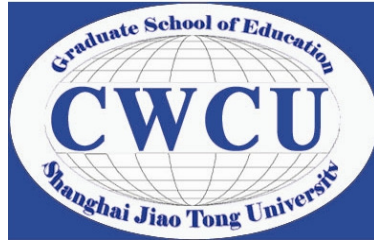


Academic Ranking of World Universities And the Performance of Asia Pacific Universities

Prof. Nian Cai LIU and Dr. Ying CHENG

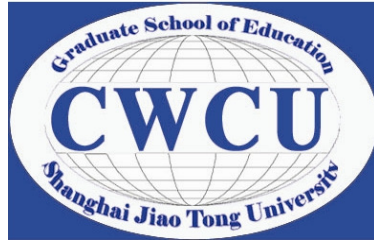
**Center for World-Class Universities, Graduate School of Education
Shanghai Jiao Tong University (SJTU), China**

April 16, 2009



Outline

- **History of ARWU**
- **Methodologies of ARWU**
- **Performance of Asian Universities**
- **Concluding Remarks**



Outline

- **History of ARWU**
- Methodologies of ARWU
- Performance of Asian Universities
- Concluding Remarks



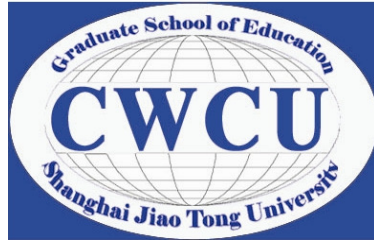
Chinese Dream of WCU

- World-class university (WCU) is a dream for generations of Chinese. It's not only for pride, but also for the future of China.
- Recently, Chinese government has launched several initiatives for research universities. The best-known one is specially designed to build WCU (985 Project).
- Many top Chinese universities had setup their strategic goals as WCU and setup timetables to reach the goals. Shanghai Jiao Tong University was no exception.



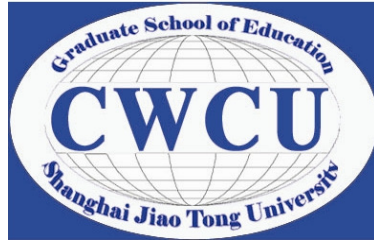
Strategic Planning of SJTU (1998)

- As a professor and Vice-Dean of the School of Chemistry and Chemical Engineering of SJTU, I was accidentally involved in the strategic planning process of building SJTU into a WCU in 1998. During the process, I asked myself many questions, including:
 - ✓ **What is the definition of and criteria for a WCU?**
 - ✓ **How many WCU should there be in the world?**
 - ✓ **What is the position of SJTU in the world?**
 - ✓ **How can SJTU reduce its gap with WCU?**



Benchmarking SJTU (1999-2001)

- In 1999, a project was started to benchmark SJTU and other top Chinese universities with four groups of US universities, from the very top to ordinary research universities.
- One of the main conclusions was that top Chinese universities were roughly in the position of 200-300 in the world.
- In 2001, a consultation report was provided to the Ministry of Education of China. Positive comments were received from top officials.



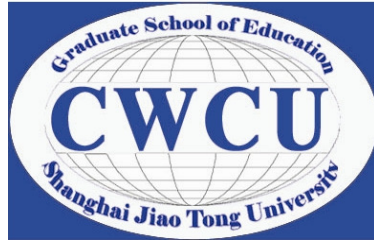
Ranking of World Universities (2001-2003)

- Since the publication of the benchmarking report, there were numerous positive comments. Many of them asked the possibility of making a real ranking of world universities instead of a rough estimation of positions.
- In order to find out the position of SJTU and other top Chinese universities in the world, a decision was made in 2001 to carry out a ranking of world universities.
- Four of us spent another two years until a ranking was actually completed.



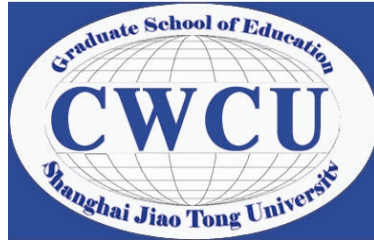
Academic Ranking of World Universities (ARWU, 2003-2008)

- ARWU was first published in June 2003 on our ranking website with the strong encouragement from our western colleagues and has been updated annually.
- Although about 1200 institutions from all over the world have actually been ranked, only the list of top 500 institutions have been published on our ranking website.
- The 1200 institutions include any university that has any Nobel Laureates, Fields Medals, Highly Cited Researchers, or papers published in Nature or Science. In addition, major universities of every country with significant amount of international publications are included.



ARWU by Broad Subject Field (2007-2008)

- Ever since its publication, ARWU has been attracting attentions from all over the world. Numerous requests have been received, asking us to provide a ranking of world universities by broad subject fields or schools.
- ARWU-FIELD was first published in February 2007 on our ranking website and has been updated annually.
- The five broad subject fields include 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).



Outline

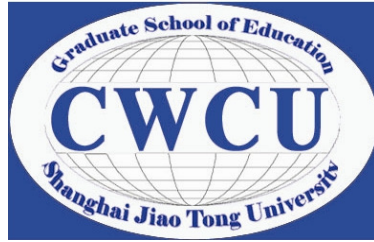
- History of ARWU
- **Methodologies of ARWU**
- Performance of Asian Universities
- Concluding Remarks



Indicators and Weights of ARWU

Criteria	Indicator	Code	Weight
Quality of Education	Alumni of an institution winning Nobel Prizes and Fields Medals	<i>Alumni</i>	10%
Quality of Faculty	Staff of an institution winning Nobel Prizes and Fields Medals	<i>Award</i>	20%
	Highly cited researchers in 21 broad subject categories	<i>HiCi</i>	20%
Research Output	Articles published in Nature and Science*	<i>N&S</i>	20%
	Articles indexed in Science Citation Index-expanded and Social Science Citation Index	<i>PUB</i>	20%
Per Capita Performance	Per capita academic performance of an institution	<i>PCP</i>	10%

* For institutions specialized in humanities and social sciences such as London School of Economics, N&S is not considered, the weight of N&S is relocated to other indicators.



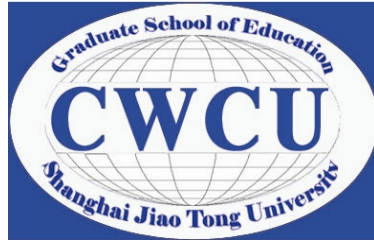
Award Indicator (As an Example)

- The total number of the staff of an institution winning Nobel Prizes in physics, chemistry, medicine and economics and Fields Medal 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 since 2001, 90% for winners in 1991-2000, 80% for winners in 1981-1990, 70% for winners in 1971-1980, and so on.
- 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 prize.



Indicators and Weights of ARWU-FIELD

Code	SCI	ENG	LIFE	MED	SOC
<i>Alumni</i>	10%	/	10%	10%	10%
<i>Award</i>	15%	/	15%	15%	15%
<i>HiCi</i>	25%	25%	25%	25%	25%
<i>TOP</i>	25%	25%	25%	25%	25%
<i>PUB</i>	25%	25%	25%	25%	25%
<i>Fund</i>	/	25%	/	/	/



Changes from ARWU Indicators

- *N&S* in ARWU is not used in ARWU-FIELD.
- *TOP* is the percentage of articles published in the top 20% journals of each category.
- *Fund* is the total engineering-related research expenditures. It's used only for ENG ranking.
- *Alumni* and *Award* since 1951 (instead of 1901) are used for all ranking fields except ENG.



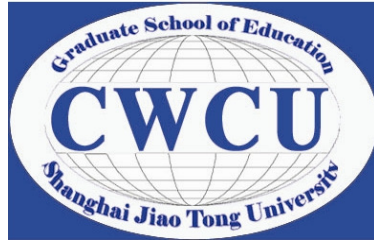
Limitations of Methodologies

- Any ranking is controversial. There are problems in any ranking, even any evaluation. There are, of course, methodological and technical limitations in ARWU.
- Consideration for the diversified nature of institutions in terms of functions, disciplinary characteristics, native language, history, and size is not enough in ARWU methodologies.



Special Features of ARWU

- First multi-indicator global university ranking.
- Transparent and stable methodologies.
- Objective indicators and third-party data.
- Presentation of results in groups.
- Verifiable results.



Outline

- History of ARWU
- Methodologies of ARWU
- **Performance of Asian Universities**
- Concluding Remarks



Performance in ARWU (2008)

Region	Top 20	Top 100	Top 200	Top 300	Top 400	Top 500
America	17	58	99	136	163	190
Europe	2	34	79	124	168	210
Asia/Oceania	1	8	22	41	68	100
Africa	0	0	0	1	2	3
Total	20	100	200	302	401	503



Percentage in Top 500 Universities From 2004 to 2008 of ARWU

Region	2004	2005	2006	2007	2008
America	39.8%	39.6%	39.2%	38.6%	37.8%
Europe	41.6%	41.0%	41.4%	40.8%	41.7%
Asia/Oceania	17.7%	18.6%	18.4%	19.6%	19.9%
<i>Australia</i>	<i>2.8%</i>	<i>2.8%</i>	<i>3.2%</i>	<i>3.3%</i>	<i>3.0%</i>
<i>Japan</i>	<i>7.2%</i>	<i>6.8%</i>	<i>6.4%</i>	<i>6.5%</i>	<i>6.2%</i>
<i>China</i>	<i>3.2%</i>	<i>3.6%</i>	<i>3.8%</i>	<i>4.9%</i>	<i>6.0%</i>
<i>Korea</i>	<i>1.6%</i>	<i>1.6%</i>	<i>1.8%</i>	<i>1.6%</i>	<i>1.6%</i>
Africa	0.8%	0.8%	1.0%	1.0%	0.6%



Percentage in Top 100 Universities From 2004 to 2008 of ARWU

Region	2004	2005	2006	2007	2008
America	55.0%	57.0%	57.4%	57.4%	58.0%
Europe	37.0%	35.0%	33.7%	33.7%	34.0%
Asia/Oceania	8.0%	8.0%	8.9%	8.9%	8.0%
Australia	2.0%	2.0%	2.0%	2.0%	3.0%
Japan	5.0%	5.0%	5.9%	5.9%	4.0%
China	/	/	/	/	/
Korea	/	/	/	/	/
Africa	/	/	/	/	/



Performance in ARWU-FIELD (2008)

	Region	Total	America	Europe	Asia/Oceania
Top 20	SCI	20	15	3	2
	ENG	20	17	2	1
	LIFE	20	16	4	0
	MED	20	16	4	0
	SOC	20	19	1	0
Top 100	SCI	107	61	32	14
	ENG	107	55	24	28
	LIFE	107	67	31	9
	MED	107	68	34	5
	SOC	107	84	18	5



2008 Performance Compared with GDP

(GDP and population data from the World Bank)

Rank	Country	% of Top 100	% of Top 500	% of GDP	% of Population
1	USA	54.0%	31.6%	27.2%	4.6%
2	UK	11.0%	8.3%	4.9%	0.9%
3	Germany	6.0%	8.0%	6.0%	1.3%
4	Japan	4.0%	6.2%	9.0%	2.0%
5	Canada	4.0%	4.2%	2.6%	0.5%
6	Sweden	4.0%	2.2%	0.8%	0.1%
7	France	3.0%	4.6%	4.6%	0.9%
8	Australia	3.0%	3.0%	1.6%	0.3%
9	Switzerland	3.0%	1.6%	0.8%	0.1%
10	Netherlands	2.0%	2.4%	1.4%	0.2%
16	China	0.0%	6.0%	6.6%	20.5%
19	Korea	0.0%	1.6%	1.8%	0.7%



Average Performance in SCI By Indicators (2008)

Indicator	<i>Alumni</i>	<i>Award</i>	<i>HiCi</i>	<i>PUB</i>	<i>TOP</i>
Top 20 of World Univ	2.0	1.8	22.1	1300	65.4%
21-100 of World Univ	0.4	0.2	5.3	700	58.7%
Go8 Univ of Australia	0.0	0.0	3.3	500	47.4%
7 “Imperial” Univ of Japan	0.3	0.2	4.5	1700	42.6%
Top 9 “985” Univ of China	0.0	0.0	0.0	1100	27.6%
Top 7 Univ of Korea	0.0	0.0	0.1	600	45.5%



Average Performance in LIFE By Indicators (2008)

Indicator	<i>Alumni</i>	<i>Award</i>	<i>HiCi</i>	<i>PUB</i>	<i>TOP</i>
Top 20 of World Univ	0.9	0.5	20.6	1000	57.0%
21-100 of World Univ	0.2	0.1	7.3	600	47.8%
Go8 Univ of Australia	0.3	0.0	2.8	550	38.5%
7 “Imperial” Univ of Japan	0.1	0.0	6.2	1000	34.1%
Top 9 “985” Univ of China	0.0	0.0	0.0	300	23.7%
Top 7 Univ of Korea	0.0	0.0	0.0	300	25.7%



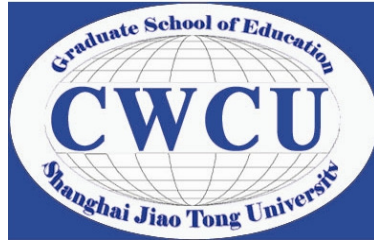
Average Performance of Institutions by Indicators (2008)

Indicator	<i>Alumni</i>	<i>Award</i>	<i>HiCi</i>	<i>N&S</i>	<i>PUB</i>
Top 20 of World Univ	9.6	4.8	68.8	28.2	4800
21-100 of World Univ	1.8	0.6	18.7	6.5	2800
101-200 of World Univ	0.5	0.1	6.9	2.7	1800
Go8 Univ of Australia	0.6	0.1	7.6	2.9	2400
7 “Imperial” Univ of Japan	1.2	0.3	14.1	7.8	4100
Top 9 “985” Univ of China	0.1	0.0	0.1	0.7	2400
Top 7 Univ of Korea	0.0	0.0	0.4	0.7	1900



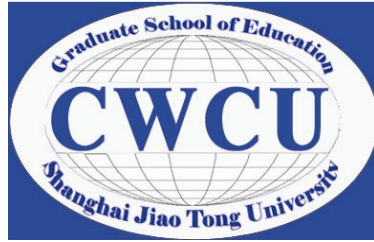
Performance Changes from 2004 to 2008 Relative to That of Top 100 World Universities

Indicator	<i>Alumni</i>	<i>Award</i>	<i>HiCi</i>	<i>N&S</i>	<i>PUB</i>
Go8 Univ of Australia	++	0	0	0	+
7 "Imperial" Univ of Japan	-	0	+	-	-
Top 9 "985" Univ of China	0	0	+	++	++
Top 7 Univ of Korea	0	0	0	0	+



Outline

- History of ARWU
- Methodologies of ARWU
- Performance of Asian Universities
- **Concluding Remarks**



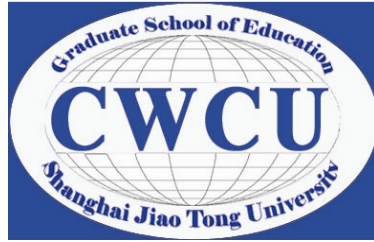
The Phenomenon of Ranking

- Although controversial, there are university rankings in almost every major country of the world.
- Whether universities and other stakeholders agree with the various ranking systems, they are clearly here to stay.
- The key issue then becomes how to improve ranking systems by the rankers and how to wisely use the rankings by various stakeholders.



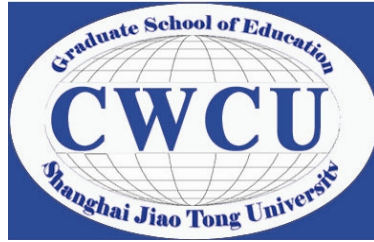
Improving ARWU

- Improve our ranking and provide update of ARWU and ARWU-FIELD annually.
- Provide more user-friendly, customized rankings on our website.
- In addition, we have been doing theoretical researches on rankings in general, trying to contribute to the knowledge of ranking.



Diversifying ARWU

- Academic Ranking of World Universities by Subject Fields (ARWU-SUBJECT) will be introduced in November 2009 for the first time. Proposed subject fields include chemistry, physics, mathematics, computer science and engineering, and economics.
- In addition, more variety of rankings for universities with different size, history, budget and function etc. will be provided in the future.



Profiling Top Universities

- Databases of top world universities with as many indicators as possible is being built.
- Detailed profiling and analysis of top world universities will be provided in the future.
- Benchmarking of top world universities with their peers will be performed at departmental/disciplinary level when necessary.



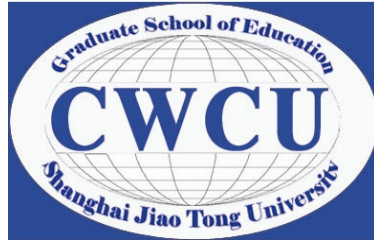
Participating in IREG

- We have been actively involved in the international association on rankings, namely the IREG-International Observatory on Academic Ranking and Excellence, as vice-chairman of its executive committee. For more details on IREG, <http://www.ireg-observatory.org/>
- We have been actively participating in international conferences related to rankings including the meetings of International Ranking Expert Group:
 - 1st meeting in Washington DC in December, 2004
 - 2nd meeting in Berlin in May, 2006
 - 3rd meeting in Shanghai in November, 2007
 - 4th meeting in Astana in June, 2009



You Can Help

- Any comments and suggestions to diversify and improve our rankings or rankings in general are always welcome. Email: ranking@sjtu.edu.cn
- Each ranking has its purpose. Whenever you use rankings, please read ranking methodologies carefully before looking at or using the ranking results.
- Ranking is just one source for information. If you are in management positions, please always consider other types of evaluation and comprehensive analysis whenever possible, such as benchmarking, peer review, etc.



Thank you very much for your attention!

<http://gse.sjtu.edu.cn/en/index.htm>

<http://www.arwu.org/>