

ShanghaiRanking's Academic Ranking of World Universities Methodology 2022

1. Candidate Universities

ARWU considers every university that has any Nobel Laureates, Fields Medalists, Highly Cited Researchers, or papers published in Nature or Science. In addition, universities with a significant amount of papers indexed by Science Citation Index-Expanded (SCIE) and Social Science Citation Index (SSCI) are also included. In total, more than 2500 universities are actually ranked, and the best 1000 are published.

2. Ranking Criteria and Weights

Universities are ranked by several academic or research performance indicators, including alumni and staff winning Nobel Prizes and Fields Medals, highly cited researchers, papers published in Nature and Science, papers indexed in major citation indices, and the per capita academic performance of an institution. 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 data distribution for each indicator is examined for any significant distorting effect; standard statistical techniques are used to adjust the indicator if necessary. Scores for each indicator are weighted as shown below to arrive at a final overall score for an institution. The highest scoring institution is assigned a score of 100, and other institutions are calculated as a percentage of the top score.

3. Indicators and Weights for ARWU

Criteria	Indicator	Code	Weight
Quality of Education	Alumni of an institution winning Nobel Prizes and Fields Medals	Alumni	10%
Quality of Faculty	Staff of an institution winning Nobel Prizes and Fields Medals	Award	20%
	Highly Cited Researchers	HiCi	20%
	Papers published in Nature and Science*	N&S	20%
Research Output	Papers indexed in Science Citation Index-Expanded and Social Science Citation Index	PUB	20%
Per Capita Performance	Per capita academic performance of an institution	PCP	10%

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

4. Definition of Indicators

Indicator	Definition
Alumni	The total number of the alumni of an institution winning Nobel Prizes and Fields Medals. Alumni are defined as those who obtain bachelor's, master's or doctoral degrees from the institution. Different weights are set according to the periods of obtaining

Indicator	Definition
Award	<p>degrees. The weight is 100% for alumni obtaining degrees after 2011, 90% for alumni obtaining degrees in 2001-2010, 80% for alumni obtaining degrees in 1991-2000, and so on, and finally 10% for alumni obtaining degrees in 1921-1930. If a person obtains more than one degree from an institution, the institution is considered once only.</p> <p>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 after 2021, 90% for winners in 2011-2020, 80% for winners in 2001-2010, 70% for winners in 1991-2000, and so on, and finally 10% for winners in 1931-1940. 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.</p>
HiCi	<p>The number of Highly Cited Researchers selected by Clarivate. The Highly Cited Researchers list issued in November 2021 was used for the calculation of HiCi indicator in ARWU 2022. Only the primary affiliations of Highly Cited Researchers are considered.</p>
N&S	<p>The number of papers published in Nature and Science between 2017 and 2021. To distinguish the order of author affiliation, a weight of 100% is assigned for corresponding author affiliation, 50% for first author affiliation (second author affiliation if the first author affiliation is the same as corresponding author affiliation), 25% for the next author affiliation, and 10% for other author affiliations. When there are more than one corresponding author address, we consider the first corresponding author address as the corresponding author address and consider other corresponding author addresses as first author address, second author address etc. following the order of the author addresses. Only publications of 'Article' type are considered.</p>
PUB	<p>Total number of papers indexed in Science Citation Index-Expanded and Social Science Citation Index in 2021. Only publications of 'Article' type are considered. When calculating the total number of papers of an institution, a special weight of two was introduced for papers indexed in Social Science Citation Index.</p>
PCP	<p>The weighted scores of the above five indicators divided by the number of full-time equivalent academic staff give PCP scores. If the number of academic staff for institutions of a country cannot be obtained, the weighted scores of the above five indicators are used. For ARWU 2022, the numbers of full-time equivalent academic staff are obtained for institutions in USA, UK, Chinese Mainland, France, Canada, Japan, Italy, Australia, Netherlands, Sweden, Switzerland, Belgium, South Korea, Czechia, New Zealand, Saudi Arabia, Spain, Austria, Norway, Poland, Israel etc.</p>

5. Data Sources

Indicator	Data Source
Nobel Prize	http://www.nobelprize.org/
Fields Medals	http://www.mathunion.org/
HiCi	https://clarivate.com/webofsciencegroup/researcher-recognition/
N&S	http://www.webofscience.com/

Indicator**Data Source**

PUB

<http://www.webofscience.com/>

Others

Number of academic staff data is obtained from national agencies such as National Ministry of Education, National Bureau of Statistics, National Association of Universities and Colleges, National Rector's Conference.

ShanghaiRanking's Global Ranking of Academic Subjects Methodology 2022

1. Ranking Subjects

In ShanghaiRanking's Global Ranking of Academic Subjects 2022, institutions are ranked in 54 subjects across Natural Sciences, Engineering, Life Sciences, Medical Sciences, and Social Sciences.

Fields	Subjects
Natural sciences	Mathematics
Natural sciences	Physics
Natural sciences	Chemistry
Natural sciences	Earth Sciences
Natural sciences	Geography
Natural sciences	Ecology
Natural sciences	Oceanography
Natural sciences	Atmospheric Sciences
Engineering	Mechanical Engineering
Engineering	Electrical & Electronic Engineering
Engineering	Automation & Control
Engineering	Telecommunication Engineering
Engineering	Instruments Science & Technology
Engineering	Biomedical Engineering
Engineering	Computer Science & Engineering
Engineering	Civil Engineering
Engineering	Chemical Engineering
Engineering	Materials Science & Engineering
Engineering	Nanoscience & Nanotechnology
Engineering	Energy Science & Engineering
Engineering	Environmental Science & Engineering
Engineering	Water Resources
Engineering	Food Science & Technology
Engineering	Biotechnology
Engineering	Aerospace Engineering
Engineering	Marine/Ocean Engineering
Engineering	Transportation Science & Technology
Engineering	Remote Sensing
Engineering	Mining & Mineral Engineering
Engineering	Metallurgical Engineering

Life Sciences	Biological Sciences
Life Sciences	Human Biological Sciences
Life Sciences	Agricultural Sciences
Life Sciences	Veterinary Sciences
Medical Sciences	Clinical Medicine
Medical Sciences	Public Health
Medical Sciences	Dentistry & Oral Sciences
Medical Sciences	Nursing
Medical Sciences	Medical Technology
Medical Sciences	Pharmacy & Pharmaceutical Sciences
Social Sciences	Economics
Social Sciences	Statistics
Social Sciences	Law
Social Sciences	Political Sciences
Social Sciences	Sociology
Social Sciences	Education
Social Sciences	Communication
Social Sciences	Psychology
Social Sciences	Business Administration
Social Sciences	Finance
Social Sciences	Management
Social Sciences	Public administration
Social Sciences	Hospitality & Tourism Management
Social Sciences	Library & Information Sciences

2. Candidate Universities

The Global Ranking of Academic Subjects has scrutinised the universities that have published a certain number of publications during the period of 2016-2020. The publication threshold is set differently for different subjects. Bibliometric data are collected from Web of Science and InCites.

2022 ShanghaiRanking's Global Ranking of Academic Subjects Selection of Universities

Fields	Subjects	Publication threshold	Listed Universities
Natural sciences	Mathematics	100	500
Natural sciences	Physics	300	500
Natural sciences	Chemistry	200	500
Natural sciences	Earth Sciences	100	500
Natural sciences	Geography	100	300
Natural sciences	Ecology	100	500
Natural sciences	Oceanography	50	200
Natural sciences	Atmospheric Sciences	50	400
Engineering	Mechanical Engineering	100	400
Engineering	Electrical & Electronic Engineering	150	500
Engineering	Automation & Control	100	200
Engineering	Telecommunication Engineering	100	300
Engineering	Instruments Science & Technology	100	300
Engineering	Biomedical Engineering	100	300
Engineering	Computer Science & Engineering	150	500
Engineering	Civil Engineering	100	300
Engineering	Chemical Engineering	100	500
Engineering	Materials Science & Engineering	200	500
Engineering	Nanoscience & Nanotechnology	150	400
Engineering	Energy Science & Engineering	200	400
Engineering	Environmental Science & Engineering	200	500
Engineering	Water Resources	100	200
Engineering	Food Science & Technology	100	300
Engineering	Biotechnology	100	500
Engineering	Aerospace Engineering	50	50
Engineering	Marine/Ocean Engineering	50	50
Engineering	Transportation Science & Technology	50	200
Engineering	Remote Sensing	50	100
Engineering	Mining & Mineral Engineering	25	100
Engineering	Metallurgical Engineering	100	200

Life Sciences	Biological Sciences	200	500
Life Sciences	Human Biological Sciences	100	500
Life Sciences	Agricultural Sciences	100	500
Life Sciences	Veterinary Sciences	50	300
Medical Sciences	Clinical Medicine	300	500
Medical Sciences	Public Health	200	500
Medical Sciences	Dentistry & Oral Sciences	50	300
Medical Sciences	Nursing	50	300
Medical Sciences	Medical Technology	100	400
Medical Sciences	Pharmacy & Pharmaceutical Sciences	100	500
Social Sciences	Economics	50	500
Social Sciences	Statistics	100	200
Social Sciences	Law	50	300
Social Sciences	Political Sciences	50	400
Social Sciences	Sociology	50	200
Social Sciences	Education	50	500
Social Sciences	Communication	25	300
Social Sciences	Psychology	100	500
Social Sciences	Business Administration	50	400
Social Sciences	Finance	50	200
Social Sciences	Management	50	500
Social Sciences	Public administration	25	200
Social Sciences	Hospitality & Tourism Management	25	300
Social Sciences	Library & Information Sciences	50	100

Web of Science categories are mapped to 54 academic subjects.

Mapping between Web of Science categories and 54 academic subjects

Fields	Academic Subjects	Web of Science Categories
Natural Sciences	Mathematics	Mathematics
Natural Sciences	Mathematics	Mathematics, Applied
Natural Sciences	Physics	Acoustics
Natural Sciences	Physics	Astronomy & Astrophysics
Natural Sciences	Physics	Optics
Natural Sciences	Physics	Physics, Applied
Natural Sciences	Physics	Physics, Atomic, Molecular & Chemical
Natural Sciences	Physics	Physics, Condensed Matter
Natural Sciences	Physics	Physics, Fluids & Plasmas
Natural Sciences	Physics	Physics, Mathematical
Natural Sciences	Physics	Physics, Multidisciplinary
Natural Sciences	Physics	Physics, Nuclear
Natural Sciences	Physics	Physics, Particles & Fields
Natural Sciences	Chemistry	Chemistry, Analytical
Natural Sciences	Chemistry	Chemistry, Applied
Natural Sciences	Chemistry	Chemistry, Inorganic & Nuclear
Natural Sciences	Chemistry	Chemistry, Multidisciplinary
Natural Sciences	Chemistry	Chemistry, Organic
Natural Sciences	Chemistry	Chemistry, Physical
Natural Sciences	Chemistry	Crystallography
Natural Sciences	Chemistry	Electrochemistry
Natural Sciences	Chemistry	Spectroscopy
Natural Sciences	Chemistry	Polymer Science
Natural Sciences	Earth Sciences	Geochemistry & Geophysics
Natural Sciences	Earth Sciences	Geology
Natural Sciences	Earth Sciences	Geosciences, Multidisciplinary
Natural Sciences	Earth Sciences	Mineralogy
Natural Sciences	Earth Sciences	Paleontology
Natural Sciences	Geography	Area Studies
Natural Sciences	Geography	Geography
Natural Sciences	Geography	Geography, Physical
Natural Sciences	Ecology	Biodiversity Conservation
Natural Sciences	Ecology	Ecology
Natural Sciences	Oceanography	Oceanography
Natural Sciences	Atmospheric Science	Meteorology & Atmospheric Sciences

Engineering	Mechanical Engineering	Engineering, Manufacturing
Engineering	Mechanical Engineering	Engineering, Mechanical
Engineering	Electrical & Electronic Engineering	Engineering, Electrical & Electronic
Engineering	Electrical & Electronic Engineering	Imaging Science & Photographic Technology
Engineering	Automation & Control	Automation & Control Systems
Engineering	Automation & Control	Robotics
Engineering	Telecommunication Engineering	Telecommunications
Engineering	Instruments Science & Technology	Instruments & Instrumentation
Engineering	Instruments Science & Technology	Microscopy
Engineering	Biomedical Engineering	Cell & Tissue Engineering
Engineering	Biomedical Engineering	Engineering, Biomedical
Engineering	Computer Science & Engineering	Computer Science, Information Systems
Engineering	Computer Science & Engineering	Computer Science, Cybernetics
Engineering	Computer Science & Engineering	Computer Science, Software Engineering
Engineering	Computer Science & Engineering	Computer Science, Artificial Intelligence
Engineering	Computer Science & Engineering	Computer Science, Hardware & Architecture
Engineering	Computer Science & Engineering	Computer Science, Theory & Methods
Engineering	Computer Science & Engineering	Computer Science, Interdisciplinary Applications
Engineering	Civil Engineering	Construction & Building Technology
Engineering	Civil Engineering	Engineering, Civil
Engineering	Chemical Engineering	Engineering, Chemical
Engineering	Materials Science & Engineering	Materials Science, Biomaterials
Engineering	Materials Science & Engineering	Materials Science, Ceramics
Engineering	Materials Science & Engineering	Materials Science, Characterization & Testing
Engineering	Materials Science & Engineering	Materials Science, Coatings & Films
Engineering	Materials Science & Engineering	Materials Science, Composites
Engineering	Materials Science & Engineering	Materials Science, Multidisciplinary
Engineering	Materials Science & Engineering	Materials Science, Paper & Wood
Engineering	Materials Science & Engineering	Materials Science, Textiles
Engineering	Nanoscience & Nanotechnology	Nanoscience & Nanotechnology
Engineering	Energy Science & Engineering	Energy & Fuels
Engineering	Energy Science & Engineering	Nuclear Science & Technology
Engineering	Energy Science & Engineering	Engineering, Petroleum
Engineering	Energy Science & Engineering	Thermodynamics
Engineering	Environmental Science & Engineering	Engineering, Environmental
Engineering	Environmental Science & Engineering	Environmental Sciences
Engineering	Environmental Science & Engineering	Environmental Studies
Engineering	Water Resources	Water Resources
Engineering	Food Science & Technology	Food Science & Technology
Engineering	Biotechnology	Biotechnology & Applied Microbiology
Engineering	Aerospace Engineering	Engineering, Aerospace
Engineering	Marine/Ocean Engineering	Engineering, Marine
Engineering	Marine/Ocean Engineering	Engineering, Ocean
Engineering	Transportation Science & Technology	Transportation
Engineering	Transportation Science & Technology	Transportation Science & Technology
Engineering	Remote Sensing	Remote Sensing
Engineering	Mining & Mineral Engineering	Mining & Mineral Processing
Engineering	Metallurgical Engineering	Metallurgy & Metallurgical Engineering

Life Sciences	Biological Sciences	Biochemical Research Methods
Life Sciences	Biological Sciences	Biochemistry & Molecular Biology
Life Sciences	Biological Sciences	Biology
Life Sciences	Biological Sciences	Biophysics
Life Sciences	Biological Sciences	Cell Biology
Life Sciences	Biological Sciences	Developmental Biology
Life Sciences	Biological Sciences	Entomology
Life Sciences	Biological Sciences	Evolutionary Biology
Life Sciences	Biological Sciences	Genetics & Heredity
Life Sciences	Biological Sciences	Limnology
Life Sciences	Biological Sciences	Marine & Freshwater Biology
Life Sciences	Biological Sciences	Mathematical & Computational Biology
Life Sciences	Biological Sciences	Microbiology
Life Sciences	Biological Sciences	Mycology
Life Sciences	Biological Sciences	Ornithology
Life Sciences	Biological Sciences	Physiology
Life Sciences	Biological Sciences	Reproductive Biology
Life Sciences	Biological Sciences	Virology
Life Sciences	Biological Sciences	Zoology
Life Sciences	Human Biological Sciences	Neurosciences
Life Sciences	Human Biological Sciences	Anatomy & Morphology
Life Sciences	Human Biological Sciences	Parasitology
Life Sciences	Human Biological Sciences	Pathology
Life Sciences	Human Biological Sciences	Immunology
Life Sciences	Human Biological Sciences	Medical Informatics
Life Sciences	Human Biological Sciences	Medicine, Research & Experimental
Life Sciences	Agricultural Sciences	Agronomy
Life Sciences	Agricultural Sciences	Horticulture
Life Sciences	Agricultural Sciences	Fisheries
Life Sciences	Agricultural Sciences	Soil Science
Life Sciences	Agricultural Sciences	Forestry
Life Sciences	Agricultural Sciences	Agriculture, Dairy & Animal Science
Life Sciences	Agricultural Sciences	Agriculture, Multidisciplinary
Life Sciences	Agricultural Sciences	Plant Sciences
Life Sciences	Veterinary Sciences	Veterinary Sciences

Medical Sciences	Clinical Medicine	Allergy
Medical Sciences	Clinical Medicine	Andrology
Medical Sciences	Clinical Medicine	Anesthesiology
Medical Sciences	Clinical Medicine	Cardiac & Cardiovascular Systems
Medical Sciences	Clinical Medicine	Clinical Neurology
Medical Sciences	Clinical Medicine	Critical Care Medicine
Medical Sciences	Clinical Medicine	Dermatology
Medical Sciences	Clinical Medicine	Emergency Medicine
Medical Sciences	Clinical Medicine	Endocrinology & Metabolism
Medical Sciences	Clinical Medicine	Gastroenterology & Hepatology
Medical Sciences	Clinical Medicine	Geriatrics & Gerontology
Medical Sciences	Clinical Medicine	Gerontology
Medical Sciences	Clinical Medicine	Hematology
Medical Sciences	Clinical Medicine	Integrative & Complementary Medicine
Medical Sciences	Clinical Medicine	Medicine, General & Internal
Medical Sciences	Clinical Medicine	Obstetrics & Gynecology
Medical Sciences	Clinical Medicine	Oncology
Medical Sciences	Clinical Medicine	Ophthalmology
Medical Sciences	Clinical Medicine	Orthopedics
Medical Sciences	Clinical Medicine	Otorhinolaryngology
Medical Sciences	Clinical Medicine	Pediatrics
Medical Sciences	Clinical Medicine	Peripheral Vascular Disease
Medical Sciences	Clinical Medicine	Psychiatry
Medical Sciences	Clinical Medicine	Rehabilitation
Medical Sciences	Clinical Medicine	Respiratory System
Medical Sciences	Clinical Medicine	Rheumatology
Medical Sciences	Clinical Medicine	Surgery
Medical Sciences	Clinical Medicine	Transplantation
Medical Sciences	Clinical Medicine	Tropical Medicine
Medical Sciences	Clinical Medicine	Urology & Nephrology
Medical Sciences	Clinical Medicine	Audiology & Speech-Language Pathology
Medical Sciences	Public Health	Health Policy & Services
Medical Sciences	Public Health	Health Care Sciences & Services
Medical Sciences	Public Health	Infectious Diseases
Medical Sciences	Public Health	Nutrition & Dietetics
Medical Sciences	Public Health	Primary Health Care
Medical Sciences	Public Health	Public, Environmental & Occupational Health
Medical Sciences	Public Health	Social Sciences, Biomedical
Medical Sciences	Public Health	Substance Abuse
Medical Sciences	Public Health	Ergonomics
Medical Sciences	Dentistry & Oral Sciences	Dentistry, Oral Surgery & Medicine
Medical Sciences	Nursing	Nursing
Medical Sciences	Medical Technology	Medical Laboratory Technology
Medical Sciences	Medical Technology	Neuroimaging
Medical Sciences	Medical Technology	Radiology, Nuclear Medicine & Medical Imaging
Medical Sciences	Pharmacy & Pharmaceutical Sciences	Chemistry, Medicinal
Medical Sciences	Pharmacy & Pharmaceutical Sciences	Pharmacology & Pharmacy
Medical Sciences	Pharmacy & Pharmaceutical Sciences	Toxicology

Social Sciences	Economics	Economics
Social Sciences	Statistics	Statistics & Probability
Social Sciences	Law	Criminology & Penology
Social Sciences	Law	Law
Social Sciences	Political Sciences	International Relations
Social Sciences	Political Sciences	Political Science
Social Sciences	Sociology	Sociology
Social Sciences	Education	Education & Educational Research
Social Sciences	Education	Education, Scientific Disciplines
Social Sciences	Education	Education, Special
Social Sciences	Communication	Communication
Social Sciences	Psychology	Psychology
Social Sciences	Psychology	Psychology, Applied
Social Sciences	Psychology	Psychology, Biological
Social Sciences	Psychology	Psychology, Clinical
Social Sciences	Psychology	Psychology, Developmental
Social Sciences	Psychology	Psychology, Educational
Social Sciences	Psychology	Psychology, Experimental
Social Sciences	Psychology	Psychology, Mathematical
Social Sciences	Psychology	Psychology, Multidisciplinary
Social Sciences	Psychology	Psychology, Psychoanalysis
Social Sciences	Psychology	Psychology, Social
Social Sciences	Psychology	Behavioral Sciences
Social Sciences	Business Administration	Business
Social Sciences	Business Administration	Industrial Relations & Labor
Social Sciences	Finance	Business, Finance
Social Sciences	Management	Management
Social Sciences	Management	Operations Research & Management Science
Social Sciences	Public Administration	Public Administration
Social Sciences	Hospitality & Tourism Management	Hospitality, Leisure, Sport & Tourism
Social Sciences	Library & Information Science	Information Science & Library Science

3. Scoring

The Rankings use a range of objective academic indicators and third-party data to measure the performance of world universities in relevant subjects, including research output (Q1), research influence (CNCI), international collaboration (IC), research quality (Top), and international academic awards (Award). The indexes of Top journals and international academic awards are based on Academic Excellence Survey (AES) conducted by ShanghaiRanking.

For each indicator, institutions are calculated as a percentage of the top-scored institution, then the square root of the percentage is multiplied by the allocated weight. The final score is obtained by adding the score of each indicator, and universities are ranked in descending order.

In calculating the CNCI score, the maximum value of CNCI in a subject is set as the lower value of: (1) either twice of the average CNCI for all institutions in this subject; (2) or the maximum of the CNCI for all institutions in this subject. The CNCI score of the institution is calculated as the proportion of their CNCI to the maximum value. If an institution's CNCI is higher than the maximum value, its CNCI score is assigned as 100.

4. Definition of Indicators

Indicators	Definition
Q1	The number of influential journal publications is an important measure of the research output of the universities in the corresponding subject. Q1 is the number of papers published by an institution in an Academic Subject in journals with Q1 Journal Impact Factor Quartile during the period of 2016-2020. Only 'Article' is considered. Data are collected from Web of Science and InCites. Publications in different Web of Science categories are grouped into relevant Academic Subjects.
CNCI	Category Normalized Citation Impact (CNCI) is the ratio of citations of papers published to the average citations of papers in the same category, the same year and same type of journal publication, by an institution in an Academic Subject during the period of 2016-2020. A CNCI value of 1 represents world-average performance. CNCI less than 1 indicates that the citation times of this group publications are lower than the average level, while CNCI greater than 1 indicates that the paper's citation performance is above the average level. Only 'Article' is considered. Data are collected from InCites database.
IC	International collaboration (IC) is an indicator used to evaluate the level of international collaboration in the respective subject between institutions. The ratio of the number of publications that have been found in at least two different countries in addresses of the authors to the total number of publications in the respective subject for an institution during the period of 2016-2020. Only 'Article' is considered. Data are collected from InCites database.
Top	Top is the number of papers published in Top Journals in an Academic Subject for an institution during the period of 2016-2020. Top Journals are nominated by distinguished scholars through ShanghaiRanking's Academic Excellence Survey . In 2022, 180 top journals identified by the Survey are used in rankings of 52 Academic Subjects. In Computer Science & Engineering, 31 selected top conferences are also taken into account this year. Only 'Article' is considered for this indicator. But in the subject of Pharmacy & Pharmaceutical Sciences,

Indicators**Definition**

Award	<p>both "Article" and "Review" are counted because only one journal in this subject was selected as the Top journal and it mainly publishes reviews.</p> <p>Award refers to the total number of the staff of an institution winning a significant award in an Academic Subject since 1981. Staff is defined as those who work full-time at an institution at the time of winning the prize. If a researcher retired at the time of winning the award, we count the institution where the researcher's last full-time academic position was held. The significant awards in each subject are nominated through ShanghaiRanking's Academic Excellence Survey. 36 prestigious international academic awards across 29 subjects were identified by the Survey. If a winner is affiliated with more than one institution at the time of winning the award, each institution is assigned the reciprocal of the number of institutions. If the award is awarded to more than one winner in one year, weights are set for winners according to their proportion of the prize. Different weights are set according to the periods of winning the prizes, diminishing by 25% each retrograde decade. The weight is 100% for winners in 2011-2020, 75% for winners in 2001-2010, 50% for winners in 1991-2000, and 25% for winners in 1981-1990. Nobel Prize in Physiology or Medicine is selected for Biological Sciences, Human Biological Sciences, Clinical Medicine, and Pharmacy & Pharmaceutical Sciences. Winners of this award are assigned to one or more subjects according to the topics of their recognized contributions. If a contribution belongs to more than one subject, the winner will be counted once for each relevant subject.</p>
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5. Data Sources

Indicator	Sources
Q1	InCites database https://incites.clarivate.com/#/analytics
CNCI	InCites database https://incites.clarivate.com/#/analytics
IC	InCites database https://incites.clarivate.com/#/analytics
Top	InCites database https://incites.clarivate.com/#/analytics
	Fields Medal http://www.mathunion.org/general/prizes/fields/details/
	The Abel Prize http://www.abelprize.no/
	Nobel Prize in Physics https://www.nobelprize.org/prizes/physics/
	Wolf Prize in Chemistry https://wolffund.org.il/home-page/
Award	Nobel Prize in Chemistry https://www.nobelprize.org/prizes/chemistry/
	Priestley Medal http://www.acs.org/content/acs/en/funding-and-awards/awards/national/bytopic/priestley-medal.html
	Crafoord Prize in Geosciences https://www.crafoordprize.se/geosciences
	The Carl-Gustaf Rossby Research Medal https://www.ametsoc.org/index.cfm/ams/about-ams/ams-awards-honors/awards/science-and-technology-medals/the-carl-gustaf-rossby-research-medal/

Indicator

Sources

The Jule G. Charney Award

<https://www.ametsoc.org/index.cfm/ams/about-ams/ams-awards-honors/awards/science-and-technology-medals/the-jule-g-charney-medal/>

ASME Medal

<https://www.asme.org/about-asme/get-involved/honors-awards/achievement-awards/asme-medal>

Timoshenko Medal

<https://www.asme.org/about-asme/get-involved/honors-awards/achievement-awards/timoshenko-medal>

IEEE Medal of Honor

<http://www.ieee.org/about/awards/medals/medalofhonor.html>

IEEE Control Systems Award

<https://www.ieee.org/about/awards/tfas/controlsys.html>

Claude E. Shannon Award

<https://www.itsoc.org/honors/claude-e-shannon-award>

Marconi Prize

<https://www.marconisociety.org/marconi-prize/>

A.M. Turing Award

<http://amturing.acm.org/>

International Award of Merit in Structural Engineering

<https://iabse.org/About/Awards/Award-of-Merit>

Andreas Acrivos Award for Professional Progress in Chemical Engineering

<https://www.iche.org/community/awards/andreas-acrivos-award-professional-progress-chemical-engineering>

MRS Medal Award

<https://mrs.org/careers-advancement/awards/fall-awards/mrs-medal>

Von Hippel Award

<https://www.mrs.org/careers-advancement/awards/fall-awards/von-hippel-award>

Global Energy Prize

<https://globalenergyprize.org/en/>

Stockholm Water Prize

<http://www.siwi.org/prizes/stockholmwaterprize/>

Robert E. Horton Medal

<https://honors.agu.org/medals-awards/robert-e-horton-award/>

EGU John Dalton Medal

<https://www.egu.eu/awards-medals/john-dalton/>

ASME-OOAE Lifetime Achievement Award

<https://www.asme.org/about-asme/honors-awards/unit-awards>

Nobel Prize in Physiology or Medicine

<https://www.nobelprize.org/prizes/medicine/>

Lasker~DeBakey Clinical Medical Research Award

<http://www.laskerfoundation.org/awards/#name=&award=Clinical&year=>

IADR Distinguished Scientist Award

<http://www.iadr.org/IADR/Awards/Grants-Awards/Distinguished-Scientist>

Nurse Researcher Hall of Fame

<https://www.sigmanursing.org/advance-elevate/awards/nurse-researcher-awards>

ISMRM Gold Medal

<https://www.ismrm.org/20m/gold-medal/>

IEEE Biomedical Engineering Award

<https://corporate-awards.ieee.org/award/ieee-biomedical-field-engineering-award/>

Indicator**Sources**

The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel

<https://www.nobelprize.org/prizes/economic-sciences/>

COPSS Presidents' Award

<https://community.amstat.org/copss/awards/presidents>

The Johan Skytte Prize in Political Science

<http://www.skytteprize.com/>

Ulysses Prize

<https://www.unwto.org/unwto-ulysses-prize-excellence-creation-and-dissemination-knowledge>

ASIST Award of Merit

<https://www.asist.org/programs-services/awards-honors/award-of-merit/>

6. Indicators and Weights

Different weights are allocated to the indicators for different subjects, as listed below.

2022 ShanghaiRanking's Global Ranking of Academic Subjects Indicators and Weights

Fields	Subjects	Q1	CNCI	IC	TOP	Award
Natural sciences	Mathematics	100	20	20	100	100
Natural sciences	Physics	100	100	20	100	100
Natural sciences	Chemistry	100	100	20	100	100
Natural sciences	Earth Sciences	100	100	20	100	100
Natural sciences	Geography	100	100	20	100	0
Natural sciences	Ecology	100	100	20	100	0
Natural sciences	Oceanography	100	100	20	100	0
Natural sciences	Atmospheric Sciences	100	100	20	100	100
Engineering	Mechanical Engineering	100	100	20	100	100
Engineering	Electrical & Electronic Engineering	100	100	20	100	100
Engineering	Automation & Control	100	100	20	100	100
Engineering	Telecommunication Engineering	100	100	20	100	100
Engineering	Instruments Science & Technology	200	100	20	0	0
Engineering	Biomedical Engineering	100	100	20	100	0
Engineering	Computer Science & Engineering	100	100	20	100	100
Engineering	Civil Engineering	100	100	20	100	100
Engineering	Chemical Engineering	100	100	20	100	100
Engineering	Materials Science & Engineering	100	100	20	100	100
Engineering	Nanoscience & Nanotechnology	100	100	20	100	0
Engineering	Energy Science & Engineering	100	100	20	100	20
Engineering	Environmental Science & Engineering	100	100	20	100	100
Engineering	Water Resources	100	100	20	100	20
Engineering	Food Science & Technology	100	100	20	100	0
Engineering	Biotechnology	200	100	20	0	0
Engineering	Aerospace Engineering	100	100	20	100	0
Engineering	Marine/Ocean Engineering	100	100	20	100	20
Engineering	Transportation Science & Technology	100	100	20	100	0
Engineering	Remote Sensing	100	100	20	100	0
Engineering	Mining & Mineral Engineering	100	100	20	100	0
Engineering	Metallurgical Engineering	100	100	20	100	0

Life Sciences	Biological Sciences	100	100	20	100	100
Life Sciences	Human Biological Sciences	100	100	20	100	100
Life Sciences	Agricultural Sciences	200	100	20	0	0
Life Sciences	Veterinary Sciences	100	50	20	100	0
Medical Sciences	Clinical Medicine	100	100	20	100	100
Medical Sciences	Public Health	100	100	20	100	0
Medical Sciences	Dentistry & Oral Sciences	100	100	20	100	100
Medical Sciences	Nursing	100	100	20	100	20
Medical Sciences	Medical Technology	100	100	20	100	20
Medical Sciences	Pharmacy & Pharmaceutical Sciences	100	100	20	100	20
Social Sciences	Economics	150	50	10	100	100
Social Sciences	Statistics	150	50	10	100	100
Social Sciences	Law	150	50	10	100	0
Social Sciences	Political Sciences	150	50	10	100	20
Social Sciences	Sociology	150	50	10	100	0
Social Sciences	Education	150	50	10	100	0
Social Sciences	Communication	150	50	10	100	0
Social Sciences	Psychology	150	50	10	100	0
Social Sciences	Business Administration	150	50	10	100	0
Social Sciences	Finance	150	50	10	100	0
Social Sciences	Management	150	50	10	100	0
Social Sciences	Public administration	150	50	10	100	0
Social Sciences	Hospitality & Tourism Management	150	50	10	100	20
Social Sciences	Library & Information Sciences	150	50	10	100	20

If you have any questions or comments about the Global Ranking of Academic Subjects, please contact us in the following ways.