

researchtrends

Welcome to the 20th issue of Research Trends, in which we focus on the recently announced Nobel Prizes. As one of the preeminent indicators of scientific value, Research Trends has naturally analyzed the results from a bibliometric point of view.

Winning a Nobel Prize is a significant achievement, but how might winning affect your career and the fortunes of those around you, such as your research institute? We measure citation rates for Nobel Prize winners and speak to past Laureates to find out how the Prize affected their careers. And we explore the astonishing effect that prizewinning staff has on global university rankings.

Meanwhile, as a respected indicator of scientific value, the global distribution of Laureates can be used to identify regional excellence. We investigate how the Nobel Prizes compare with country rankings based on citations. In addition, we try to find out whether bibliometrics are used at any stage of the selection process, but discover that the entire process is shrouded in secrecy.

Finally, how would you feel if a Nobel Laureate cited your work? We learn about why quality should be worth more than quantity in citation analysis.

If you would like to comment on any of the topics covered, please use our [feedback](#) facility.

DID YOU KNOW?

That socks really protect against icy weather?

The Ig Nobel Prizes run parallel to the official Nobel Prizes, and since 1991 pride themselves on increasing the visibility of science, medicine and technology by honoring “achievements that first make people laugh, and then make them think”. The name comes from a pun on the word ignoble and the name Nobel – after Alfred Nobel of the Nobel Prize fame.

Ten winners were distinguished during the latest award ceremony, which took place on September 30 in Harvard. Although all the award-winning research was of interest, Research Trends would like to specially mention the Physics Prize winners, Lianne Parkin and her team at the University of Otago in New Zealand, whose randomized controlled trial demonstrates that wearing socks over shoes appears to reduce the likelihood of slipping on icy footpaths.

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The value of bibliometric measures



The Midas touch

Winning a Nobel Prize is a significant achievement, recognized worldwide and beyond academia as the ultimate scientific accolade. But it is not just the Laureates who benefit; universities earn serious respect for having prizewinners on staff.

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Research trends



Does a Nobel Prize lead to more citations?

At first sight, winning a Nobel Prize seems like exactly the sort of thing that will raise your profile, leading to increased citations and smoother funding applications. On the other hand, it could also bring high expectations for future success. Research Trends investigates the effects a Nobel Prize could have on your career.

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Country trends



Where do Nobel Laureates come from?

The Nobel Prizes are awarded amid much secrecy in Sweden and Norway. Research Trends compares the global distribution of Laureates with country rankings based on citations to see how the Nobel Committees are measuring up.

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Expert opinion



Popularity or prestige: are you making the right impact?

You might not have won a Nobel Prize this time round, but how about having a Nobel Laureate cite your work? We speak to Ying Ding, Assistant Professor in the School of Library and Information Science at Indiana University, about quality over quantity in citation analysis.

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People focus



The secret life of the Nobels

Winning a Nobel Prize is one of the highest achievements in many fields of science, but how are Laureates actually chosen? Research Trends investigates and finds that everything is shrouded in secrecy.

The value of bibliometric measures



The Midas touch

THOMAS JONES

Nobel Prizes can bring the winner fame, fortune and respect, but their impact can be felt beyond the individual winner. Established to recognize scientific and cultural discoveries benefiting mankind, Nobel Prizes can also be used by bibliometricians to assess scientific research. Many Nobel Prize winners, particularly in science, are affiliated to university departments; this can bring recognition to the department and university, and, more formally, has been put to use as a means of assessing research departments and universities.

Over the last decade, there has been growing interest in the production of rankings to assess the performance of universities on a global scale. One particular ranking exercise, the Academic Ranking of World Universities (ARWU), produced since 2003 by Shanghai Jiao Tong University, includes an indicator based on Nobel Prizes and Fields Medals awarded to staff and alumni of the university that accounts for 30% of the overall score in the rankings.

Winning a Nobel Prize is a rare event, and the distribution of Prizes across institutions changes little year on year (the Prizes have been running for over 100 years, with only a handful awarded each year), so do they have any effect on the evolution of rankings such as ARWU? To explore this question, we examined the relationship between large year-to-year rank changes and individual indicators used to determine universities' overall scores in the ranking.

Winning by association

Having a staff member or alumnus that wins an award can give a substantial boost to a university's position in the ARWU rankings. All institutes that rose by at least eight places in one year are associated with Nobel Prizes or Fields Medals to staff or alumni (see Table 1). The emphasis given to these Prizes in the rankings reflects their rarity value, and that they mark the best research. But does such an award, given to one or a few individuals, tell you much the overall quality of the broad range of research at large, multi-faculty universities?

On the flipside, failure to win a Nobel Prize or Fields Medal in a given year does not tend to harm a university's position in the ranking. Significant drops in rank are more often associated with other ARWU indicators that describe a university's publication record (see Table 2).

This highlights an important point about the rankings: these big, rare awards, once won, continue to contribute to the overall score of a university even when the awards are effectively his-

Selling out?

According to many practitioners in the field of quantitative research assessment, the Academic Ranking of World Universities and other similar university rankings are primarily marketing rather than research-management tools. The Expert Group on the Assessment of University-Based Research (AUBR 2009) underlined in its 2009 report that institutional research performance is a multidimensional concept that may be poorly reflected in the currently available global rankings. A rank position itself does not tell managers how to improve their institution's performance. They need more detailed and accurate data on the research performance of their personnel, and they need to take the context and mission of their particular institution into account.

torical. Although an award's effect on a university's score does decline over the decades, these effects are negligible within the timescale that ARWU has been creating these rankings.

Furthermore, since Nobel Prizes are often awarded decades after the ground-breaking work was carried out, they do not reflect the current research strength of an institution. In addition, this research may have been conducted at a completely different university, even though the university where the winner is currently employed receives the credit for the award.

In fact, Anthony van Raan, has commented on the limitations of using of Nobel Laureates as an indicator of institutional research performance: "'Affiliation' is a serious problem. A scientist may have an (emeritus) position at [ARWU] University A at the time of the award (which seems to be the criterion in the Shanghai study), but the prize-winning work was done at University B. The 1999 physics Nobel Laureate Veltman is a striking example (A = University of Michigan, Ann Arbor; B = University of Utrecht)." (1)

Tipping the scales

This raises two important questions about the value of using awards to assess universities. Can awards given to only a few individuals each year really contribute to an effective means of

Continued from page 3

assessing a huge number of large, multi-faculty institutions? And is right to use a measure that incorporates rapid gains, but does not allow for rapid declines?

If anything, this indicates the power of such awards, not only in recognizing specific examples of excellence, but in the way they are also taken as indicators of prestige for the universities, departments, and even research teams, associated with the recipient.

Reference:
 [1] van Raan, A.F.J. (2005) "Fatal Attraction: Conceptual and methodological problems in the ranking of universities by bibliometric methods", *Scientometrics*, Vol. 62, No. 1, pp. 133–143.

Further reading:

Billaut, J-C.; Bouyssou, D. and Vincke, P. (2010) "Should you believe in the Shanghai ranking? An MCDM view", *Scientometrics*, issue 84, pp. 237–263.

Rank change (places gained)	Number of institutions			Reasons for change			
		Alumni	Award	HiCi	N & S	PUB	PCP
20	1		1			1	
18	1		1				
16	2	1	1	1	1	1	
15	1	1		1			
14	2		1	1	1		1
12	2	1	1				
10	6	1	1	2	1	1	4
9	3		1		2	2	
8	4	1	1	1	1	1	
7	1			1	1		
6	4	1			2	3	1
5	2	1		1		1	
	Total	7	8	8	9	10	6

Table 1 – Large rank gains in the ARWU rankings 2004–2009, and the indicator changes associated with these rank changes. All universities that gained at least eight places in the rankings between years when staff or alumni received a Nobel Prize or Fields Medal (highlighted). For full details of the indicators, visit www.arwu.org.

Rank change (places gained)	Number of institutions			Reasons for change			
		Alumni	Award	HiCi	N & S	PUB	PCP
-13	2			2	2	1	
-10	4			1	3	3	
-9	3			1	3		
-8	3			2	1	2	
-7	8			2	6	5	
-6	5			2	2	4	
-5	18	1	1	4	11	8	1
Total	43	1	1	14	28	23	1

Table 2 – Large rank declines in the ARWU university rankings 2004–2009 and the associated indicator changes. Big rank falls were not associated with falls in the score for Nobel Prizes and Fields Medals, but rather the publication record (highlighted). This is because an institute cannot lose an award once gained, although ARWU does have a mechanism built in that values an award less the longer it has been held for. This may account for the small declines in ranking associated with the alumni and award scores.

Research trends



Does a Nobel Prize lead to more citations?

SARAH HUGGETT

A Nobel Prize is considered by most as the pinnacle of scientific achievement, but does winning a Nobel Prize have any effect on the citations received by individual researchers?

For instance, it has been noted that citations can be used to indicate potential future Nobel Laureates (1, 2). Eugene Garfield's research group found that among the 50 most highly cited primary authors in the Science Citation Index of 1967, six had already won the Nobel Prize and eight others went on to win. In addition, among the 50 most-cited authors in economics between 1966 and 1986, 15 had already won a Nobel Prize and two others received it between 1987 and 1991. However, while this indicates the power of citation analysis to forecast Nobel Prize winners, does it work the other way round: can Nobel Prizes indicate future citations?

Research Trends extracted the publication records of the winners of the 2000–2004 prizes in Chemistry, Economic Sciences, Physics, and Physiology or Medicine from Scopus. Annual 1996–2009 citations to this dataset, comprising more than 10,000 records, were then exported. Finally, the citations were matched by the year the Prizes were awarded to allow the data before and after the Prize to be compared (see Figures 1 and 2).

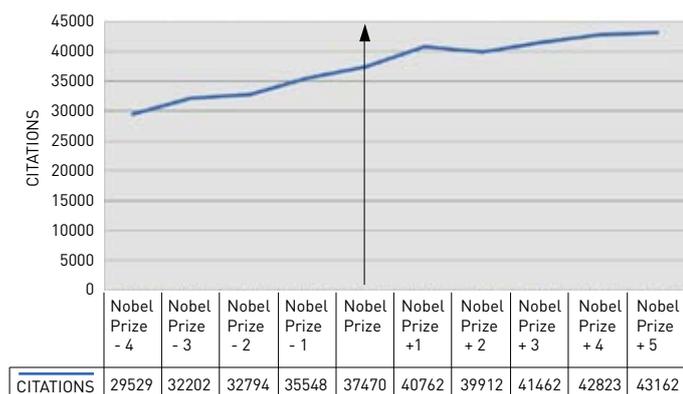


Figure 1 – Annual citations received by papers published by 2000-2004 Nobel Prize winners four years before receiving the prize and five years afterwards.
Source: Scopus.

These analyses reveal no particularly large shift in citation rates between the “before Nobel” versus “after Nobel” time periods, which makes sense, as the prizes are usually received many years after the award-winning research has been published. Control analyses performed for eminent scientists who did not

win a Nobel Prize but achieved excellence in related research areas confirmed that perceived increases in citation rates (e.g. for Chemistry) could not be directly attributed to the Nobel Prize.

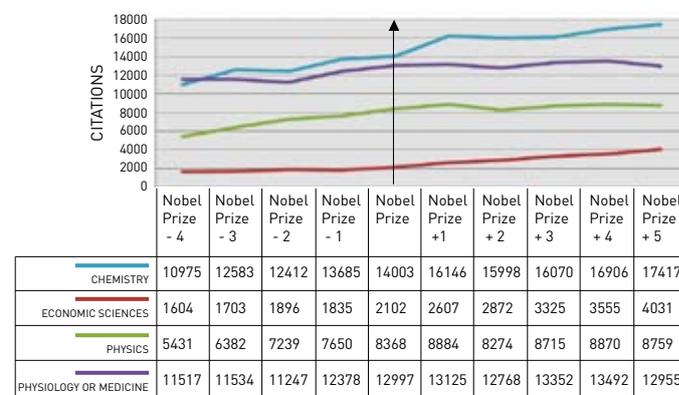


Figure 2 – Annual citations received by papers published by 2000-2004 Nobel Prize winners, by subject area, four years before receiving the prize and five years afterwards.
Source: Scopus.



Professor Wolfgang Ketterle

Life goes on...

This apparent absence of effect of Nobel Prizes on citations was consistent with the observations of the recipients themselves.

Professor Wolfgang Ketterle, winner of the 2001 Physics Prize for achievement of Bose-Einstein condensation in dilute gases of alkali atoms and for early fundamental studies of the properties of the condensates, says: “In my case, the Nobel Prize has not changed my career or publication record in any major way. I was fortunate that my work received very good attention and funding before the Nobel Prize. Probably, the Nobel Prize made it easier to maintain this.”

Professor Kurt Wüthrich, 2002 Chemistry prizewinner for the development of nuclear magnetic resonance spectroscopy for determining the three-dimensional structure of biological macromolecules in solution, made the following observations: “In my case, the Nobel Prize came just three years before mandatory retirement age. This coincided with a change in

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Professor Kurt Wüthrich

government policy in Switzerland, allowing people who wished to carry on working to extend their employment beyond the age of 65 [...] I published rather a bit less afterwards, but not by much. My citation rate went up for a couple of years after the Prize, and is now back at the level it was before winning the Prize. [...] It certainly made it easier for me to establish collaborations I was interested in.

[...] When it comes to publication and peer review, I notice that our papers are being read extremely carefully and we very often get really detailed reports on our papers that are longer than the papers themselves."



Professor Peter Agre

Professor Peter Agre, 2003 Chemistry prizewinner for the discovery of membrane water channels, reports: "[It] was both exhilarating and draining. Basically, our work was already pretty well regarded, but the expectations after the Nobel became unrealistic. The family dog didn't love me more than before, but my many friends and colleagues were jubilant. Our funding and publication record did

not change. It was ironic that prior to the Nobel, the only NIH application of ours that had been rejected was the one where we proposed the work that led to the water channel! I guess we were ahead of our time."

References:

- [1] Garfield, E. and Welljams-Dorof, A. [1992a] "Of Nobel class: A citation perspective on high impact research authors", *Theoretical Medicine*, Vol. 13, pp. 118-126.
- [2] Garfield, E. and Welljams-Dorof, A. [1992b] "Of Nobel class: A citation perspective on high impact research authors [Part 2]", *Theoretical Medicine*, Vol. 13, pp. 128-136.

Country trends



Where do Nobel Laureates come from?

SARAH HUGGETT

The Nobel Prizes are awarded by various institutions in Sweden and Norway, but does this Scandinavian outlook have any impact on the geographical distribution of Prize winners?

In his will, Nobel specified that: "It is my express wish that in awarding the prizes no consideration whatever shall be given to the nationality of the candidates, but that the most worthy shall receive the prize, whether he be a Scandinavian or not." (1)

According to country rankings based on the number of documents or citations, such as the [SCImago country rankings](#), the leading nations in terms of article output are:

1. The United States
2. The United Kingdom
3. Japan
4. China
5. Germany

And the leaders in terms of citations are:

1. The United States
2. The United Kingdom
3. Germany
4. Japan
5. France

The United States and Europe lead

The geographical distribution of the Nobel Prizes for Physics, Chemistry, Physiology or Medicine, and Economic Sciences mirrors these results, with most Prize recipients coming from the US, the UK and Germany (see Figure 1). This prevalence persists for all subject areas (see Figures 2, 3, 4, 5) except for Germany for Economic Sciences. On a regional basis, most Laureates are, unsurprisingly, found in North America and Europe. Asia comes third due to Japan.

Taking a look at national performance for specific subject areas, we find that Canada leads on Nobel Prizes for Chemistry while Russia is strong in Physics. Most Physiology or Medicine, and Economic Sciences Prizes are won by Americans and Europeans, with the UK doing particularly well for Economic Sciences.

Emerging Laureates?

The Nobels have been awarded since 1901, and during this period of time, the leaders have remained relatively stable. However, the results of investment within emerging economies is already showing a rapid rise in output, and the most successful of these, such as China, are gaining prominence in country rankings. For instance, while China ranks fourth for output, according to SCImago, it still lags behind in terms of

citations, ranking 12th overall. However, this rank does represent a steady upwards trend in citation impact over the years.

It will be interesting to see if this investment starts paying off in terms of recognition, both through citations as well as potentially receiving prestigious prizes. Due to the average 20-year delay between discovery and recognition in the context of the Nobel Prizes, this particular indicator will not start becoming apparent for some time yet.

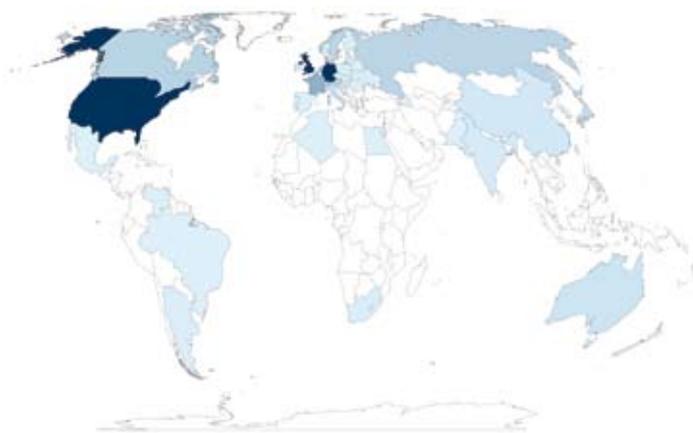


Figure 1 – Geographical distribution of Nobel Prize winners in Physics, Chemistry, Physiology or Medicine, and Economic Sciences (country of birth or affiliation at time of award).
Source: NobelPrize.org

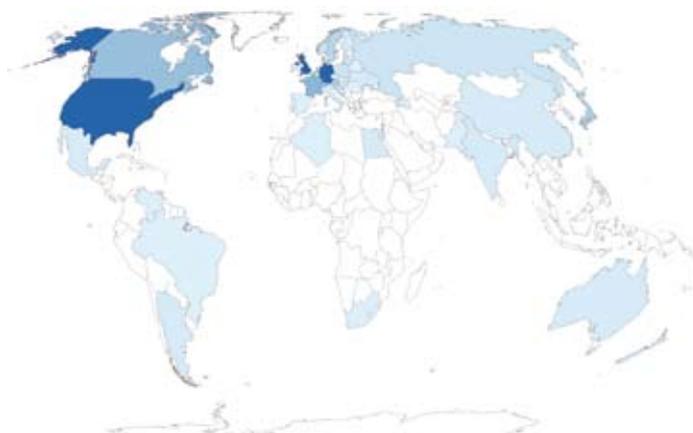


Figure 2 – Geographical distribution of Nobel Prize winners in Chemistry (country of birth or affiliation at time of award).
Source: NobelPrize.org

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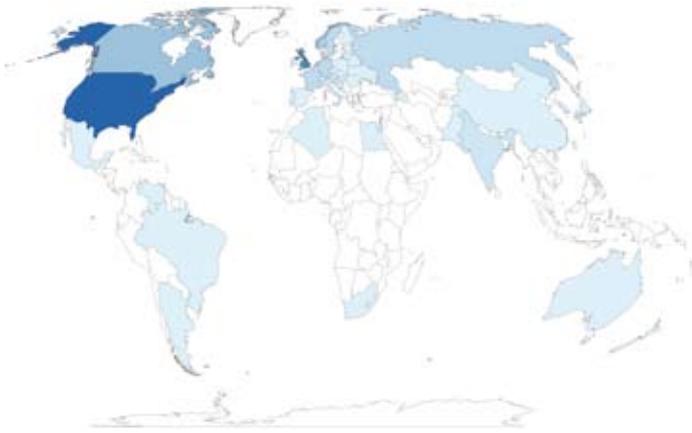


Figure 3 – Geographical distribution of Nobel Prize winners in Economic Sciences (country of birth or affiliation at time of award).
Source: NobelPrize.org

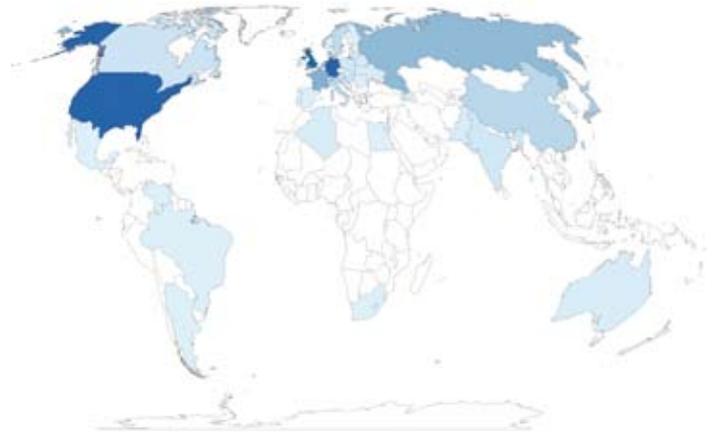


Figure 4 – Geographical distribution of Nobel Prize winners in Physics (country of birth or affiliation at time of award).
Source: NobelPrize.org

Reference:
(1) ["Full text of Alfred Nobel's Will", Nobelprize.org., Oct. 15, 2010.](#)

Useful links:
[BBC News – Which country has the best brains?](#)

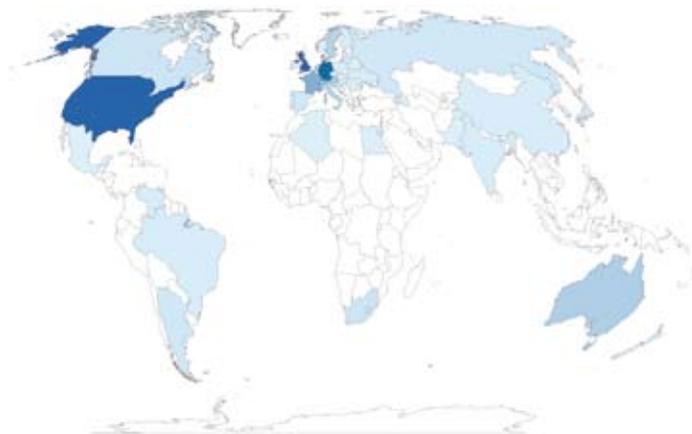


Figure 5 – Geographical distribution of Nobel Prize winners in Physiology or Medicine (country of birth or affiliation at time of award).
Source: NobelPrize.org

Expert opinion



Popularity or prestige: are you making the right impact?

MICHELLE PIROTTA

When researchers compile resumes quoting indices such as the *h*-index and citation counts, they often mention any prestigious journals they have published in. This is natural; even if your paper receives no citations, simply being admitted into a leading journal confers an element of prestige on your career.



Ying Ding

However, have you ever wondered who is actually citing you? Being cited by your colleagues and junior researchers in your department is one thing, but what if your academic hero cites your work? Imagine finding out that your paper was read and acknowledged by the leading researcher(s) in your field; would that not be a more valuable indicator that your ideas

are valuable? And what if a Nobel Prize winner cited your work in his or her next paper? How many “lesser” citations would you exchange for this single endorsement?

Who’s citing whom?

Ying Ding, Assistant Professor in the School of Library and Information Science at Indiana University, the US, believes citations from recognized experts should count for more. In a recent paper, co-authored with Blaise Cronin, “Popular and/or prestigious? Measures of scholarly esteem”, she explores whether taking the source of a citation into account can help identify groundbreaking contributions to a subject area, in this case, the field of information retrieval. (1)

Ding makes a clear distinction between: “popularity, which is how many citations a paper receives, irrelevant of who is making the citation, and prestige, which gives greater weight to citations coming from highly cited papers.”

She is concerned that raw citation counts might identify educational or other general-interest texts, especially review articles, as the most highly cited works in a field. It is possible to receive a large number of citations from non-experts, but Ding believes that experts in the field are more likely to be citing groundbreaking discoveries.

She explains: “I wanted to use citations to identify which papers were making real contributions to the field. I therefore decided to follow citations from recognized experts only. A real breakthrough is more likely to be recognized by thought leaders in a field, and so it is those citations I wanted to track,” she explains.

While there could be an element of circularity in using highly cited (popular) papers to determine prestige, Ding explains, “we could use peer review and other qualitative measures to pinpoint the leaders, but my objective was to find a quantitative measure of prestige. Based on the 80/20 rule of thumb [in which just 20 percent of all published papers attract 80 percent of citations], I only counted citations from this 20 percent.”

Essentially, Ding is using the most-cited papers in a field as a filter so she can use citations to distinguish between popularity and prestige, with prestige being a finer distinction.

Rising above the crowd

Separating out this 20 percent becomes even more useful when we remember how crowded academia is getting these days. The number of scientists, journals, papers and citations has been climbing exponentially. According to Ding, “now there are so many citations that we need to distinguish those that really indicate scientific impact.”

Many groups need to be able to identify prestige, either quickly or because they are not actually experts themselves. Journal editors need to efficiently find the best experts for peer review, while research institutes, governments and other sources of funding need to be able to identify the best targets. “With more competition for scarcer funding, it is becoming increasingly important for the people who make these decisions to identify where they will get the best return on investment: that is obviously by directing funding at the researchers most likely to create value and impact as a result,” says Ding.

Real quality lasts

Ding sorts her authors into two tables showing the top-10 for prestige and for popularity over a 50-year time period. By checking the names at the top of these tables, Ding finds that

Continued from page 9

the authors identified as prestigious remain in the top-10 for far longer than those who are popular.

She explains: “Popularity doesn’t last because ideas and technologies change. This is why prestige is a better way to identify groundbreaking papers. For instance, a textbook might initially receive a lot of citations, but (depending on how fast the field moves) this will eventually become outdated. On the other hand, real contributions to a field will be cited for a long time. If a paper introduces concepts or terminologies that become building blocks in the field, then many people will cite them for a longer time.”

Some papers are only identified as prestigious, indicating they are only receiving citations from the most-cited papers. This suggests that the content is so innovative that only the leaders in the field are capable of identifying their importance. Ding points out: “If we don’t weight citations, these papers would fall to the bottom of the list, as they don’t receive a high number of citations. However, if the experts are citing this work, it is important that we can see this.”

From popularity to prestige

According to Ding, prestige should be the ultimate aim of all scientists, since this means you have contributed something of real and lasting value to your field.

“Ultimately, ‘prestige’ measures whether you have made significant contributions, which first requires experience and deep understanding of your subject. Not everyone can

become a thought leader, and measuring prestige helps us understand which researchers have achieved this level. It helps us understand which authors are being read by the best researchers,” she explains.

And how should researchers work towards this prestige? According to Ding, “you have to write better papers! My strategy starts with only reading the best papers. It’s not possible to read everything, so you should limit your reading to the very best journals and papers in your field. You also need to reserve time for critical thinking. Keep asking yourself ‘what is missing, what can I add?’ There’s no point following the crowd.”

And what about Ding herself; is she putting her theory into practice? “Prestige is obviously my ultimate ambition because that would mean I’ve managed to make a lasting contribution, but I first need to make myself highly cited, so this is what I’m currently working towards.”

Additional reading:

1. Bollen, J.; Rodriguez, M.A.; and Van De Sompel, H. (2006) “Journal Status”, *Scientometrics*, issue 69, pp. 669–687.
2. González-Pereira, B.; Guerrero-Bote, V.P.; and Moya-Anegón, F. (2009) “The SJR indicator: A new indicator of journals’ scientific prestige”, arxiv.org/pdf/0912.4141.

Reference:

- [1] Ding, Y. and Cronin, B. (2011) “Popular and/or Prestigious? Measures of Scholarly Esteem”, *Information Processing and Management*, Vol. 47, issue 1, pp. 80–96.

People focus



The secret life of the Nobels

MICHELLE PIROTTA

There are many ways of assessing a particular researcher's contribution to science and mankind, and Nobel Prizes have been recognized as an indicator of outstanding impact for over 100 years. They are so well regarded that having a Laureate on staff can significantly boost a university's ranking.

As such a respected and definitive recognition of scholarly value in a number of fields of human endeavor, Research Trends investigates how Nobel Laureates are selected.

Veil of secrecy

According to Nobel.org, the statutes of the Nobel Foundation specifically: "restrict disclosure of information about the nominations [...] for 50 years. The restriction concerns the nominees and nominators, as well as investigations and opinions related to the award of a prize." (1)

The selection processes in the scientific fields of Physics, Chemistry, and Physiology or Medicine is run along very similar lines (see box for an overview). Those eligible to nominate and how they are selected, as well as whom they nominate and how they themselves judge candidates, are secret for 50 years. The Nobel Committee also appoints experts to assess the preliminary candidates. Again, who these people are, how they are selected and what weight their opinion has is not disclosed. The Laureates are finally selected through majority vote.

It seems fair to imagine that bibliometrics might be consulted at some stage of the lengthy process. As journal editors and university administrators already know, determining excellence is a difficult job.

Since the Nobel Committee clearly uses peer nomination and review, we asked the Chairmen of two Nobel Committees whether they pay attention to metrics. Lars Thelander, Chairman of the Nobel Committee for Chemistry, and Ingemar Lundström, Chairman of the Nobel Committee for Physics, declined to reveal anything: "I regret to tell you that all details on the internal prize work in the Committees are secret for [...] 50 years and therefore I cannot answer your questions."

Bias and influence

However, the 50-year restriction means archives prior to 1960 are open to researchers. This is still too early to investigate whether bibliometrics were used, but researchers are shedding light on how decisions are made behind this veil of secrecy.

Elisabeth Crawford has conducted research in the Nobel archives since they were opened to scholars in 1974. In "Nobel:

Selection process (e.g. "Physiology or Medicine")

The Nobel Committee for Physiology or Medicine sends nomination forms to around 3,000 selected professors, Nobel Laureates in Physiology or Medicine, and members of the Nobel Assembly, among others. The completed forms must reach the Nobel Committee by January 31 of the following year. The Committee screens the nominations, and then sends a list of preliminary candidates to specially appointed experts who assess the candidates' work. The Committee then submits its recommended candidates to the Nobel Assembly at Karolinska Institutet, which selects the Nobel Laureate by majority vote. (1) For more information, visit Nobel.org.

Always the Winners, Never the Losers", she lists some of the things she has learned: "[...] that Einstein's award of the physics prize of 1921 for his discovery of the law of the photoelectric effect rather than for his theory of special relativity was due to the incapacity of members of the Nobel Committee for Physics to grapple with theoretical physics and their reluctance to reward 'speculations' such as relativity theory; [...] and that Lise Meitner's exclusion from the 1944 chemistry prize awarded Otto Hahn for the discovery of nuclear fission resulted from a complex set of circumstances in which the chemistry committee's difficulty of evaluating an interdisciplinary discovery, Sweden's scientific and political isolation during the Second World War, and a lack of sensitivity to the ravages of racial persecution all figured prominently." (2)

Meanwhile, in "Yellow fever and Max Theiler: the only Nobel Prize for a virus vaccine", Erling Norrby from The Royal Swedish Academy of Sciences casts doubt on the 1951 nomination and selection process for Max Theiler, who received the Nobel Prize in Physiology or Medicine for his yellow fever vaccine. (3) While there is no question that this vaccine has benefited mankind, it is the only Nobel Prize for a virus vaccine. And more curious is how he was nominated. Late on January 31, 1951, the deadline for nominations, the Chairman of the Committee, Vice-Chancellor of the Karolinska Institutet and Professor of Pathology Hilding Bergstrand, nominated Theiler. Bergstrand then performed the evaluation. (3)

Continued from page 11

According to Crawford: "Committee members' own ideas about the kind of scientific work that should be honored with awards played a major role. In this they were guided both by their own research interests and by prior prize decisions."

What we can learn?

Research into the archives also reveals how much depends on the final vote. For instance, while Theiler won his Nobel Prize based on just three nominations, only one of which was detailed, Selman A. Waksman was nominated 39 times in six years before winning. [3]

Crawford calculates that each candidate, whether winning or losing, was nominated on average eight times. [2] "However, this figure masks the much higher number of nominations accumulated by perennial losers such as the physicists Arnold Sommerfeld [74], Vilhelm Bjerknes [54] and Friedrich Paschen [45], and the chemist Gilbert Newton Lewis [42].

She believes that: "Learning the names of the candidates and of those who nominated them as well as the specific scientific work for which they were put forth provides much information not only about what was considered scientific achievement in the first half of the 20th century, but also about who were considered the important scientists and the relations between them."

To this, we could add that learning the selection criteria would provide much information on how Nobel Laureates are selected, thus shedding light on what kind of discovery one of the most prestigious scientific prizes considers worthy of recognition.

If you have any comments on this story, or have done any research on this subject, we would love you hear from you. Please use our [feedback](#) facility.

References:

- [1] "Nomination and Selection of Medicine Laureates". Nobelprize.org., Oct. 17, 2010.
- [2] Crawford, E. (1998) "Nobel: Always the Winners, Never the Losers". *Science*, Vol. 282, No. 5392, pp. 1256–1257. DOI: 10.1126/science.282.5392.1256.
- [3] Norrby, E. (2007) "Yellow fever and Max Theiler: the only Nobel Prize for a virus vaccine". *The Journal of Experimental Medicine*, pp. 2779–2784.

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