

Using math model, NJIT professor names MVP and Cy Young award contenders

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NJIT's Bruce Bukiet, a mathematician who has applied mathematical modeling techniques to elucidate the dynamics of run scoring in baseball, is now applying his methods to ascertain the players most deserving of major league baseball's prestigious 2008 Most Valuable Player (MVP) and Cy Young awards. Bukiet, a popular NJIT math professor, dives annually into such terrain in part for his love of the game, but also for his love of teaching and math.

"Baseball can be a terrific learning tool," said Bukiet. "It demonstrates how math can be used in life." This year for the first time high school junior Kevin Fritz, of Hillsborough helped formulate Bukiet's picks. Bukiet met Fritz earlier this year through one of NJIT's many pre-college programs. Thanks in part to Bukiet, Fritz took special honors in Intel's 2008 Science and Engineering Fair.

This is the eighth year that Bukiet has used his model to determine whether it is worthwhile to wager on games each day during the baseball season. His picks (posted on www.egrandslam.com) have led to (slightly) positive results for six of the past eight years. Regular updates on the chances of each team winning the Championship Series and the World Series are posted at: m.njit.edu/~bukiet/baseball/playoffs08.htm.

For the American League (AL), Bukiet said, Toronto Blue Jay pitcher Roy Halladay deserves to win both the MVP and the Cy Young Award because his performance would have contributed 4.5 extra wins to a team of otherwise all average players. That is, "Halladay would have

taken a team that was 81-81 and single-handedly made it an 85.5-76.5 team," Bukiet explained. "The key criterion of the model is that the player most deserving of these awards should be the player who would have contributed the greatest number of extra wins to that of a team of average players at each position."

Bukiet's model places Milton Bradley of the Texas Rangers, whose performance would have contributed 4.3 extra wins to an otherwise average team, as the top hitter in the AL, and runner-up for MVP honors.

New York Yankee third baseman Alex Rodriguez, Cleveland Indian pitcher Cliff Lee and outfielder Carlos Quentin of the Chicago White Sox round out the top five MVP candidates in the AL, contributing 4.1, 4 and 3.5 wins respectively to an otherwise average team. After Halladay and Lee, Mariano Rivera of the New York Yankees, Ervin Santana of the Los Angeles Angels of Anaheim and Jonathan Papelbon of the Boston Red Sox round out the top five AL pitching performances.

In the National League (NL), Derek Lowe of the Los Angeles Dodgers deserves the Cy Young award. "His performance would have garnered 3.4 extra wins," said Bukiet. "The Philadelphia Phillies' Cole Hamels, San Francisco Giants' Tim Lincecum, Arizona Diamondbacks' Dan Haren and New York Mets' Johan Santana also numbered among his NL top 5 pitchers with performances worthy of 3.3, 3.2, 2.9 and 2.8 extra wins, respectively.

Albert Pujols (St. Louis Cardinals) is Bukiet's Most Valuable Player in the Major Leagues. "His performance would have led an otherwise average team to nearly 87 wins," said Bukiet. While Pujols would have added 5.8 extra wins to the team, other remarkable players included Chipper Jones (Atlanta Braves), Hanley Ramirez (Florida Marlins), Lance Berkman (Houston Astros) and Matt Holliday (Colorado

Rockies). All would have contributed 5.3, 5.1, 5 and 3.9 extra wins, respectively.

Bukiet's method studies each player's annual season statistics. He then applies a Markov process approach to modeling production of runs in baseball games. Bukiet first presented this mathematical model in 1997 in Operations Research. His method predicts how many games a team should win per season, the expected influence of trades and whether to wager on a game. Bukiet considered all players who placed in the top five in their league in at least one of the categories: hits, home runs, runs batted in, stolen bases, batting average and slugging percentage for hitters; wins, saves, earned run average, walks plus hits per inning pitched (WHIP) and batting average against (for pitchers).

Source: New Jersey Institute of Technology

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