Baseball Pitching & Hitter WAR

Aahan Mehta, Ewa Adebayo-Oke, Sonya Lasser

Introduction

- WAR (Wins Above Replacement) is the standard for evaluating player value in baseball, yet no rigorous version exists for NCAA Division I competition
- Existing WAR metrics function as black boxes and fail to account for disparities in competition level across D1's 30 conferences
- This project develops a transparent, conference-adjusted WAR framework for pitchers and hitters, using play-by-play data from TruMedia and Trackman
- The goal is to give Duke baseball a reliable, data-driven tool for evaluating player performance and informing scouting and transfer decisions

Methodology

- To calculate Pitcher WAR we adapted an already existing formula[1] with an adjustment based on conference level, creating tiers of NCAA conferences

Tier	Schools
1	ACC, SEC, Independent
2	Big 12, Big Ten, SoCon, Sun Belt
3	CUSA, Big West, Big South, OVC, American, Southland
4	CAA, Big East, Mountain West, MAC, Atlantic 10, ASUN, WCC, WAA
5	MVC, MAAC, Summit League, America East, SWAC, Horizon, NEC, Ivy League, Patriot

Table 1: NCAA D1 Tiers

- We then incorporate the adjustment into a players Field Independent Pitching (FIP)- which is a metric that measures a pitcher's effectiveness based solely on events they can control

$$\text{FIP} = \frac{13 \cdot HR + 3 \cdot (BB + HBP) - 2 \cdot K}{IP} + \text{FIP Constant} - \text{FIP Adjustment}$$

- Using the FIP of each player, we determined the replacement level, leading to Pitcher WAR

$$RAR = \frac{\text{RepLevel} - \text{AdjustedFIP}}{9} \cdot IP$$

$$\text{WAR} = \frac{\text{RAR}}{\text{Average Winning Runs}}$$

- We calculate Hitter WAR using a similar methodology[2], by scaling weighted on base average (wOBA) with the adjustment

$$\text{WAR} = \frac{\left[\frac{(\text{wOBA} - \text{wOBA Adjustment})}{1.25}\right] \times \text{PA} + \text{PA} \times \frac{20}{600}}{\text{Average Winning Runs}}$$

Results

Top and Bottom 5 Pitchers by WAR
2026 Division I Season

Player	Team	WAR
Top 5 Players		
Mason Edwards	University of Southern California	4.88
Wes Mendes	Florida State University	4.61
Dylan Volantis	University of Texas	4.50
Aidan King	University of Florida	4.46
Jack Radel	University of Notre Dame	4.44
Bottom 5 Players		
Breyllin Suriel	Indiana State University	−1.42
Noah Ehlers	Mercyhurst College	−1.48
James Ellis	Saint Peter's University	−1.48
Carter Champey	University of Maryland Eastern Shore	−1.70
Elijah Benton	University of Maryland Eastern Shore	−1.76

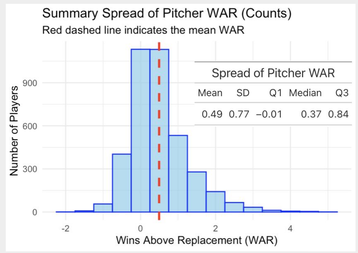
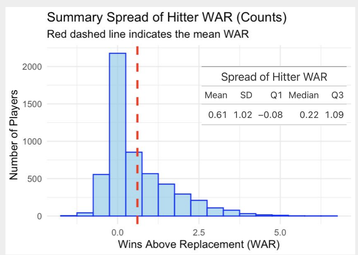


Table 2 (left): Individual Pitcher WAR Leaderboard

Figure 1 (above): Spread of Pitcher WAR

- Mason Edwards and Wes Mendes were both selected in the second round of the 2026 MLB Draft, and Jack Radel was selected in the first round.
- Volantis and King were not eligible this year for the MLB Draft.
- Two of the lowest WAR pitchers being from the same school could indicate flaws in the school's coaching systems.



Top and Bottom 5 Hitters by WAR
2026 Division I Season

Player	Team	PA	WAR
Top 5 Players			
Daniel Jackson	University of Georgia	286	6.31
Landon Hairston	Arizona State University	278	6.25
Vahn Lackey	Georgia Tech	281	6.04
Chris Katz	Mercer University	286	5.82
Tague Davis	University of Louisville	264	5.46
Bottom 5 Players			
TJ Schuyler	Indiana University, Bloomington	93	−1.29
Christian Holmes	University of Wisconsin-Milwaukee	207	−1.38
Corey Robinson	Stetson University	127	−1.42
Nolan Zajac	Western Michigan University	166	−1.46
Sam Ardoin	Northwestern State University	211	−1.54

Table 3 (right): Individual Hitter WAR Leaderboard

Figure 2 (above): Spread of Hitter WAR

- Vahn Lackey was selected 3rd overall in the 2026 MLB Draft, while Daniel Jackson was selected 37th overall and Chris Katz was selected in the 9th round.
- Landon Hairston and Tague Davis were not eligible for the MLB Draft this year.
- WAR does not completely predict draft position, since different teams have different position requirements, players can be predicted to develop differently in professional baseball, and our offensive WAR does not incorporate defensive metrics.

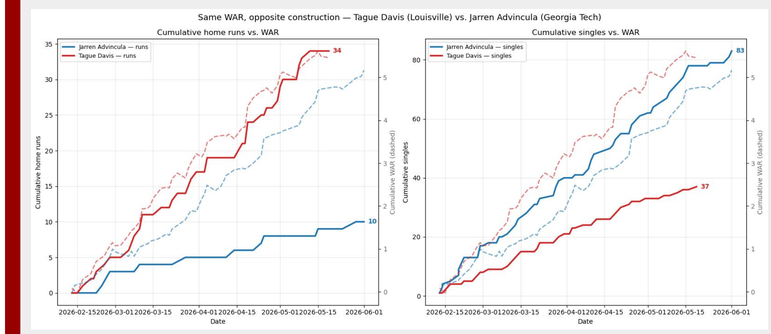


Figure 3: Construction of Hitting WAR

- Figure 3 is a comparison of a power hitter and contact hitter with similar WAR
- WAR allows you to compare players who have completely different styles to another with a single metric

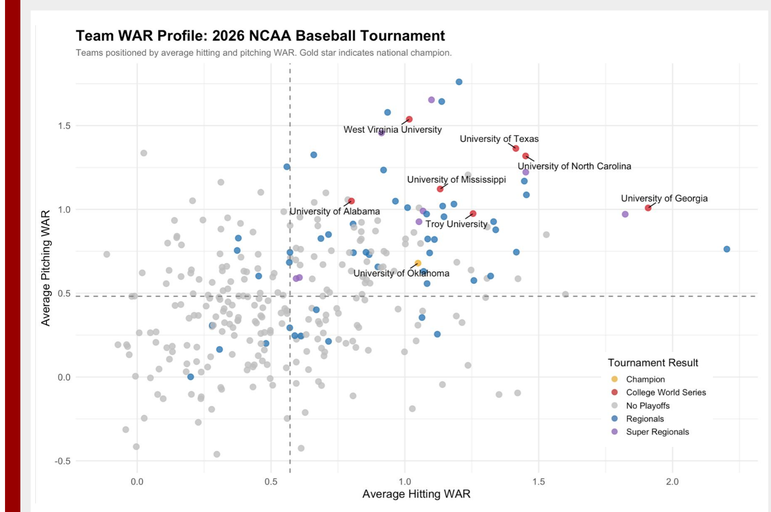


Figure 4: Team WAR & Outcomes

- Note a generally positive relationship between WAR and position in the tournament
- The teams with the best hitting and pitching WAR both didn't make it out of their region, and the national champion Oklahoma was not seeded going into the tournament
- WAR is a great metric to evaluate performance, but not necessarily a predictive one

Acknowledgements

[1] Slowinski, P. (2012, March 28). WAR for pitchers. FanGraphs Library. https://library.fangraphs.com/war/calculating-war-pitchers/
[2] Slowinski, P. (2012, April 2). WAR for position players. FanGraphs Library. https://library.fangraphs.com/war/war-position-players/

Thank you to Sean Coveny, Gregory Herschlag, and Ariel Dawn for their help organizing this Data+ Program