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# Baseball by the numbers: one man's journey into the world of analytics

*By Jon Kingdon*


Moraga resident Zo Obradovic Photo provided

It was Mark Twain (among others) who said, "There are three kinds of lies: lies, damned lies, and statistics." Zo (Zoran) Obradovic, Moraga resident and Principal Engineer for Research and Development for the Philadelphia Phillies baseball team - along with the other analysts on the Phillies and the analytics departments for the other 29 major league baseball teams - would beg to differ.

Prior to the creation of the analytics departments in major league baseball, most teams came to rely on Bill James, who in 1977 until 1988 published his annual `Bill James Baseball Abstracts' which analyzed and studied baseball through the use of statistical data.

It was in 2016 when the Philadelphia Phillies became the last team in the major leagues to start an analytics department and Obradovic became the third person hired for the department, though his path to the Phillies was not as the crow flies.

Growing up outside of Chicago and a big Chicago Cubs fan, Obradovic was immediately attracted to computers. "I thought computers were cool," Obradovic said. "Initially I found that you could play games on them and always thought they were super interesting and exciting. My dad felt that computers were not going anywhere but I told him to trust me on this one."

After graduating from the University of Chicago and Purdue University with a BS and MS in computer science, Obradovic worked on Wall Street for 10 years and began some startups in Chicago. With the unpleasant weather and lack of space in Chicago and at the admonition of his wife Jackie, Zo chose to move to the Bay Area. "We lived a mile off the 80 freeway and drove the 2,200 miles, getting off at the Golden Gate Bridge," Obradovic said.

After leaving Bank of America, Obradovic began working with some startups like VSCO, a photo and video editing app. The demands of startups required Obradovic working late into the evenings and on weekends. "At that point, I decided that I did not want to be gone from my family," Obradovic said. "I wanted to be there for my wife and kids."

That's when fate stepped in and Obradovic learned that computers, videos and baseball were interconnected in the major leagues. "I saw an ad for a job in computers for the Philadelphia Phillies on their website and on a spur, I applied for the position just to see where it would go," Obradovic said. "A couple of weeks later, I received a call from Andy Galdi who has just been hired as the Phillies Director of Baseball Research and Development and learned that the Phillies were creating an analytics department."

Having settled in California with his sons in school, Obradovic made it clear that he did not want to move but would be willing to work remotely. "Andy thought for a second and said simply, `That's fine'," Obradovic said. "Their goal was not to hire baseball lifers because they had plenty of people like that. They wanted people that knew statistics and computers. Our department now comprises 25 analysts which are evenly split between statisticians/mathematicians and computer people. The archetype now is the jocks and nerds working together to make the best team possible."

The book "Moneyball" by Michael Lewis, and the movie starring Brad Pitt, opened up a lot of eyes to what was possible with analytics. Obradovic, who sees himself as the Jonah Hill character on the screen, came in at the right time for the Phillies as they were the last team in league to have an analytics department. "Starting late ended up providing us with a paradoxical benefit because we were starting with the latest technologies, like all the startups do so, at that point, we were able to move a lot faster than the teams that were stuck with older equipment."

With dozens of high-speed cameras in each stadium, major league baseball uses a program called Statcast that was introduced in 2015 which measures all sorts of events that take place during a baseball game by tracking the movements of the ball and the players on the field.

The raw data from every game each day is downloaded to all 30 teams the next morning. That may seem simple enough, but last season Statcast recorded 53,380,301 metrics from 1,435,241 pitches and 328,405

balls in play, according to Yahoo Sports. Starting when the ball is pitched, the cameras will track the spin of the ball, determining its speed, the axis of how it's spinning and curving through space. They also track the batters and where the players are on the field.

As the Principal Engineer of R & D, Obradovic's job is to facilitate the work of the analysts. "I create the technical infrastructure that allows them to ask questions efficiently," Obradovic said. "Statistics have always been an important part of baseball. Everybody could talk about batting average and earned won average. We just have better statistics right now, so we try to tease it out and yet there is also the element of luck. We get about two terabytes of data each game (a terabyte equals 1 trillion bytes in computerese). We have this avalanche of data, and the question is what we do with it. That's where I come in. I create the technical infrastructure that will allow our analysts to get the results they are looking for which allows the smart people to ask the relevant questions in every area of baseball operations."

With the Phillies playing the Houston Astros in the World Series, a season's worth of data for each team is being used to find tendencies in their opponents as they each developed their game plans.

For example, the Phillies know that during the regular season, the Astros threw the third-highest percentage of four-seam fastballs that averaged at least 18 inches of Induced Vertical Break. Conversely, the Astros know that the Phillies performed well on pitches like that.

The Astros know that the Phillies threw the second-highest percentage of pitches located on the inner half of the plate during the regular season. Conversely, the Astros were the sixth best team on pitches located on the inner half of the plate.

"And that's what I love about this," Obradovic said. "The batter knows that the pitcher likes to throw outside but the pitcher knows that the batter knows this so he may throw a heater inside but he knows the batter may be thinking the same thing so he may then decide to throw it on the outside corner. It's a real cat and mouse game that never goes away."

This only scratches the surface of what the analysts do. Not only scouting their opponents, they will also work with their coaches on improving an individual player's performance. "For example, with the videos and computer analysis, we were able to determine how a pitcher's motion was different on his good and bad days, something you could not see with the naked eye," Obradovic said. "It's the same with batters who may be in a slump, and often we'll find that all it will take is a minor adjustment for them to get back on track."

They will also work with the trainers in helping to determine the best therapy for each player and the scouts with their evaluations in preparation for trades, free agency, and the draft.

Analytics departments are no longer restricted to the major leagues. "All the stuff that we do is trickling down to the major colleges and even some of the smaller schools," Obradovic said. "It's just a matter of time until it reaches down to the high schools and the youth sports as well."

Coaching little league in Lamorinda, Obradovich, also plays the numbers game. "We track the number of pitches thrown with a maximum of 55 pitches," Obradovich said. "However, it doesn't take into account the warmup pitches and the throws to first base."

As much as Obradovich enjoys his work, he makes it clear that it's not for everyone. "Working in computers requires that you have a love of learning because the evolution of technology is a constant thing," Obradovich said. "When I spoke to students at Campolindo about a career in computer or data science, I made it clear that to work in this area, you have to love to learn new things all the time. It's a great career because every six months, there are new things being invented. It's a full-time job to stay on top of things and in my case figuring out how to apply it to a team's performance."

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