

Welcome

# The Executive Board's Christmas reception



The Executive Board's Christmas reception | Thursday, 12 December 2013

**ETH Zurich –  
another strong performance, but high expectations remain**



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## Consistently ranked amongst the top performers

ETH Zurich is the best university in continental Europe and one of the best in the world.

- **Ranked 14th** in THE Ranking: ranked 12th in 2012
- **Ranked 12th** in the QS ranking: one position higher
- **Ranked 20th** in the AWRU (Shanghai): up four positions



## Successful in scientific competition

In 2013, researchers at ETH Zurich won:

- **5 ERC Advanced Grants** of the European Research Council  
Total: CHF 16.3 million
- **9 ERC Starting Grants:** CHF 18 million
- **4 ERC Consolidator Grants:** CHF 8.6 million
- From 2014, the Federation will support 6 to 8 new main areas of research (**NFS/NCCR**).
  - 10 applications have been shortlisted
  - **5 of which are being led by ETH Zurich** as the leading or co-leading house
  - Grants applied for: CHF 76 million
- **Climate KIC: 2 of 12 flagship project proposals approved**, including the one with ETH as the leading house

## Interdisciplinary research: impressive output

Area of research	Citation frequency (1 = global mean value)	Share of publications in the 10% of the most- cited journals	Share of publications with international involvement
Energy research (ESC)	1.52	18%	51%
Materials research (MRC)	1.74	22%	50%
Imaging (CIMST)	1.54	18%	55%
Quantum research (QSIT)	2.54	32%	60%
System biology (SystemsX)	2.27	29%	57%
D-BSSE	1.84	22%	56%
Environment & sustainability (CCES)	1.57	20%	57%

## Switzerland's economy: ahead of its competition

Ranking	in 2000	in 2012/13
1	Finland	Switzerland
2	USA	Singapore
3	Germany	Finland
4	Netherlands	Sweden
5	<b>Switzerland</b>	Netherlands
6	Denmark	Germany
7	Sweden	USA
8	UK	UK
9	Singapore	Hong Kong SAR
10	Australia	Japan

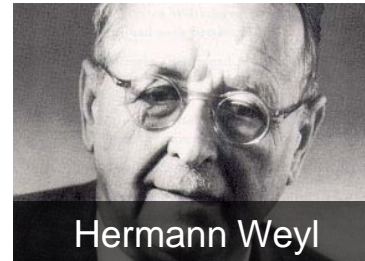
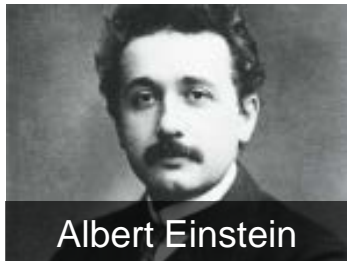
Changes in the top ten countries of the Global Competitiveness Index Ranking 2000 vs 2012/13.

Source: World Economic Forum 2012

# Institute of Theoretical Studies (ETH-ITS)

An institute for the foundations of knowledge

- Was established on 1 June 2013 thanks to a donation of CHF 50 million
- Research and networking in **basic sciences** such as mathematics, theoretical physics, theoretical IT
- Models:
  - Institute for Advanced Studies, Princeton
  - CREATE Campus in Singapore, from which ETH Zurich also benefits
- Continues the Zurich tradition of great thinkers:





# Institute for Science, Technology, and Policy

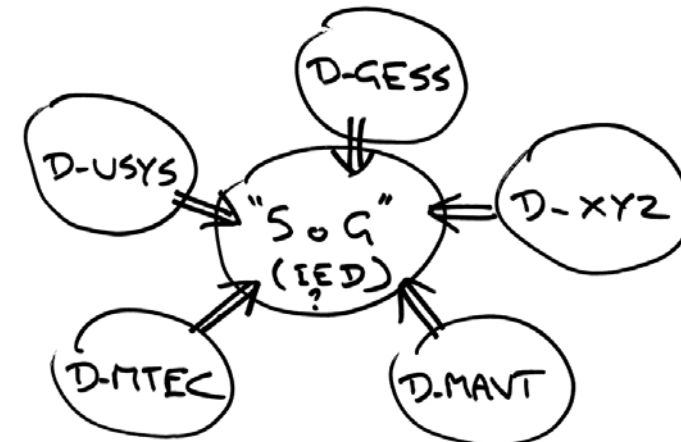
(ISTP, in planning)

## Mission

- To solve complex problems of society
- To strengthen sustainability and resilience
- To form personalities for responsible positions

## Organisation

- Double connection:  
department of origin and ISTP
- Research fellows
- Professors of practice



## ETH hub in Singapore: an outstanding start

- **September 2010:** launch of the Singapore ETH Centre for Global Environmental Sustainability (SEC) with 2 persons. First focus: future cities
- **December 2013:** some 200 active members, of which 13 full professors, approx. 50 doctoral students and some 90 Master's degree students

2010-13 performance targets significantly surpassed:

- approx. 140 publications
- 15 awards and honours
- 8 international conferences
- 14 patents



# Research in Singapore: outlook



## Cooler Calmer Singapore

Simulation of scenarios for lower temperatures, a reduction in noise and less risk of flooding.



## Rochor+

Research to strengthen the historical centre of the city of Singapore.



## Bamboo+

Bamboo fibres replace steel in concrete.

# Guidelines for research

Express quality criteria for degree courses and learning units

## Quality of the curriculae

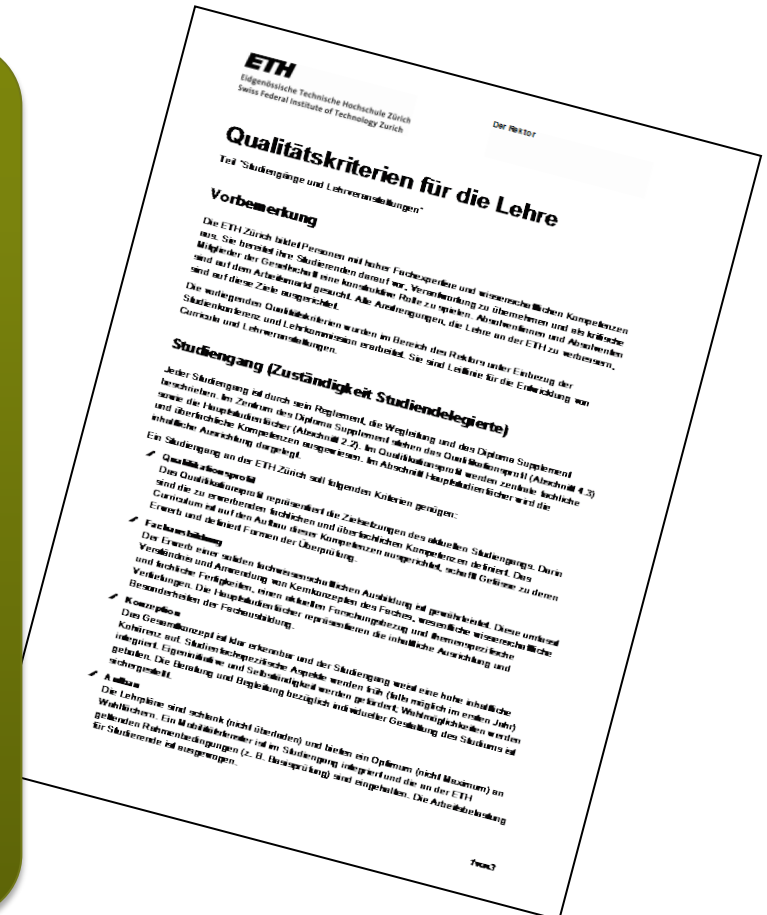
- Qualification profile
- Specialist education
- Conceptual design
- Infrastructure
- Flexibility and innovation
- Structure
- Professional ethics

## Quality of the assessment

- Performance assessments
- Regular assessments
- Reference to areas of work

## Quality of the courses

- Alignment with curriculum
- Learning targets
- Performance assessments
- Student-focused teaching
- Reference to research
- Work load
- Materials and documents



# ETH initiative regarding MOOC

ETH-MOOC courses are called **TORQUEs**:  
**T**iny, **O**pen-with-**R**estrictions courses focused on **Q**uality and **E**ffectiveness

	TORQUE	MOOC
Number of participants	Dozens to hundreds	Several thousand
Connection with classroom teaching	<b>Closely connected as a must</b>	None



Example: TORQUE on the statistics software R by Markus Kalisch and Lukas Meier, D-MATH





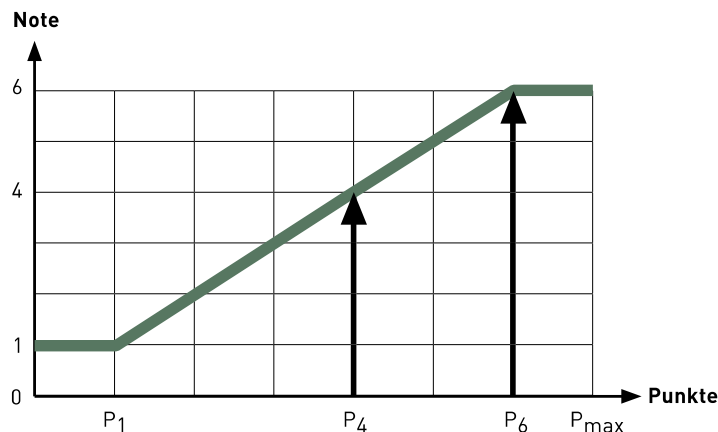
# Guideline for written grading

## Contents

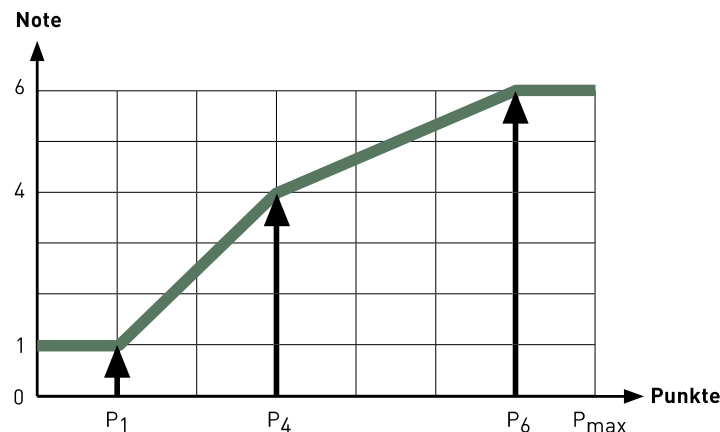
- Specific practice for all topics relating to grading
- Foundations and further literature
- Simple checklist for use

## Objective: to promote criteria-guided examining

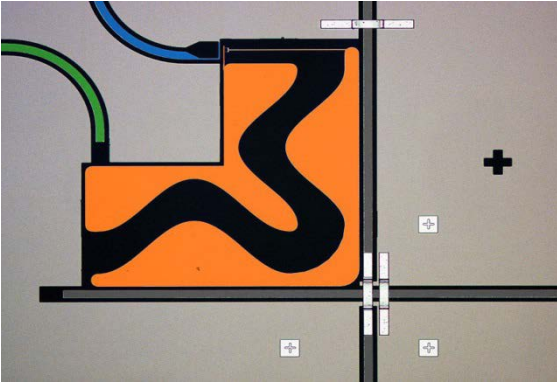
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Doppelte lineare Interpolation

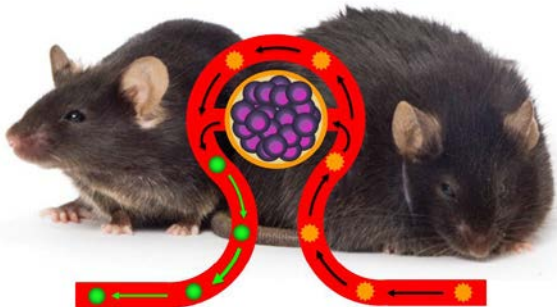


## Exciting research results – some examples



### Information beamed for the first time

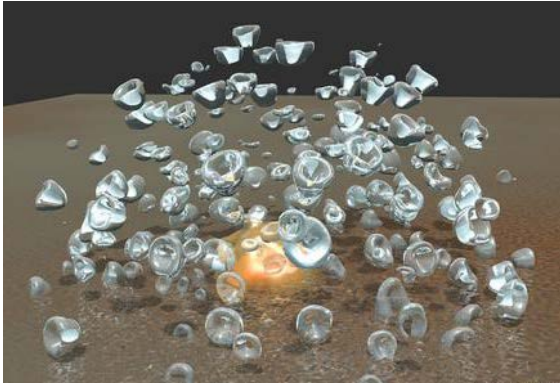
The group under **Prof Andreas Wallraff** has managed to teleport information in a solid-state system. This was achieved thanks to a chip that stores and processes information in accordance with the laws of quantum physics as opposed to those of physics.



### Implantable slimming aid

The group of **Prof Martin Fussenegger** has constructed an implant that monitors blood-fat values and makes an appetite suppressant. In response to excessive levels, it produces a messenger substance that signals satiety to the body. The result is an early warning system and treatment in one device.

## Exciting research results – some examples



### World record in simulations

The group around **Prof Petros Koumoutsakos** simulated 15,000 simultaneously imploding gas bubbles. They thereby achieved a 150-fold improvement on previous experiments. The results are hugely significant, for instance in medicine when removing kidney stones. The team won the **Gordon Bell Prize** for its achievements.



### Fast calculations with little energy

The new **Piz Daint** supercomputer at the CSCS is not only the fastest computer in Europe, but also the most energy-efficient petaflop system in the world. The basis for this are GPU processors from the gaming and graphics industries. The researchers hope to achieve even better calculations of weather models.

## Exciting research results – some examples



### Pouring concrete without formwork

**ETH architects and construction materials specialists** have developed a special method to make construction elements from plastically mouldable concrete. The researchers use digital design processes and robot-assisted production methods.



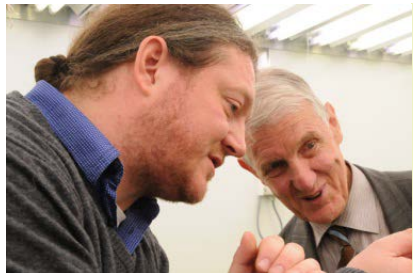
### Almost real

The body cannot independently regenerate ears after injury. Ear cartilages do not contain nerves or blood vessels. Thanks to a precise analysis of its properties, a team under **Kathryn Stok** from the Institute for Biomechanics can now create very precise ear cup implants.

## Awards in 2013 – a small selection



The Academy of Motion and Picture Arts and Sciences awarded **Prof Markus Gross** and two other scientists from the US a "**Tech-Oscar**". They have developed a method that is used by leading special effects studios to simulate smoke and explosions in Hollywood films.



**Prof Olivier Voinnet** won the **Rössler Prize 2013**. Together with more than two dozen employees, he is examining the functions and roles of small interfering RNA molecules in the regulation of vital processes such as immune response.



**Prof Maksym Kovalenko** won the **Ruzicka Prize** for his work in the area of the chemistry of inorganic nanostructures for application in electronics and lithium-ion batteries.



## Awards in 2013 – a small selection



**Nine machine engineering students** built a "streamliner tandem" in their focus project. The pilot faces the driving direction in a semi-lying position, while the second driver lies under him head-first. They travelled 83 km in one hour with it – a new world record.



**Virtamed**, an ETH spin-off, won the Swiss Economic Award as the best hi-tech company. The start-up develops, produces and sells various virtual reality simulators. This allows doctors to practice efficiently outside the operating theatre and without any danger to patients.



ETH Zurich was honoured by the national association ICT Vocational Training Switzerland as one of the **best training facilities** for information and communication technology (ICT). This means that ETH Zurich is an institution that is particularly committed to training.

## Successful spin-offs

- The **100 best Swiss start-ups** included 25 ETH spin-offs in 2013
- Four of them made it into the **top ten**:

BIOVERSYS

insphero

Dacuda

GETYOURGUIDE



- **Prize money** of ETH spin-offs in 2013: approx. CHF 1 million
- Won from EU projects: CHF 6 million
- Investments: some CHF 80 million

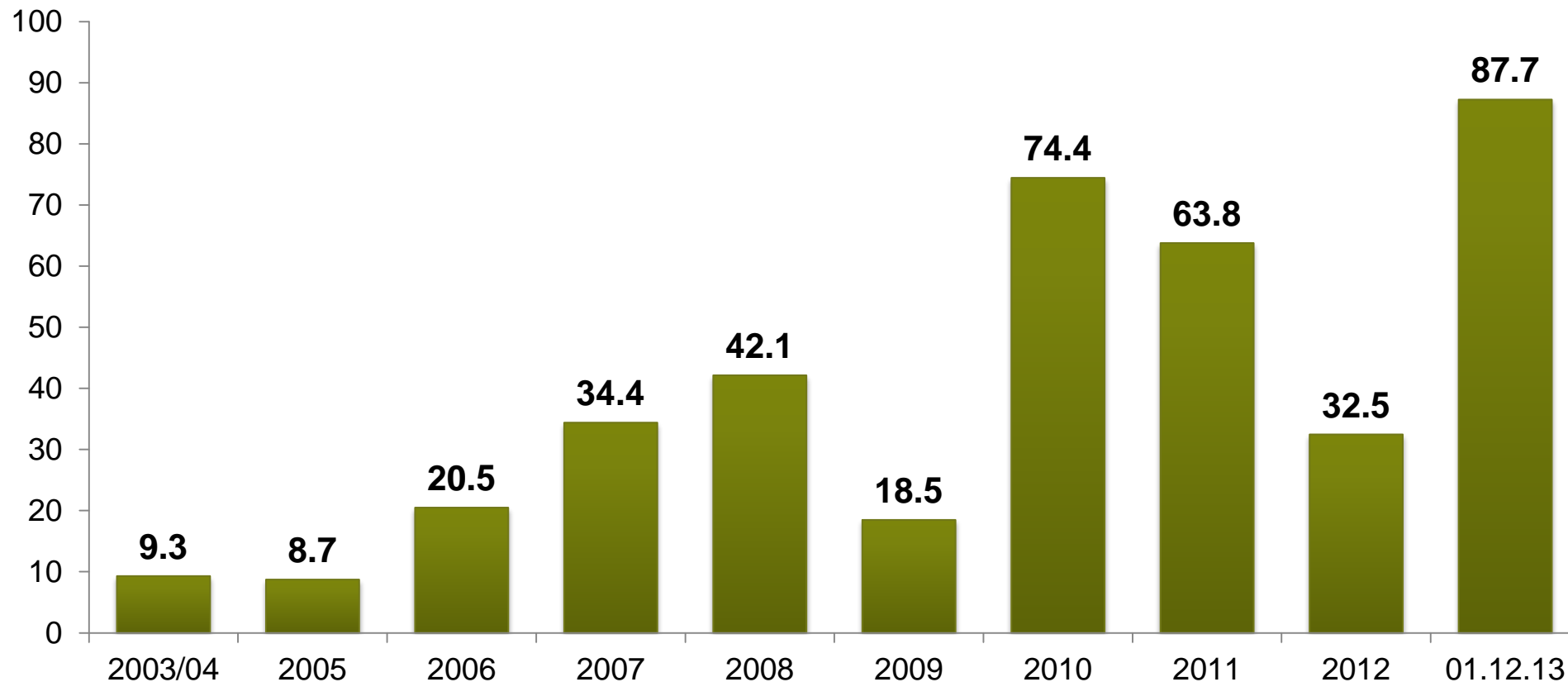
## Support for young researchers



- Second Innovation and Entrepreneurship Lab opened (ieLabs)
- Young scientists (e.g. pioneer fellows) develop first prototypes en route to their spin-off
- Support from coaches from the industry
- **Two ieLabs**
  - Centre (Leo) – engineering
  - Hönggerberg (HPL) – biosciences with biosafety-level 1 and 2 laboratory workstations

# ETH Zurich Foundation: a platform for big dreams

Growth for ETH Zurich from philanthropy: promised donations in CHF million



# ETH Zurich Foundation: a platform for big dreams

## New donations in 2013

- Max Rössler and Walter Haefner Foundation:  
CHF 50 million for the Institute of Theoretical Studies
- Werner Siemens Foundation:  
CHF 10 million for a new professorship in deep geothermal energy
- Alstom:  
CHF 2.5 million for energy seed projects
- More than 1,000 ETH employees and ETH alumni: generous donations for the Excellence Scholarship Programme





## Acceleration of the ETH strategy

Since 2008, CHF 170 million awarded for:  
20 new professorships, 150 grants and beacon research projects



Medical technology  
Prof Stephan, D-ITET patron:  
Braginsky Foundation

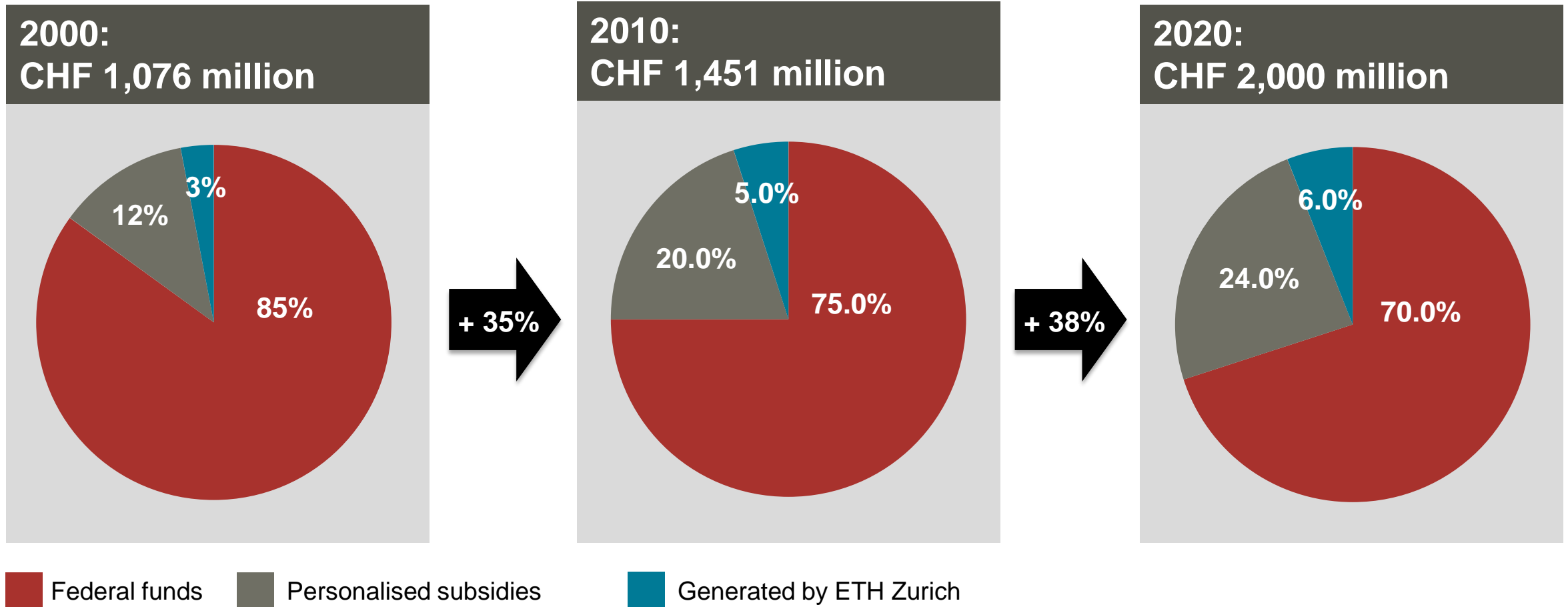


Talent  
Excellence Scholars Philippe,  
Sophie, Marianna



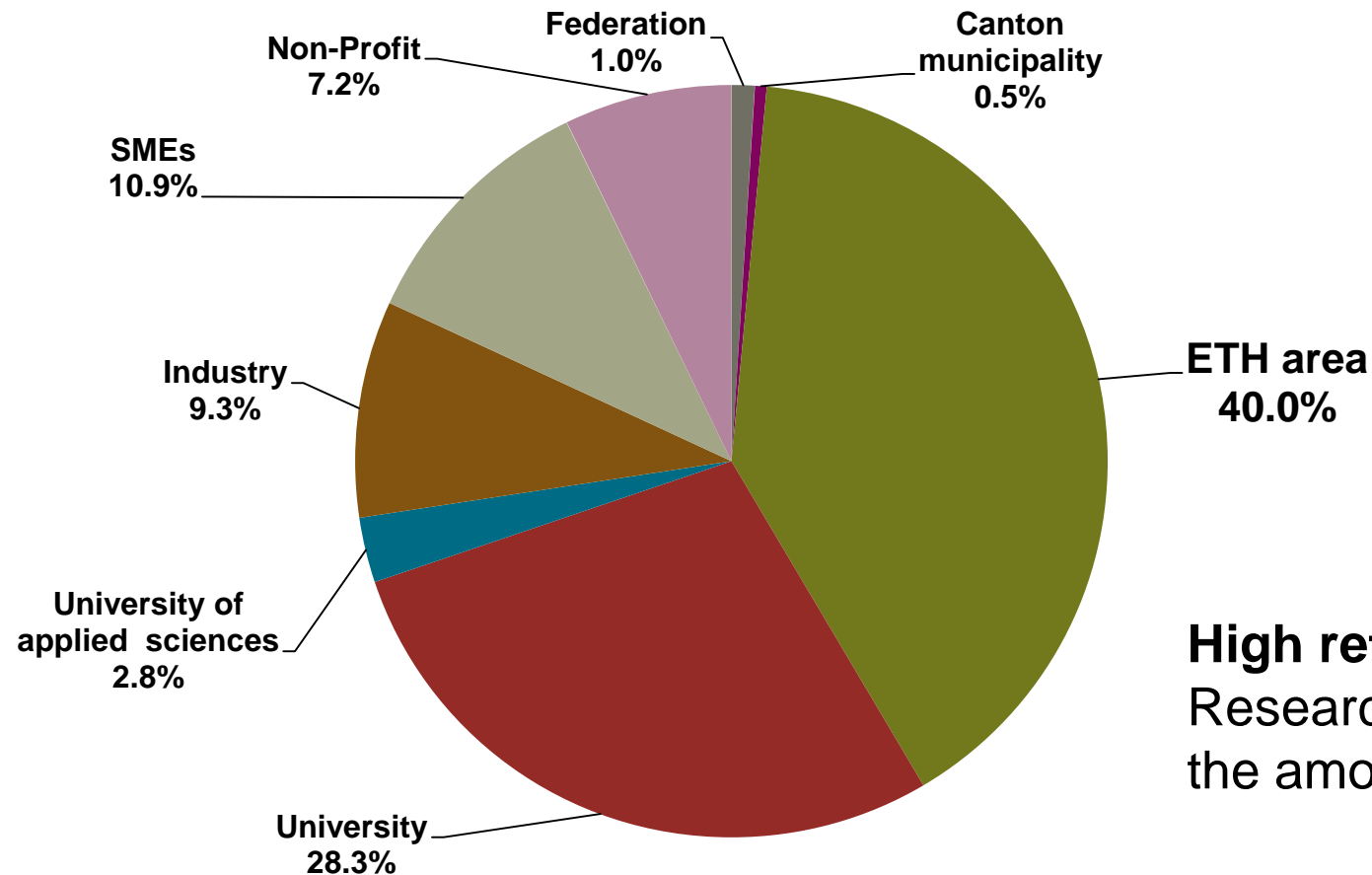
Sustainable construction  
ETH House of Natural Resources

# Financial basis broadened successfully



# Swiss participation in EU research programmes

Payments to researchers (per participant category)

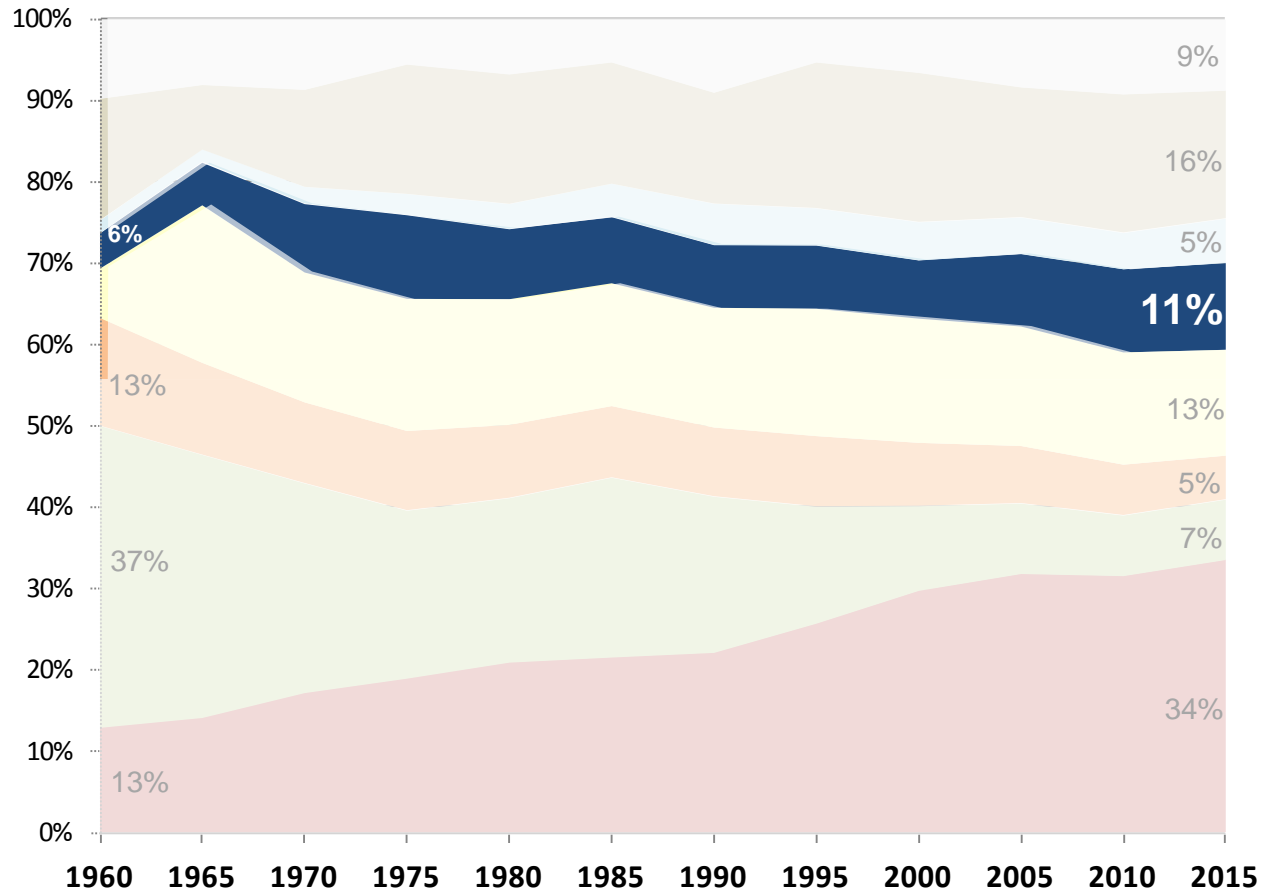


## High return rate:

Researchers in Switzerland received **1.5 times** the amount paid to the EU by Switzerland.

# The Federation acknowledges the importance of education and research

Breakdown of federal expenditure by tasks



Major **shifts** in federal expenditure since 1960  
Expenditure on education and research has **risen over the long term**

- Übrige
- Finanzen und Steuern
- Beziehungen zum Ausland
- Bildung & Forschung
- Verkehr
- Landwirtschaft & Ernährung
- Landesverteidigung
- Soziale Wohlfahrt & Gesundheit

# ETH Zurich as an economic powerhouse

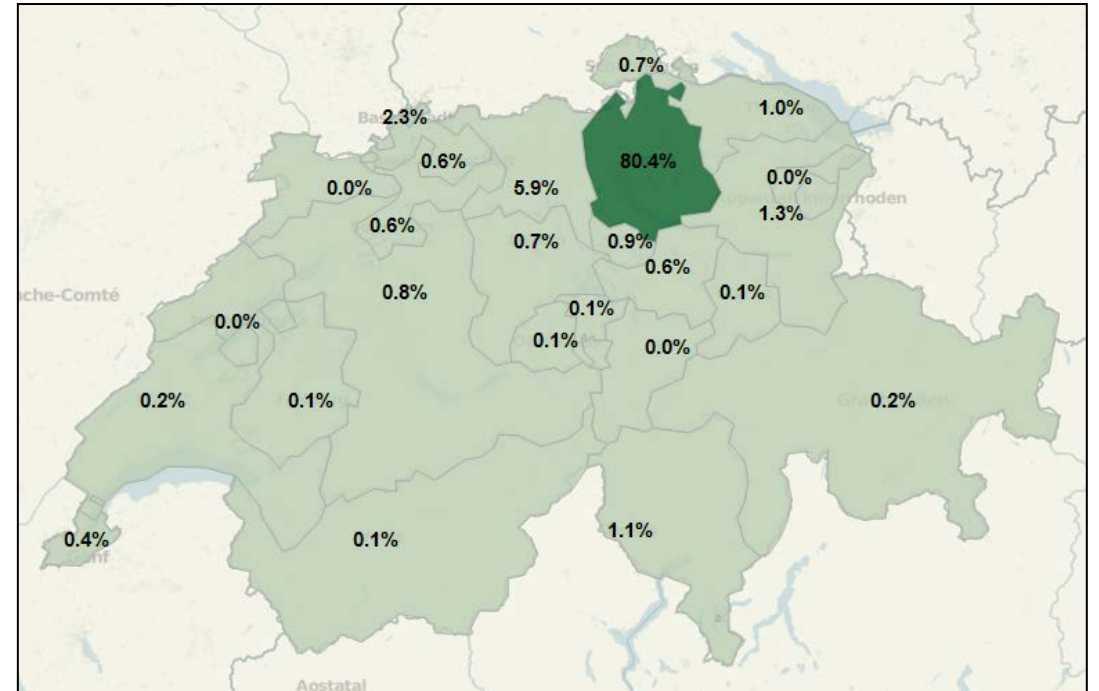
Canton of Zurich benefits strongly

2/3 of the ETH business volume remains in the canton of Zurich  
(about CHF 1 billion)

Expenditure (2012)	ETH total	Spent in the canton of Zurich
Personnel	CHF 923 million	approx. CHF 740 million
Operations and investments	CHF 544 million	approx. CHF 240 million
<b>Total</b>	<b>CHF 1,467 million</b>	<b>approx. CHF 980 million</b>

## Payment of ETH salaries:

80% is paid to employees in the canton of Zurich





# Equal! Office for equal opportunities – highlights in 2013

Exhibition in the main building: Check Your Stereotypes

- Event: 20th anniversary of the Equal! office
- Objective: to raise awareness of how gender-related stereotypes are connected with choosing degree courses or professions and careers
- The more consciously we handle stereotypes, the better we can overcome undesirable consequences.



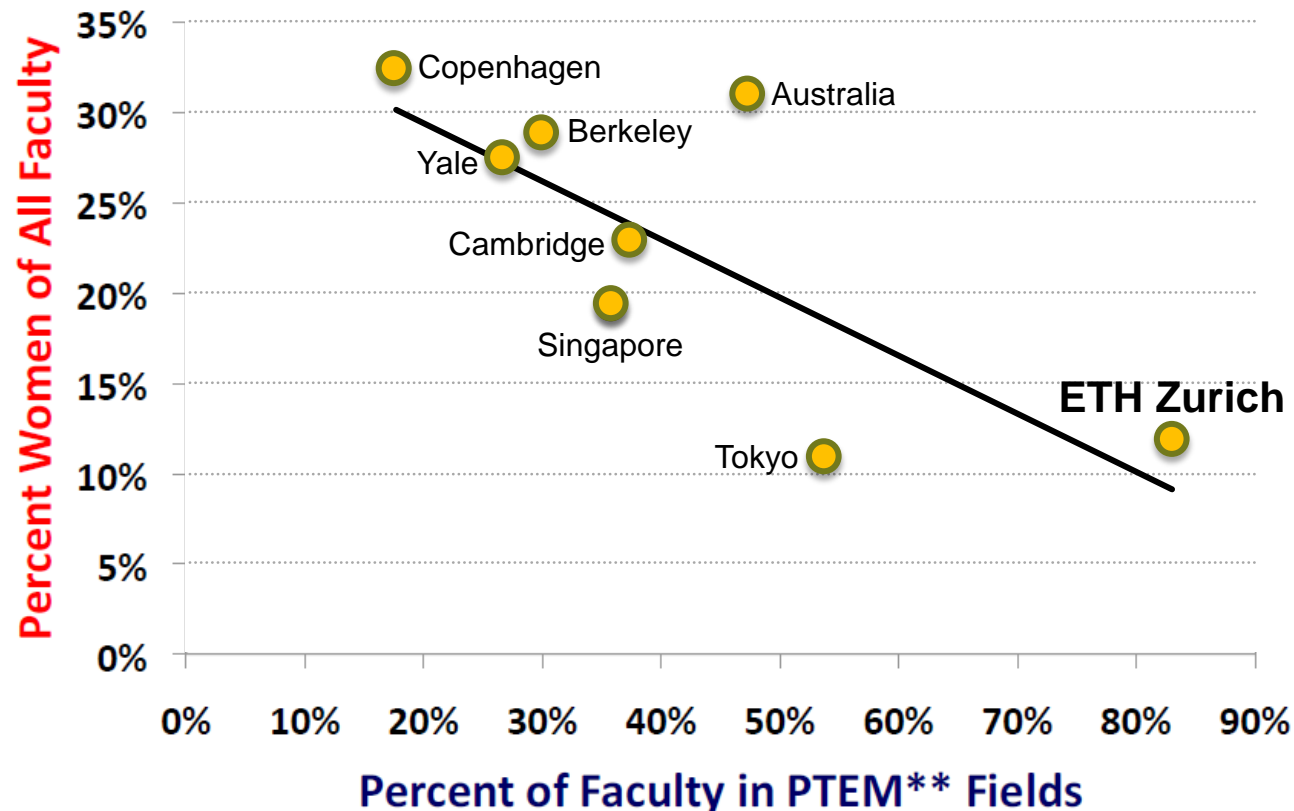
## Equal! office for equal opportunities – highlights in 2013

- March 2013: **Legacies of Women Forum** at ETH Zurich
- Meeting of the **IARU Gender representatives** at the end of October
- New gender monitoring report: share of approx. **30% assistant professors at ETH** (same proportion of women as for students)
- Support by the Executive Board for the **Women Professors' Forum (WPF)** by the coordinating office for 2 years



# Share of female professors: not better, but also no worse than the competition

Scatterplot of IARU Institutions\*: **Percent of Faculty in PTEM\*\*** by **Percent Women among All Faculty**, 2012



\*Peking did not have specific data for PTEM faculty.

\*\*PTEM includes: Physical Sciences, Technology, Engineering, and Mathematics.

# Compliance Guide

Rules at a glance – they give us clarity

## Objectives:

- To strengthen the culture of independent responsibility and autonomy
- To increase the awareness for reputation and responsibilities
- To communicate framework conditions for leadership
- To provide guidance in respect of the key rules
- The correct conduct of everybody involved makes a contribution to integrity



# Renewal projects in communication

- New corporate design – rolled out in mid-2013
- Successful start of ETH web
  - ETH website
  - Intranet and student portal
  - Specialist sites
- New “life” employee magazine in German and English





# Scientifica 2013

"The risks we take and when we take them"

## Successful major event of ETH and UZH

- More than 20,000 enthusiastic visitors explored their own willingness to take risks on 31 August and 1 September
- Exhibition, short lectures and podiums, events for children and on the stage in the Scientifica tent and much more facilitated a lively exchange between science and the general public





# ETH Zurich merchandising items

Available in the ETH Store since the start of 2013

- **A joint venture** between ETH Zurich, the Polybuchhandlung book store and SAB
- **Exclusive items** in ETH design for the office, at home or on the go
- Also available at:  
HPI building Hönggerberg (shop-in-shop in the joint store of the Polybuchhandlung and SAB) as well as in the web shop (store.ethz.ch)



## Objectives for 2014

ETH is in outstanding form, it is rated highly both in Switzerland and abroad. Precisely for that reason, the expectations placed on the institution by politicians, business and society are exceptionally high.

### We want:

- ... the ETH to be perceived as an outstanding **education facility** throughout the world. The **excellent students** from Switzerland and abroad as well as its autonomy guarantee that the ETH can continue to attract **top talent as professors** in future.
- ... to maintain and enhance **the strong basis in the foundations** of education and research, specifically, for instance, in the area of **quantum engineering**.

## Some of the objectives for 2014

### We want:

- ... to establish **ethical standards for collaborating with business** in Switzerland and abroad.
- ... to continue using our knowledge in natural sciences and engineering to develop **proposed solutions to the urgent issues of our time** (energy, water, health care, equal opportunities).
- ... to entrust a flourishing university with incoming ETH President **Lino Guzzella** , who will take office from 2015, for him to manage and enhance.

*To maintain the leading position of ETH Zurich, **the competent and committed effort of all employees is required – I am counting on you!***



# Your questions and comments



## Questions and comments

- Higher tuition fees for foreign students: why?
- Confirmation of attendance obligation: consequences of the trial-based waiver
- Support for the cultural integration of scientists from abroad (countries where other languages are spoken)?
- Quantity or quality in research



# Your further questions and comments





# Awarding "The Golden Tricycle"

by AVETH and Equal!, the office for equal opportunities



**The Executive Board thanks you for your successful contribution in 2013 and wishes you and your families a Merry Christmas and a Happy New Year.**

