
Forecasting the Nobel Prize Winners: Some Caveats Are in Order

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At this time of year, guessing who will win the Nobel Prize is a popular parlor game for scientists. The fact is, of course, no one except members of the Nobel awards committees can possibly predict the fields or discoveries that will be selected, much less the actual winners. Like the weather, however, fields and individual winners can be intelligently forecast. And one of the strongest indicators of Nobel-class science is citation frequency. That's the major criterion—along with whether a researcher has garnered one of several “predictor” awards—that *The Scientist* used in the current edition's, as well as our two previous issues', list of “nominees” for this year's prizes.

More than 25 years ago, citation data from the Institute for Scientific Information demonstrated that the overwhelming majority of Nobelists, like all highly creative people, are productive. They publish five times more than the average scientist; they are cited 30 to 50 times the average.

Another strong Nobel predictor is whether a candidate has been honored with other prestigious awards—the Lasker, Wolf, Gairdner, or Priestley, for example—or has gained membership

in a national academy. By combining these indicators, *The Scientist* identified 38 eminent scientists, most of whom have appeared in our continuing series of citation superstars for 1965-78, 1973-84, and 1981-88.

The database from which this information is derived is the *Science Citation Index*, published by ISI. To rank as a citation superstar is a dazzling achievement. Consider, for example, that during the period 1973-84, 1.4 million authors in the database were cited at least once. Of these, about 5,000 (.4 percent) received 1,000 or more citations—and just 4,000 (.3 percent) were cited 1,500 or more times. To rank among the top .2 percent for this period, a scientist would have to have been among the top 2,800 or so worldwide, regardless of discipline.

While *The Scientist's* approach to identifying likely “candidates” is, we trust, illuminating, readers must keep several caveats in mind:

■ Scientists who have published books—even those designated “Citation Classics” in *Current Contents*—are not included unless they have also published journal articles in SCI-indexed journals.

■ The three chronological periods

examined are not precisely comparable. The number of articles published in 1965-78 was 5,101,972, in 1973-84 was 5,858,002, and in 1981-88 was 4,662,114. Furthermore, the average number of references per paper, generally speaking, has almost tripled in the last quarter-century.

■ As stated previously ("Slow And Steady Wins The Race," *The Scientist*, Sept. 17, 1990, page 15), most Nobel-class scientists publish numerous high-impact papers over the years, which may bias our selections in favor of older scientists. (It follows that when Nobel committees are inclined to honor recent breakthroughs—like superconductivity or catalytic antibodies—then recent citation data would more likely identify putative Nobelists.)

Further, since any list of "citation superstars" will include the names of prolific or high-impact reviewers, methodologists, data compilers, and others, a purely algorithmic iden-

tification of candidates on the basis either of productivity or citation admittedly would be absurd. (That's why Associate Editor Angela Martello, who oversaw this year's Nobel forecast coverage, contacted scientists in the appropriate disciplines to further validate her citational studies.)

What is the potential value to the science community of our annual forecasts? Well, I'd like to think that they lower the probability that scientists who are less visible despite the high impact of their work will be overlooked. And even more relevant, these lists could perhaps jog the memories of the nominating committees of the national academies. As the former president of NAS once stated succinctly: For every scientist elected, there is at least one other, equally qualified, who is left out. This is but another expression of the oft-quoted remark about the French Academy: Who shall occupy the 41st chair? ■