The New York Times

Bonds Beats the Babe! Statistical Model Crowns a New 'Greatest' in Baseball

A new ranking methodology places Barry Bonds over Babe Ruth as the game's best player ever. Statisticians, at least, are cheering.

John P. Dessereau

By Alexander Nazaryan
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Every sport has its arguments over which player was the greatest, but no sport takes the debate as seriously as baseball does. It is a game informed by an obsession with statistics, such that passions are often checked by numbers: *How could anyone love a player with such a miserable on-base percentage?*

It is something consequential, then, when anyone makes a declarative statement regarding anything about baseball. But a team of statisticians did just that. They have spent years devising a definitive ranking of baseball's best performers, no matter what era or which team was involved. Their new method compared players across history by placing the respective achievements within the context of a given year's pool of eligible baseball talent.

The controversial answer: The Greatest of All Time title no longer belongs to the New York Yankee legend Babe Ruth but to Barry Bonds.

San Francisco Giants' Barry Bonds hits his 756th all time career home run in 2007, breaking Hank Aaron's record. Credit...Peter DaSilva for The New York Times

The poor Bambino isn't even second. That spot belongs to Roger Clemens, who pitched for both the Boston Red Sox and the Yankees. He is followed by Bonds's godfather, Willie Mays (both men are generally associated with the San Francisco Giants, though they played for other teams as well). Ruth ranks fourth, followed by Hank Aaron of the Milwaukee, and later Atlanta, Braves. Mickey Mantle, who won seven World Series rings while wearing Yankee pinstripes, falls to 23rd.

Baseball purists may object, noting that Bonds and Clemens are among several high-profile major league players accused of using steroids during the 1990s. (This likely

explains why neither player is enshrined in Cooperstown, the sport's Hall of Fame in upstate New York.)

But statistics tell their own story. Daniel J. Eck, a statistician at the University of Illinois Urbana-Champaign who led the new study and has been working on the model for about a decade, noted that because so many other players took performance-enhancing drugs, or PEDs, any improvement from banned chemicals is reflected in players' achievement models for those years. "I'm OK with a PED-laden person being number one, over, say, a person who played before baseball was integrated," Dr. Eck said. In other words, despite Bonds's steroid use, he put up more outlandishly impressive numbers, in era-adjusted terms, than Ruth.

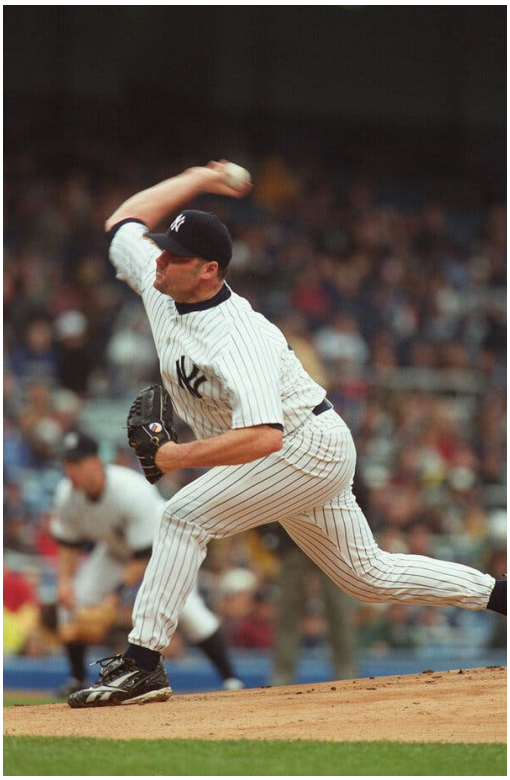
Needless to say, trying to calculate the size of the baseball talent pool in an entire society, not just those who ended up in Major League Baseball, requires an enormous amount of historical data, as well as many carefully considered assumptions. But several experts in baseball statistics, or sabermetrics, said the new ranking methodology, devised by statisticians at the University of Illinois Urbana-Champaign and published recently in the Annals of Applied Statistics, was a home run.

"It's arguably the state of the art, at this point, for player evaluation over time," said Dr. Michael J. Schell, an oncologist and biostatistician at the Moffitt Cancer Center in Florida, who also writes about baseball. Some years ago, as an outside expert, he reviewed a draft of the Illinois team's work and found its calculations less than fully persuasive. That was no longer the case. "They've moved the ball forward," Dr. Schell said.

Dr. Eck said he knew of no other serious ranking system that had Bonds in first place.

As its starting point, the Illinois analysis used a well-established measure known as wins above replacement, or WAR. Whether a player is a designated hitter, a skilled shortstop or a closer with a blistering fastball, his WAR value indicates how many wins he contributed to his team in a given year relative to a generic player.

But the researchers wanted to know how each player's achievements stacked up against all of the latent talent available to the sport of baseball that year, an immense undertaking that involved accounting for racism, demography, war and the rise of both basketball and football. "The statistical model we developed is entirely new, not just a tweak of existing ideas," Dr. Eck said.



Roger Clemens, pitching here for the Yankees, was second on the new all-time-greatest ranking. Credit...Barton Silverman/The New York Times

Dr. Eck linked the distribution of talent to the distribution of achievement, allowing for a comparison between the two that works as well for a player in 1925 as it does for one in 2025. “To have a high talent score, one must stand out from their peers in their own time and be a product of a large talent pool,” the study notes.

The new rankings skew toward players in the post-segregation era because the talent pool greatly expanded after Jackie Robinson broke the racial barrier by joining the Brooklyn Dodgers in 1947. This statistical rebalancing has led to accusations that the Illinois model tried to leave segregation-era standouts such as Ty Cobb and Rogers Hornsby out of the record books.

“They’re not junk,” Dr. Schell said of those players, although he allowed that they may have previously been “overrated,” having played at a time when the talent pool was small and relatively unimpressive. (Training and nutrition also improved.) Still, no study can (yet) measure the emotional appeal of one player over another.

Christopher Kinson, one of the statisticians who worked on the new model, has been pained by charges that he and his colleagues were trying to engineer outcomes. “We didn’t set out to do this because we believe that the great players are not white,” he said. White players continue to dominate the 25-player list, which does not include recent stars like the Japan-born wunderkind Shohei Ohtani, a Los Angeles Dodger.

“The people who are writing this paper are very sophisticated statistically, very sophisticated mathematically,” said Gregory J. Matthews, a statistician at Loyola University Chicago who also consults for the Cincinnati Reds. “It’s a very rigorous, well-written study.”

The new statistical method compares players by placing their respective achievements within the context of a given year’s pool of eligible baseball talent. Credit…Zack Wittman for The New York Times

Adrian Burgos Jr., a historian of Latino and sports history at the University of Illinois and an author on the study, conceded that the new rankings were certain to rankle. “One of the things that’s always been fascinating is how much we undervalue the performance of the super-talented players of a much bigger talent pool today,” he said. “Nostalgia for an older era,” Dr. Burgos said, can blind baseball die-hards to “elite performance in more contemporary moments.”

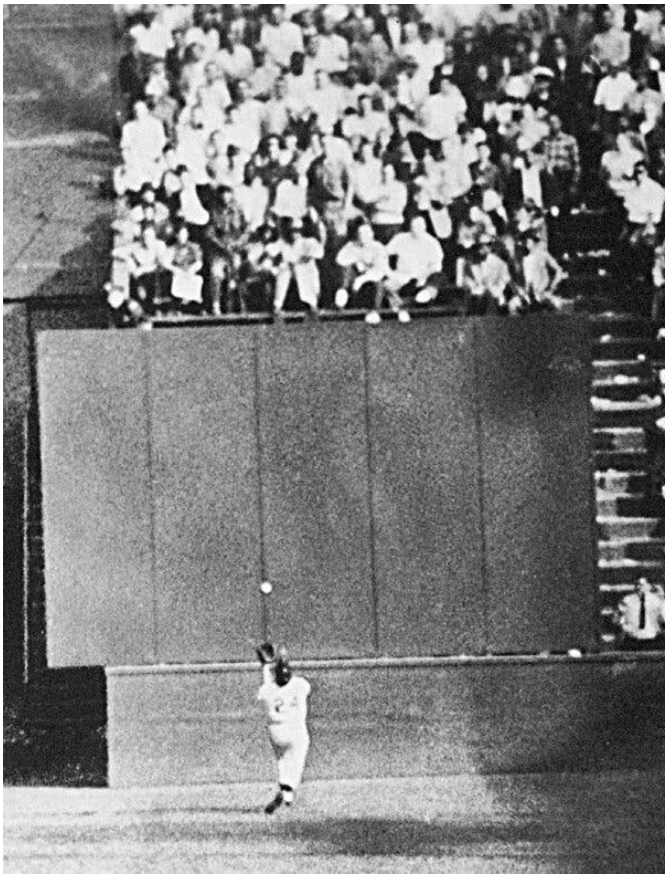
Dr. Matthews praised the researchers for being transparent about the assumptions they made — a key marker of sound scientific research, he said. “They enumerate every single one of those assumptions, and they test how much these assumptions matter.” One important assumption the researchers made is that the most talented baseball players in any year were playing the game professionally. In their new paper, they acknowledged that this is no longer the case, pointing to Kansas City Chiefs quarterback Patrick Mahomes, who chose to play football over baseball. They ran tests where the model is adjusted accordingly, with talent and professional achievement no longer in synchrony.

“There’s this idea of reproducible research in science,” Dr. Matthews said. “You should be able to take someone’s research and go from the raw data, through their analysis, and match their numbers exactly.”

The talent-based methodology, known as Full House Modeling, is based on the title of a book by Stephen Jay Gould, the evolutionary biologist and a baseball enthusiast. In his book “Full House,” Dr. Gould explains how batting averages above

.400 vanished because of the evolution of talent and convergence of achievement, making unconventional standouts less likely.

“Baseball is this system that’s really rare and desirable for scientists because it’s a closed system operating under essentially the same rules, with very careful data collection,” Dr. Eck said. “Under that circumstance, you should be able to calculate and infer things extraordinarily well.”



Willie Mays of the New York Giants making “the Catch” at the top of the eighth inning of Game 1 of the World Series on Sept. 29, 1954.Credit...Associated Press

Having been refined by the Illinois researchers, the concept of Full House Modeling could find use beyond baseball. “I definitely could see it being applied in other disciplines, in other sectors of life, not just sports,” Dr. Kinson said.

As for the game, no metric can resolve debates about its greatest players. For some, it is unquestioningly Ruth, who pointed to the outfield before slamming a home run against the Chicago Cubs during the 1932 World Series. Unless it’s Mays, with his over-the-shoulder catch at the Polo Grounds in 1954. Or Clemens, who was honored with seven Cy Young awards — given each year to each league’s best pitcher — during his career. Then there is Ohtani, whose otherworldly prowess at the plate and the mound (yes, he also pitches) has earned credible comparisons to the Babe.

John Thorn, the official historian for Major League Baseball, said that the Illinois study confirmed a truth readily evidenced whenever Ohtani sends a pitch sailing into the skies above Chavez Ravine or the crowd at Boston's Fenway Park launches into "Sweet Caroline" during the eighth inning: "Baseball is better than ever."

The study took into account racism, population shifts, several wars and baseball's declining popularity starting in the 1960s and '70s. Credit...Mark Makela for The New York Times

https://www.nytimes.com/2025/08/12/science/baseball-statistics-babe-bonds.html

Truth is, Barry Bonds in his prime was the most formidable hitter baseball has ever seen. The only qualification placed upon this is, of course, that his achievement is only as "level playing field" as the percentage of his peers who were using PED's too. Bonds' ballooning skull and narcissism-on-steroids personality at the time made him look like the worst of the offenders. But I think he just wanted to see what he could do utilizing every advantage, with the power and bat control he was able to master intoxicating.

My quibble is that I think, as would be expected with a narcissistic master of his craft, that it was all always and only about Barry. Every at-bat was about hitting another home run or at least, Barry demonstrating his mastery of the strike zone. He took marginal pitches (to demonstrate his eye at the plate, and to give pitchers the message he would only swing at strikes, giving him the best chance to hit another homer) that a team-friendly player would have driven for a sacrifice fly or hit "the other way" to ignite a rally or dumped into a corner or driven up a gap so that a runner could score from first. Not Barry Bonds. And no one on the Giants dared ask differently of him. Beyond his intimidating imperial personality, people paid to see Bonds hit home runs.

To Bonds's credit, the Giants were never able to find someone to hit behind him in the order to protect him. He did it all despite this—and got many of those walks too because there was no one to fear hitting behind him. Or, in defense of his teammates and opposing managers, no one dangerous enough to make pitching to Bonds worth it.

Pity it is that top of the list are people as dislikeable as Barry Bonds and Roger Clemens. A'Knob, Ty Cobb, Greg Maddox, and maybe even the Babe too are not so likeable. TJB

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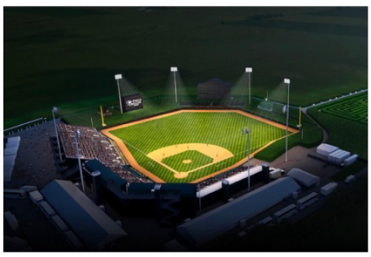

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At Eck Sports Lab, our mission is to research all things sports with a current focus on baseball. We study topics ranging from player evaluation metrics to comparing baseball players across eras. The common thread linking all of our projects is a dedication to high-quality and often innovative statistical and interdisciplinary research with a focus on an accessible and entertaining presentation of our ideas.

Current Projects

Comparing Baseball Players Across Eras

Project page: Era Adjusted Baseball Stats v2.1
Full write-up: Stats and Case Studies v2.1

This is an ongoing project devoted to the development of statistical tools which can era-adjust performance metrics. The impetus for this project was the initial discovery that the current consensus of baseball ranking methods were biased towards the performances of pre-integration players. You can explore these origins in our initial Shiny app on baseball nostalgia. We have since made an advance towards the creation of era-adjusted statistics with the development of what we call Full House Modeling. Full House Models era-adjust statistics through a principled balancing of how players performed "vs. their peers" and the quality of the talent pool of players' contemporaries. These models are a crystallization of conceptual logic articulated by Stephen Jay Gould, as explained in this short video.

Here is a snapshot of our current results. Below is the top 10 list according to era-adjusted baseball reference wins above replacement (ebWAR) and era-adjusted fangraphs wins above replacement (efWAR):

rank	name	ebWAR	name	efWAR
1	Barry Bonds	154.71	Barry Bonds	145.57
2	Willie Mays	145.30	Roger Clemens	140.75
3	Roger Clemens	144.38	Willie Mays	135.78
4	Babe Ruth	138.64	Henry Aaron	127.96
5	Henry Aaron	135.67	Greg Maddux	120.91
6	Alex Rodriguez	120.64	Babe Ruth	120.6
7	Stan Musial	119.37	Stan Musial	112.79
8	Ty Cobb	115	Alex Rodriguez	110.52
9	Greg Maddux	113.55	Randy Johnson	109.78
10	Albert Pujols	111.95	Ty Cobb	108.95

The list above combines Babe Ruth's batting and pitching WAR

Lots more interesting analysis.

https://ecklab.github.io