Academic Ranking of World Universities by Broad Subject Fields - 2007 (ARWU-FIELD - 2007)

Ranking Methodology

1. Selection of Universities

The ranking list for ARWU - FIELD includes every institution that has any Nobel Laureates, Fields Medals, and Highly-Cited Researchers. In addition, major universities of every country with significant amount of articles indexed by Science Citation Index-Expanded (SCIE) and Social Science Citation Index (SSCI) are also included. In total, more than one thousand institutions have been actually ranked in each broad subject field. **(BACK)**

2. Definition of Broad Subject Fields

Institutions are ranked by five broad subject fields, including Natural Sciences and Mathematics (SCI), Engineering/Technology and Computer Sciences (ENG), Life and Agriculture Sciences (LIFE), Clinical Medicine and Pharmacy (MED), and Social Sciences (SOC). Arts and humanities are not ranked because of the technical difficulties in finding internationally comparable indicators with reliable data. Psychology/Psychiatry is not included in the ranking because of its multi-disciplinary characteristics. **(BACK)**

3. Ranking Criteria and Weights

Similar to ARWU, institutions are ranked according to their academic or research performance in each broad subject field. Ranking indicators include alumni and staff winning Nobel Prizes and Fields Medals, Highly Cited Researchers, articles indexed in Science Citation Index-Expanded (SCIE) and Social Science Citation Index (SSCI). Two new indicators were introduced, one is the percentage of articles published in the top 20% journals of each field, and the other is the engineering research expenditure. **(BACK)**

Indicators and Weights for ARWU - FIELD

Code	Weight	SCI	ENG	LIFE	MED	SOC
Alumni	10%	Alumni of an institution winning Fields Medals in mathematics and Nobel Prizes in Chemistry and Physics since 1951	Not Applicable	Alumni of an institution winning Nobel Prizes in Physiology or Medicine since 1951	Alumni of an institution winning Nobel Prizes in Physiology or Medicine since 1951	Alumni of an institution winning Nobel Prizes in Economics since 1951
Award	15%	Staff of an institution winning Fields Medals and Nobel Prizes in Chemistry and Physics since 1961	Not Applicable	Staff of an institution winning Nobel Prizes in Physiology or Medicine since 1961	Staff of an institution winning Nobel Prizes in Physiology or Medicine since 1961	Staff of an institution winning Nobel Prizes in Economics since 1961
				Highly cited researchers in 8 categories: ➢ Biology & Biochemistry		

HiCi	25%	Highly cited researchers in 5 categories: ➢ Mathematics ➢ Physics ➢ Chemistry ➢ Geosciences ➢ Space Sciences	Highly cited researchers in 3 categories: ➢ Engineering ➢ Computer Science ➢ Materials Science	➢ Molecular Biology & Genetics ➢ Microbiology ➢ Immunology ➢ Neuroscience ➢ Agricultural Sciences ➢ Plant & Animal Science ➢ Ecology/ Environment	Highly cited researchers in 2 categories: ➢ Clinical Medicine ➢ Pharmacology ➢ Social Sciences, General **(Partly)**	Highly cited researchers in 2 Categories: ➢ Social Sciences, General **(Partly)** ➢ Economics/ Business
PUB	25%	Articles Indexed in Science Citation Index-Expanded in **SCI** fields	Articles Indexed in Science Citation Index- Expanded in **ENG** fields	Articles Indexed in Science Citation Index- Expanded in **LIFE** fields	Articles Indexed in Science Citation Index- Expanded in **MED** fields	Articles Indexed in Social Science Citation Index in **SOC** fields
TOP	25%	Percentage of articles published in top 20% journals of **SCI** fields to that in all **SCI** journals	Percentage of articles published in top 20% journals of **ENG** fields to that in all **ENG** journals	Percentage of articles published in top 20% journals of **LIFE** fields to that in all **LIFE** journals	Percentage of articles published in top 20% journals of **MED** fields to that in all **MED** journals	Percentage of articles published in top 20% journals of **SOC** fields to that in all **SOC** journals
Fund	25%	Not Applicable	Total engineering-related research expenditures	Not Applicable	Not Applicable	Not Applicable

4. Definition of Indicators

Alumni indicates the total number of the alumni of an institution winning Nobel Prize in physics, chemistry, medicine and economics and Fields Medals in mathematics. Alumni are defined as those who obtain bachelor, Master's or doctoral degrees from the institution. Different weights are set according to the periods of obtaining degrees. The weight is 100% for alumni obtaining degrees in 1991-2000, 80% for alumni obtaining degrees in 1981-1990, 60% for alumni obtaining degrees in 1971-1980, 40% for alumni obtaining degrees in 1961-1970, and finally 20% for alumni obtaining degrees in 1951-1960. If a person obtains more than one degrees from an institution, the institution is considered once only. Nobel Laureates in Physiology or Medicine are used in both LIFE and MED ranking.

Award indicates the total number of the staff of an institution winning Nobel Prizes in physics, chemistry, medicine and economics and Fields Medals in mathematics. Staff is defined as those who work at an institution at the time of winning the prize. Different weights are set according to the periods of winning the prizes. The weight is 100% for winners in 2001-2006, 80% for winners in 1991-2000, 60% for winners in 1981-1990, 40% for winners in 1971-1980, and finally 20% for winners in 1961-1970. If a winner is affiliated with more than one institution, each institution is assigned the reciprocal of the number of institutions. For Nobel Prizes, if a prize is shared by more than one person, weights are set for winners according to their proportion of the prize. Nobel Laureates in Physiology or Medicine are used in both LIFE and MED ranking.

HiCi indicates the number of highly cited researchers in twenty subject categories

defined and provided by isihighlycited.com. These highly cited researchers are assigned to five broad subject fields. If a researcher is listed in more than one subject category, his/her weight for each category is the reciprocal of the number of categories listed. Specifically, researchers who are listed in Social Science, General Category are checked one by one, and they are reclassified into three groups according to their affiliation colleges/departments. People worked at health-related units such as medical school, school of public health and school of nursing are grouped for MED ranking, people affiliated to Psychology/Psychiatry departments are not considered for the ranking, other individuals in this category are totaled for SOC ranking.

PUB indicates the total number of articles indexed by Science Citation Index-Expanded and Social Science Citation Index in 2005. Only publications of article type are considered. Each article published by an institution is assigned into one of the six broad subject fields according to journals the article was published in (Classification of Journal Categories), including above-mentioned five broad subject fields and Interdisciplinary and Multidisciplinary Sciences. If an article is published in a multi-assigned journal (which is assigned to more than one ISI category), it is divided into related groups.

TOP indicates the percentage of articles published in the top 20% journals of each broad subject field. Top 20% journals are defined as their impact factors in the top 20% of each ISI category according to Journal Citation Report, 2005. Articles in the top journals of each ISI category are then aggregated into the six broad subject fields and the TOP is calculated as the number of articles in the top 20% journals of a particular broad subject field to that in all journals of the field. A threshold was set for the minimum number of top articles in each broad subject field. The threshold was defined as 10% of the average of top articles by the top three institutions in each broad subject field. If the threshold of a particular field is less than 50, then 50 is used. If the number of top articles of an institution does not meet the minimum threshold, the TOP indicator is not calculated for the institution and its weight is relocated to other indicators. Only publications of article type are considered.

Fund indicates the total engineering-related research expenditures in 2004. This indicator is only used for ENG ranking. If the data for all institutions of a country cannot be obtained, the Fund indicator will not be considered for the institutions and its weight will be relocated to other indicators. For this ranking, the amounts of engineering-related research expenditures are obtained only for institutions in USA and some institutions in Canada.   **(BACK)**

5. Scoring Procedures

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. The distribution of data for each indicator is examined for any significant distorting effect and standard statistical techniques are used to adjust the indicator if necessary. Scores for each indicator are weighted to arrive at a final overall score for an institution. The highest scoring institution is assigned a total score of 100, and other institutions are calculated as a percentage of the top total score. The scores are then placed in descending order.   **(BACK)**

6. Data Sources

Nobel laureates. http://www.nobelprize.org
Fields Medals. http://www.mathunion.org/medals/

Highly cited researchers. http://www.isihighlycited.com
Articles indexed in Science Citation Index-expanded, Social Science Citation
Index. http://www.isiknowledge.com
Journal Citation Report, 2005. http://www.isiknowledge.com
Engineering-related research expenditures for USA institutions, 2004. ASEE:
Profiles of Engineering and Engineering Technology Colleges. **(BACK)**

7. List of Abbreviations

Abbreviations used in the names of institutions are as follows:
Agr - Agriculture
Chem - Chemistry
China-hk - China - Hong Kong
China-tw - China - Taiwan
Coll - College
Fed - Federal
Inst - Institute
Med - Medicine
Natl or Nacl - National
Phys - Physics
Sch - School
Sci - Science
Tech - Technology
Univ - University

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