



## International Ranking of Universities

In response to the growing international competition among universities, systems of ranking are developed which are based on various quantitative and qualitative methods. The media and the active players in the areas of education and research frequently refer to rankings, but they are also met by critique due to the random selection of criteria.

### I. Shanghai Jiao Tong University: Academic Ranking of World Universities

The universities selected for analysis in the Shanghai-Ranking are compared and evaluated based on six quantitative indicators (cf. table 1). The indicators and their relative weight place the focus on research: each of the following two indicators account for 20 %: the quality of the staff and the research output of the university. The quality of the education and the size of the university each accounts for 10 %. For each indicator, the highest scoring institution is assigned a score of 100, and other institutions are calculated as a percentage of the top score. Scores for each indicator are weighted as shown below to arrive at a final overall score for an institution.

In the Shanghai-Ranking 2005 and 2006 two considerable changes were seen in comparison with 2004. First, the fifth indicator concerning research output was expanded to include the social sciences and arts and humanities citation index. Second, in the calculation of published articles the social sciences and the arts and humanities were counted twice in the total citation index. Otherwise, the methodology of the ranking remains unchanged since 2004.

**Table 1 : Indicators and Weight in Shanghai-Ranking 2005 and 2006**

Area	Indicators	Weight
Quality of education	1. Alumni of an institution winning Nobel Prizes and Fields Medals between 1911 and 2005.	10 %
Quality of staff	2. Staff of an institution winning Nobel Prize in Physics, Chemistry, Medicine, and Economics and Fields Medals between 1911 and 2005.	20 %
	3. Highly cited researchers in 21 broad subject categories, including life science, medicine, physics, engineering and social sciences between 1981 and 1999.	20 %
Research Output	4. Articles published in <i>Nature</i> and <i>Science</i> between 2001-2005 (N&S).	20 %
	5. Articles in <i>Web of Science (SCI Expanded &amp; SSCI Expanded)</i> in 2005 and in Social Science and Arts & Humanities citation index.	20 %
Size of the institution	6. The weighted score of the above five indicators divided by the number of full-time equivalent academic staff. If the number of academic staff for institutions of a country cannot be obtained, the weighted scores of the above five indicators is used.	10 %

Notable in the Shanghai-Ranking 2006 is the marked dominance by American universities. The ranking is headed by the American elite institutions of Harvard and Stanford. Altogether three non-American universities can be found in the top 20: The University of Cambridge (2), the university of Oxford (10), and the University of Tokyo (19). The highest ranking Swiss university is the ETH Zurich (27). Also relative well positioned are the universities of Zurich (58) and Basel (81). Considering the European universities alone, the ETH Zurich is ranked number 5 after 4 British universities and is then according to the Shanghai-ranking the best university on the European continent. In the European list, the university of Zurich is ranked 14, University of Basel 25. Also included among the best 200 European universities are the Universities of Berne and Geneva and the ETH Lausanne.

As seen in table 2, the results of the Shanghai-Rankings 2006, with a few exceptions, remains the same as the previous year. This is true both for the different rankings in general and for the positions of the Swiss universities more specifically.

**Table 2: Top-10 of the Shanghai-Rankings 2006 and 2005, positions of Swiss Universities**

2006			2005		
Rank	Worldwide TOP 500 (compared to 05)	Europe TOP 100 (compared to 05)	Rank	Worldwide (compared to 04)	Europe (compared to 04)
1	Harvard University, USA, (-)	Cambridge University, UK, (-)	1	Harvard University, USA, (-)	Cambridge University, UK, (-)
2	Cambridge University, UK, (-)	Oxford University, UK, (-)	2	Cambridge Univ., UK, (+1)	Oxford University, UK, (-)
3	Stanford University, USA, (-)	Imperial College London, UK, (-)	3	Stanford Univ., USA, (-1)	Imperial College London, UK, (-)
4	Univ. of California, Berkeley, USA, (-)	University College London, UK, (-)	4	Univ. of California, Berkeley, USA, (-)	University College London, UK, (-)
5	Massachusetts Inst. of Tech., USA, (-)	ETH Zurich, CH, (-)	5	Massachusetts Institute of Technology, USA, (-)	ETH Zurich, CH, (-)
6	California Institute of Technology, USA, (-)	Univ. Utrecht, NL, (-)	6	California Institute of Technology, USA, (-)	Univ. Utrecht, NL, (-)
7	Columbia University, USA, (-)	Univ. Paris 06, FR, (+1)	7	Columbia University, USA, (+2)	Karolinska Institut Stockholm, SWE, (+2)
8	Princeton University, USA, (-)	Karolinska Institut Stockholm, SWE, (-1)	8	Princeton University, USA, (-1)	Univ. Paris 06, FR, (-1)
8	Univ. of Chicago, USA, (+1)	9. Manchester Univ., UK	9	Univ. of Chicago, USA, (+1)	Univ. of Edinburgh, UK, (+1)
10	Oxford University, UK	Univ. Munich, D, (-)	10	Oxford University, UK, (-2)	Univ. Munich, D, (+1)
<b>Swiss universities:</b>		<b>remaining Swiss universities:</b>	<b>Swiss universities:</b>		<b>remaining Swiss universities:</b>
27	ETH Zurich (-)		27	ETH Zurich (-)	
58	Univ. Zurich (-1)	14. Univ. Zurich (-1)	57	Univ. Zurich (-)	13. Univ. Zurich (-)
81	Univ. Basel (+6)	25. Univ. Basel (+3)	87	Univ. Basel (+4)	28. Univ. Basel (+3)
102-150	Univ. Geneva (-)	35-56. Univ. Geneva (-)	101-152	Univ. Geneva	36-56. Univ. Geneva (-)
102-150	EPF Lausanne (+)	35-56. EPF Lausanne (+)	153-202	ETH Lausanne	57-79. ETH Lausanne (-)
151-200	Univ. Berne (-)	57-78. Univ. Berne	153-202	Univ. Berne	57-79. Univ. Berne (-)
201-300	Univ. Lausanne	79-122. Univ. Lausanne	301-400	Univ. Lausanne	
401-500	Univ. Freiburg	172-207. Univ. Freiburg	401-500	Univ. Freiburg	

In official comments to the rankings, the authors mention as limitation that the quality of a university cannot be measured by mere numbers and the difficulty in obtaining internationally comparable data. Due to the less than ideal data collection, decisive factors, such as the rate of satisfaction among students and staff or the quality of teaching cannot be included in the analysis. Besides these general shortcomings mentioned by the authors themselves, various other issues critical of the Shanghai-rankings have been raised which can be briefly summarized as follows:

- Due to the overproportionate weighting of bibliometric indicators (indicators 3, 4 and 5), universities with strong natural science departments in anglophone countries are favoured.
- Elite universities specializing in the areas of social sciences and/or liberal arts are either not mentioned at all in the Shanghai-Rankings or receive a very poor ranking because of the chosen indicators, especially the number of publications in *Science* and *Nature*.
- The field of teaching is in the ranking only considered with the somewhat questionable indicator 1 „Alumni winning Nobel Prize or Fields Medal.”
- Because of the very high degree of aggregation (general impression based on 6 quantifiable indicators) the ranking is of superficial and limited importance.

## II. The Times Higher World University Rankings

The World University Ranking of the British Times Higher Education Supplement produces a worldwide ranking of 200 universities based on 5 qualitative and quantitative indicators. The Ranking was carried out for the first time in 2004. Altogether 300 universities, identified by scientific experts, were analyzed. In addition to a global ranking, separate rankings were made for Europe and North America (top 50) as well as for the rest of the world (top 40). In contrast with the Shanghai-ranking, the Times-ranking includes a globally executed Peer Review: 1300 academics from 88 countries and 5 continents have evaluated the universities in the fields in which they are considered experts. The Times-Ranking is then based on the reputation of the universities among scholars in each discipline. In 2004, this Peer Review accounted for 50 % of the total number of points for each university. In order to establish the employment rate of the current graduates, the Times ranking in 2005 introduced as a new criterion an employer survey carried out among recruiters at international corporations. Responses from 333 recruiters asked to identify the 20 best universities whose graduates they prefer to employ were given 10% weight. Hence the weight of the Peer Review indicator was lowered, but at 40% remained the most important indicator.

**Table 3: Indicators and Weight in the Times Ranking**

Area	Indicator	Weight	
		2004	2005 /2006
<b>International reputation of university</b>	1. Peer Review: 1300 leading scholars evaluate universities in specific research areas.	50 %	40 %
<b>International reputation among recruiters</b>	(2) Worldwide interviews with 333 recruiters at international cooperations regarding the 20 universities with the most qualified graduates.	-	10 %
<b>International research impact</b>	2. Number of citations in <i>Thomson Scientific</i> Database per faculty member.	20 %	20 %
<b>Teaching quality</b>	3. Student/faculty ratio	20 %	20 %
<b>International outlook</b>	4. Number of international students	5 %	5 %
<b>International outlook</b>	5. Number of international faculty members	5 %	5 %

According to the results of the Times-Rankings 2004 no one country holds a monopoly on excellence in university education. In the ranking of the 200 best universities, altogether 29 countries are represented (7 countries in the top 20). The clear dominance of US universities, which account for 7 out of

the top-10 universities worldwide, is explained by the authors as resulting from the specific conditions of these institutions (cf. table 4). These reflect, on the one hand, a high degree of political independence, and on the other hand, large endowments combined with an alumni culture and a tax system which favours an effective growth of these institutions. In 2004, of the Swiss universities, only the two ETHs made it into the list of the 300 universities considered by the rankings. In 2005 and 2006, however, 7 universities are ranked.

**Table 4: Times Ranking Top 10 in 2005 and 2006: Worldwide and Europe**

2006			2005		
Rank	Worldwide (compared to 05)	Europe Top 50 (compared to 05)	Rank	Worldwide (compared to 04)	Europe Top 50 (compared to 04)
1	Harvard Univ., USA, (-)	Cambridge Univ., UK, (-)	1	Harvard Univ., USA, (-)	Cambridge Univ., UK, (+1)
2	Cambridge University, UK, (+1)	Oxford Univ., UK, (-)	2	Massachusetts Inst. Of Tech., USA, (+1)	Oxford Univ., UK, (-1)
3	Oxford Univ., UK, (+1)	Imperial College London, UK, (+2)	3	Cambridge University, UK, (+3)	Ecole Polytechnique, FR (+3)
4=	Massachusetts Inst. of Tech., USA, (-2)	London School of Economics, UK, (-)	4	Oxford Univ., UK, (+1)	London School of Economics, UK, (-)
4=	Yale Univ., USA, (+3)	5. Ecole Normale Supérieure, Paris (+2)	5	Stanford Univ., USA, (+2)	Imperial College London, UK, (-)
6	Stanford Univ., USA, (-1)	<b>ETH Zurich, CH, (-)</b>	6	Univ. of California, Berkeley, USA, (-4)	<b>ETH Zurich, CH, (-3)</b>
7	California Inst. of Tech., USA, (+1)	Univ. College London, UK, (-)	7	Yale Univ., USA, (+1)	Ecole Normale Supérieure, Paris, FR, (-)
8	Univ. of California, Berkeley, USA, (-2)	Edinburgh Univ. UK, (-)	8	California Inst. Of Tech., USA, (-4)	Univ. College London, UK, (+1)
9	Imperial College London, UK, (+4)	Ecole Polytechnique, FR (-6)	9	Princeton Univ., US (-)	Edinburgh Univ. UK, (+4)
10	Princeton Univ., US (-1)	<b>Univ. Geneva (+20)</b>	10	Ecole Polytechnique, FR, (+17)	<b>ETH Lausanne, CH, (-2)</b>
<b>Swiss universities:</b>		<b>Additional Swiss universities:</b>	<b>Swiss universities:</b>		<b>Additional Swiss universities</b>
24	ETH Zurich, (-3)	16. ETH Lausanne, CH, (-6)	21	ETH Zurich, (-11)	28. Univ. Zurich (new)
39	Univ. Geneva, (+49)	23. Univ. Basel, (new)	34	ETH Lausanne, (-2)	30. Univ. Geneva (new)
64	ETH Lausanne, (-30)	31. Univ. Lausanne (new)	85	Univ. Zurich, (new)	
75	Univ. Basel, (+52)	45. Univ. Zurich (-17)	88	Univ. Geneva, (new)	
89	Univ. Lausanne (+44)		127	Univ. Basel, (new)	
109	Univ. Zurich, (-24)		133	Univ. Lausanne (new)	
178	Univ. Berne (new)		150	Univ. St Gallen (new)	

Harvard University successfully defended its leading position in 2006. In addition, 7 US universities continued to be ranked among the 10 best universities. Prominent exceptions are, likewise identical to the previous year, the two British universities of Cambridge and Oxford. In comparison with 2004, ETH Zurich lost 11 positions on the rankings in 2005, and fell back to the 21st position from the 10th. It is thus replaced by the Ecole Polytechnique in Paris, which went up from 27 to 10 on the ranking, as the best university in continental Europe.

In 2006 ETH Zurich went down another three positions. The ETH Lausanne is ranked 64 in 2006. Five cantonal universities made the leap into the top 200 in 2005: the university of Zurich (85), the

university of Geneva (88), university of Basel (127), the university of Lausanne (133) and the university of St Gallen (150). En 2006, the university of Bern joins the ranking in position 178 and St-Gall is no more ranked.

In the European list, the two ETH achieved the excellent rankings of 6 (Zurich) and 16 (Lausanne) in 2006. The pronounced decline of the position of the ETH Zurich is primarily caused by a significant drop in the number of cited research publications. Whereas the ETH Zurich the previous year totalled 60 out of 100 possible points in this category, the 2005 ranking only accorded it 8 points. One possible explanation might be the lack of consistent references to the name of the institution internationally<sup>1</sup>.

Various points of criticism have been raised concerning the Times-Ranking:

- *Subjectivity and lack of transparency in the peer-review:* The Times ranking does not provide information about the criterion by which the peers are selected or the distribution of peers in terms of countries and disciplines. It is also not possible to trace which peers have reviewed specific academic disciplines and regions.
- Limiting the citation analysis to the Science & Social Science Citation Index results in a distortion in favour of the English language universities and a disproportionate evaluation of the natural sciences.
- The degree of aggregation of the ranking is very high: General statements about the quality of a university are made based on only 5 indicators. For that reason the significance of this ranking is to be considered somewhat limited and superficial.

The Times ranking is a first attempt - in many respects in need of improvement – to evaluate leading universities worldwide. The usage of qualitative instruments such as the peer review is a sensible and necessary addition to more common quantitative indicators. To grant the results of the peer review 40% or 50% weight, though, seems rather high.

### **III. Newsweek Top 100 Global Universities**

The ranking of the magazine Newsweek, first published in August 2006, is a combination of indicators of the Shanghai Jiao Tong (50 %: indicators 3, 4 and 5 in table 1) and the Times Higher Education (40 %: Indicators 3, 4 and 5 in table 3). For the remaining 10% the number of volumes in the library of the institution is decisive. The following universities achieved the highest rankings: 1. Harvard Univ., 2. Stanford Univ., 3. Yale Univ., 4. California Institute of Technology, 5. Univ. of California at Berkeley, 6. Univ. of Cambridge, 7. Massachusetts Institute of Technology, 8. Oxford Univ., 9. Univ. of California at San Francisco, 10. Columbia Univ.

### **IV. G-factor International University Ranking**

The G-Factor reflects the number of links on the homepages of 300 universities which refer to the same 300 universities. The links are searched and numbered with the search engine Google. This ranking shows the interrelations among these universities. At the top of this ranking is MIT, followed by Harvard and Berkeley.

### **V. Webometrics**

This ranking of Laboratorio de Internet (Spain) does not measure the quality or the reputation of an institution but how strongly universities commit themselves to provide free online access to academic papers. The data are collected with the help of the following search engines: Google, Yahoo! Search, MSN Search and Teoma. In addition, the format of the data, their visibility on the internet and their size are measured in order to establish the ranking of the universities. The 10 highest ranked universities are all American: Berkeley at the top is followed by MIT and Harvard.

---

<sup>1</sup> In scientific articles, the authors' address is sometimes not consistent. One can find for instance: ETH Zurich or Swiss Institute of Technology or Eidgenössische technische Hochschule.

Table 5 offers an overview of the positions of the Swiss universities in the above mentioned ranking systems.

**Table 5: The Position of Swiss Universities in various Worldwide and European Rankings:**

**Worldwide Rankings**

	Year	Top	ETHZ	EPFL	Basel	Berne	Freiburg	Geneva	Lausanne	Zurich
I. Shanghai Jiao Tong	2006	500	27	102-150	81	151-200	401-500	102-150	201-300	58
II. Times Higher Education	2005	200	21	34	127	X	x	88	133	85
III. Newsweek	2005	50	21	26	44	X	x	32	x	46
IV. G-Faktor	2006	300	17	99	223	202	x	87	x	109
V. Webometrics	2006	3000	47	137	348	210	625	104	525	186

**European Rankings**

	Year	Top	ETHZ	EPFL	Basel	Berne	Freiburg	Geneva	Lausanne	Zurich
I. Shanghai Jiao Tong	2006	500	5	35-56	25	57-78	172-207	35-56	79-122	14
II. Times Higher Education	2005	50	6	10	x	X	x	30	x	28
V. Webometrics	2006	100	4	28	x	58	x	14	x	49

© State Secretariat for Education and Research