

ETH zürich

Stellenbosch University, University of Cape Town, University of Pretoria, University of the Witwatersrand

**Welcome to ETH Zurich!**

Anders Hagström, ETH Global



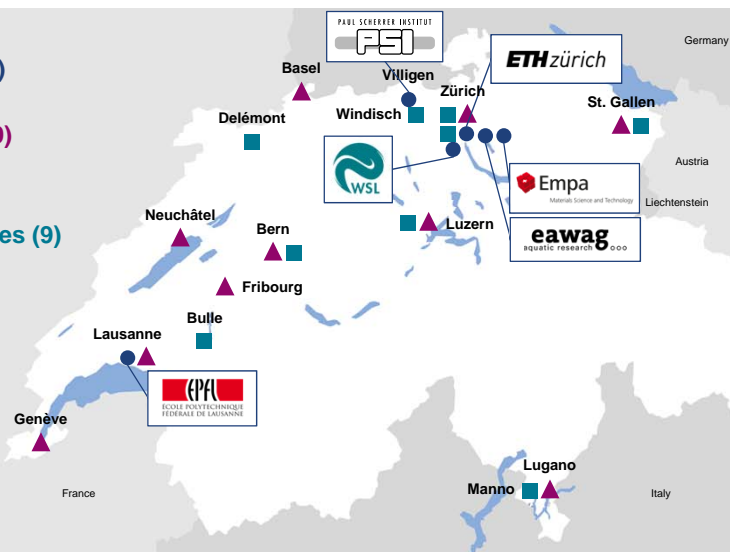
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**Swiss Higher Education System**

ETH Domain (6)

Universities (10)

Universities of Applied Sciences (9)



Source: www.sbfi.admin.ch

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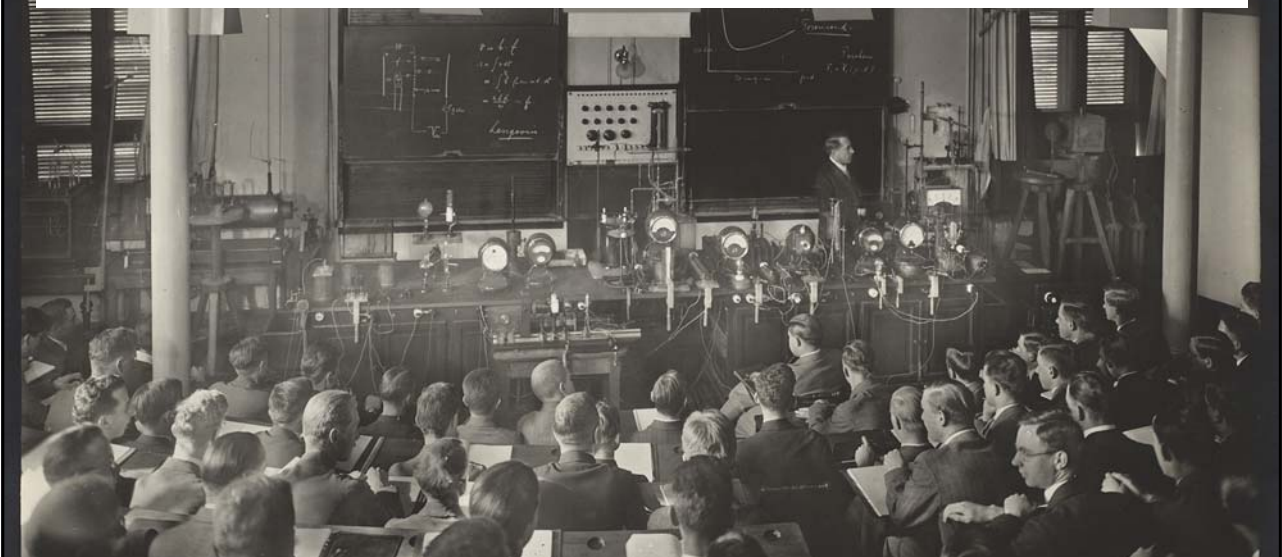
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**“Polytechnikum” founded in 1855 –  
Driving Force of Industrialization in Switzerland**



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**A Physics Lecture back in 1928...**



## George Washington Bridge (1931)



Source: ETH-Bibliothek, Bildarchiv

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## 21 Nobel Laureates – Tradition of Scientific Excellence

1901	Physics	<b>Wilhelm Conrad Röntgen</b>
1912	Chemistry	<b>Alfred Werner</b>
1915	Chemistry	<b>Richard Willstätter</b>
1918	Chemistry	<b>Fritz Haber</b>
1920	Physics	<b>Charles-Edouard Guillaume</b>
1921	Physics	<b>Albert Einstein</b>
1936	Chemistry	<b>Peter Debye</b>
1938	Chemistry	<b>Richard Kuhn</b>
1939	Chemistry	<b>Leopold Ruzicka</b>
1943	Physics	<b>Otto Stern</b>
1945	Physics	<b>Wolfgang Pauli</b>
1950	Medicine	<b>Tadeusz Reichstein</b>
1952	Physics	<b>Felix Bloch</b>
1953	Chemistry	<b>Hermann Staudinger</b>
1975	Chemistry	<b>Vladimir Prelog</b>
1978	Medicine	<b>Werner Arber</b>
1986	Physics	<b>Heinrich Rohrer</b>
1987	Physics	<b>Georg Bednorz / Alexander Müller</b>
1991	Chemistry	<b>Richard Ernst</b>
2002	Chemistry	<b>Kurt Wüthrich</b>



Albert Einstein



Leopold Ruzicka



Wolfgang Pauli



Vladimir Prelog



Richard Ernst



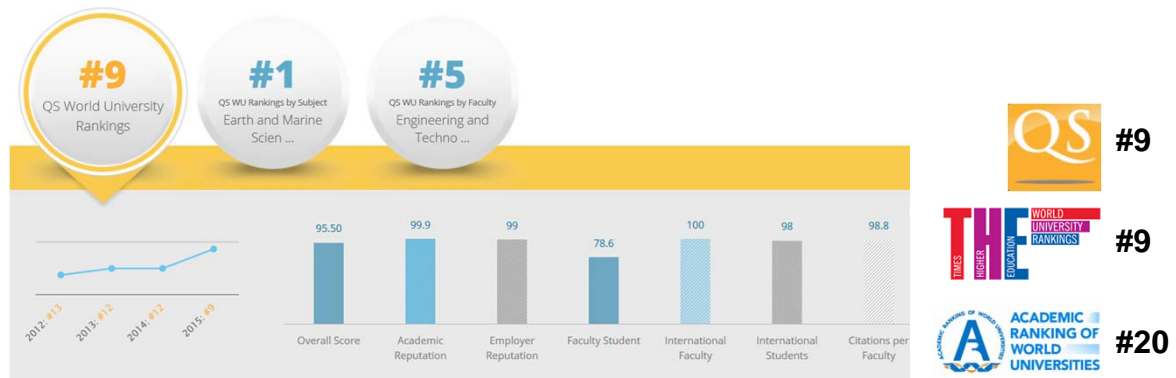
Kurt Wüthrich



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## International Rankings – ETH Zurich Among the Top Ten



Graphics: www.topuniversities.com

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## ETH Zurich's Three-fold Mission

### Education

Level / Origin	Swiss	International
Bachelor	86%	14%
Master	64%	36%
Doctorate	33%	67%

### Research



### Tech Transfer



Images: iStock.com and ETH Zürich

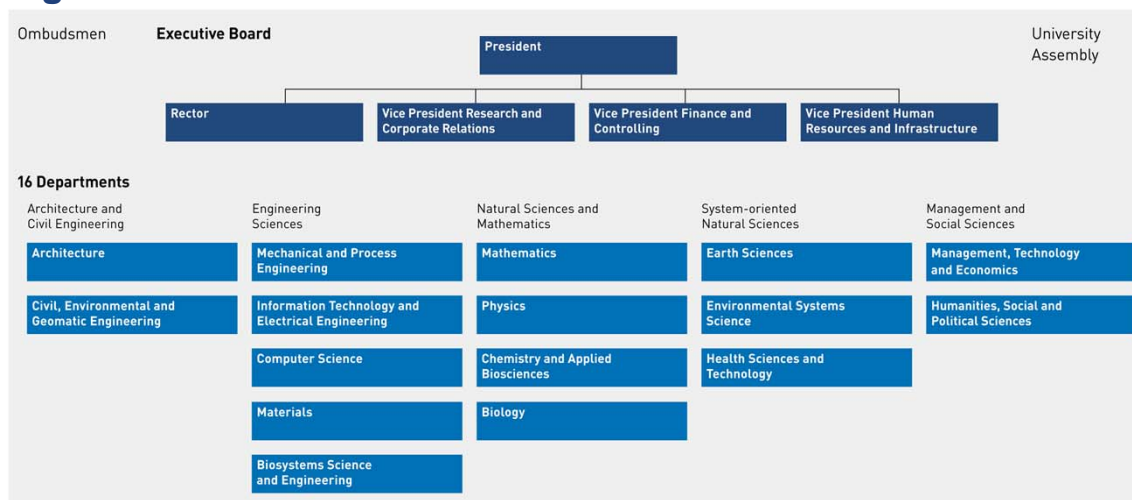
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## Key Figures (2015)

		% International
<b>Students (headcount)</b>	<b>19 233</b>	<b>38%</b>
<b>Undergraduate (Bachelor)</b>	<b>9 117</b>	<b>19%</b>
<b>Graduate</b>	<b>9 481</b>	
– Master	5 450	39%
– Doctorate	4 031	70%
Master of Advanced Studies/MBA	740	37%
Exchange/Visiting Students	416	
<b>Professors (FTEs*)</b>	<b>467</b>	<b>69%</b>
of which assistant professors	80	
<b>Research Staff (incl. doctoral students) (FTEs*)</b>	<b>5 065</b>	<b>69%</b>
<b>Administrative and Infrastructure staff</b>	<b>2 437</b>	<b>23%</b>
<b>Total budget</b>	<b>1 651 million CHF</b>	

\* FTE: full-time equivalents

## Organisation



## Competence centres for promoting interdisciplinary cooperation

### ... at ETH Zurich

- Competence Centre for Materials and Processes (CC-MaP)
- Energy Science Center (ESC)
- Risk Center
- Teaching and Learning (EducETH)
- World Food System Center (WFSC)

### ... within ETH Domain

- Biomedical Imaging (NCCBI)
- Energy and Mobility (CEEM-CH)
- Environment and Sustainability (CCES)
- Materials Science (CCMX)

### ... with other institutions

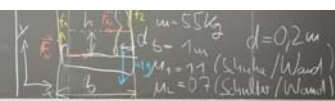
- Center for Climate Systems Modeling (C2SM)
- Center for Experimental and Clinical Imaging Technologies (EXCITE) Zurich
- Neuroscience Center Zurich (ZNZ)
- Zurich-Basel Plant Science Center (PSC)
- Competence Center for Personalized Medicine (CC-PM)



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## Bachelor Programmes – Building on a Solid Foundation

1) Keine translatorische Bewegung / Beschleunigung  
 $\Rightarrow \vec{F}_{\text{result}} = \vec{0}$



normales horizontales Druck  
 gegen die Wand?  
 Druck  $\hat{=} |\vec{F}_N| \rightarrow \sum \vec{F}_x = 0$

für  $\sum \vec{F}_y = 0$ :  $f_1 + f_2 = mg$   
 Situation gerade vor dem Rutschen  
 $M_1 F_N + M_2 F_N = mg \Rightarrow F_N = 300N$

um dabei stabil zu sein,  
 was muß der Abstand  
 h sein?  
 $\sum \vec{M} = \vec{0}$  um beliebige Achse

wähle Rotationsachse  
 $\perp$  zur Zeichenebene  
 um die Schulter  
 $-f_1 b + F_N h + mg d = 0$   
 $\Rightarrow h \approx 0.74m$

für  $F_N = 300N$  und  $h = 0.74m$   
 stabil?  
 $\sum \vec{M} = \vec{0} \Rightarrow f_1 = \frac{1}{b} (F_N h + mg d)$   
 $= 218N$  OK  
 anderssch:  $M_2 F_N = 327N$

$\sum \vec{F}_y = \vec{0} \Rightarrow f_2 = mg - f_1 = 327N$   
 anderssch:  $M_2 F_N = 209N$   
 bevor Kippen: unterschätzt  
 $\Rightarrow$  statisches Gleichgewicht

kurz vor dem Kippen  
 Reibkraft und Normalkraft  
 greifen am Punkt A an

Bedingung für stat. Gleichgewicht  
 $\sum \vec{F} = \vec{0}$  un-Richt:  $F_N - mg = 0 \Rightarrow F_N = mg$   
 un-Richt:  $F_N = mg$



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## Master Programmes – Getting fit for Competition



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## Doctorate – for Research Excellence



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## Education beyond Knowledge Transfer



Image: ETH Zurich / Alessandro Della Bella

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## Education in Mechanical Engineering – the Innovation Project



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## The “Student Project House” – Think-space, Make-space



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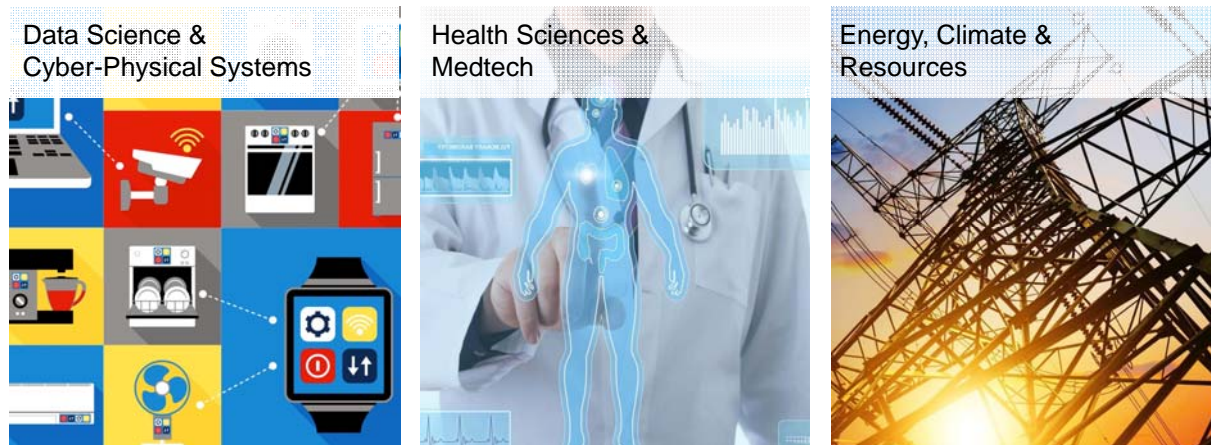
## Basic Research Leads to Breakthroughs and Innovation



Bild (Montage): iStock.com – Merzavka /ETH-Bibliothek Zürich, Bildarchiv

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## Strategic Focus Areas in Research and Teaching



Bilder: iStock.com und ETH Zürich

## Fostering the Entrepreneurial Spirit





