

# COMPARING UNIVERSITY RANKINGS

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# INTRODUCTION

- Globalization of Higher Education
  - Increased mobility of students and scholars
  - Strong competition for this “market”
- Rankings of Universities
  - ARWU, first World Ranking (2003)
    - Great impact
  - Conceptual & Methodological debate
    - **Bibliometrics-related issues**
  - New actors
    - Webometrics (since 2004)
    - THE-QS (since 2005)
    - HEEACT (since 2007)
    - Leiden (since 2007)
    - *Scimago (sch. late 2009)*

# RANKINGS MAIN FEATURES

CRITERIA	WEBOMETRICS	ARWU	HEEACT	QS-THES
	Spain (research lab)	China (university)	Taiwan (gov agency)	United Kingdom (firm)
Univs analysed	17000	3000	3500	2000
Univs ranked	6000	500	500	500+
Teaching		Alumni Nobel 10%		Students/Staff 20%
Internatio- nalisation				% Foreign Students 5% % Foreign Professors 5%
Size	Webpages 20%	University 10%		
Research	Documents 15% Papers GS 15%	Nature&Science 20% Papers S&SSCI 20%	Papers S&SSCI 20%	
Impact	Links 50%	Highly Cited Researchers 20%	Highly Cited Res 50% Cit High IF Journals 30%	Citations Scopus 20%
Prestige		Faculty Nobel 20%		Academic Survey 40% Employers Survey 10%

- CWTS (Leiden University) Crown indicator
  - Discipline weighted citations \* publications (“brute force”)

# WHY TO COMPARE?

## ○ Common Aspects

- Simple, **composite index** of a few main indicators
- “A priori” **weighting system**
- World-class Universities
- Research performance as a central issue

## ○ Specific characteristics

- Different “models” (?) for different variables weightings
- Web publication as performance indicator (WR)
- Surveys for prestige recognition (THE-QS)
- Foreign students & scholars, internationalization (THE-QS)
- Prizes for measuring excellence (ARWU)
- Beyond 500 mark for increased coverage (WR)
- Bibliometric crown indicator (CWTS)

# HOW TO COMPARE?

- Building the population
  - Top 500 or closest for all the Rankings
    - Matching the entries between the Rankings
  - Top 250 for Europe
    - Re-ranking from World data when needed
  - Filling the gaps
    - Berlin, Karolinska, UC San Francisco, Rockefeller
- Comparing results
  - No raw data, only **ranks**
    - No individual indicators, but only **global ranks**
  - New mathematical approach, from correlation (higher, but incomplete) to **similarity** measures
  - Checking for explanations about “strange” positions

# METHODOLOGY

## Size of the Overlap

- Rankings are ignored
- Number of common items in both lists

## Spearman's Footrule

- Applied only to common items
- Takes into account differences in Rankings
- Normalized to the range  $[0,1]$

## M Measure

- Including non-overlapping items (Kumar et al.)
- (Normalized) similarity measure
- Proposed by Bar-Ilan, Mat-Hassan & Levene (2006)

**NEW**

# WORLD RESULTS (2008)

2008		ARWU			THES			WR			HEEACT		
		OC	F	M	OC	F	M	OC	F	M	OC	F	M
Top 10	ARWU				7	0.58	0.60	4	0.25	0.46	4	1	0.62
	THES	7	0.58	0.60				2	0	<b>0.21</b>	2	1	0.46
	WR	4	0.25	0.46	2	0	<b>0.21</b>				5	0.33	0.40
	HEEACT	4	1	0.62	2	1	0.46	5	0.33	0.40			
Top 100	ARWU				67	0.60	0.62	63	0.52	0.52	77	0.69	0.68
	THES	67	0.60	0.62				53	0.39	<b>0.31</b>	62	0.53	0.51
	WR	63	0.52	0.52	53	0.39	<b>0.31</b>				59	0.53	0.48
	HEEACT	77	0.69	0.68	62	0.53	0.51	59	0.53	0.48			
Top 200	ARWU				140	0.55	0.63	129	0.57	0.53	172	0.68	0.70
	THES	140	0.55	0.63				123	0.40	<b>0.35</b>	138	0.53	0.53
	WR	129	0.57	0.53	123	0.40	<b>0.35</b>				130	0.56	0.50
	HEEACT	172	0.68	0.70	138	0.53	0.53	130	0.56	0.50			
Top 500	ARWU				372	0.23	0.65	361	0.59	0.57	444	0.75	0.73
	THES	372	0.23	0.65				335	0.19	<b>0.40</b>	367	0.24	0.56
	WR	361	0.59	0.57	335	0.19	<b>0.40</b>				362	0.55	0.54
	HEEACT	444	0.75	0.73	367	0.24	0.56	362	0.55	0.54			

# COMMENTS

- High similarity between ARWU & HEEACT
  - Research results oriented
    - Both strongly based on WoS (**ISI-Thomson**) database
  - (Minor?) mistakes in affiliation suspected
- A different pattern by THE-QS
  - Geographic biased survey
  - Research results based on a different database (**Scopus-Elsevier**)
- Unexpected & expected Webometrics ranks
  - Not only research (**Google Scholar**), but other missions: teaching, third mission
  - Change of bias: From biomedicine to technology
  - Web bad policies explain major discrepancies

## INTER-YEAR CONSISTENCY

Top 100		2005			2006			2007			2008		
		OC	F	M	OC	F	M	OC	F	M	OC	F	M
ARWU	2005				97	0.94	0.99	96	0.93	<b>0.93</b>	95	0.91	<b>0.92</b>
	2006	97	0.94	<b>0.99</b>				99	0.95	<b>0.93</b>	96	0.92	<b>0.92</b>
	2007	96	0.93	<b>0.93</b>	99	0.95	0.93				97	0.95	<b>0.99</b>
	2008	95	0.91	<b>0.92</b>	96	0.92	0.92	97	0.95	<b>0.99</b>			
THES	2005				82	0.75	<b>0.83</b>	74	0.64	<b>0.73</b>	73	0.64	<b>0.71</b>
	2006	82	0.75	<b>0.83</b>				80	0.70	<b>0.81</b>	79	0.69	<b>0.78</b>
	2007	74	0.64	<b>0.73</b>	80	0.70	<b>0.81</b>				90	0.79	<b>0.89</b>
	2008	73	0.64	<b>0.71</b>	79	0.69	<b>0.78</b>	90	0.79	<b>0.89</b>			

- Very high similarities between the ARWU rankings for the different years.
- Much lower for QS-THES rankings, probably due to the **switch from ISI to Scopus** data (2007) and the changes in the **survey** respondents composition

# WORLD TOP TEN (USA): INDIVIDUAL ANALYSIS

INSTITUTION	ARWU				THES				WR			HEEACT	
	2005	2006	2007	2008	2005	2006	2007	2008	2006	2007	2008	2007	2008
California Institute of Technology	6				8	7	7-8	5	35	42	40	32	31
Carnegie Mellon University	54	56	60	63	44	35	20-21	21	10	13	14	177	170
Columbia University New York	7				20	12	11	10	16	15	15	9	13
Cornell University	12				14	15	20-21	15	7	7	7	18	18
Harvard University	1				1				2	4	2	1	
Johns Hopkins University	19	20	19	20	27	23	15	13-14	61	72-73	39	2	2
Massachusetts Institute of Technology	5				2	4-5	10	9	3	2	1	10	8
Pennsylvania State University	39	42	43	42	64	99-100	90-91	105	13	5	5	31	29
Princeton University	8	8-9	8	8	9	10	6	12	39	38	25	48	42
Stanford University	3	3	2	2	5	6	19	17	4	1	3	4	3
University of California Berkeley	4	4	3	3	6	8	22	36	1	3	4	7	6
University of California Los Angeles	14	14	13	13	37	31	41	30-31	17	20	17	5	5
University of California San Diego	13	13	14	14	42	44	58	58	26	39	34	8	10
University of California San Francisco	18				18				136	144-145	142	15	9
University of Chicago	9	8-9	9	9	17	11	7-8	8	12	14	19	26	24
University of Illinois Urbana Champaign	25	25	26	26	59	77	73	71	5	11	11	41	44
University of Michigan	21				36	29-30	38-39	18	6			6	7
University of Minnesota	32	32	33	28	150-154	188	142-143	87	15	12	8	22	23
University of Texas Austin	36	39	38	39	26	32	51-52	70	9	9	10	66	71-72
University of Washington	17	17	16	16	88-92	84	55-56	59	11	10	13	3	4
University of Wisconsin Madison	16	16	17	17	73-75	79-80	55-56	55	8	8	9	20	21
Yale University	11				7	4-5	2-5	2	37-38	37-38	44	14	15

# WORLD TOP TEN (EUROPE): INDIVIDUAL ANALYSIS

INSTITUTION	ARWU				THES				WR			HEEACT	
	2005	2006	2007	2008	2005	2006	2007	2008	2006	2007	2008	2007	2008
Ecole Polytechnique France	252	249	252	283-284	10	37	28	34-35	469	384	313	311	265
Imperial College	23	23	23	27	13	9	5	6	137	649	215	28	27
University College London	26	26	25	22	28	25	9	7	67	55	64	24	20
University of Cambridge	2	2	4	4	3	2	2-5	3	19	21	26	17	16
University of Oxford	10				4	3	2-5	4	22	40	47	19	19

- 27 universities combining the Top 10 of all Rankings
  - 22 are from the USA
  - 4 of the 5 European ones are British
    - Probably due to THE-QS geographically biased survey
- Discrepancies are important
  - English as a lingua franca of scholarly communication and the absence of the Japanese, German or French universities

# EUROPEAN RESULTS (2008)

2008		CWTS			ARWU			THES			WR			HEEACT		
		OC	F	M	OC	F	M	OC	F	M	OC	F	M	OC	F	M
Top 10	CWTS				7	0.75	0.86	5	0.83	0.83	6	0.33	0.63	8	0.81	<b>0.91</b>
	ARWU	7	0.75	0.86				6	0.78	0.82	5	0.67	0.66	7	0.67	0.85
	THES	5	0.83	0.83	6	0.78	0.82				5	0.50	0.61	6	0.78	0.83
	WR	6	0.33	0.63	5	0.67	0.66	5	0.50	0.61				6	0.44	0.62
	HEEACT	8	0.81	<b>0.91</b>	7	0.67	0.85	6	0.78	0.83	6	0.44	0.62			
Top 100	CWTS				83	0.67	0.81	69	0.61	0.74	66	0.48	0.56	90	0.80	<b>0.90</b>
	ARWU	83	0.67	0.81				74	0.51	0.73	63	0.42	0.55	83	0.64	0.80
	THES	69	0.61	0.74	74	0.51	0.73				60	0.44	0.54	68	0.58	0.72
	WR	66	0.48	0.56	63	0.42	0.55	60	0.44	0.54				62	0.49	0.54
	HEEACT	90	0.80	<b>0.90</b>	83	0.64	0.80	68	0.58	0.72	62	0.49	0.54			
Top 200	CWTS				174	0.73	0.82	164	0.34	0.74	150	0.52	0.58	186	0.82	<b>0.90</b>
	ARWU	174	0.73	0.82				171	0.36	0.74	149	0.51	0.57	174	0.73	0.81
	THES	164	0.34	0.74	171	0.36	0.74				152	0.25	0.55	164	0.36	0.72
	WR	150	0.52	0.58	149	0.51	0.57	152	0.25	0.55				145	0.47	0.56
	HEEACT	186	0.82	<b>0.90</b>	174	0.73	0.81	164	0.36	0.72	145	0.47	0.56			

# EUROPEAN RESULTS (2008)

NAME	CWTS	ARWU	THES	WR	HEEACT
Catholic University of Leuven	6	54	24	59	11
Utrecht University	5	9	21	7	8
Ecole Normale Superieure Paris		22	8	79	114
Université Paris 6 Pierre and Marie Curie	11	7	58		12
Université Paris XI Sud	25	10	113		27
Imperial College	4	5	3	68	4
King's College London	20	25	5	162	21
University College London	3	3	4	6	3
University of Bristol	23	16	10.5	67	30
University of Cambridge			1		
University of Edinburgh	17	13	6	8	17
University of Manchester	12	6	9	124	9.5
University of Oxford	2	2	2	4	2
Karolinska Institute	9	11	10.5	189	5
Royal Institute of Technology Sweden	96	106	71	9	131
Ludwig Maximilians Universität München	13	14	36	56	6
Swiss Federal Institute of Technology Zurich	8	4	7	2	9.5
Universität Wien	34	72	41	10	63
University of Copenhagen	10	8	13	32	22
University of Helsinki	7	19	35	3	7
University of Oslo	41	17	72.5	5	52

## COMMENTS II

- Similarity measures for the European universities are much higher than for World universities
  - The two most similar rankings are the CWTS (Leiden) and the HEEACT (Taiwan) ranking because both are strongly based on publication and citation counts
- 21 entries for the combined list of those in Top 10 of each Ranking
  - Full agreement on **Cambridge** as the best European University
  - UK universities are the largest group, with three French and only one German Universities

# CONCLUSIONS

Each Ranking is reflecting different aspects of the University complexity. For the **World Class Universities**, research performance could be strongly correlated with global quality

However when other factors related to excellence (prizes), prestige (survey), internationalization or community engagement are considered different scenarios appear

Similarities among the Rankings are high, specially when considering those mostly research performance based (**ARWU**, **HEEACT** and **CWTS** )

Some of the discrepancies among the Rankings are due to the lack of consensus about inclusion criteria (biomedical universities, university hospitals, graduate-only universities)

Globally the most dissimilar is **THE-QS**, as this survey based exercise is probably geographically biased, but **Webometrics** provides several displaced individual ranks due to bad web polices

Universities from USA and UK are the leaders in most of Rankings