

PRESIDENT'S SELECTION

The Newsletter from the ETH Zurich President

www.ethz.ch

HIGHLIGHTS

EDITORIAL

Innovations with passion



Photo: Doris Fancioni

It locates avalanche victims: the Alcedo drone with its inventors.

A balancing robot, a mini-helicopter, two fine-tuned racing cars and a flying sailboat were the projects that delighted the audience at the latest Rollout event held by the Department of Mechanical and Process Engineering. Most of the projects will also be put into real practice.

Every year on Rollout day at the beginning of June, the mechanical engineering students at ETH Zurich reveal the focus projects on which they have spent a year of their Bachelor programme dedicating their energies to (see box).

On land, water and in the air

The projects made a huge impact on the large audience. The electro-driven Furka racing car received great admiration for its chassis made of carbon fibre reinforced plastic (CFRP) which, despite being light as a feather is also robust, and enables the racing car to accelerate from 0 to 100km in three and a half seconds.

With the Hermes project, the students took a focus project from last year, the Pegasus hybrid racing car, and developed and optimised it a stage further. By successfully re-adjusting the clutch, they were able to achieve maximal energy efficiency.

The HyRaii team designed a new kind of hydrofoil sailboat that flies like an aeroplane over water. A sophisticated steering mechanism

stabilises the boat allowing it to reach tremendous speeds.

And Alcedo, a mini-helicopter, could very well be helping avalanche rescue teams in the future. It flies over the avalanche snow at a height of two metres and uses a smoke signal to mark the location of the victims. Alcedo has real chances of rotating its four blades in practice as Rega, the nationwide air-rescue organisation, has backed the project and is very interested in the product.

The crowd puller

However, the audience's favourite and winner of the Siemens PLM sponsored prize of 1300

Swiss francs at this year's Rollout was Rezero, the cute robot who operates on a ball. It is agile, perfectly balanced and moves around with unbelievable accuracy, avoiding obstacles and even following people. Rezero too could be put into real practice, as a robot waiter, for example, a guide or as a day-to-day help. The Disney Company is contributing funds to this project – one of many examples of how working with industry adds value to the focus projects. In almost all cases, private sponsors are involved.



Photo: ETH Zurich
Rezero the Robot skilfully avoids obstacles.

Focus projects – from the lecture hall to real practice

The focus projects enable mechanical engineering students at ETH Zurich to put their theoretical knowledge into practice during the course of their Bachelor programme. Working with colleagues from other universities, they spend a whole year developing a product on their own and learn how to put their idea into action – from the basic draft and concept, to simulation and design, and all the way to marketing.

Adventure

Dear Reader,



After finishing their basic theory courses, many ETH students feel attracted to teaching methods that work on real projects.

This new way of teaching, based on exciting and inspiring pioneer work, is drawing more and more young people to our university.

This is where science offers adventure, education and research all at the same time – combined with a measure of competition, project management, fund raising and, of course, innovation. This diverse mix sparks particular interest in the ambitious new generation.

Exciting projects are fascinating and lead to a curiosity for the world of research (see article on left). On top of this, putting your heart into solving a tricky scientific problem with colleagues is ideal preparation for professional life.

I hope you enjoy reading this issue and I wish you an excellent summer.

R. Eichler

Prof. Dr. Ralph Eichler
President ETH Zurich

"QUOTE ... UNQUOTE"

«The scientific agenda in future will be increasingly influenced by scientists from the south.»

Kofi Annan, former UN General Secretary and Nobel Peace Prize winner, on the occasion of the Richard R. Ernst Lecture at ETH Zurich on 18 June 2010.

SENSOR TECHNOLOGY



The sensor detects acetone molecules from the mouth.

Diabetes in breath

A sensor developed at ETH Zurich can determine from human breath whether a person is suffering from type 1 diabetes. The researchers are now looking for industry partners in order to develop a device suitable for daily use.

Type 1 diabetes is revealed by the presence of acetone in a patient's breath. A research team led by Sotiris Pratsinis, Professor of Particle Technology at the Institute of Process Engineering, has developed a sensor that proves the presence of acetone in human breath and thus a type 1 diabetes condition. The sensor can detect even ultralow concentrations of 20 ppb acetone (1 particle per billion).

The sensor's sensitivity is due to a detector film of nanoparticles whose sponge-like structure traps the acetone molecules and then activates the sensor. The sensor is smaller than a fifty centimes coin and could therefore easily be fitted into a handy device for measuring blood sugar levels.

Die ETH researchers are currently looking for partners from the medical industry in order to develop such a device. For diabetes patients this would represent a huge step forward and would save them the daily prick of their finger.

LOCOMOTIVE BUILDING

Within reach of ETH

Having secured a contract for 59 double-deck trains from the Swiss Federal Railways, Bombardier Switzerland in Oerlikon and Winterthur will be creating one hundred new jobs. Proximity to ETH played an important part in the choice of location. With this decision, Bombardier has followed the example of other large organisations who work with ETH.

Bombardier Switzerland is to build 59 new double-deck trains for the Swiss Federal Railways. In order to carry out the 1.9 billion franc project, the organisation needs top level expertise. Bombardier in Winterthur and Oerlikon will therefore be creating a hundred new posts, mainly for engineers. With this move, the organisation will enhance Zurich's position as a competence centre for the development of electric locomotives on the international stage. It should be noted that proximity to ETH played an important part in the choice of this location.

Working with ETH is a growing trend

Bombardier has already benefited from ETH expertise: they have, for example, worked with graduates on the development of a test facility for hybrid locomotives which can simulate rail power systems from across the world.

Other large enterprises have sought proximity to ETH expertise too. On the IBM premises in Rüschlikon, a research centre for nanotechnology is being created as part of a strategic partnership between the IBM Zurich Research Laboratory and ETH. Siemens Switzerland is currently financing a professorship at ETH for sustainable building and projects with 5 million francs. And the latest example of a successful partnership with industry is the recently inaugurated Walt Disney Research Laboratory at ETH, the only Disney research centre in Europe (see box below).

LATEST

New ETH partners

With the financing gained by the ETH Zurich Foundation, strategic projects can be fast-tracked and outstanding young talent advanced. In recent months, a number of new partners have been won including FIFA (a professorship in Medical Engineering), Metall Zug, Gruner, Dätwyler and Implenia.



Honoured climate geologist

The climate geologist and ETH professor, Gerald Haug (right), was awarded the ETH Zurich's highest prize. For his research work on climate and human history he was given the 200,000 franc Max Rössler prize (left: prize donator).

ETH Zurich in Bern

As part of a series of regular events, ETH Zurich was in Bern to provide information to members of the Swiss Parliament and top level representatives from government, business and science on *Supercomputing in Switzerland*. The next event on 22 September will look at *Life quality for an aging society*.

ETH RESEARCH IN THE PICTURE: SIMULATIONS OF MICE AND MEN



On 30 April 2010, ETH Zurich opened its new research laboratory in association with the Walt Disney Company. Around twenty computer scientists are developing innovative technologies for reality simulation here at Disney Research Zurich (DRZ).

Among their projects is the digitisation of the human face and facial gestures. The 3D scanner that has been developed at DRZ reconstructs faces with a precision at micrometre level – in other words, no wrinkle goes unexposed – resulting in 3D facial models with a reality never seen before.

FINAL WORD

Zuse's sleepy Zurich

Exactly 60 years ago, the Z4 computer, the first of its kind available in Europe at the time, was installed in the ETH main building. Hired in 1950 for a period of five years, Konrad Zuse's brainchild noisily produced urgently necessary technical calculations for use in science and industry.

Z4 also ran at night, to which Zuse (1910–1995) made the following comment: "At least the Z4's rattling gave sleepy Zurich something of a night life." The question remains whether the geeky computer pioneer would actually have made use of the party scene that Zurich now enjoys.

Photo: ETH Zurich / Philippe Hollenstein