

PRESIDENT'S SELECTION

The Newsletter from the ETH Zurich President

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HIGHLIGHT

Students' favorite teacher



images: Tom Kawara

Professor Willi Gujer (63): Face to face with his Master's students ...

This year Willi Gujer was named ETH Zurich's most exemplary teacher. The professor of urban water management was awarded the "Credit Suisse Award for Best Teaching" at ETH Zurich Day ceremonies. We spoke with him about his teaching.

Mr. Gujer, is there a special trick to your success that you can reveal?

Tricks and ruses have no place in the classroom; the students soon see through them. No, the learning process involves a lot of work for both sides and neither the professor nor the students can avoid it.

So what's the secret?

It's vital that you take the students seriously. For the main part, I don't view the lesson from my point of view as a professor but rather try to understand why the students are sitting here and what subject-specific problems they might have. This is the only way I can appreciate their right to learn as successfully as possible.

All the same, surely you demand something of them as well?

My classes certainly don't have the reputation of being an easy ride – quite the opposite, in fact. The more that is demanded, the better the students are that then attend our consolidation lec-

tures and write their Master's dissertations with us.

Can you be responsive to the needs of every individual?

At the Bachelor level there are 60 people so it's difficult and then there are still about 20 in the Master's lectures. All the same, I always make sure I stay in the lecture theater during the breaks and ask individual students how the lesson is being received. I also listen to any discussions in order to understand what is going on with the young people themselves.

You became a professor in 1992. Has the attitude to learning changed since then?

It's not so much the students that have changed as me, especially as regards my perspective. In the beginning, I thought I knew what a good lesson was. However, together with the assistants I integrated the students' feedback and the practical necessities and developed a holistic educational concept. The lectures are coordinated and portray urban water management in its multidisciplinary breadth.



... and always dedicated to his goal.

What does the future hold for teaching?

More electronic aids and appliances provide a wider range of possibilities that we can put to good use. For the lessons, however,

there is no qualitative quantum leap. The lecture theater will never become obsolete, as an inspiring course cannot be taught via the Internet alone. Serious preparation remains a central success factor, which always means work for me. However, it is work that I enjoy doing.

EDITORIAL

Think for yourself!

Dear Reader,



In science, progress is achieved through the interplay between experimental insight and theoretical prognosis. That

applies to classical research, at least.

Now, state-of-the-art computer technology has made a new discipline possible: computer-aided science shapes conceivable truths with high-performance computers. For example, highly complex climate developments or completely new superconductive materials can now be researched virtually (page 2).

We need to make the most of the possibilities the supercomputers can offer but we should evaluate the models with a critical eye and interpret the results competently. And in all of this, there continues to be one thing we should still do ourselves: think!

I wish you interesting reading, Merry Christmas and a Happy New Year!

R. Eichler

Prof. Dr. Ralph Eichler,
President of ETH Zurich

"QUOTE ... UNQUOTE"

"Education isn't an instant product that can be produced on demand."

ETH Zurich's Rector, Heidi Wunderli-Allenspach, at the ETH Zurich day 2008 on her hope that the boom in engineering students will not be slowed by the financial crisis.

ELECTROTECHNOLOGY



Image: H.K. Bramaz

The ultra-high revolution electrical drive system.

One million revs

ETH Zurich researchers have broken the magic barrier of one million revolutions per minute. This is the highest rotational speed ever achieved by an electric drive system.

The trend towards increasingly smaller cell phones and other electrical appliances means that increasingly smaller holes have to be drilled for the electronics. This is only possible using a drive system that boasts a high rotational speed. Up to now, industrially deployed motors have normally reached 250,000 revolutions per minute.

Researchers from ETH Zurich's Power Electronic Systems Laboratory have now developed a drive system in collaboration with the motor manufacturer ATE and ball bearings manufacturer myonic that can achieve a record one million revolutions per minute.

Based on the results of the research, two PhD students from the same lab founded the spin-off Celeroton. It will make the lab models industrially viable and thus provide ultra-high revolution electrical drive systems for different branches of industry.

Info: www.celeroton.com

MATERIAL RESEARCH

Superconductors to be

Calculations made using supercomputers predict that while germanium hydride already becomes superconductive at relatively high temperatures, it can be processed more effectively than the previously known high-temperature superconductors.

Until now, the highest transition temperature found – below which a material is superconductive – was for a cuprate, a copper compound. It lies at minus 107° Celsius, or 166 kelvins. However, cuprates are difficult to process and so far it has not been possible to make long wires out of it.

The so-called conventional superconductors do not have this problem but their transition temperature is far too low; such a conductor would be beneficial at the boiling point of nitrogen, i.e. minus 196° Celsius (77 kelvins). At this temperature, a material can be cooled down with liquid nitrogen which can be produced cheaply. Consequently, materials that are superconductive at this temperature (i.e. lossfree conductors) are interesting for technical applications.

Scientists are therefore seeking materials that have a transition temperature of over 77 kelvins. An international team of researchers from ETH Zurich's Laboratory of Crystallography has come one step closer to this goal.

Virtual superconductor soon in lab test

Calculations made using high-performance computers showed that germanium hydride (GeH_4) is a conventional superconductor with a transition temperature of 64 kelvins, albeit under extremely high pressure. Lab experiments should now reveal whether they coincide with the calculations. The scientists are in no doubt, however; their algorithms have already proven themselves for other materials.

LATEST

Pathway for diabetes

ETH Zurich researchers from the Institute of Cell Biology have identified genes that might be involved in the development of type 2 diabetes. If they were deactivated, the illness might be delayed for years.

Better climate models

With the new competence center, the Center for Climate Systems Modeling (C2SM), ETH Zurich is looking to contribute to the further development of this research field. Besides ETH Zurich, Meteo Schweiz, Empa and Agroscope Reckenholz-Tänikon are also on board.

Info: www.czsm.ethz.ch



Accolades for vitamin B6

Teresa Fitzpatrick is the first woman to receive ETH Zurich's Latsis Prize, which has been awarded annually since 1985. The plant scientist was honored for her outstanding discoveries in the biosynthesis of the essential vitamin B6.

UNDER THE SPOTLIGHT: BIOLOGY AT ZERO GRAVITY



What do elderly people have in common with astronauts at zero gravity? They often suffer from muscle degeneration. This debility can be put down to numerous processes at cell level, which the research has still not been able to fully explain.

One important factor in this might be the calcium balance of the cell. ETH Zurich researchers from the Space Biology Group were given a golden opportunity to investigate the cellular processes in a state of weightlessness in a converted airbus. In doing so, they are anticipating various medical advances.

FINAL WORD

Bears on Wall Street

Rajendra K. Pachauri, Chairman of the UN's Intergovernmental Panel on Climate Change, recently gave a talk at ETH Zurich on the subject of climate change. In doing so, the figurehead of the IPCC also brought up the problem of biodiversity; one in four species is threatened with extinction.

For example, bears have become a rare sight in Switzerland, explained the charismatic Indian. However, the gluttonous bruins have not died out; today, most of them prefer to meet on the New York stock exchange. A typical example, not of extinction but of the migration of species, Pachauri cannily concluded.