.2

Successful anniversary year

The year 2005 was characterised by the “150 years of ETH Zurich” anniversary. ETH staff and students as well as other interested parties were treated to a host of events spread throughout the year. The “ETH on the Road” theme was aimed at grammar school pupils and teachers. Between January and April 2005, ETH visited eleven Swiss grammar schools in all four parts of the country with the “ETH Science Truck”. From the end of April until mid-May, as part of “ETH for All”, the exhibition “Welten des Wissens” (Worlds of Knowledge) opened its doors for two weeks. With this theme, ETH Zurich was looking for dialogue with the population. “ETH at Home” offered ETH staff and students the opportunity to celebrate their university’s birthday. “ETH Visions” in November was the concluding event, a joint reflection of opinion leaders and the ETH staff and students about the future of the university. In addition to the events which took place in the context of the four themes, there were many other attractions. In spring 2005, the cornerstone for a knowledge centre in Afghanistan was laid – a project which was the result of an anniversary competition.

Teaching and research continued at ETH Zurich despite the anniversary activities. In spring 2005, a School Domain of

Earth, Environment and Natural Resources (S-ENETH) was founded. An association of this size and quality, with joint planning and implementation of teaching and research in the environmentally oriented sciences, is unique worldwide. In June PAC-Car, a vehicle driven by hydrogen, set a new world record in fuel efficiency. PAC-Car was built by a group of students in a project-oriented specialisation. In summer it was demonstrated how successful ETH spin-offs can be. The healthcare company Roche took over the ETH spin-off GlycArt for over 200 million Swiss francs. In autumn the first group of students completed their ETH Bachelor and the first ones began with ETH Master courses. The first regular Master’s degrees are expected in 2007.

Young ETH researchers were very successful in 2005. Four of the 25 prize winners of the European Young Investigator Award are conducting research at ETH Zurich. The Science City project reached an important milestone. In autumn 2005, ETH Professor Kees Christiaanse and his team presented the master plan and therefore the basis of Science City. In November the cornerstone for the first building – the Information Science Lab – was laid.

→ Strategic objectives

Ready for the challenges ahead

ETH Zurich is one of the world's leading universities for natural sciences and technology, offering an excellent education to scientists and engineers, to the executives of the future. It promotes innovation and value creation. It also has the effect of being a driver to technological progress in Switzerland. And it acts as a forerunner in the debate surrounding the use of new technologies and natural resources in a responsible and sustained manner. ETH Zurich fulfils these duties by rapidly adapting to new challenges in education and research and by creating attractive working conditions for academic and non-academic staff. It provides the most talented students and researchers – both male and female, and irrespective of their origin – with an innovative, supportive and challenging educational and research environment. In the process, it benefits from alliances with the world's best universities and the multicultural climate of Switzerland. For the coming years, ETH Zurich will have the following areas of focus:

Modernise teaching further.

The early introduction of the Bologna reform by ETH Zurich and the increasing importance of university rankings are resulting in a welcome globalisation of education and continuing education. In order to consolidate a leading position in the international competition, new forms of learning must be implemented quickly and efficiently, innovative teaching needs to be rewarded and a greater value needs to be placed on teaching performance.

Promote young scientists.

The education and continuing education of grammar school teachers is the starting point in setting about this task. They provide their pupils with the enthusiasm for science

and the skills required to study at university. Giving advice to prospective students prior to the start of their studies, followed by integrated careers guidance and the introduction of structured Master and Doctorate programmes are further milestones on the path towards the promotion of young, talented scientists.

Diversify the financing of ETH Zurich.

Additional funding is required to consolidate ETH Zurich's international position. On the one hand, considerably more third-party funding needs to be acquired from national funds, the KTI/CTI Innovation Promotion Agency, the EU and industry, while on the other hand, the ETH Zürich Foundation should step up its fundraising activities and thereby help diversify funding further.

Intensify value generation and technology transfer.

The aim is to strengthen the entrepreneurial spirit of both students and staff as well as to find means and ways of providing lasting support to young spin-off companies. Contacts with national and international industry are to be strengthened and simplified.

Expand internal and external communication.

Dialogue with all of its partners is an obligation which a leading international university with strong national foundations needs to meet. In this respect, it is guided by an integrated communication strategy. Through its open dialogue, it creates understanding and trust in society, politics, business and science both nationally and internationally. It strengthens the way in which the ETH staff and students identify with their university.

Dear Reader

2005 was a special year for ETH Zurich. It turned 150 years old and celebrated this anniversary by looking ahead to the future. 2005 was also a special year for me. Since 1 December, I have been President of ETH Zurich. Between being elected in May 2005 and taking up my position in December, I had seven months in which to get to know ETH Zurich in greater detail. During this period, I spoke with members of the ETH community from all areas – with professors and students as well as teaching, research and administrative staff. The goodwill which these people extended to me and the open manner in which I was treated were especially pleasing.

The new Executive Board has set itself the target of consolidating ETH Zurich's position as a leading international university with a strong national foundation in teaching and research. To this end, it defined five areas of focus which will be of core importance to its work:

These include modernising teaching further, promoting young scientists, intensifying technology transfer and contact with industry, diversifying financing and acquiring new financial resources, as well as expanding communication both internally and externally. You can read more about this on page 7 ("Ready for the challenges ahead").

Let me elaborate on the expansion of communication. The experiences of the anniversary year have shown just how valuable and fruitful dialogue between society and the scientific community can be for both sides. As a result, we intend to intensify the dialogue and direct contact we have with the population, politics and business, both nationally and internationally. In Switzerland, ETH Zurich has considerably expanded its communication. For our international image, we are now devising a strategy which sets out where we want to have a presence and how we will communicate there. However, just as important to me is enhancing communication within ETH Zurich, both between the members of its different areas as well as between the Executive Board and the lecturers, students, staff and the alumni, the graduates of our institution. ETH Zurich should merge even more to form one unit.

With the support of all of the ETH staff and students, we can achieve our goals. It is to them, the staff and students of our university, that I would like to express most sincere thanks for their tireless efforts and their impressive work.

Ernst Hafen
President ETH Zurich

Highlights 2005

ETH for All

A two-week exhibition at the Platzspitz park in the centre of Zurich and events at the ETH Hönggerberg site were two of the highlights of the “150 years of ETH Zurich” anniversary programme. Entitled “ETH for All”, this theme proved a major success with the public.

What we can learn from a 60 million-year old living creature. How the Alps were formed – in 300 seconds. The best perpetual motion machine of all time. The “Welten des Wissens” (Worlds of Knowledge) exhibition between 22 April and 8 May transformed the Platzspitz park near Zurich’s main railway station into a universe of knowledge. It provided the general public with a place where they could experience research and get to meet and talk to scientists from ETH Zurich.

Five worlds of knowledge were presented at the exhibition.

In “Earth Fire Water Air” – the largest of the five worlds – researchers showed how the system of our earth and the complex relationship between man and nature can be grasped and understood. The oldest existing living creature – a stromatolite – provided an explanation as to how an atmosphere with oxygen came into being on earth. With the aid of illustrations by the Zurich-based cartoonist Mike van Audenhove, visitors were able to see for themselves, within the space of 300 seconds, how the Alps have been formed over the last 300 million years. The “Man Image Network” world provided an insight into information technology with topics such as biomedical engineering, wireless commu-

nication and wearable computing. The focal points of “Machines Energy Production” were the dream of mankind, the perpetual motion machine, as well as a virtual factory. The worlds “Castles in the air Plans The art of construction” and “Books Data Knowledge” showed further aspects of ETH Zurich, right up to the 21st century library.

Live dialogue with 150 ETH professors.

Supplementing the exhibition, ETH Zurich set up pavilions in popular places in Zurich city centre, where ETH professors reported on their areas of research and answered questions from passers-by. This form of dialogue between the population and scientists became a real hit with the public. Overall, around 150 professors gave some 430 short lectures over the space of the two weeks and thus provided 430 opportunities for an exchange between the scientific community and the public. An events stage in the main tent of the exhibition offered a wide range of activities, from scientific demonstrations and concerts to cabaret shows and attractions for children. Every day at 12:30 p.m., well-known Swiss personalities met ETH researchers on the events stage in the “Mittagsgespräch”. National football team coach Köbi Kuhn, comedian Emil and other guests all appeared at these public talks, held by presenters from the Swiss Radio DRS.

→ Closeness to the population discovered: the two-week exhibition “Welten des Wissens” at the Platzspitz park as an anniversary highlight.



→ Glance at the sun: hands-on research.



“ETH for All” a real hit with the public.

Over 160,000 people visited the exhibition in the Platzspitz park. Another 20,000 attended the short lectures given by 150 ETH professors in the pavilions in Zurich city centre. And more than 40,000 others showed their interest in visiting the outstation to the Platzspitz exhibition, which was set up at Zurich’s main railway station from 22 to 24 April. This was the highlight of the “ETH for All” theme anniversary celebrations. “ETH for All” began on 19 and 20 March with two open days at the ETH Hönggerberg site.

The research disciplines of materials science, chemistry, pharmaceutical sciences and microbiology extended invitation to the public.

The open days on 19 and 20 March marked the end of an entire week of events under the motto “Matter, Molecules, Medicines, Microbes”. The four research disciplines to open their doors to the public were materials science, chemistry, pharmaceutical science and microbiology, which have been combined in the new HCI research and teaching building at the ETH Hönggerberg site. Around 9,000 people visited the many attractions on display, enjoying the atmosphere at the ETH Hönggerberg site in springlike temperatures.

The stations on which children were able to carry out their own experiments proved extremely popular. A particular hit with the younger visitors was the production of water and dirt-repellent hand creams or “Gummibear hell with colour flames” in which gummibears were broken down into their chemical components. Starting on the Friday, many guests used the “Tag der Geschichte und Gegenwart” to combine a visit to the Museum of Chemistry and Pharmacy with a stroll through the medicinal plant garden.

When the theory of relativity dawns at night.

The “Nacht der Physik” on 17 June marked the end of “ETH for All”. Discussing black holes, finding out about wind and weather and understanding Einstein’s theory of relativity – just some of the things for visitors to the “Nacht der Physik” to experience. Thousands accepted the invitation from the Department of Physics. They were introduced to the secrets of physics with experiments and lectures while enjoying the mild summer’s evening. In the afternoon, many young people entered the competition for pupils, organised by the Department of Physics. The winning teams were then presented with their prizes in the evening by ETH President Olaf Kübler.

Visualizing cerebrospinal fluid flow phenomena

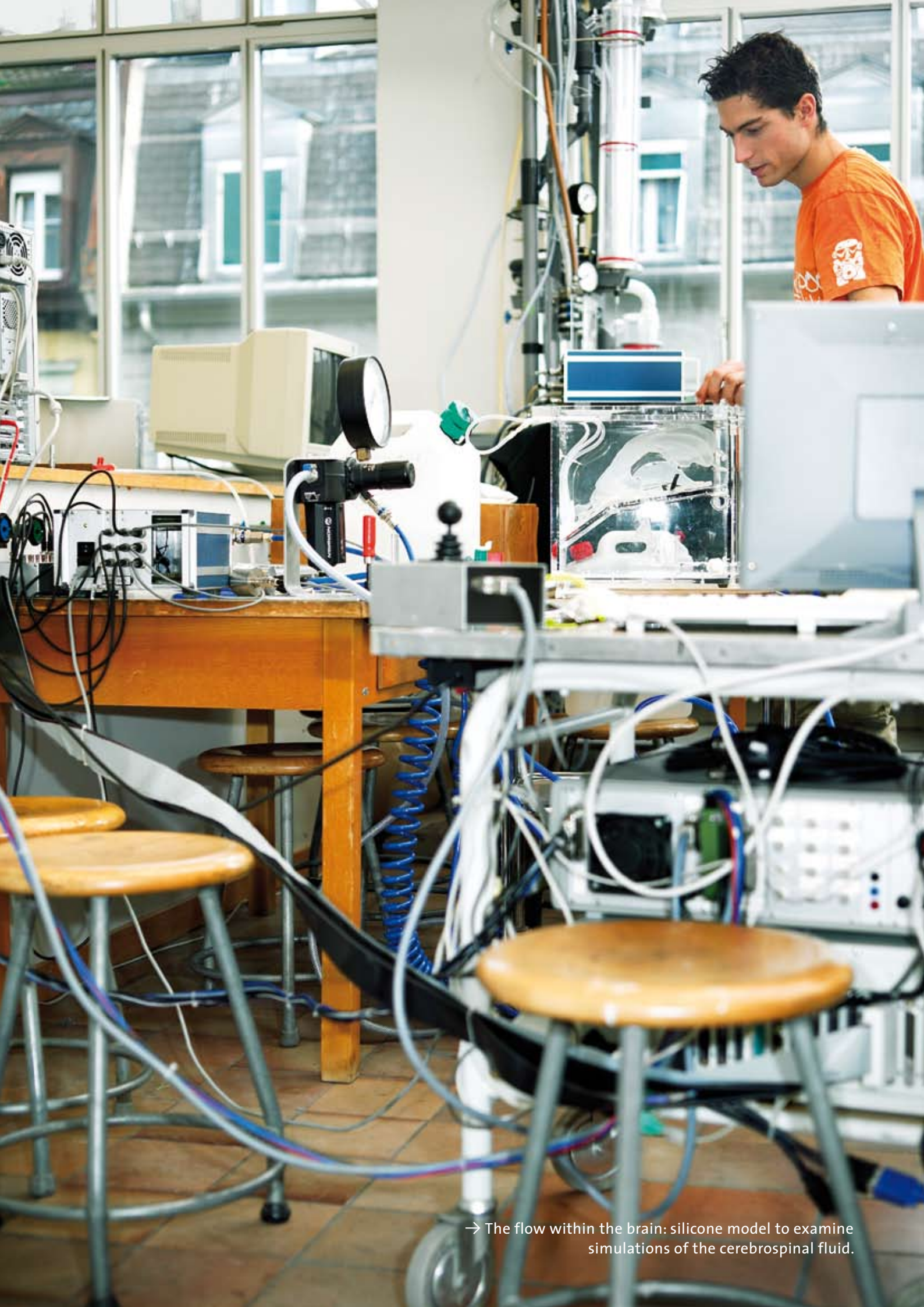
A multitude of diseases are directly or indirectly connected with the cerebrospinal fluid (CSF), including hydrocephalus and multiple sclerosis. ETH researchers are realizing a multifaceted investigation of the CSF flow and transport phenomena through the creation of a comprehensive simulation tool.

Experts from the ETH departments of Mechanical and Process Engineering and of Information Technology and Electrical Engineering are realizing together with researchers from the University Hospital Zurich and the University of Oxford a multifaceted investigation of the cerebrospinal fluid (CSF) flow and transport phenomena within the human cranial cavity. The goal of this project is to create a comprehensive simulation tool. This is expected to benefit greatly the continuous effort to conceive and devise new therapeutic approaches for a multitude of diseases that are directly or indirectly connected with the CSF, including hydrocephalus, multiple sclerosis, Alzheimer's disease and meningitis, by giving medical researchers the ability to precisely quantify the characteristics of the flow. This detailed knowledge aids clinicians in a range of therapies, from determining how to set a hydrocephalus shunt to pinpointing the optimal location and dosage of a drug injected directly into the CSF space.

High-resolution anatomical images are the basis of the simulation.

To create a functioning simulation of the CSF environment, the geometry of the CSF space of a volunteer was reconstructed in a semi-automated procedure using high-

resolution anatomical images acquired through magnetic resonance imaging (MRI) techniques. The reconstructed geometry, which included the ventricles and the surrounding subarachnoid space, was implemented into a computational fluid dynamics solver for analysis of the transient CSF flow. For an added degree of realism in the model, the motion of the ventricles containing the CSF was measured through harmonic phase post-processing. Furthermore, the 3-D CSF flow velocities and surrounding tissue motion are measured using a novel phase-contrast MRI technique to provide the flow boundary conditions for the computational fluid dynamics simulation. The simulated flow field gives not only the relative pressure within the CSF space, but also allows tracking of drug convection and diffusion when injected into the CSF space. Validation of the computational fluid dynamics simulations was established by in vitro modelling with a thin-walled silicone phantom. This model was built into a two-chamber pressure controlled environment to simulate the compression-expansion behaviour of the ventricles. The transient flow field within the phantom was characterized by means of particle tracking velocimetry for comparison with the computational fluid dynamics flow field.



→ The flow within the brain: silicone model to examine simulations of the cerebrospinal fluid.

Impressive young ETH researchers

The European Young Investigator Award recognises outstanding young researchers. In 2005 four of the 25 prize winners came from ETH Zurich – the physicist Ilka Brunner as well as the biologists Daniel Gerlich, Patrick Meraldi and Lucas Pelkmans.

Under the umbrella of EUROHORCs (European Heads of Research Councils), the European research sponsors and science organisations set up the European Young Investigator (EURYI) Award in 2004. Their intention with this prize is to promote young talented researchers. Young European scientists can submit a project and, if successful, they will receive up to 1.2 million euros for their research work over a period of five years. The 25 prize winners in 2005 include four researchers from ETH Zurich.

At the base of physics.

The research activity of Ilka Brunner from the Institute for Theoretical Physics is devoted to string theory. This is considered to be the most promising approach to unite the general theory of relativity and the standard model of particle physics. In particular, Ilka Brunner analyses multi-dimensional membranes (so-called D-branes), which play a very important part in string theory. Following postdoctoral research at Rutgers University and CERN, Ilka Brunner has been at ETH Zurich since October 2004.

A model of cell dynamics.

The research activity of Daniel Gerlich from the Institute of Biochemistry is devoted to the development of technologies for quantifying regulatory processes in living human cells and then modelling them. To do this, he uses the sys-

tems biology approach which explores spatial and temporal networks of proteins. One good example of a dynamic process is the cell division. Daniel Gerlich was a postdoctoral fellow at EMBL in Heidelberg before arriving at ETH Zurich in July 2005.

Critical kinetochores.

Patrick Meraldi from the Institute of Biochemistry is pursuing issues surrounding cell division in his work. He is investigating kinetochores which mediate the attachment when paired-off chromosomes are pulled apart during cell division. Faulty kinetochores lead to an imbalance in the division of the chromosomes, such as that which occurs in patients with Down Syndrome. Patrick Meraldi has been working at ETH Zurich since April 2005.

Specialist in cell cargo.

Lucas Pelkmans investigates what transport routes exist through the cell membrane, how these routes build spatial and temporal networks and how this membrane system processes information and translates it into physiological reactions. If there are malfunctions in these processes this can lead for instance to a tumour. Lucas Pelkmans was a Ph.D. student from 1999 to 2002 at ETH Zurich and returned to Zurich in 2005. He will be completing his project at the Institute for Molecular Systems Biology.

→ Off to new shores: the EURYI Award gives young researchers Daniel Gerlich, Ilka Brunner, Patrick Meraldi and Lucas Pelkmans a further boost.





→ Bologna reform: the first group of students have started a regular Master programme.

First Master programmes underway

The award of the first Bachelor's degree saw ETH Zurich reach a further milestone in implementing the Bologna reform. In the winter semester 2005/2006, the first students embarked on a Master programme, such as the specialised "Master in Biomedical Engineering".

In 2005, the first 118 students at ETH Zurich received their Bachelor's degrees. They come from the following degree programmes: mechanical engineering, materials science, computational science and engineering, chemistry, chemical engineering and biotechnology, human movement sciences as well as the professional officers' programme. With the exception of the professional officers, these students – together with students from other universities – were able to embark on a Master programme in the winter semester 2005/2006. Compared to the previous diploma courses, Master programmes are structured to focus much more closely on research. By using English as a second teaching language, multilingualism and thus the international scope of the course are also being promoted.

Online admissions platform set up.

In 2005, the Rectors' Conference of the Swiss Universities (CRUS) clarified the admissions procedure for Master courses in Switzerland further. Holders of a Bachelor's degree from a Swiss university are admitted to the Master programmes in the corresponding discipline without having to satisfy any preconditions. However, it is possible that some additional requirements will be imposed. The CRUS has compiled and published the list of disciplines. Universities have more freedom when it comes to specialised Master programmes, although the requirements must be clear, the same for everybody and must also be published in advance.

Since the number of interested applicants is expected to be high for Master courses, ETH Zurich has developed an online platform which went live in March 2006. Students can apply for a Master programme using this platform. The workflow underpinning the platform simplifies the admissions procedure. The web is clearly becoming the most important medium of information for students.

Master in Biomedical Engineering at the interface between biology and technology.

In the winter semester 2005/2006, ETH Zurich was the first Swiss university to launch a specialised Master programme in biomedical engineering. The programme which is taught in English, is dedicated to issues focusing on the interface between biology and technology. It looks at questions such as: How are biological signals transmitted? What impact do forces have on bone cell activity? The education is closely integrated into the corresponding research. Students work on a semester and Master project of their choice, where they are integrated in a research group. A total of six ETH departments as well as the Faculty of Medicine of the University of Zurich are involved in the project. There is already an international feel to the first-year intake, with students coming from Switzerland, China, France, India, Turkey and the USA. The first ETH Master students will receive their degrees in 2007.

The ETH spin-off model of success

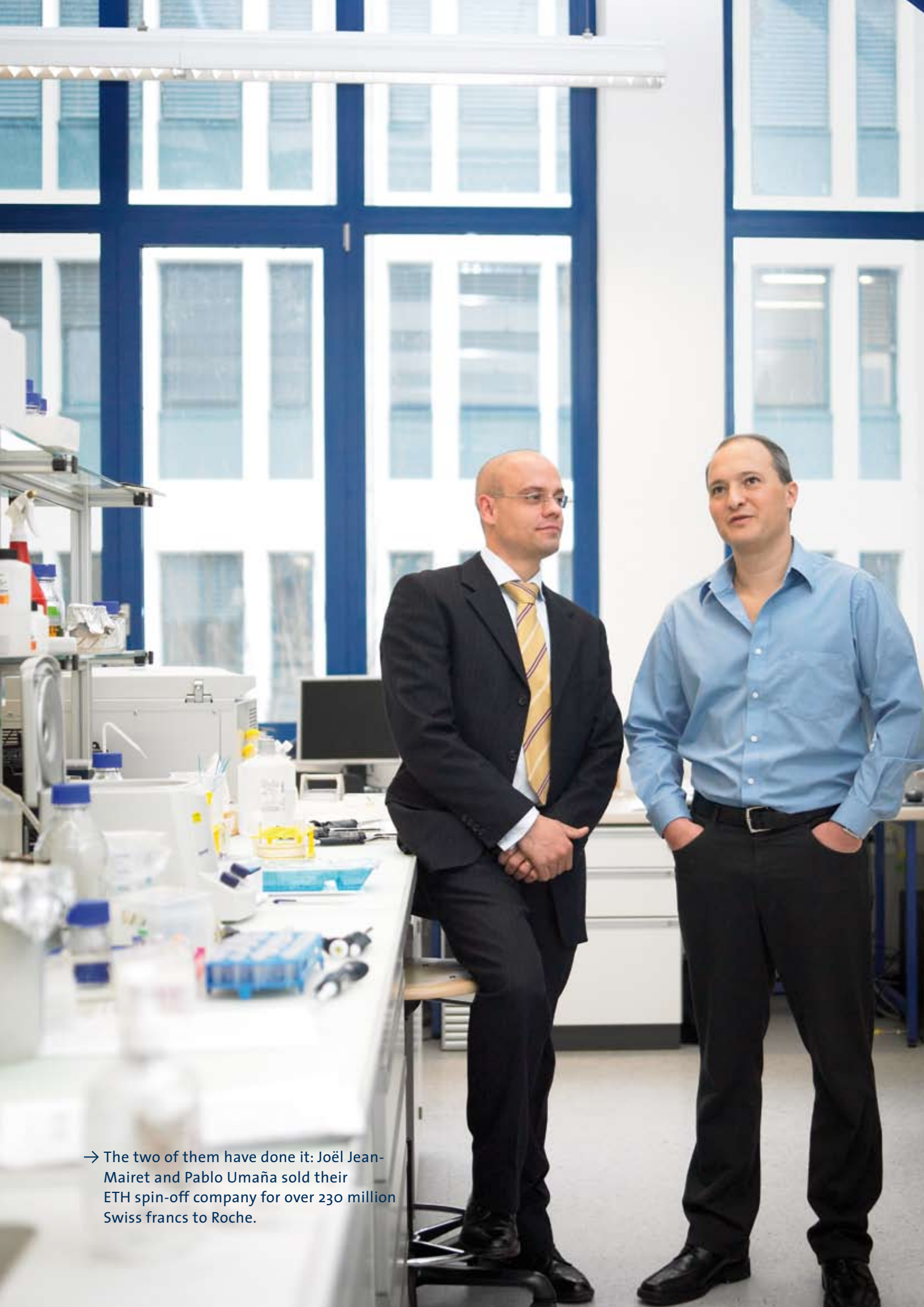
Since the 1990s, ETH Zurich has been supporting newly formed companies based on ETH research findings. The GLYCART Biotechnology AG spin-off company, which was taken over in summer 2005 by Roche for over 200 million Swiss francs, demonstrates just how successful this can be.

In 2000, ETH scientists Dr. Joël Jean-Mairet and Dr. Pablo Umaña founded the GLYCART Biotechnology company with ETH professor James E. Bailey, now deceased. The “GlycoMAB” basic technology was developed at ETH Zurich. This method leads to a stable overexpression of glycosyl transferase genes in antibody-producing cell lines. This makes the antibodies around 50 times more attractive for the human immune defence cells – natural killer cells and macrophages – which the antibodies destroy along with the structures such as cancer cells or infectious agents marked with them. GLYCART had been cooperating with the health-care company Roche since autumn 2004. In spring 2005, another company made a takeover bid for GLYCART and following this it started to keep an eye out for interested buyers. Roche’s bid was accepted and it bought GLYCART in July 2005 for 234 million Swiss francs.

ETH Zurich assists in forming companies.

GLYCART is not an isolated case. In the mid-1990s, ETH Zurich expanded its activities for supporting the formation of companies. The central agency for this is ETH transfer, the

technology transfer office of ETH Zurich. To count as an ETH Zurich spin-off, companies have to be based on ETH research findings and at least one founder must come from ETH Zurich. In the initial phase, spin-offs are given advice, business contacts and access to infrastructure. This philosophy also forms the basis of ETH Zurich’s involvement in setting up the Zurich Technopark at the start of the 1990s and the “biotop” life science incubator with laboratory and office premises in Schlieren near Zurich in the summer of 2003. Also among the activities which started in the mid-1990s were the further education courses “Lust auf eine eigene Firma”. These have since been attended by over 14,000 participants in the interim period. Since 1998, ETH Zurich has been organising the Venture business plan competition in conjunction with McKinsey & Company Switzerland. With active coaching this takes the participants from the business idea through to the professional business plan. Venture is not just a competition but also a training programme and contact forum for future entrepreneurs. Over 130 spin-offs have been founded at ETH Zurich since the mid-1990s. Most of them are still operating successfully.



→ The two of them have done it: Joël Jean-Mairet and Pablo Umaña sold their ETH spin-off company for over 230 million Swiss francs to Roche.

→ Under construction: the House of Science in Bamiyan, Afghanistan, sponsored by ETH Zurich.



Knowledge centre for Afghanistan

In Bamiyan, to the north-west of the Afghan capital Kabul, a knowledge centre is being built under the lead of ETH Zurich. This ETH House of Science is the result of a competition for young architects to mark the ETH anniversary.

As part of the 150-year anniversary of ETH Zurich, the Department of Architecture and the Department of Civil, Environmental and Geomatic Engineering invited entries for a competition of ideas. The aim was for participants to design a temporary architectural structure for the anniversary, a “Castle in the Air”. However, the competition winners – architecture students Ivica Brnic, Florian Graf and Wolfgang Rossbauer – presented a somewhat different project. With the money available for the “Castle in the Air”, they wanted to create something permanent, something useful, in a Third World country – Afghanistan. Financed by ETH Zurich and also promoted by many parties, the project finally got off the ground. The cornerstone for the knowledge centre was laid on 26 April 2005. The construction represents both an adventure and a challenge in war-torn Afghanistan. Those responsible for the project are confident that the centre will be ready by summer 2006.

Developed during close dialogue.

To see what the project actually involves, one need only take a look at the history of the construction: modern technology and demanding architectonic or scientific concepts are not finished products which can be simply exported to remote areas of the world. In order to be able to use them

in a meaningful fashion and in a way which is designed to meet people’s needs in other cultures, careful and respectful changes have to be made to local requirements, circumstances and traditions. Accordingly, the project was developed from the outset in close dialogue with local bodies and, in particular, lecturers and students from Bamiyan University. Bamiyan University was only rebuilt in 2003. In addition to the existing courses such as agricultural sciences and education, there are plans to set up a geology and possibly an archaeology faculty.

Exchange knowledge.

The House of Science aims to become a model for the knowledge transfer in the 21st century. This transfer is not one-way. The cooperation projects between ETH Zurich and Bamiyan University, which in future should vitalise the knowledge centre, are also guided by this principle. These projects have been set up in the subject areas of construction technology, agronomy, political sciences and cultural heritage. The building, which is only two storeys high for reasons of earthquake resistance, will house Internet workstations, a digital library, laboratories, an auditorium and guest accommodation.

Swiss CSCE policy in the focal point of research

In 1975, a total of 35 countries signed the Helsinki Final Act as part of the Conference on Security and Cooperation in Europe (CSCE). A researcher at ETH Zurich critically examines the role of Switzerland in this process of détente during the Cold War.

The Conference on Security and Cooperation in Europe (CSCE) and the Helsinki Final Act played an important role in the process of détente during the Cold War in the 1970s. Looking back, this era probably heralded the end of the Cold War. The neutral and non-aligned countries were able to position themselves as a third power between East and West. The right to discuss security issues with the two major military alliances as equal partners was considered a significant endorsement for neutral countries.

The comprehensive security concept.

The West ensured that issues relating to the freedom of movement, easier opportunities for contact between East and West, humanitarian issues and improved communication were dealt with. The development of a comprehensive security concept which, in addition to the political and military field, also included human rights, symbolises the historical significance of the Helsinki Final Act. In Switzerland, the contribution to the early CSCE process is viewed as one of the most significant elements of Swiss foreign policy during the Cold War. The literature records how Swiss diplomacy was able to earn respect through active, yet sober and pragmatic involvement in the delegations. However, how was this role seen from outside at the time? Historian

Christian Nünlist of the Center for Security Studies at ETH Zurich has examined this question in detail.

Swiss CSCE policy sharply observed.

The investigation is based on documents from archives in the USA, Great Britain and Germany which only recently became available. At the beginning of the 1970s, the West initially regarded Switzerland's bilateral probings among the neutral countries of Europe and Eastern Europe with suspicion. However, once the preliminary talks for the CSCE began in Helsinki in November 1972, the Western delegations were appreciative of the active conduct of the well-prepared Swiss diplomats. Following the transfer of the negotiations to Geneva in autumn 1973, Western opinion changed again. British and West German officials expressed concern that Switzerland was concentrating too much on its arbitration project and was neglecting the West's further interests. Nevertheless, on the whole the West was aware that Switzerland's active CSCE policy played a major part in bringing about the Final Helsinki Act. This research on the CSCE process is part of the international "Parallel History Project on NATO and the Warsaw Pact (PHP)" which the Center for Security Studies has been promoting substantially since 1999.

→ Mountain of files analysed: investigation into the role of Switzerland in the process of détente during the Cold War



PAC car sets world record

Students from the Department of Mechanical and Process Engineering have built a world-record holding vehicle. PAC-Car, which is powered by a hydrogen-driven fuel cell, is the most efficient vehicle in the world at the equivalent of 5,385 kilometres per litre of petrol.

Construction of a vehicle which would set a world record in fuel efficiency – this was the aim of a team from the Department of Mechanical and Process Engineering. PAC-Car achieved this. 5,385 kilometres per litre of petrol or once around the world with eight litres is the result which the team produced at the end of June 2005 at the Shell Eco-Marathon in Ladoux, France. However, the heart of PAC-Car is not a petrol engine, but a fuel cell which draws electrical energy from hydrogen which in turn drives two electric motors. PAC stands for “Pile À Combustible” or in English “fuel cell”. The only emission produced by the vehicle is pure water. At 30 kilograms, PAC-Car is a lightweight unit.

Vehicle with best fuel efficiency.

The idea for PAC-Car originated in 2002 at the Measurement and Control Laboratory. At the time ETH Zurich had already gained some experience of fuel cells through various projects. The Shell Eco-Marathon, a fuel efficiency competition, was brought to ETH Zurich’s attention by a researcher who had come here from the University of Valenciennes in France. ETH Zurich then took part in this race in 2003 and 2004 with a chassis from the University of Valenciennes

and a self-designed fuel cell and achieved its best result at ninth position.

PAC-Car constructed by students.

Work on the completely new build of the “world record” vehicle began in autumn 2003. A team was put together, comprising a project leader plus four prospective mechanical engineers. These four students had opted for project-oriented specialisations. This involves a team of two to six students developing and managing a scientific project from start to finish. It is supported by a professor. The students have to submit two interim reports which equate to semester papers. In the case of the PAC-Car specialisation project, the four prospective mechanical engineers were supported by other ETH students, by ETH staff and partners from science and industry. The two female drivers of the vehicle are also students at ETH. Taking the example of PAC-Car, the team managed to integrate the latest developments in fuel cell and drive technology, aerodynamics, lightweight construction and control technology into a unique, highly efficient system.



→ Around the world with the equivalent of eight litres of petrol: ETH students constructed the world's most efficient vehicle.



→ Research field with great economic potential: metallic glasses reveal highly interesting mechanical properties.

Materials with outstanding mechanical and physical properties

Bulk metallic glasses form a new class of materials with excellent mechanical and other physical properties which are coming into increased use, for example in information technology or sports equipment applications. Innovative ETH researchers have developed bulk metallic glasses with improved plasticity, enhancing their mechanical properties even further.

Amorphous metals exhibit very interesting mechanical and other physical properties. Bulk metallic glasses display, for example, approximately double the yield strength and four times the elastic limit of their crystalline counterparts. Unfortunately these properties cannot be fully exploited in these glasses due to brittle fracture behaviour: with no crystalline structure, dislocation movement is impossible and deformation only takes place in a few highly localized shear bands. This prevents ductility, since the deformation energy is concentrated in a very small volume of the material. Enhancing the plasticity of bulk metallic glasses could, however, lead to materials with great promise for structural and functional applications. One approach to achieving this is the integration of second-phase particles: researchers at the ETH Laboratory of Metal Physics and Technology have developed graphite-particle-reinforced bulk metallic glass composites with a fully amorphous matrix. Their microstructure is largely independent of cooling rate – and thus easily reproducible. Their material properties can also be tailored by varying the graphite content. Composites containing 3 to 10 volume percent graphite show the greatest improvement in their combination of yield strength and

plasticity: the highest so far reported in foreign-particle-reinforced bulk metallic glasses.

Bulk metallic glasses are already used in mobile phones, golf clubs, and much more.

Products with a bulk metallic glass component are already used variously in information technology (e.g. mobile phones), sports equipment (e.g. golf clubs), high-performance spring applications, watch and jewellery manufacture, and amorphous coatings. In contrast, investigation of the related group of glassy biomaterials and light-metal-based alloys is still in its early stages. There is enormous scope for research in all of these areas, and great potential for application, for example in medical devices, microtechnology, and lightweight construction. For glassy biomaterials researchers at the Laboratory of Metal Physics and Technology have been testing the biocompatibility of bulk metallic glasses. Most interestingly for biomedical applications, a nickel-free zirconium-based bulk metallic glass, developed in their laboratory, has been found to perform as well in cytotoxicity tests as non-toxic polystyrene.

System-oriented sciences moving closer together

The Departments of Agricultural and Food Sciences, Earth Sciences together with Environmental Sciences have formed the School Domain of Earth, Environment and Natural Resources (S-ENETH). With S-ENETH, ETH Zurich wants to create stronger links between research and teaching in this area.

The School Domain of Earth, Environment and Natural Resources (S-ENETH) was founded on 1 April and introduced to a broad public on 22 April at “Welten des Wissens”. With around 1,400 students, 500 doctoral candidates, 500 technical, administrative or scientific staff and a good 50 professorships, S-ENETH makes up about a sixth of ETH Zurich. S-ENETH deals with how the earth works, its natural systems, sustainable use, production and the transformation of natural resources as well as environmental management and environmental remediation. S-ENETH is probably unique in the world, thanks not only to these all-round content-related competencies, but also to the joint strategic planning and implementation of teaching and research across the three departments. In addition to the Departments’ basic mission (“core business”), the “Strategic Priority Areas (SPAs)” on “Planet Formation and Evolution of Life”, “Natural Hazards and Risk Management”, “Climate and Environmental Change”, “Sustainable Land Use” together with “Food, Environment, Health and Society” deal with key issues with regard to global challenges. The SPAs link up to newly created interface areas and exist in the sense of “added value” from trans-departmental cooperation. Moreover, S-ENETH also consciously seeks collaboration with other ETH departments and centres within the ETH domain in its work. This means for instance that it plays an important part as the “leading house” of the Competence Center Environment and Sustainability (CCES) of the ETH

Board. The fact that S-ENETH is also concerned with the integration of the social sciences and the humanities, is demonstrated by its intention to establish a joint institute with the ETH Department of Humanities, Social and Political Sciences. With S-ENETH, north-south research at ETH has also gained in importance: in November 2005, ETH Zurich – under the direction of S-ENETH – signed a memorandum of understanding with the United Nations Environment Programme (UNEP).

S-ENETH united in one location.

Thanks to the move of the Department of Environmental Sciences to one of the renovated former chemistry buildings at the ETH Zurich Zentrum site, all the S-ENETH departments are now in close proximity. With this new site for encounters and cultural exchange, an important spatial prerequisite for the consolidation of S-ENETH has been fulfilled.

Common base year for bachelor programmes.

Cooperation has already progressed a long way in teaching. Bachelor programmes in Agricultural Science, Earth Sciences, Food Science and Environmental Sciences are extensively based on common principles. Master programmes are also coordinated in the same way and include common minors. Joint Master programmes are in preparation.



→ Improving our understanding of the earth, environment and natural resources: gauging station near Zug (Switzerland) for a project on methane sources and sinks.



→ Over 90 ETH staff and students in a different kind of spotlight: taking centre stage in the anniversary musical.

ETH staff and students in the spotlight

They make ETH what it is – an internationally recognised university: all those who teach and study or work in research and administration at ETH Zurich. In the anniversary theme “ETH at Home” it was demonstrated that the ETH staff and students are capable of achieving more.

The “ETH at Home” anniversary theme offered ETH staff and students the opportunity to celebrate their university’s birthday. With this in mind, the ETH students’ association (VSETH) held various events for students in conjunction with a number of subject-related associations. The summer festival at the ETH Hönggerberg site – organised by the Personnel Commission – attracted thousands of ETH staff and students. The Academic Sports Association of Zurich and ETH Alumni offered a whole series of anniversary events. However, it was mainly in the music and dance of the “Welcome tomorrow” ETheater that ETH staff and students were able to display their hidden talents.

Casting for ETheater.

“Welcome tomorrow” was the motto of the ETH anniversary and “Welcome tomorrow” was also the title of the ETH musical which was specially written for the anniversary. With a great deal of irony and very much tongue in cheek,

“Welcome tomorrow” told a crazy story. It is a reminder of the privilege of being able to invent the future ourselves, and at the same time raises the issue of responsibility for the future. The ETH Zurich Personnel Commission launched this piece with the intention of bringing together as many ETH staff and students with a keen interest in music, dance and theatre as possible in a joint project, as well as providing the audience with food for thought on futuristic subjects in a jovial way. More than 90 ETH staff and students threw themselves enthusiastically into this project both on stage and behind the scenes. The eight performances, which were staged at the end of June in the large physics lecture theatre at the ETH Hönggerberg site, all sold out. As a lasting consequence of the project, the Personnel Commission is planning to create a culture group at ETH. The aim will be to put together a cultural programme as a balance to technology, the lab and computing – a promising contribution to a lively corporate identity at ETH.

ETH of the future

The week-long “ETH Visions” theme in November 2005 marked the end of the “150 years of ETH Zurich” anniversary celebrations. With guests from politics, business, science and culture, ETH staff and students discussed the future of their university and of Switzerland as a centre for education and research.

Four themes marked the anniversary celebrations of 150 years ETH Zurich. The fourth and final theme, which was held in the ETH main building from 14 to 19 November, highlighted a further key feature. Under the title “ETH Visions”, ETH Zurich posed itself questions, questions about its future and thus the future of Switzerland as a centre for education and research. With ETH Visions, ETH Zurich aimed to put a process into motion which will continue long after the anniversary year. What contribution will ETH Zurich make to Switzerland and the world over the coming decades? How will ETH Zurich manage the balancing act of being a global university with national foundations at the same time? Over the course of the week, speeches, workshops and panel discussions served as a forum for dialogue and joint reflection. Each day was devoted to a specific topic: Monday was the Day of Teaching, Tuesday was Research Day, Wednesday was Equal Opportunity and Nobel Laureates’ Day, Thursday was Economy, Politics and Alumni Day and Friday was Universities’ Day. ETH Day on the Saturday marked the end of the week and thus concluded events for the anniversary celebration.

Creating an independent culture.

For the Day of Teaching, the main building became a teaching forum with various events ranging from lectures and exhibitions to entertainment interludes. The core issue of

the day related to the kind of education that ETH Zurich will offer its students in 30 years when access to knowledge will be always available to everyone, everywhere. Conclusion of the day: ETH Zurich should arouse increasing curiosity among its students and impart skills instead of knowledge. Reducing teacher-centred teaching was deemed to be a promising method for achieving this. As a result, more ‘free space’ could be created for teamwork, individual initiative and dialogue.

Researchers require ‘free space’.

Curiosity is insatiable, research inexhaustible. Scientific research creates the basis for innovation and makes a contribution to culture. This was a core finding of the Research Day. During lectures and panel discussions, the exponents of this ETH Visions day debated issues relating to the future of research in Switzerland and the globalised world. Determination and focus are essential in order to survive amid international competition. However, researchers should also enter into more intensive discussion with society and politics in order to win trust and confidence.

Reflecting on the work-life balance.

One of the conclusions from the Equal Opportunity Day was that equal opportunity at a leading university requires a change in mentality and culture – both in men and women.

→ 'Free space' discussion: politics, business, science and culture meet for an exchange of views at the end of the anniversary year.



→ Flowers passed on: seven Nobel Laureates on their research careers and the role ETH played in it.



Female professors are important role models for young women, just as male professors are important role models for young men. The Nobel Laureates' Day formed the second part of the day. Seven Nobel Laureates looked back on their research careers and presented their recipes for success to young scientists.

Financing an elite education.

The Economy, Politics and Alumni Day saw representatives from business and politics explain how they imagine the future of ETH Zurich to be. The point of departure for this day was a thesis paper prepared in advance by a working group. The relationship between the economy and ETH needs to be constantly redefined. However, this relationship needs to always show itself as being open and transparent. The participants also looked at the question as to whether unlimited access to universities is still in keeping with the times. The conclusion of this day was that Switzerland needs to have the courage to have an elite education.

Internationalisation is indispensable.

One of the conclusions drawn from Universities' Day was that research is already international, but teaching has to adopt an increasingly global approach. Internationalisation

and the associated student mobility were the focal point of this day. ETH Zurich was shown to be in need of a clear strategy in this respect. This also requires the university to integrate foreign students and researchers. Successful examples of easier integration from the USA and the UK were also presented on this day.

Results implemented into everyday ETH life.

The thoughts and reflections shared throughout the week were observed by a group of well-known figures from science, politics, business and culture – the Groupe de Réflexion – which then brought together the findings of the individual days. The members of the Groupe de Réflexion were former National Councillor and entrepreneur Ulrich Bremi, Martin Heller, cultural entrepreneur and Artistic Director of Expo.02, Felicitas Pauss, Professor for Particle Physics at ETH Zurich, Mauro Pfister, ETH graduate and former President of VSETH, Daniela Suppiger, doctoral candidate of Mechanical Engineering at ETH Zurich, the outgoing ETH President Olaf Kübler and his successor Ernst Hafen. Ernst Hafen is also responsible for ensuring that the findings of the week-long "ETH Visions" theme are incorporated into everyday ETH life.

Science City taking shape

The master plan is ready. The cornerstone has been laid for the Information Science Lab. For Science City this signals the beginning of the implementation phase.

The master plan is a set of rules for expanding the ETH Hönggerberg site into Science City. It determines the long-term development strategy and the character of the university campus, and already hints at the future atmosphere of Science City. The master plan is not a straitjacket. In the case of the new buildings, for instance, it dispenses with definitions of building volumes. Rather, it contains principles for potential building locations or fundamental building forms and configurations. The ETH Professor of Architecture and city planner, Kees Christiaanse, and his architect's office created the Science City master plan. The central theme which runs throughout the plan is the idea of connecting all areas. The construction style is intended to closely connect living and working activities, and to link public, semi-public and private spaces smoothly with one another. This will allow Science City to achieve a functional mix of research and study, experiences and entertainment, knowledge transfer and encounter resulting in synergies. It is not only ETH staff and students, but also people outside the organisation, in particular the residents of the surrounding neighbourhoods, who will be able to benefit from this. As far as actual deployment are concerned, the master plan remains very open and therefore flexible. However, Science City has already taken shape in terms of certain content-related structures. Around 60 usage modules, which to some extent originate from the broadly laid-out participation process, have been arranged into clusters. In addition

to the central clusters of "Research" and "Teaching", there are clusters such as "Bridgehead Economy", "Living", "Public Offers", "Sport" and "Exhibition and Art".

Cornerstone of first building laid.

In the run-up to ETH Day on 19 November 2005, the cornerstone of the Information Science Lab at the ETH Hönggerberg site was laid. This laboratory is the first building to form part of Science City. Among the participants at the laying of the cornerstone were the Mayor of Zurich, the ETH Zurich Executive Board, Dr. Branco Weiss and a representative of the Werner von Siemens Foundation together with the architect of the building, Prof. Dietmar Eberle. Dr. Branco Weiss made the construction of the building possible with a donation of 23 million Swiss francs. The Werner von Siemens Foundation is financing key facilities in the new building which should be finished by 2007.

Animal PET Imaging centre

Examinations of animals using positron emissions tomography (animal PET imaging) help particularly in research on cancer, cardio-vascular diseases and brain diseases. They are also used in the search for possible treatment methods and new drugs. On 1 September ETH Zurich opened a new centre for animal PET imaging. It is located at the ETH Hönggerberg site and constitutes a core element of the science section of the emerging Science City.

→ Science City in focus: project manager Michael Salzmann with the extension plans for the ETH Hönggerberg site.



Scientific and Cultural Institutions

ETH Library

For the ETH Library the activities surrounding the 150 year anniversary of ETH Zurich also had a particular significance. The “Information Management in Science and Technology” symposium at the start of the year emphasised the great challenges which scientific libraries are faced with nowadays within universities. By participating in “Welten des Wissens” the population has been made aware of the value and importance of the ETH Library for the university as well as the benefits of its services and the facilities provided. With the anniversary exhibition “blättern & browsen – 150 Jahre ETH-Bibliothek” in the Stadthaus Zurich, the library introduced the public to the full range of facilities which are also available to them.

The “Schulratsprotokolle online” digitisation project – also completed in 2005 – makes it possible to use any computer to access various sources regarding the history of ETH Zurich since its establishment up to 1968.

In 2005, as has been the case over the past few years, a further focal point was the continual expansion of the Electronic Library: the number of electronic journals grew to more than 7,600 titles and the number of electronically available books to more than 5,100. The number of databases available for research has levelled off at around 190. In addition to the continual expansion of electronic information sources and services, the establishment of the “Grüne Bibliothek” represented a new information facility which combines the relevant media holdings from two departments and the ETH Library.

SystemsX

The Swiss initiative in systems biology – SystemsX – which ETH Zurich and the universities of Zurich and Basel have jointly adopted, is in the process of building up its nodes. At the beginning of 2005, the Institute of Molecular Systems Biology was founded at ETH Zurich. This is one of four Scientific Nodes of SystemsX and it is headed by Prof. Rudolf Aebersold. By the end of 2005, the Institute had already grown to three working groups which were developing new technologies for the collection and analysis of biological data.

The Competence Center for Systems Physiology & Metabolic Diseases also made a good start. This network of 22 research groups at ETH Zurich and the University of Zurich is attempting to obtain new findings about the metabolic syndrome using systems biology. The aim is to gain a better understanding of the correlations between diabetes, obesity and cancer. It has also been possible to establish a promising research partnership with the healthcare company Roche. Roche is investing a total of 6.3 million Swiss francs in researching diabetes type 2 over three years. Furthermore, the Competence Center for Systems Physiology & Metabolic Disease is offering a doctoral programme as its first SystemsX node.

Breakthrough at the Center of Biosystems (C-BSSE) of ETH Zurich in Basel. Prof. Renato Paro has been appointed as founding director. Preparations are underway to make further appointments. It is planned that the Center located in the Rosental Biopark in Basel will be opened as a new department of ETH Zurich in summer 2006.

SystemsX is set to grow further. Once the ETH Board has decided to declare SystemsX as a competence centre of the ETH domain, other Swiss universities will be able to join the initiative. Several more Swiss universities have already shown great interest. In this way, SystemsX is becoming a role model for national cooperation in the university sector.

CSCS

The Swiss National Supercomputing Centre CSCS is Switzerland's competence centre for the provision, development and promotion of technical and scientific services in the field of high-performance computing. The CSCS investigates new information technologies, refines the applications and makes them available to researchers both at home and abroad for complex simulations and modellings. To this end, CSCS conducts its own research and development in the field of computer sciences.

In 2005, the CSCS became the first European high-performance computing centre to install a Cray XT₃ computer. The massively parallel system (MPP) is based on Red Storm technology. The new machine was selected in a joint project with the Paul Scherrer Institute (PSI). It has the power to carry out 5.9 billion computing operations a second (5.9 Tflop/s). The new Cray computer increases the existing computing capacity of the CSCS by more than five times and is therefore one of the most powerful computers in Europe. The PSI uses a fixed proportion of installed computing capacity for complex situations.

At the beginning of May 2005, the ETH anniversary wave also reached south Ticino: the CSCS opened its doors to the public and showed what the inside of a high-performance computing centre looks like. Visitors were able to learn about the numerous fields – from climate research to particle physics – for which the CSCS computers can be used.

gta – the exhibitions programme

On the occasion of the 150 year anniversary the gta presented an overview of the building activity of ETH Zurich since its foundation. The title “ETH builds Zurich 1855–2005” referred to the important role of ETH in the development of the city of Zurich. In the main hall of ETH Zurich, not only were historical materials on display – including some from the gta archive – but also the projects planned for the future such as “Science City”. Parallels in development were presented by an exhibition which was also staged during the summer semester as a result of a competition at EPF Lausanne for an extension of the campus under the title “Building the future of learning”.

At the ETH Hönggerberg site, exhibitions on contemporary architectural positions were staged, such as the travelling exhibition on the Spanish architect Alejandro de la Sota, a small monographic exhibition on the Lausanne architects Ueli Brauen and Doris Wälchli as well as a piece by the English guest lecturers Jonathan Sergison and Stephen Bates on building with brick as a material. One exhibition afforded an insight into late Modernism through Scharoun’s Czech pupils, Lubomír and Cestmír Slapeta.

The highlight of the winter semester was the exhibition project on the Hallenstadion Zurich. The Hallenstadion, erected in the style of the “Neues Bauen” in 1938/1939, was for its part one of the largest halls in Europe. For the first time it was possible to rework sketches and plans left by Karl Egender, the architect of the Hallenstadion, for the current renovation and extension of the building. These can be found in the gta archive.

Collegium Helveticum

The activities of Collegium Helveticum, a joint facility of the University of Zurich and ETH Zurich, were dedicated to two areas of focus. The first one dealt with the relationship of visions for the future and science in the past and present. Among other activities, a series of lectures “Wissenschaft als Labor des Künftigen” (Science as the laboratory of the future) and, together with the “Filmpodium” of the city of Zurich, the evening events “Sci-Fi Favorites” took place, in which researchers and artists introduced their favourite science fiction films. The second area of focus was the theme of “Pain”. The public series of lectures “Schmerz – Perspektiven auf eine menschliche Grunderfahrung” (Pain – Perspectives on a basic human experience) covered the range, from the physiological prerequisites of pain sensation via various medical methods to pain relief through to creative engagement with pain in literature and art.

In July 2005, the Ludwik Fleck Zentrum was founded; located in the Collegium, it administers the scientific legacy of the Polish scientist. The centre operates the Fleck Archive in collaboration with the Archive of Contemporary History; the Fleck Archive prepares the unpublished documents and makes them accessible to the public. At the same time the Ludwik Fleck Zentrum is a seat of research, networking and documentation on Ludwik Fleck and a place to engage with Fleck’s life and ideas.

Since the winter semester 2004/2005, the area of focus of the Collegium’s research has centred on the “Die Rolle der Emotion: ihr Anteil bei menschlichem Handeln und bei der Setzung sozialer Normen” (The role of emotion: its share in human action and in setting social standards) project. There are three fellows each from the University of Zurich (Ingolf U. Dalferth, Ernst Fehr and Jakob Tanner) and ETH Zurich (Hans Rudolf Heinemann, Hanns Möhler and Reinhard Nesper) involved in the project, which is supported by the cogito foundation. In addition to scientific work, the theme was broadened in various symposia such as “Emotion und Selbst: die Angstanalyse” (Emotion and the self: the analysis of fear), “Die Rolle der Emotionen in politischen Entscheidungsprozessen” (The role of emotions in political decision-making processes) and “Religion und Emotion” (Religion and emotion).

Collection of Prints and Drawings

In the ETH anniversary year, instead of four exhibitions, the Collection of Prints and Drawings organised seven, four of which were in the exhibition room. “European Old Master Prints 1450–1750 – A Selection” brought an above-average number of visitors to the collection. The second exhibition “Landscapes – Swiss Drawings 1750–1850” presented a selected group of drawings. Many produced a surprising effect with their freshness and intensity of colour after not having been exhibited for decades. The third exhibition was from the year of the founding of ETH: “1855 – Prints from the Mid-19th Century”. Here too, many an unknown treasure, particularly where the French prints were concerned, came to light. The founding fathers of the Polytechnic Institute turned their attention mainly to Paris and its world exhibitions of 1855, 1868 and 1878. Professors were sent there specifically to study the technical and artistic innovations. The greatest surprise was the fourth exhibition “From Urs Graf to Anton Raphael Mengs – Master Drawings from Four Centuries”. The Collection of Prints and Drawings was able to demonstrate that it is not just a treasure trove of prints but also of drawings by Old Masters. As part of the exhibition the large and richly illustrated visual handbook to the collection was published.

The exhibition “Picasso’s Practical Art – The Margadant Collection” started off in St. Gallen and continued on to Münster and Berlin. It will be on display in Zurich in 2006. The “Tracking Suburbia” exhibition in the Swiss Institute – Contemporary Art in New York was opened on 13 September 2005 by the Swiss Federal President. The largest of the three guest exhibitions took place in Zurich: “Swiss Prints 1980–2005”. Around 200 works from its own collection revealed that prints can still be an exciting medium, even for young artists. The exhibition and the book met with a good response.

Extensive groups of works by Raymond Pettibon and Christopher Wool have been acquired. An opportunity arose to purchase four large colour wood cuts by the Swiss artist Martin Disler who died prematurely. The artist’s widow also presented a portfolio and a group of large format etchings as gifts. The Collection of Prints and Drawings owns the most extensive collection of Dieter Roth’s artists’ books in the world. There are also quite a few rare items in addition to this mixed bag. We are thankful for a significant gift from the estate of Dr. Charlie Wunderly-Böhme, an exquisite glued volume with numerous etchings by Jacques Callot.

Review of the ETH year



ETH on the Road

The anniversary theme “ETH on the Road” was geared to grammar school pupils and teachers. With the “ETH Science Truck”, ETH Zurich visited a total of eleven Swiss grammar schools between January and April 2005, from Bellinzona to Muttenz. “ETH on the Road” generated considerable interest with exciting and stimulating features from the areas of teaching and research.

ETHistory

For the 150th anniversary celebrations of ETH Zurich, the Professorship of Technical History made the history of ETH Zurich accessible on the web. The www.ethistory.ethz.ch website invites visitors to take five historical ‘tours’, giving them the chance to discover ETH Zurich in a systematic manner over its 150 years.



Einstein in Zurich

In October 2005, ETH Zurich staged an exhibition on Albert Einstein’s years spent in Zurich. Visitors learnt how Einstein came to the “Poly” as a student, how in 1905 – in his “annus mirabilis” – he pushed the boundaries of physics at that time after having moved to Berne, and the impact he created as a professor first at the University of Zurich and then at ETH Zurich.

Physics in the 21st Century

In mid-June 2005, leading physicists from all over the world – including four Nobel Laureates, one Balzan Prize winner and a Fields Medal winner – came together at a symposium on physics in the 21st century. One of the reasons for this gathering was the “annus mirabilis”. Einstein’s findings from this year form the basis for much of what is involved in research today.



Fear and Anxiety

Federal Councillor Pascal Couchepin and the 14th Dalai Lama were the most prominent guest figures at the “Fear and Anxiety” symposium on 4 August 2005. The event, which combined scientific opinion with Buddhist approaches, went in search of common ground. Over 3,000 people visited the symposium in the ETH main building with many more following the event as a video broadcast via the Internet.

Field trial evaluated

The field trial on transgenic wheat, carried out during the first half of 2004, proved successful. The results were presented in September 2005 and showed that, for the first time, it had been possible to improve the fungal resistance of wheat by means of a transgenic organism outdoors. The numerous biosecurity trials also provided valuable data for future field trials. They proved that no increased risk exists for humans or the environment.



New Executive Board in office

On 1 December 2005, two new members were added to the ETH Zurich Executive Board. The new President of ETH Zurich is Ernst Hafen, a developmental biologist and hitherto Professor and Head of the Institute of Zoology at the University of Zurich. Dimos Poulidakos, Professor of Thermodynamics and Head of the Laboratory of Thermodynamics in Emerging Technologies at the Institute of Energy Technology, is the new Vice-President for Research. Ernst Hafen and Dimos Poulidakos succeed Olaf Kübler and Ulrich W. Suter respectively. The other members of the Executive Board are Rector Konrad Osterwalder and Gerhard Schmitt, Vice-President for Planning and Logistics.

From l. to r.: Gerhard Schmitt, Dimos Poulidakos, Konrad Osterwalder and Ernst Hafen.



Sporting highlights in the anniversary year

To mark the 150th anniversary of ETH Zurich, an extra stage was added to the Sola relay race in 2005. The race's finishing line was in the ETH main building. This change meant that the Sola race entered the city centre and was a special occasion for VIP runners such as the Nobel Laureate Kurt Wüthrich and the then incumbent ETH President Olaf Kübler. Sola 2005 also saw a new record number of teams entered (686) as well as a new winner in the EWZ-Power-Team. The organisers of the customary rowing regatta also came up with something special. In addition to the traditional race between students from the University of Zurich and ETH Zurich, teams of professors from the two Zurich universities and five foreign universities also went head to head on the water, with the team of professors from ETH Zurich emerging victorious.



VIP visit from India

On 26 May 2005, Indian President A. P. J. Abdul Kalam visited ETH Zurich accompanied by Federal Councillor Pascal Couchepin. President Kalam has a Ph. D. in physics.

VIP visit from Thailand

Princess Chulabhorn Mahidol of Thailand was the guest of ETH Zurich on 12 July 2005. The Princess has a Ph. D. in chemistry.

«Power of the Brain»

The eighth edition of the "BrainFair" was held between 19 and 24 May 2005 – this year's theme was "Conscience and Consciousness". Besides the University of Zurich and ETH Zurich, the "Science et Cité" organisation was involved for the first time.



ETH Zurich buildings

To mark the 150th anniversary of ETH Zurich, gta presented an overview of the institution's building activities since its foundation. "ETH builds Zurich 1855–2005", the title of the exhibition on display at the ETH main building from the end of May to the end of June, charts the important role played by ETH in the development of the city of Zurich.

50 years of the Swiss Institute for Business Cycle Research

Since 1955 – i.e. for the last 50 years – ETH Zurich's Swiss Institute for Business Cycle Research (KOF) has been consulting companies to ask for their views on the state of the economy. These surveys are an indispensable element in assessing economic performance. In 2005, the ETH Board appointed a new head of the KOF, with Jan-Egbert Sturm succeeding Bernd Schips on 1 January 2006.



Solar energy research conducted with PSI

Together with the Paul Scherrer Institute (PSI), ETH Zurich was involved in the commissioning of two solar energy research plants in 2005. Since April, a 300 kilowatt pilot plant for the solar production of zinc has been in operation at the Weizmann Institute in Israel. The solar reactor technology is a joint development between PSI and ETH Zurich and is the heart of the plant. At the start of November, a new high-flow solar simulator with a maximum radiation intensity of more than 10,000 suns was officially brought on stream.

Sharp rise in new entrant figures

A good 2,100 students started their courses at ETH Zurich in the winter semester 2005/2006. This represents a significant increase of around 17% on the previous year.



Collection of Prints and Drawings

The Collection of Prints and Drawings showed three guest exhibitions overall in 2005. The “Tracking Suburbia” exhibition at the “Swiss Institute – Contemporary Art” in New York was opened on 13 September by Swiss Federal President Samuel Schmid, who that week was participating in the UN General Assembly.

Vision for the anniversary

At the end of May 2005, a three-metre long panoramic view of Zurich was officially unveiled on the roof terrace to the Dozentenfoyer of the ETH main building. The screen print, a work by the artist Thomas Germann, is an anniversary present to ETH Zurich from the Military Academy.

75 years of hydraulic engineering

At the end of October 2005, the Laboratory of Hydraulics, Hydrology and Glaciology (VAW) celebrated its 75th anniversary, for which it held a celebratory colloquium and open day.

Calculus

Power and intrigue is normally the stuff of operas. But it can also extend to science. In a special anniversary event, the music theatre “Calculus” was performed for the first time in May 2005 on the “Studiobühne” of the Zurich Opera House. This is based on the play of the same name by the emeritus professor of chemistry and inventor of the Pill, Carl Djerassi.

Open Class

In the winter semester 2005/2006, the first Open Class began at ETH Zurich. This novel series of lectures is open to anyone interested and who is over the age of 15. The lectures offer both new and interesting information from the worlds of science and research in a surprising and entertaining fashion.



Old chemistry building freshly renovated

At the start of November, both of the renovated chemistry buildings CAB and CHN were opened. The renovation has allowed ETH to create the space so as to accommodate the institutes and chairs of the Department of Environmental Sciences, some of which were widely dispersed, together at one site. The renovated buildings are also home to ETH's newest library, the "Grüne Bibliothek" with agricultural and environmental sciences, and VSETH.

ETH World becomes ICT Committee

In mid-August, the Executive Board approved the Strategy for the Use of Information and Communications Technology at ETH Zurich and appointed an ICT Committee to implement these objectives. The chairman of the new committee is Peter Widmayer, Professor of Computer Science. In the ICT Commission, ETH World, which was completed as planned on 30 November 2005, has found an organisation to succeed it.



Polyball 2005

On 26 November, the Polyball once again lured thousands to the ETH main building. This year's theme was "Sternenwerfer". Inspired by the ETH anniversary, the organisers of the Polyball had also created a book charting the history of the Polyball, which goes back over 100 years.

Latsis Prize for ETH engineer

Patrick Jenny, SNF Professor of Computational Fluid Dynamics at the Institute of Fluid Dynamics, was awarded the Latsis Prize for 2005. Patrick Jenny is the second scientific engineers to receive the National Latsis Prize.

Zonta Prize for ETH researcher

The biochemist Cornelia Halin, post-doctoral fellow at the Institute of Pharmaceutical Sciences, has been awarded the Zonta Prize from the international women's network Zonta. This network is designed to advance the profile of women in the area of research.