

# A Universidade do Porto no U.S. News 2016

## Best Global Universities rankings

Reitoria da Universidade do Porto

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# A Universidade do Porto no U.S. News 2016 Best Global Universities rankings

<http://www.usnews.com/education/best-global-universities>

## 1. Metodologia do U.S. News Best Global Universities rankings e participação da U.Porto

“The second annual U.S. News [Best Global Universities](#) rankings were produced to provide insight into how universities compare globally. As an increasing number of students are planning to enroll in universities outside of their own country, the Best Global Universities rankings – which focus specifically on schools' academic research and reputation overall and not on their separate undergraduate or graduate programs – can help those students accurately compare institutions around the world.

The Best Global Universities rankings also provide insight into how [U.S. universities](#) – which U.S. News has been ranking separately for more than 30 years – stand globally. All universities can now benchmark themselves against schools in their own country and region, become more visible on the world stage and find top schools in other countries to consider collaborating with.

The overall Best Global Universities rankings encompass the top 750 institutions spread out across 57 countries – up from the top 500 universities in 49 countries ranked last year. The first step in producing these rankings, which are powered by [Thomson Reuters InCites™](#) research analytics solutions, involved creating a pool of 1,000 universities that was used to rank the top 750 schools.

To create the pool of 1,000, we first included the top 200 universities in the results of Thomson Reuters' global reputation survey, described further below. Next, we added institutions that had published the highest number of articles during the most recent five-year period (2009-2013) that was used for the bibliometric data, de-duplicated with the top 200 from the reputation survey.

As a result of these criteria, many stand-alone graduate schools, including Rockefeller University and the University of California—San Francisco, were eligible to be ranked and were included in the ranking universe.

The second step was to calculate the rankings using the 12 indicators and weights that U.S. News chose to measure global research performance. Each school's profile page on usnews.com for the top 750 universities lists the overall global score as well as numerical ranks for the 12 indicators, allowing students to compare each school's standing in each indicator.

The indicators and their weights in the ranking formula are listed in the table below, with related indicators grouped together; an explanation of each follows.

Ranking indicator	Weight
Global research reputation	12.5%
Regional research reputation	12.5%
Publications	10%
Books	2.5%
Conferences	2.5%
Normalized citation impact	10%
Total citations	7.5%
Number of publications that are among the 10 percent most cited	12.5%
Percentage of total publications that are among the 10 percent most cited	10%
International collaboration	10%
Number of Ph.D.s awarded	5%
Number of Ph.D.s awarded per academic staff member	5%

## Reputation Indicators

Results from Thomson Reuters' [Academic Reputation Survey](#) were used to create the two reputation indicators used in our ranking analysis.

The survey, which aimed to create a comprehensive snapshot of academics' opinions about world universities, had respondents give their views of programs in the disciplines with which they were familiar. This method allowed respondents to rate universities at the field and department level, rather than at the institution level, creating a more specific and accurate measurement of a university's reputation as a whole.

In order to appropriately represent all regions, Thomson Reuters took steps to overcome language bias, differing response rates and the geographic distribution of researchers. These steps included:

- Sending an invitation-only survey to academics selected from Thomson Reuters' databases of published research, based on the estimated geographic proportions of academics and researchers across the globe
- Providing accessibility in 10 languages
- Rebalancing the survey's final results based on the geographic distribution of researchers in order to overcome differing response rates

The results of the survey were used in two separate ranking indicators as follows.

**Global research reputation (12.5 percent):** This indicator reflects the aggregation of the most recent five years of results of the Academic Reputation Survey for the best universities globally for research.

**Regional research reputation (12.5 percent):** This indicator reflects the aggregation of the most recent five years of results of the Academic Reputation Survey for the best universities for research in the region; regions were determined based on the [United Nations definition](#). This indicator had the effect of significantly increasing the international diversity of the rankings, since it focused on measuring academics' opinions of other universities within their region. The U.S. News rankings are the only global rankings to use this indicator, and the 2016 edition marks the second year of its inclusion.

## Bibliometric Indicators

The bibliometric indicators used in our ranking analysis are based on data from the [Web of Science™](#) for the five-year period from 2009 to 2013. The Web of Science™ is a Web-based research platform that covers more than 12,000 of the most influential and authoritative scholarly journals worldwide in the sciences, social sciences, and arts and humanities.

This year, two new ranking factors – books and conferences – were added to the ranking methodology. As a result, the weights of two other ranking factors – publications and total citations – were adjusted downward by 2.5 percentage points each. The weights of the rest of the ranking factors were not changed.

**Publications (10 percent):** This is a measure of the overall research productivity of a university, based on the total number of scholarly papers (reviews, articles and notes) that contain affiliations to a university and are published in high-quality, impactful journals. This indicator is closely linked to the size of the university. It is also influenced by the discipline focus of the university, as some disciplines, particularly medicine, publish more than others.

**Books (2.5 percent):** Books are an important medium of publication for scholarly research, particularly in the social sciences, arts and humanities. The addition of this ranking indicator provides a useful supplement to the data on articles and better represents universities that have a focus on social sciences and arts and humanities.

**Conferences (2.5 percent):** Academic conferences are an important venue for scholarly communication, particularly in disciplines tied to engineering and computer science. The formal publication of conference proceedings can represent genuine research breakthroughs in certain fields that may not have been documented or published elsewhere.

**Normalized citation impact (10 percent):** The total number of citations per paper represents the overall impact of the research of the university and is independent of the size or age of the university; the value is normalized to overcome differences in research area, the publication year of the paper and publication type.

NCI is considered one of the core measures of research performance and is used by various research evaluation bodies globally. The subject fields used in the analysis came from Thomson Reuters' InCites™ product, which helps institutions evaluate research output, performance and trends; understand the scope of an organization's scholarly contributions; and articulate outcomes to inform research priorities. InCites utilizes the content and citation indicators found in the Web of Science™.

**Total citations (7.5 percent):** This indicator measures how influential the university has been on the global research community. It is determined by multiplying the publications ranking factor by the normalized citation impact factor. Total citations have been normalized to overcome differences in research area, publication year of the paper and publication type.

**Number of publications that are among the 10 percent most cited (12.5 percent):** This indicator reflects the number of papers that have been assigned as being in the top 10 percent of the most highly cited papers in the world for their respective fields. Each paper is given a percentile score that represents where it falls, in terms of citation rank, compared with similar papers (same publication year, subject and document type). As the number of highly cited papers is dependent on the size of the university, the indicator can be considered a robust indication of how much excellent research the university produces.

**Percentage of total publications that are among the 10 percent most cited (10 percent):** This indicator is the percentage of a university's total papers that are in the top 10 percent of the most highly cited papers in the world (per field and publication year). It is a measure of the amount of excellent research produced by the university and is independent of the university's size.

**International collaboration (10 percent):** This indicator is the proportion of the institution's total papers that contain international co-authors divided by the proportion of internationally co-authored papers for the country that the university is in. It shows how international the research papers are compared with the country in which the institution is based. International collaborative papers are considered an indicator of quality, as only the best research will be able to attract international collaborators.

### **School-Level Indicators**

Publicly available data sources were used to create the school-level indicators.

**Number of Ph.D.s awarded (5 percent):** This indicator reflects the total number of doctoral degrees awarded in 2013. The number of doctorates awarded can be considered an alternative indicator of research output and is linked to volume.

**Number of Ph.D.s awarded per academic staff member (5 percent):** This is the number of Ph.D.s awarded per the number of academic faculty members for the same year. This is a size-independent measure of the education environment at the university.

### **How the Overall Global Scores and Numerical Rankings Were Calculated**

To arrive at a school's rank, the overall global scores were calculated using a combination of the weights and z-scores for each of the 12 indicators used in the rankings. In statistics, a z-score is a standardized score that indicates how many standard deviations a data point is from the mean of that variable. This transformation of the data is essential when combining diverse information into a single ranking because it allows for fair comparisons between the different types of data.

Several of the indicators were highly skewed, so the logs of the original values were used. The indicators that used logs were:

- Publications
- Books
- Conferences
- Total citations
- Number of publications that are among the 10 percent most cited
- Number of Ph.D.s awarded
- Global research reputation
- Regional research reputation

This log manipulation rescaled the data and allowed for a more normalized and uniform spread across each of the indicators. After these eight indicators were normalized, the z-scores for each indicator were calculated in order to standardize the different types of data to a common scale.

In order to calculate a school's overall global score, the calculated z-scores for each of the 12 indicators were then weighted using the assigned weights described earlier. U.S. News determined the weights based on our judgment of the relative importance of the ranking factors and in consultation with bibliometric experts.

The overall global score for each school was calculated by summing the school's weighted values for each indicator. The minimum score from the pool of 1,000 schools was then subtracted from each of the scores in order to make zero the lowest possible score.

The scores were then rescaled by multiplying the ratio between the overall performance of each university and the highest-performing university by 100. This forced the scores to fall on a 0-100 scale, with the highest-performing school earning an overall global score of 100.

The top 750 universities out of the 1,000 were then numerically ranked in descending order from 1 to 750 based on their weighted, rescaled overall global score. Each school's overall global score was rounded to one decimal place in order to increase variance between scores and to minimize the occurrence of ties.

In addition, the 1,000 universities received a numerical rank for each of the 12 ranking indicators, such as publications, total citations and global research reputation, based on their z-score for that indicator. The highest-scoring university for each of the 12 indicators – except for the regional research reputation indicator – received a rank of 1 and the lowest-scoring university received a rank of 1,000. ties were allowed.

The numerical ranks for the regional research reputation indicator were not on a scale from 1 to 1,000 because universities were only compared with other schools in their region, as defined by the U.N. Since each of the regions in the 2016 Best Global Universities have their own regional research reputation rankings, that means there's more than one No. 1 school for this particular indicator.

As noted earlier, the numerical ranks for each of the 12 indicators are published on usnews.com for each school ranked in the top 750. This means that there are some schools in the top 750 rankings that have ranking indicators with numerical ranks in the 751 to 1,000 range. The numerical ranks published for each ranking indicator are to be used to determine the relative position of each school in that indicator. The numerical indicator ranks were not used to calculate the overall global score.

#### **Data Collection and Missing Data**

The data and metrics used in the ranking were provided by Thomson Reuters InCites™ research analytics solutions. The bibliometric data were based upon the Web of Science™.

Publications are limited to those published between 2009 and 2013. However, the citations to those papers come from all publications up to the most recent data available. For the 2016 edition of the U.S. News Best Global Universities, published in 2015, this cutoff was around April 2015. It is necessary to use a slightly older window of publication to allow for citations to accumulate and provide statistically relevant results.

The subject fields used in the analysis came from Thomson Reuters' InCites™ schema and did not include arts and humanities journals, and therefore they are excluded for the citation-based indicators; but articles from arts and humanities journals were included in the papers count used in the publications indicator. Arts and humanities journals accumulate few citations and citation analysis is less robust; therefore, the deliberate exclusion of arts and humanities improves the robustness of the results.

When data were not available, such as Ph.D.s awarded, a z-score of zero was used so as to neither reward nor penalize the university (i.e., it is treated as an average of all the other universities).

When the value is zero it is not possible to calculate the log value; therefore, a substitute is used. The substitute is one-tenth of the minimum value of all other institutions. There were no missing data in the bibliometric or reputation indicators.

#### **University Rankings by Region**

After the overall top 750 rankings were calculated, U.S. News then produced additional rankings. The U.S. News Best Global Universities rankings by region show the top institutions in five regions with a large number of globally ranked schools. Those regions are Africa, Asia, Australia/ New Zealand, Europe and Latin America. To determine which countries are in which region, we used the U.N. definition of geographical regions.

The methodology for the region rankings is based entirely on how a school ranked in the overall Best Global Universities rankings covering the top 750 schools worldwide. Universities are numerically ranked in their region based on their position in the overall Best Global Universities rankings.

For example, in Europe, the highest-ranked university in the overall top 750 rankings is the United Kingdom's University of Oxford, at No. 5 globally, which also makes the school No. 1 in Europe. The second highest-ranked university in Europe is the U.K.'s University of Cambridge, which is ranked No. 6 globally, making it No. 2 in Europe.

## University Rankings by Country

The U.S. News Best Global Universities rankings by country show the top institutions in 32 countries with five or more schools that are globally ranked in the top 750.

The methodology for the country rankings is based entirely on how a school ranked in the overall Best Global Universities rankings covering the top 750 schools worldwide. Universities are numerically ranked in their country based on their position in the overall Best Global Universities rankings.

For example, in Canada, the highest-ranked university in the overall top 750 rankings is the University of Toronto, at No. 16 globally. That means it is also ranked No. 1 in the Best Global Universities in Canada rankings. The second highest-ranked university in Canada in the overall rankings is the University of British Columbia, ranked at No. 33 globally, which means it's ranked No. 2 in Canada.”<sup>1</sup>

A U.S. News não solicita diretamente informação às Universidades, contudo utiliza a informação reportada pelas instituições à Thomson Reuters no âmbito do [Global Institutional Profiles Project](#). A U.Porto colabora neste projeto desde 2010. Para a edição deste ano, a informação foi solicitada em abril e reportada em maio.

No [Anexo 2](#) apresentam-se os valores de estudantes e académicos relativos às Universidades portuguesas tornados públicos pela U.S.News.

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<sup>1</sup> Robert Morse and Melinda Foster, How U.S. News Calculated the Best Global Universities Rankings Oct. 5, 2015, in <http://www.usnews.com/education/best-global-universities/articles/methodology> Acedido 6 outubro de 2015.

## 2. Evolução<sup>2</sup> das posições da U.Porto no U.S.News Best Global Universities rankings

### 2.1 Global Ranking

	2014	2015
World rank	#333	#322
Europe rank	#144	#139=
Iberoamérica rank	#15	#12
Portugal rank	#2	#2
Global score	36,4	51,2
Global research reputation	#335	#313
Regional research reputation	#368	#124
Publications	#208	#185
Books	n	#447
Conferences	n	#111
Normalized citation impact	#502	#574
Total citations	#253	#238
Number of publications that are among the 10 percent most cited	#257	#258
Percentage of total publications that are among the 10 percent most cited	#477	#596
International collaboration	#483	#570
Number of Ph.D.s awarded	#528	#250
Number of Ph.D.s awarded per academic staff member	#630	#671

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### 2.2 Subject Rankings<sup>3</sup>

Na edição de 2015, a U.Porto surge em 7 das 22 áreas. Em 2014 surgia apenas em duas. A metodologia dos Subject Rankings é apresentada no [Anexo1](#).

#### Agricultural Sciences

	2014	2015
World rank	#74	#57=
Europe	#27	#19
Iberoamérica	#7	#6
Portugal	#1	#1
Overall score	63.3	68.5
Global research reputation	#128	#107
Regional research reputation	#226	#64
Publications	#69	#60
Normalized citation impact	#34	#37
Total citations	#42	#39
Number of publications that are among the 10 percent most cited	#28	#25
Percentage of total publications that are among the 10 percent most cited	#29	#31
International collaboration	#198	#184

<sup>2</sup> Dados de 2014 e 2015 retirados de <http://www.usnews.com/education/best-global-universities> respetivamente em 28 de outubro de 2014 e 6 de outubro de 2015.

<sup>3</sup> Dados de 2014 e 2015 retirados de <http://www.usnews.com/education/best-global-universities#subject-rankings> respetivamente em 28 de outubro de 2014 e 6 de outubro de 2015.

## Engineering

	2014	2015
World rank	#99	#88=
Europe	#26	#21=
Iberoamérica	#3	#3
Portugal	#2	#2
Overall score	57.5	68.7
Global research reputation	#170	#197
Regional research reputation	#177	#46
Publications	#151	#137
Normalized citation impact	#31	#92
Total citations	#102	#105
Number of publications that are among the 10 percent most cited	#75	#79
Percentage of total publications that are among the 10 percent most cited	#21	#62
International collaboration	#99	#190

## Chemistry

	2015
World rank	#172=
Europe	#59=
Iberoamérica	#9=
Portugal	2=
Overall score	55.9
Global research reputation	#207
Regional research reputation	#77
Publications	#69
Normalized citation impact	#307
Total citations	#111
Number of publications that are among the 10 percent most cited	#166
Percentage of total publications that are among the 10 percent most cited	#335
International collaboration	#379

## Environment/Ecology

	2015
World rank	#142=
Europe	#57=
Iberoamérica	#6
Portugal	#2
Overall score	51.3
Global research reputation	#188
Regional research reputation	#49
Publications	#61
Normalized citation impact	#221
Total citations	#104
Number of publications that are among the 10 percent most cited	#134
Percentage of total publications that are among the 10 percent most cited	#242
International collaboration	#168

## Materials Science

	2015
World rank	#209=
Europe	#64
Iberoamérica	#8
Portugal	#4
Overall score	52.1
Global research reputation	#315
Regional research reputation	#77
Publications	#140
Normalized citation impact	#232
Total citations	#162
Number of publications that are among the 10 percent most cited	#183
Percentage of total publications that are among the 10 percent most cited	#261
International collaboration	#333

## Pharmacology and Toxicology

	2015
World rank	#100
Europe	#40
Iberoamérica	#3
Portugal	#1
Overall score	45.0
Global research reputation	#92
Regional research reputation	#36
Publications	#70
Normalized citation impact	#134
Total citations	#87
Number of publications that are among the 10 percent most cited	#105
Percentage of total publications that are among the 10 percent most cited	#152
International collaboration	#138

## Plant and Animal Science

	2015
World rank	#147=
Europe	#66=
Iberoamérica	#8
Portugal	#2
Overall score	64.0
Global research reputation	#304
Regional research reputation	#84
Publications	#87
Normalized citation impact	#279
Total citations	#105
Number of publications that are among the 10 percent most cited	#117
Percentage of total publications that are among the 10 percent most cited	#273
International collaboration	#139

### 3. Posição das Universidades portuguesas no 2016 U.S. News Best Global Universities rankings

#### 3.1 Global Ranking

	Global score		Mundo Rank		Europa Rank		Iberoamérica rank		Portugal	
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
U.Lisboa	41,8	55,4	#265=	#240 =	#113	#106 =	9	#5	#1	#1
U.Porto	36,4	51,2	#333	#322	#144	#139 =	15	#12	#2	#2
U.Coimbra	30,6	47,3	#430	#405 =	#185	#175 =	21	#17	#3	#3
U.Minho		44,6		#457 =		#201		#22		#4
U.Aveiro	28	44,1	#484=	#471 =	#208	#206	27	#25	#4	#5
Nova U.Lisboa		43,9		#477 =		#210 =		#26		#6
#IES			500	750	n/d	333	28	53	4	6

n/d não disponível

#### Indicator Rankings das Universidades portuguesas no 2016 U.S. News Best Global Universities rankings

	U.Lisboa	U. Porto	U.Coimbra	U. Minho	U.Aveiro	Nova U.Lisboa
Global score	55.4	51.2	47.3	44.6	44.1	43.9
Global research reputation	#261	#313	#422	#582	#545	#614
Regional research reputation	#68	#124	#169	#214	#197	#197
Publications	#121	#185	#350	#512	#413	#485
Books	#274	#447	#327	#435	#447	#533
Conferences	#75	#111	#227	#161	#229	#288
Normalized citation impact	#536	#574	#484	#376	#574	#484
Total citations	#168	#238	#356	#465	#438	#462
Number of publications that are among the 10 percent most cited	#193	#258	#384	#488	#427	#472
Percentage of total publications that are among the 10 percent most cited	#568	#596	#562	#492	#544	#530
International collaboration	#363	#570	#487	#374	#491	#431
Number of Ph.D.s awarded	#224	#250	#663	#748	#819	#700
Number of Ph.D.s awarded per academic staff member	#798	#671	#680	#726	#615	#669

### 3.2 Subject Rankings

Estão presentes Universidades portuguesas em 10 dos 22 Subject Rankings.

A metodologia dos Subject Rankings é apresentada no [Anexo1](#).

#### Agricultural Sciences

	U. Porto	U.Lisboa	#IES
World Rank	#57=	#61=	100
Europa	#19	#20	40
Iberoam	#6	#7	17
Portugal	#1	#2	2
Overall score	68.5	67.8	
Global research reputation	#107	#161	
Regional research reputation	#64	#13	
Publications	#60	#71	
Normalized citation impact	#37	#67	
Total citations	#39	#60	
Number of publications that are among the 10 percent most cited	#25	#51	
Percentage of total publications that are among the 10 percent most cited	#31	#61	
International collaboration	#184	#71	

#### Biology and Biochemistry

	U.Lisboa	#IES
World Rank	#212=	250
Europa	#87	104
Iberoamérica	#5	8
Portugal	#1	
Overall score	47.0	
Global research reputation	#198	
Regional research reputation	#71	
Publications	#175	
Normalized citation impact	#323	
Total citations	#209	
Number of publications that are among the 10 percent most cited	#216	
Percentage of total publications that are among the 10 percent most cited	#299	
International collaboration	#218	

## Chemistry

	U.Lisboa	U. Aveiro	U.Porto	Nova U. Lisboa	#IES
World Rank	#147=	#172=	#172=	#228=	250
Europa	#46=	#59=	#59=	#91=	102
Iberoamérica	#5	#9=	#9=	#14=	16
Portugal	#1	#2=	#2=	#4	4
Overall score	57.7	55.9	55.9	50.6	
Global research reputation	#346	#281	#207	#355	
Regional research reputation	#58	#117	#77	#109	
Publications	#52	#136	#69	#207	
Normalized citation impact	#313	#197	#307	#225	
Total citations	#95	#143	#111	#206	
Number of publications that are among the 10 percent most cited	#150	#135	#166	#210	
Percentage of total publications that are among the 10 percent most cited	#350	#183	#335	#216	
International collaboration	#149	#310	#379	#245	

## Engineering

	U.Lisboa	U.Porto	U.Aveiro	#IES
World Rank	#57=	#88=	#223=	250
Europa	#12=	#21=	#63=	71
Iberoamérica	#2	#3	#10	14
Portugal	#1	#2	#3	3
Overall score	73.2	68.7	54.5	
Global research reputation	#138	#197	#332	
Regional research reputation	#20	#46	#63	
Publications	#46	#137	#313	
Normalized citation impact	#186	#92	#153	
Total citations	#41	#105	#276	
Number of publications that are among the 10 percent most cited	#47	#79	#231	
Percentage of total publications that are among the 10 percent most cited	#223	#62	#101	
International collaboration	#245	#190	#85	

## Environment/Ecology

	U.Lisboa	U.Porto	#IES
World Rank	#124=	#142=	150
Europa	#50	#57=	60
Iberoamérica	#5	#6	6
Portugal	#1	#2	2
Overall score	53.8	51.3	
Global research reputation	#149	#188	
Regional research reputation	#29	#49	
Publications	#45	#61	
Normalized citation impact	#248	#221	
Total citations	#98	#104	
Number of publications that are among the 10 percent most cited	#143	#134	
Percentage of total publications that are among the 10 percent most cited	#264	#242	
International collaboration	#141	#168	

## Materials Science

	U.Aveiro	U.Minho	U.Lisboa	U.Porto	#IES
World Rank	#132=	#197=	#204=	#209=	250
Europa	#26=	#56=	#59=	#64	83
Iberoamérica	#1	#5	#7	#8	10
Portugal	#1	#2	#3	#4	4
Overall score	61.1	53.3	52.8	52.1	
Global research reputation	#205	#282	#229	#315	
Regional research reputation	#56	#81	#69	#77	
Publications	#91	#113	#114	#140	
Normalized citation impact	#239	#247	#264	#232	
Total citations	#111	#145	#154	#162	
Number of publications that are among the 10 percent most cited	#125	#168	#193	#183	
Percentage of total publications that are among the 10 percent most cited	#259	#275	#305	#261	
International collaboration	#73	#229	#386	#333	

## Mathematics

	U.Lisboa	U.Aveiro	#IES
World Rank	#53=	#128	150
Europa	#15=	#45	56
Iberoamérica	#3	#8	11
Portugal	#1	#2	2
Overall score	68.4	53.6	
Global research reputation	#100	#223	
Regional research reputation	#23	#51	
Publications	#6	#209	
Normalized citation impact	#236	#55	
Total citations	#35	#150	
Number of publications that are among the 10 percent most cited	#56	#107	
Percentage of total publications that are among the 10 percent most cited	#242	#27	
International collaboration	#97	#82	

## Pharmacology and Toxicology

	U.Porto	#IES
World Rank	#100	100
Europa	#40	40
Iberoamérica	#3	3
Portugal	#1	1
Overall score	45.0	
Global research reputation	#92	
Regional research reputation	#36	
Publications	#70	
Normalized citation impact	#134	
Total citations	#87	
Number of publications that are among the 10 percent most cited	#105	
Percentage of total publications that are among the 10 percent most cited	#152	
International collaboration	#138	

## Physics

	U.Lisboa	#IES
World Rank	#174=	250
Europa	#79	113
Iberoamérica	#7	13
Portugal	#1	1
Overall score	62.6	
Global research reputation	#195	
Regional research reputation	#86	
Publications	#52	
Normalized citation impact	#313	
Total citations	#113	
Number of publications that are among the 10 percent most cited	#117	
Percentage of total publications that are among the 10 percent most cited	#319	
International collaboration	#360	

## Plant and Animal Science

	U.Lisboa	U.Porto	U.Algarve	#IES
World Rank	#128=	#147=	#235=	250
Europa	#58	#66=	#110=	119
Iberoamérica	#6	#8	#16=	22
Portugal	#1	#2	#3	3
Overall score	66.4	64.0	55.1	
Global research reputation	#239	#304	#370	
Regional research reputation	#26	#84	#98	
Publications	#59	#87	#229	
Normalized citation impact	#282	#279	#241	
Total citations	#77	#105	#233	
Number of publications that are among the 10 percent most cited	#118	#117	#226	
Percentage of total publications that are among the 10 percent most cited	#328	#273	#228	
International collaboration	#323	#139	#120	

## Anexo 1

### Metodología de U.S. News 2016 Best Global Universities Subject Rankings

“In addition to rankings of the world's top 750 universities overall and by region and country, the second annual U.S. News [Best Global Universities](#) rankings include an examination of the leaders in key academic subject areas. U.S. News used a separate methodology to publish the top global universities in 22 subject areas; new this year is a subject ranking for arts and humanities. The [subject rankings](#) are powered by [Thomson Reuters InCites™](#) research analytics solutions.

These subject-specific rankings – which are not of academic majors, departments or specific schools at universities, such as business schools or medical schools – are based on academic research performance in those subjects. We have used various bibliometric measures, including publications and citations, as well as indicators for global and regional reputation in that specific subject.

In many cases, an institution that had a strong focus on a certain subject was ranked in that subject but was excluded from the overall Best Global Universities rankings encompassing the top 750 universities worldwide. In total, 45 universities and one country, Georgia, were in the subject rankings but not the overall top 750 rankings.

#### Ranking Indicators

The bibliometric indicators are based on data from the [Web of Science™](#) for the five-year period from 2009 to 2013. The Web of Science™ is a Web-based research platform that covers more than 12,000 of the most influential and authoritative scholarly journals worldwide in the sciences, social sciences, and arts and humanities. The 22 subject fields used in the analysis came from subject schema in Thomson Reuters' InCites™, which uses the content and citation indicators from the Web of Science™.

The first step in producing the subject rankings was to create the total universe of schools that could be ranked in each field. Depending on the subject, the top 250 or 500 universities that had published the most papers in that subject area in the 2009-2013 time period were included in the ranking universe.

This year, U.S. News studied how many papers each university had published in each of the 22 subject areas and determined that the rankings could be extended in some areas, as many universities had published more than 250 papers in that subject, or more than 500 papers, in the 2009-2013 period.

Working with Thomson Reuters' bibliometric experts, it was determined that fields such as engineering, chemistry and physics had enough papers to significantly expand the number of schools ranked in that subject compared with last year. This meant that the total number of schools ranked in each subject and the number of ranked universities published by U.S. News vary depending on the total number of papers published in that subject in the five-year period.

Unlike last year, when each subject ranking featured the top 100 universities, in this year's edition, the number of universities ranked in each field varies. In eight fields, the top 250 universities are ranked; in five fields, the top 150 are ranked; and in nine fields, the top 100 are ranked.

The table below shows the number of universities that published more than 250 papers and more than 500 papers from 2009 to 2013 in each subject area; the total number of universities ranked in these subjects; and the number of schools U.S. News published rankings for in each subject area.

Subjects	Number of universities with >250 papers in 2009-2013	Number of universities with >500 papers in 2009-2013	Total number of universities ranked	Number of ranked universities published by U.S. News
Agricultural sciences	214	81	250	100
Arts and humanities	237	95	250	100
Biology and biochemistry	539	283	500	250
Chemistry	939	570	500	250
Clinical medicine	889	676	500	250
Computer science	223	83	250	100
Economics and business	193	48	250	100
Engineering	657	355	500	250
Environment/ecology	329	126	250	150

Subjects	Number of universities with >250 papers in 2009-2013	Number of universities with >500 papers in 2009-2013	Total number of universities ranked	Number of ranked universities published by U.S. News
Geosciences	335	175	250	150
Immunology	203	89	250	100
Materials science	443	208	500	250
Mathematics	334	110	250	100
Microbiology	132	23	250	100
Molecular biology and genetics	359	191	250	150
Neuroscience and behavior	382	224	250	150
Pharmacology and toxicology	272	82	250	100
Physics	837	543	500	250
Plant and animal science	488	235	500	250
Psychiatry/psychology	318	146	250	150
Social sciences and public health	486	280	500	250
Space science	200	95	250	100

The next step was to calculate the 22 separate subject rankings using the ranking factors U.S. News selected. The new arts and humanities ranking used 10 ranking factors; the other 21 subject rankings used eight ranking factors, as was done in the inaugural edition of the Best Global Universities rankings.

Each indicator used in the subject rankings was based on bibliometric and global and regional reputation data compiled for that specific subject. For example, for the Best Global Universities for Clinical Medicine rankings, each of the eight rankings factors used in the calculations was based on data and values for clinical medicine.

The subject rankings methodology differs from the one used to produce the overall Best Global Universities rankings of the top 750 schools in a number of ways.

First, U.S. News tailored the subject ranking methodology to the different publication characteristics of the soft sciences compared with the hard sciences. As noted in the table below, the soft sciences are computer science; economics and business; engineering; mathematics; and social sciences and public health. The hard sciences are the remaining 16 subject areas, excluding arts and humanities.

Hard sciences	Soft sciences	Arts and humanities
Agricultural sciences	Computer science	Arts and humanities
Biology and biochemistry	Economics and business	
Chemistry	Engineering	
Clinical medicine	Mathematics	
Environment/ecology	Social sciences and public health	
Geosciences		
Immunology		
Materials science		
Microbiology		
Molecular biology and genetics		
Neuroscience and behavior		
Pharmacology and toxicology		

Hard sciences	Soft sciences	Arts and humanities
Physics		
Plant and animal science		
Psychiatry/psychology		
Space science		

Next, U.S. News developed a distinct ranking methodology for arts and humanities.

The arts and humanities methodology takes into account key characteristics of that field, in which publications play a significantly smaller role. That meant that for the arts and humanities rankings, the number of publications or other indicators that relate to publications and citations were weighted far less than they were in the other subject areas.

This also meant that the conferences and books indicators were used and heavily weighted but weren't used in the other subject rankings, and that both global research reputation and regional research reputation were weighted more heavily than in the other subject rankings.

School-level data on Ph.D.s awarded and number of faculty were not available at the subject level and therefore not included in the subject rankings methodology.

The use of citation analysis within the hard sciences is well established. However, in the soft sciences the relationship between citations and performance is less clear. There are a number of reasons for this.

First, unlike the hard sciences, journal articles are often not the main method of communication of research, and citation rates to the articles may be low. Second, in the social sciences and economics and business, when a scholar cites another work, it is frequently a point of debate or discussion.

This is in contrast to the hard sciences, where the reason for citing another work is usually one of utility or influence. In the case of mathematics, although a journal article is the main method of communication, citations tend to take a longer time to accumulate than other fields and the overall citation rate to mathematics papers tends to be quite low.

These reasons do not negate the use of citation analysis for research evaluation, but they decrease confidence in the robustness of the results. Therefore, U.S. News lowered the weights assigned to these citation indicators in the soft sciences to reflect the lower confidence.

The table below lists the weights and factors used to compute the 22 subject rankings, with related indicators grouped together. For a detailed explanation of each ranking factor, please read "[How U.S. News Calculated the 2016 Best Global Universities Rankings.](#)"

Ranking indicator	Weights used for hard sciences	Weights used for soft sciences	Weights used for arts and humanities
Global research reputation	12.5%	12.5%	20%
Regional research reputation	12.5%	12.5%	15%
Publications	15%	17.5%	10%
Books	N/A	N/A	15%
Conferences	N/A	N/A	5%
Normalized citation impact	10%	7.5%	7.5%
Total citations	15%	12.5%	7.5%
Number of publications that are among the 10 percent most cited	15%	17.5%	7.5%
Percentage of total publications that are among the 10 percent most cited	10%	10%	7.5%
International collaboration	10%	10%	5%

### How the Subject Scores and Numerical Rankings Were Calculated

To arrive at a school's rank in each of the 21 subjects, the subject scores were calculated using a combination of the weights and z-scores for each of the eight indicators used in each subject ranking. In statistics, a z-score is a standardized score that indicates how many standard deviations a data point is from the mean of that variable. This transformation of the data is essential when combining diverse information into a single ranking because it allows for fair comparisons between the different types of data.

Several of the indicators were highly skewed, so the logs of the original values were used. These indicators that were logged were:

- Publications
- Total citations
- Number of publications that are among the 10 percent most cited
- Number of Ph.D.s awarded
- Global research reputation
- Regional research reputation

This log manipulation rescaled the data and allowed for a more normalized and uniform spread across each of the indicators.

After the indicators were normalized, the z-scores for each indicator were calculated in order to standardize the different types of data to a common scale.

In order to calculate a school's subject score, the calculated z-scores for each of the eight indicators were weighted using the weights described earlier. U.S. News determined the weights based on our judgment of the relative importance of the ranking factors and in consultation with bibliometric experts.

The subject score was calculated by summing the school's weighted values for the eight indicators in that subject. The minimum score from the pool of 250 schools was then subtracted from each of the scores in order to make zero the lowest possible score.

The scores were then rescaled by multiplying the ratio between the overall performance of each university in that subject and the highest-performing university by 100. This forced the scores to fall on a 0-100 scale, with the highest-performing school earning a subject score of 100.

The 250 schools in each of the 21 subject areas were then numerically ranked in descending order from 1 to 250 based on their weighted subject score. Each school's subject score was rounded to one decimal place in order to increase variance between scores and to minimize the occurrence of ties. U.S. News published the top 100 ranked schools in each subject.

In addition, in each subject area, the 250 universities received a numerical rank for each of the eight ranking indicators, such as publications, total citations and global academic reputation, based on their z-score for that indicator. The highest scoring university for each of the eight indicators received a rank of 1, and the lowest scoring university received a rank of 250. ties were allowed.

The numerical ranks for each of the eight indicators are published on usnews.com for each school in each of the 21 subject areas. This means that there are some schools in the subject rankings that have ranking indicators with numerical ranks in the 101 to 250 range. The numerical ranks published for each ranking indicator are to be used to determine the relative position of each school in that indicator on a 1 to 250 scale, with 1 being the highest. The numerical indicator ranks were not used to calculate the subject score.

### **Data Collection**

The data and metrics used in the rankings were provided by Thomson Reuters InCites™ research analytics solutions. The bibliometric data were based upon the Web of Science™.

Publications are limited to those published between 2008 and 2012. However, the citations to those papers come from all publications up to the most recent data available. For the 2015 edition of the U.S. News Best Global Universities, published in 2014, this cutoff was around April 2014. It is necessary to use a slightly older window of publication to allow for citations to accumulate and provide statistically relevant results.

The subject fields used in the analysis came from Thomson Reuters' InCites™ schema and did not include arts and humanities journals, and therefore they are excluded for the citation-based indicators; but articles from arts and humanities journals were included in the papers count used in the publications indicator. Arts and humanities journals accumulate few citations and citation analysis is less robust; therefore, the deliberate exclusion of arts and humanities improves the robustness of the results."<sup>4</sup>

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<sup>4</sup> Robert Morse and Melinda Foster, How U.S. News Calculated the Best Global Universities Subject Rankings, Oct. 5, 2015, in <http://www.usnews.com/education/best-global-universities/articles/subject-rankings-methodology> accessed 6 de outubro de 2015.

## Anexo 2

### Números de estudantes e académicos das IES portuguesas no U.S.News

	U.Lisboa	U. Porto	U.Coimbra	U.Minho	U.Aveiro	Nova U.Lisboa
Total number of students	47849	32720	22795	19090	10791	18867
Number of international students	4160	3088	2406	1758	1051	1309
Total number of academic staff	2742	1740	1203	1014	608	1051
Number of international staff	58	44	33	43	27	61
Number of undergraduate degrees awarded	7018	3497	2952	2450	1119	2076
Number of master's degrees awarded	2261	3582	2316	1732	1147	1820
Number of doctoral degrees awarded	469	426	287	212	170	258