

MARCH 9-11, 2018 ★ PHOENIX, AZ



ANALYTICS CONFERENCE





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SABR
ANALYTICS
CONFERENCE

Welcome!

Welcome to the seventh annual SABR Analytics Conference.

In 2018, we have invited another top group of speakers from throughout the baseball industry, including Brian Kenny of MLB Network, ESPN's Jon "Boog" Sciambi and Eduardo Perez, Arizona Diamondbacks Sr. Vice President/Assistant GM Amiel Sawdaye and announcer Mike Ferrin, Seattle Mariners Director of High Performance Dr. Lorena Martin, MLB Advanced Media's Tom Tango, Mike Petriello, and Daren Willman, former National League Cy Young Award winner and Texas Rangers coach Eric Gagné, Los Angeles Dodgers executives Ehsan Bokhari, Philip Cho, and Emilee Fracapane, Chicago White Sox executive Chris Getz, Seattle Mariners executive Andy McKay, The Athletic's Eno Sarris, Genius Sports Special Counsel Bill Squadron, and many more. We'll also have ten research presentations with a wide-ranging, diverse group of speakers throughout the conference.

Each year, the top minds of the baseball analytic community gather to discuss, debate and share insightful ways to analyze and examine the great game of baseball. The event is a natural for SABR. The Society for American Baseball Research has a long and storied history with baseball statistical analysis, evidenced by the link between our name and sabermetrics. While SABR is a multi-faceted organization involved in virtually every aspect of baseball, we have taken a major step to reconnect with our beginnings by producing and hosting our seventh annual SABR Analytics Conference.

This year's conference will feature the high-quality content you've always enjoyed at the SABR Analytics Conference and the same number of featured panels and research presentations, but there will be a few changes to the usual schedule: We will begin programming early Friday afternoon on March 9 and will run through Sunday afternoon on March 11. The change in schedule is due to the availability at our host hotel this year. In addition, the Diamond Dollars Case Competition will start at 5:00 p.m. on Friday evening and the networking reception will be held on Saturday evening, March 10 at the Hyatt Regency Phoenix. Lunch, which is included in your conference registration, will be served at noon on Friday — before the regular programming begins — and also on Saturday between the morning and afternoon sessions.

SABR's long history in this area of baseball research, coupled with our mission of advancing the understanding and the knowledge of baseball, makes us the perfect choice to coordinate and host such an important baseball industry event.

Once again, we want to thank all of our attendees and our sponsors, which include Major League Baseball, Rawlings, Baseball Info Solutions, SMT, Genius Sports, Baseball-Reference.com, neuroFit, Mindful Athlete Training, and the following MLB teams: the Arizona Diamondbacks, Chicago Cubs, Cincinnati Reds, Cleveland Indians, Colorado Rockies, Los Angeles Angels of Anaheim, Los Angeles Dodgers, New York Mets, San Diego Padres, San Francisco Giants, and Toronto Blue Jays.

You can visit SABR.org/analytics during and after the conference for complete coverage of the 2018 SABR Analytics Conference, including stories, multimedia highlights, and photo galleries.

Vince Gennaro, SABR President ♦ Marc Appleman, SABR Chief Executive Officer

Events Schedule

FRIDAY, MARCH 9

Friday's programming will be held at the Hyatt Regency Phoenix, 122 N. 2nd St., Phoenix, AZ 85004.

♦ **9:30 a.m.-6:00 p.m.: Registration open**

You can pick up your SABR Analytics Conference registration packet in the Regency Ballroom Foyer (1st floor) of the Hyatt Regency Phoenix.

♦ **12:00-1:00 p.m.: Lunch
(Atrium, 2nd floor)**

Analytics Conference registration includes lunch.

♦ **1:00-1:10 p.m.: Conference Welcome: Vince Gennaro/Marc Appleman
(Regency Ballroom, 1st floor)**

SABR President Vince Gennaro and Chief Executive Officer Marc Appleman will welcome attendees.

♦ **1:10-2:00 p.m.: The State of Analytics: Brian Kenny and Jon Sciambi
(Regency Ballroom, 1st floor)**

MLB Network host Brian Kenny and ESPN's Jon "Boog" Sciambi will speak on The State of Analytics.

♦ **2:00-2:30 p.m.: Research Presentation 1
(Regency Ballroom, 1st floor)**

RP1—Sean Forman and Hans Van Slooten, "WAR: We'll Try to Resist all Puns and Still Tell You What It Is Good For"

♦ **2:45-3:45 p.m.: MLB Team Approach to Analytics
(Regency Ballroom, 1st floor)**

Speakers: Amiel Sawdaye, Arizona Diamondbacks; Eduardo Perez, ESPN; Eno Sarris, The Athletic; Mike Ferrin, Arizona Diamondbacks/MLB Network Radio. Moderator: Vince Gennaro, SABR.

♦ **4:00-5:00 p.m.: Statcast Presentation
(Regency Ballroom, 1st floor)**

Speakers: Tom Tango, Daren Willman, and Mike Petriello of MLB Advanced Media.

♦ **5:00-5:10 p.m.: Introduction to Diamond Dollars Case Competition
(Regency Ballroom, 1st floor)**

SABR President Vince Gennaro will introduce the 2018 Diamond Dollars Case Competition in the Regency Ballroom, with presentations to follow upstairs on the second floor.

♦ **5:15-10:00 p.m.: Diamond Dollars Case Competition
(Phoenix, Cassidy, Curtis, and Cowboy Artists Ballrooms, 2nd floor)**

Presentations of the Diamond Dollars Case Competition. *See page 20 for more information.*

Events Schedule

SATURDAY, MARCH 10

Saturday's programming will be held at the Hyatt Regency Phoenix, 122 N. 2nd St., Phoenix, AZ 85004.

♦ **8:00 a.m.-5:00 p.m.: Registration open**

You can pick up your SABR Analytics Conference registration packet in the Regency Ballroom Foyer (1st floor) of the Hyatt Regency Phoenix.

♦ **8:30-9:30 a.m.: Player Development Panel**

(Regency Ballroom, 1st floor)

Speakers: Chris Getz, Chicago White Sox; Andy McKay, Seattle Mariners. Moderator: Eduardo Perez, ESPN.

♦ **9:45-10:45 a.m.: Research Presentations 2-3**

(Regency Ballroom, 1st floor)

RPs 2-3 will take place back-to-back in a single session.

RP2—Vince Gennaro, “Differentiating Performance vs. Potential in Player Development”

RP3—Brian Reiff, “Defense in PARTs: Splitting Positioning, Airballs, Range, and Throwing”

♦ **11:00 a.m.-12:00 p.m.: Is the Media Doing its Part to Advance the Analytics Discussion?**

(Regency Ballroom, 1st floor)

Speakers: Jon Sciambi, ESPN; Eno Sarris, The Athletic; baseball author Rob Neyer.
Moderator: Brian Kenny, MLB Network.

♦ **12:00-12:45 p.m.: Global Sports Betting and the Role of Integrity Technology**

(Regency Ballroom, 1st floor)

Speaker: Bill Squadron, Genius Sports.

♦ **12:45-1:45 p.m.: Lunch**

(Atrium, 2nd floor)

Analytics Conference registration includes lunch.

♦ **2:00-2:30 p.m.: SABR Analytics Conference Lifetime Achievement Award Presentation**

(Regency Ballroom, 1st floor)

Sabermetric pioneer Pete Palmer will be honored with the second SABR Analytics Conference Lifetime Achievement Award.

♦ **2:30-3:30 p.m.: Research Presentations 4-5**

(Regency Ballroom, 1st floor)

RPs 4-5 will take place back-to-back in a single session.

RP4—Matt Swartz, “Knowledge and Evolution in the Free Agent Market”

RP5—Rob Mains and Pete Palmer, “A Revised Look at Clutch Hitting”

Events Schedule

♦ **3:45-4:30 p.m.: Diverse Perspectives Panel**

(Regency Ballroom, 1st floor)

Speakers: Dr. Lorena Martin, Seattle Mariners; Ehsan Bokhari, Los Angeles Dodgers; Philip Cho, Los Angeles Dodgers; Emilee Fragapane, Los Angeles Dodgers. Moderator: Vince Gennaro, SABR.

♦ **4:30-5:30 p.m.: Diamond Dollars Case Competition**

(Regency Ballroom, 1st floor)

Encore presentation from the winning team of the Diamond Dollars Case Competition.

♦ **5:30-7:30 p.m.: Welcome/Networking Reception with Baseball Industry Network**

(Atrium Lounge, 2nd floor)

The welcome reception will be an opportunity for conference attendees to meet some of our panelists, speakers, writers and others working throughout the baseball industry. Cash bar.

SUNDAY, MARCH 11

Sunday's programming will be held at the Hyatt Regency Phoenix, 122 N. 2nd St., Phoenix, AZ 85004.

♦ **8:00 a.m.-2:00 p.m.: Registration open**

You can pick up your SABR Analytics Conference registration packet in the Regency Ballroom Foyer (1st floor) of the Hyatt Regency Phoenix.

♦ **8:30-9:00 a.m.: Research Presentation 6**

(Regency Ballroom, 1st floor)

RP6—Travis Petersen, “Augmenting Statcast Hit Probability with Hit Direction and Sprint Speed”

♦ **9:00-10:00 a.m.: Technology Panel**

(Regency Ballroom, 1st floor)

Speakers: Jeremy Booth, New Balance Baseball Future Stars Series; Matt Reiland, Power Alley Analytics; Jarett Sims, Monsterful VR. Moderator: Brett Kurland, Arizona State University.

♦ **10:15-11:15 a.m.: Research Presentations 7-8**

(Regency Ballroom, 1st floor)

RPs 7-8 will take place back-to-back in a single session.

RP7—Glenn Healey and Shiyuan Zhao, “Modeling Batter Characteristics Using Hit-Tracking Data”

RP8—Mark Simon, “Has the Shift Seen Its Day?”

♦ **11:15-11:30 a.m.: SABR Analytics Conference Research Award presentations**

(Regency Ballroom, 1st floor)

The winners of the 2018 SABR Analytics Conference Research Awards will be announced and presented.

Events Schedule

♦ **11:30 a.m.-12:30 p.m.: Pitching Panel**

(Regency Ballroom, 1st floor)

Speakers: Eric Gagne, Texas Rangers; former Chicago Cubs GM Ed Lynch. Moderator: Barry Bloom.

♦ **12:45-1:45 p.m.: Research Presentations 9-10**

(Regency Ballroom, 1st floor)

RPs 9-10 will take place back-to-back in a single session.

RP9—Alex Vigderman, “Synthetic Statcast Data”

RP10—Dorion Liston, et al, “Visual Tracking: An Indicator of Health and Performance”

♦ **1:45-2:00 p.m.: Conference wrap-up**

(Regency Ballroom, 1st floor)

SABR President Vince Gennaro and Chief Executive Officer Marc Appleman.

Please note: All speakers and panelists are subject to change due to availability.

Speakers/Panelists

Conference Welcome: Vince Gennaro and Marc Appleman

1:00 p.m., Friday, March 9, Regency Ballroom, 1st floor

♦ **Vince Gennaro** is the President of SABR's Board of Directors, author of *Diamond Dollars: The Economics of Winning in Baseball*, and host of a weekly national radio show, *Behind the Numbers: Baseball SABR Style on SiriusXM*. He is also the Associate Dean and Clinical Associate Professor of NYU's Preston Robert Tisch Institute for Global Sport. He is a consultant to MLB teams and appears regularly on MLB Network. He is also the architect of the Diamond Dollars Case Competition series, which brings together students and MLB team and league executives and serves as a unique learning experience, as well as a networking opportunity for aspiring sports executives.

♦ **Marc Appleman** joined SABR as the Executive Director in 2010 and was named Chief Executive Officer in 2015. His arrival has sparked new growth for the organization as SABR has become a major part of the baseball community, especially since the launch of the SABR Analytics Conference in 2012. Marc's broad-based career began as a sportswriter who covered baseball for the *Los Angeles Times San Diego Edition*. He honed his skills in digital media and sports content development as the Senior Coordinating Editor and Director of SportsNation at ESPN New Media, the Director of Programming at AOL Sports, Managing Editor of FoxSports.com, and as a writer/editor for *Sports Illustrated for Kids*. He also brings a wealth of strategic and marketing skills to SABR, having worked as Chief Operating Officer for Active.com and President of Content and Programming for Nobok Sports.

The State of Analytics: Brian Kenny and Jon Sciambi

1:10 p.m., Friday, March 9, Regency Ballroom, 1st floor

♦ **Brian Kenny** is a host at MLB Network, where he appears across the network's studio programming, including "MLB Now" and "MLB Tonight." He is also the author of *Ahead of the Curve: Inside the Baseball Revolution*. A 25-year national TV and radio veteran, Brian joined MLB Network from ESPN, where he was a "SportsCenter" anchor, host of the "Brian Kenny Show" on ESPN Radio and an Emmy Award-winning anchor for "Baseball Tonight."

♦ **Jon "Boog" Sciambi** joined ESPN full time in 2010 as play-by-play voice for MLB on ESPN Radio, while continuing the same role for college basketball and MLB on ESPN, which he has done since 2005. He has been the regular play-by-play voice for "Wednesday Night Baseball" telecasts since 2014. Previously, Jon was the lead play-by-play announcer for the Atlanta Braves on Fox Sports South and SportSouth from 2007-09, and host for 790 The Ticket in South Florida, and as voice of the Florida Marlins on WQAM from 1997-2004.

Speakers/Panelists

MLB Team Approach to Analytics

2:45 p.m., Friday, March 9, Regency Ballroom, 1st floor

- ♦ **Mike Ferrin** is entering his third season on the Arizona Diamondbacks radio broadcast team, as the pre- and postgame show host and secondary play-by-play announcer on Arizona Sports 98.7 FM and the Arizona Diamondbacks Radio Network. Since 2007, he has worked as a nationally renowned broadcaster on SiriusXM MLB Network Radio as the host of “Power Alley” and the on-site host in the MLB postseason and Winter Meetings. Previously, he was the play-by-play announcer for the Double-A Bowie Baysox and a sports producer and reporter for WGN Radio in Chicago.
- ♦ **Eduardo Perez** is an analyst for ESPN’s “Baseball Tonight” and an announcer for “Monday Night Baseball.” He was the Houston Astros’ bench coach in 2013 after two seasons as the Miami Marlins’ hitting coach. He has served as manager of the Colombian national team and as manager and general manager of the Puerto Rican national team. In 2008, he earned Manager of the Year honors in the Puerto Rican Winter League and in 2009 he led the Ponce Lions to the Caribbean Series. From 1993-2006, Eduardo played parts of 13 seasons in the Major Leagues, primarily as a first baseman, for the Angels, Cardinals, Reds, Devil Rays, Indians and Mariners. He joined ESPN as an analyst for the 2006 postseason and worked full-time for the network for the next four seasons before returning in 2014.
- ♦ **Eno Sarris** is a staff writer for The Athletic, where he specializes in pitching analytics. He takes the best public analytics findings to the players in the clubhouse to get their reactions. He has also been a contributor to FanGraphs, ESPN, MLB.com, Fox Sports, SB Nation, The Hardball Times, and others.
- ♦ **Amiel Sawdaye** is entering his second season as Senior Vice President and Assistant General Manager with the Arizona Diamondbacks, where he oversees the team’s amateur and international scouting and assists GM Mike Hazen on all facets of baseball operations. He spent 15 seasons working in the Boston Red Sox front office, most recently as VP of Amateur and International Scouting, helping the club win three World Series. He graduated from the University of Maryland with a degree in decisions information systems.
- ♦ **Moderator: Vince Gennaro**, SABR President

MLB Advanced Media Statcast Presentation

4:00 p.m., Friday, March 9, Regency Ballroom, 1st floor

- ♦ **Tom Tango** is the Senior Data Architect, Stats at MLB Advanced Media and is the co-author of *The Book: Playing the Percentages in Baseball*. He also developed the Tangotiger.com website, where fans and analysts will find a large number of research pieces devoted to sabermetrics. Tom has previously worked as a consultant for major-league teams in baseball and hockey.
- ♦ **Mike Petriello** is a Stats Analyst for MLB Advanced Media and writes daily about Statcast and advanced metrics for MLB.com and each of the 30 club sites, bringing the latest in stats to the baseball public. He can also regularly be seen on MLB Network, is the host of the Statcast Podcast. Prior to joining MLBAM, he wrote for FanGraphs and ESPN.

Speakers/Panelists

♦ **Daren Willman** is the Director of Baseball Research and Development for MLB Advanced Media. He spearheads socially fan driven content featuring Statcast in his work for MLBAM. He developed the popular data websites BaseballSavant.com, MLBfarm.com, and NFLsavant.com. Previously, he was the lead software architect at the Harris County District Attorney's Office in Houston.

Player Development Panel

8:30 p.m., Saturday, March 10, Regency Ballroom, 1st floor

♦ **Chris Getz** is entering his second season as the Chicago White Sox Director of Player Development. He played parts of seven seasons with the White Sox, Kansas City Royals, and Toronto Blue Jays, after being drafted by Chicago out of the University of Michigan in 2005. After his retirement in 2014, he joined the Royals front office as a baseball operations assistant, assisting in minor-league operations and player personnel decisions.

♦ **Andy McKay** is entering his third season as the Seattle Mariners Director of Player Development, responsible for overseeing all aspects of the Mariners minor-league system, including roster management and skills development. Previously, he served as Peak Performance Coordinator for the Colorado Rockies from 2012 to 2016. He also spent 14 seasons as the head baseball coach at Sacramento City College, winning one California state championship and eight league titles.

♦ **Moderator: Eduardo Perez**, ESPN analyst/announcer.

Is the Media Doing its Part to Advance the Analytics Discussion?

11:00 a.m., Saturday, March 10, Regency Ballroom, 1st floor

♦ **Eno Sarris**, The Athletic staff writer

♦ **Jon "Boog" Sciambi**, ESPN announcer

♦ **Rob Neyer** is a longtime baseball writer and editor for ESPN.com, SB Nation, and most recently FoxSports.com. Rob began his career as a research assistant for groundbreaking baseball author Bill James, and later worked for STATS, Inc. He has also written or co-written six baseball books, including The Neyer/James Guide to Pitchers (with Bill James), winner of the Sporting News/SABR Baseball Research Award.

♦ **Moderator: Brian Kenny**, MLB Network host

Global Sports Betting and the Role of Integrity Technology

12:00 p.m., Saturday, March 10, Regency Ballroom, 1st floor

♦ **Bill Squadron** is the Special Counsel for Genius Sports. He has been an executive, government official, and attorney in the sports media, technology and data fields for more than 25 years, and is currently Special Counsel to Genius Sports, a global leader in data, analytics and betting

Speakers/Panelists

services. Prior to his role at Genius Sports, he served as President of Bloomberg Sports, which created groundbreaking data and analytics products for multiple sports, both in the U.S. and internationally. He was also the co-founder, Chairman and CEO of Sportvision, Inc., and head of advanced media and technology in North America for IMG.

Diverse Perspectives Panel

3:45 p.m., Saturday, March 10, Regency Ballroom, 1st floor

- ♦ **Ehsan Bokhari** is a Senior Analyst in Baseball Research & Development with the Los Angeles Dodgers. He holds a Ph.D. in quantitative psychology and a master's degree in statistics from the University of Illinois at Urbana-Champaign and bachelor's degrees in mathematics and psychology from the University of Arizona.
- ♦ **Philip Cho** is a Senior Analyst in Baseball Research & Development with the Los Angeles Dodgers. He holds a master's degree in operations research from the Massachusetts Institute of Technology and a bachelor's degree from the United States Air Force Academy. He was an operational flight test analyst in the Air Force from 2011-14 and has also served as a visiting researcher at Columbia University.
- ♦ **Emilee Fragapane** is a Baseball Operations Coordinator with the Los Angeles Dodgers. She holds a master's degree in economics from the University of California at Santa Barbara and a bachelor's degree in quantitative microeconomics from California State University at Sonoma. She joined the Dodgers front office as a baseball operations intern in 2013 and as a full-time baseball research analyst in 2014.
- ♦ **Dr. Lorena Martin** joined the Seattle Mariners front office in 2017 as the team's first-ever Director of High Performance, where she is responsible for coordinating all aspects of the Mariners physical and mental training approach of players and staff, including oversight of the entire organization's medical, strength and conditioning, nutrition, and mental skills departments. Prior to joining the Mariners, she was Director of Sports Performance Analytics for the Los Angeles Lakers. She has earned three post-doctorates in GIS spatial analysis (2016), biostatistics (2015), and epidemiology (2014) at the University of California at San Diego, along with a Ph.D. in Exercise Physiology from the University of Miami. She is the author of *Sports Performance Measurement and Analytics* (2016) and the co-author of *Sports Injury Prevention & Rehabilitation* (2017).
- ♦ **Moderator: Vince Gennaro**, SABR President

Technology Panel

9:00 a.m., Sunday, March 11, Regency Ballroom, 1st floor

- ♦ **Jeremy Booth** is the CEO of the New Balance Baseball Future Stars Series and the CEO/President of Program 15 Baseball Player Development, based in Houston, Texas. He is also a Senior Consultant at Monsterful VR. Previously, he spent nine years as an area scout and supervisor in the Minnesota Twins, Milwaukee Brewers, and Seattle Mariners organizations.

Speakers/Panelists

- ♦ **Matt Reiland** is a data consultant and operates Power Alley Analytics. He previously managed finance teams at Lowe's corporate headquarters, and performed cost and schedule analysis of oil and gas investments at ConocoPhillips. He served for seven years as a Nuclear Submarine Officer in the US Navy, including a tour on the USS Montpelier. He graduated from North Carolina State University with a degree in mathematics and earned his MBA at The Citadel.
- ♦ **Jarett Sims** is the CEO and founder of Monsterful VR, a New York-based tech startup that produces virtual-reality training tools for baseball prospects. Previously, he was the Vice President of Product for HYPR and he also has worked as a product manager, web developer, and UI designer. He is a graduate of George Washington University and the son of longtime Seattle Mariners broadcaster Dave Sims.
- ♦ **Moderator: Brett Kurland** is a professor of practice at the Walter Cronkite School of Journalism and Mass Communication at Arizona State University. He is the founding director of the Phoenix Sports Bureau of Cronkite News at Arizona PBS, where students cover professional and intercollegiate sports for a variety of professional media outlets. He is an Emmy Award-winning sports producer and multimedia entrepreneur with more than 16 years of experience producing content across a variety of platforms, ranging from mobile phones to broadcast television networks. Kurland's work has included documentaries, features, live events and studio shows for numerous networks, including ESPN CBS, FOX and NBC.

Pitching Panel

11:30 a.m., Sunday, March 11, Regency Ballroom, 1st floor

- ♦ **Eric Gagné** is a former National League Cy Young Award winner and three-time All-Star closer. He was hired recently by the Texas Rangers as the pitching coach for their Arizona League affiliate. In 2003 with the Los Angeles Dodgers, he set an NL record with 55 saves and a 1.20 ERA in 77 appearances, becoming just the second Canadian-born pitcher to win the Cy Young Award. He set a major-league record by converting 84 consecutive save opportunities from 2002-04. He earned a World Series ring with the Boston Red Sox in 2007 and recorded 187 saves over his 10-year career. He also served as Team France's pitching coach during the 2013 World Baseball Classic qualifiers and pitched for Team Canada in the 2017 WBC.
- ♦ **Ed Lynch** was the general manager of the Chicago Cubs for six seasons (1994-2000) following an eight-year career as a pitcher in the major leagues with the Cubs and New York Mets, with whom he earned a World Series ring in 1986. After retiring and obtaining his law degree from the University of Miami, he moved into the front office as the San Diego Padres' farm director in 1990 before he was hired by the Cubs as baseball's youngest GM at age 38. In Chicago, he selected Kerry Wood with his first pick in the amateur draft and helped lead the Cubs back to the postseason in 1998. Later, he served as a special assistant to the GM with the Cubs and, until recently, a scout with the Toronto Blue Jays.
- ♦ **Moderator: Barry M. Bloom** was a national reporter for MLB.com for more than 15 years and has nearly four decades of experience covering sports. He covered baseball and hockey for five years at *Bloomberg News* and also spent 16 years as a writer at the *San Diego Union-Tribune*.

Research Presentations

SABR and Baseball Info Solutions are pleased to announce the research presentations that will be delivered at the seventh annual SABR Analytics Conference. Most presentations will be delivered back-to-back in hour-long single sessions.

All presentations will be held in the **Regency Ballroom on the 1st floor of the Hyatt Regency Phoenix**. Here is the schedule of research presentations for the 2018 SABR Analytics Conference:

Research Presentation 1 2:00-2:30 p.m., Friday, March 9

RP1— Sean Forman and Hans Van Slooten, “WAR: We’ll Try to Resist all Puns and Still Tell You What It Is Good For”

Baseball-Reference.com added Sean Smith’s (rallymonkey at BaseballThinkFactory.org) Wins Above Replacement in 2010 and over the past eight years has built on Sean’s work, adding additional factors and calculations to the metric. Sean Forman and Hans Van Slooten will walk you through the main ideas of WAR, some implementation details, a discussion of the differences between the three primary WAR systems, and answer your questions.

Sean Forman launched Baseball Reference in the Spring of 2000 while avoiding his Ph.D. dissertation at the University of Iowa. He eventually completed his dissertation in Applied Mathematics and taught math and computer science for six years at Saint Joseph’s University in Philadelphia. In the fall of 2007, Sports Reference LLC was formed, combining baseball, basketball, and football sites, and has now grown to ten employees and includes college sports, hockey, and soon world football. Sean was named a Henry Chadwick Award winner in 2011 and continues to serve as Sports Reference’s President. Sports Reference has been named a top 50 site by *Time Magazine*, won a Sloan Conference Alpha Award in 2013, and is the current statistical partner for the National Baseball Hall of Fame.

Hans Van Slooten is entering his third year as the Manager of Baseball Operations at Sports Reference, after serving in the same role for Hockey-Reference.com beginning in 2013. Hans is a graduate of the University of Illinois at Urbana-Champaign in Computer Science and served as a software engineer for comScore and OLSON prior to joining Sports Reference. He is currently the membership chair of SABR’s Halsey Hall Chapter in the Twin Cities.

Research Presentations

Research Presentations 2-3

9:45-10:45 a.m., Saturday, March 10

RP2 and RP3 will take place back-to-back in a single session.

RP2—Vince Gennaro, “Differentiating Performance vs. Potential in Player Development”

Identifying and developing talented young players who will materialize into major leaguers is a challenge for every MLB team. It is also the foundation of an efficiently constructed, competitive roster. And for many low-revenue MLB teams, it's their only hope to contend for the elusive championship. Why do some prospects perform well at AA and AAA, but they fail at the major league level, while others who seem to be only average minor league performers, become bona fide major leaguers? By employing a tool used by many major corporations to assess management talent potential, major league organizations may be able to improve their ability to identify and develop prospects into future major leaguers.

Vince Gennaro is the President of SABR's Board of Directors, author of *Diamond Dollars: The Economics of Winning in Baseball*, and host of a weekly national radio show, *Behind the Numbers: Baseball SABR Style on SiriusXM*. He is also the Associate Dean and Clinical Associate Professor of NYU's Preston Robert Tisch Institute for Global Sport. He is a consultant to MLB teams and appears regularly on MLB Network. He is also the architect of the Diamond Dollars Case Competition series, which brings together students and MLB team and league executives and serves as a unique learning experience, as well as a networking opportunity for aspiring sports executives.

RP3—Brian Reiff, “Defense in PARTs: Splitting Positioning, Airballs, Range, and Throwing”

Introduction: With batted ball location and timer data for plays, one can estimate the defensive value of players by comparing their ratios of outs made per opportunity to the ratios of other players on similar balls in play. However, some have found such metrics limiting because they do not attempt to isolate factors such as starting positioning, especially with the dramatic increase in shift usage across baseball. Our research incorporates new data from Baseball Info Solutions such as fielder starting position coordinates and baserunner times to break down infield defense into separate components of positioning, range, and throwing.

Methods: Our evaluations are based on four calculations for each play.

- A. The probability the play is made, calculated by comparing similar batted balls based on Baseball Info Solutions' batted ball location and timer data.
- B. The probability the play is made given fielders' starting positioning relative to the batted ball location.
- C. The probability the play is made at the point when the fielder touches the ball based on his proximity to the bag and time to throw
- D. Whether the play resulted in an out or not.

Those calculations relied on a plus/minus mathematical approach where we bucketed plays based on the similarity of relevant factors (e.g. ball in play location and velocity).

With those four pieces, we calculated the runs defenders have saved with their positioning (B minus A), range (C minus B), and throws (D minus C).

Brian Reiff is a Research Associate at Baseball Info Solutions. He initially joined the R&D group as an intern during his senior year of school at Lehigh University and became a full-time member of the staff after graduating in May 2017.

Research Presentations

Research Presentations 4-5

2:30-3:30 p.m., Saturday, March 10

RP4 and RP5 will take place back-to-back in a single session.

RP4— Matt Swartz, “Knowledge and Evolution in the Free Agent Market”

Earlier in the sabermetric revolution, I published numerous articles exploring which groups of players provided the most value on the free agent market. However, unlike hard science where findings are usually unconditional, empirical economic evidence can change as market participants learn. The physics of batted ball contact do not change if the players learn about them, nor do the mathematics of run scoring. Yet when front offices learn that shortstops provide more production per dollar, they can bid up their prices in free agency, nullifying the future applicability of the finding itself.

In this presentation, I will demonstrate which of my prior findings still hold as teams have learned more, and which value differences have eroded as teams’ knowledge has increased. I will revisit whether teams still overpay for production from free agents signed away from other teams, or if they have redirected more resources towards re-signing their own players. I will also check whether the same positions on the diamond that provided the most value per dollar continue to remain bargains, or if teams have changed spending patterns by position. In addition, I will explore whether certain statistical profiles still correspond to better value as well, or if teams have started spending more on good base runners, contact hitters, and pitchers with strong peripherals.

Throughout the presentation, I will explain the economics behind the results and what economic theory tells us about their durability or lack thereof. This will give better insight into how the smartest teams will extract more wins from their free agent dollars going forward.

Dr. Matt Swartz’s research and writing have appeared at MLB Trade Rumors, The Hardball Times, FanGraphs, Baseball Prospectus, and SB Nation, and he does the arbitration salary projection model for MLB Trade Rumors. Matt consults for a major-league team with whom he connected at this very conference in 2013. He graduated from University of Pennsylvania in 2009 with a Ph.D. in Economics, and also from UPenn in 2003 with a B.A. in Mathematics and Economics. Matt is a native Philadelphian, and lives there now with his wife, Laura, and his 4-year-old daughter, Maya.

RP5—Rob Mains and Pete Palmer, “A Revised Look at Clutch Hitting”

In 1977, Dick Cramer wrote the seminal “Do Clutch Hitters Exist?” in SABR’s *Baseball Research Journal*, confirming earlier work by Pete Palmer that answered the rhetorical question in the negative. In 2004, Bill James wrote “Underestimating the Fog,” also in the *BRJ*, suggesting that prior analyses, including Cramer’s, are limited by the data with which we can do our analyses, and that there clutch hitters may, in fact, exist, though we may not know how to identify them. Many subsequent studies have attempted to reach a conclusion, and while most fall on Cramer’s side, the question remains open.

We performed a new analysis by creating a simulation of 18 equal players over an entire season and measured the difference between their player win averages (i.e., the situation-dependent difference in win probability before and after each appearance) and the run expectancy of each appearance (which is not situation-dependent). We simulated 1,000 seasons and calculated standard deviations of the difference between the two measures as our base.

We then analyzed every player with 500 or more plate appearances between 1946 and 2017 and calculated a z-score equal to the difference between the player’s situation-dependent and non-situation-depen-

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dent batting performance divided by the standard deviation calculated above. This enabled us to identify batters who performed better or worse in high-leverage situations compared to their overall norms.

We found that in each season, there were, in fact, some players who performed very well in the clutch and some who performed poorly. However, we feel this is more than countered by two other findings:

Performing better in pressure situations was not a replicable skill. Only one batter was in the top 5% in clutch hitting more than four times in his career, compared to players who consistently are among the best at other metrics.

The players who performed best in the clutch and those who performed worse were in many cases incongruous. Several players were among the top 5% *and the bottom 5%* at various points in their careers, highlighting the apparent randomness.

This is not to say that some batters do not perform better when the pressure's on, but rather that those who do tend to be those who do best in all situations, clutch or not.

Rob Mains is an author at Baseball Prospectus, where his "Flu-Like Symptoms" column runs twice weekly. He is also a contributor to Banished to the Pen. He is a SABR member, a Retrosheet volunteer, and a former Wall Street equities analyst.

Pete Palmer is the co-author with John Thorn of *The Hidden Game of Baseball* and co-editor with Gary Gillette of the *Barnes and Noble ESPN Baseball Encyclopedia* (five editions). Pete worked as a consultant to Sports Information Center, the official statisticians for the American League from 1976 to 1987. Pete introduced on-base average as an official statistic for the American League in 1979 and invented on-base plus slugging (OPS), now universally used as a good measure of batting strength. He won the SABR Bob Davids Award in 1989 and was selected by SABR in 2010 for the inaugural class for the Henry Chadwick Award.

Research Presentation 6 8:30-9:00 a.m., Sunday, March 11

RP6—Travis Petersen, "Augmenting Statcast Hit Probability with Hit Direction and Sprint Speed"

Statcast hit probability measures the likelihood that a batted ball will become a hit by using exit velocity and launch angle. The metric attempts to strip away effects of defense and ballpark to determine the hit probability of a batted ball the moment it leaves the bat.

Utilizing machine learning and statistical techniques, hit direction and sprint speed have been added in order to improve the accuracy of the hit probability model. These additional variables allow us to better understand the potential for hits on infield ground balls and deep fly balls.

Travis Petersen is a Senior Data Scientist at MLB Advanced Media and an adjunct professor at Fordham University. He previously worked at IBM and has a master's degree in Business Analytics from Fordham University.

Research Presentations

Research Presentations 7-8

10:15-11:15 a.m., Sunday, March 11

RP7 and RP8 will take place back-to-back in a single session.

RP7—Glenn Healey and Shiyuan Zhao, “Modeling Batter Characteristics Using Hit-Tracking Data”

The Statcast system measures several physical parameters of batted balls. We use multidimensional distributions defined over these parameters to develop a new approach for characterizing hitters which leads to a batter similarity measure that captures information about bat speed and swing plane. The new metric is applied to Statcast data from the 2016 and 2017 seasons to identify batter groups and unique batters. By applying the metric to individual players over time, we identify batters with swings that are the most stable and the least stable. Leaderboards and visualizations generated using non-metric multidimensional scaling are presented to illustrate the new approach.

The new metric can be exploited to advance a range of application areas. The measure allows the direct comparison of batter swing characteristics across various contexts including MLB, MiLB, amateur, and foreign leagues. The identification of similar batters increases the sample sizes that can be used to predict the outcome of batter/pitcher matchups and supports regression to more appropriate population means by forecasting systems. The measure can also be used to develop improved models for the aging characteristics associated with different swing types. The new approach also allows pitchers to optimize pitch selection strategy according to batter strengths and weaknesses recovered by applying machine learning techniques to groups of similar batters. In addition, the measure allows batters to be monitored over time to detect changes in swing mechanics or health.

Glenn Healey is a professor of electrical engineering and computer science at the University of California, Irvine where he is director of the computer vision laboratory. He received the B.S.E. degree in Computer Engineering from the University of Michigan and the M.S. degree in computer science, the M.S. degree in mathematics, and the Ph.D. degree in computer science from Stanford University. Dr. Healey’s professional life is dedicated to combining physics, statistical signal processing, and machine learning methods for the development of algorithms that extract information from large sets of data.

Shiyuan Zhao is a Ph.D. student in Electrical Engineering and Computer Science at the University of California, Irvine. She received the B.S.E. degree in Aerospace Engineering from Beihang University and the M.S. degree in Electrical Engineering from the University of California, Irvine.

RP8—Mark Simon, “Has the Shift Seen Its Day?”

Despite work done in the past on the success of defensive shifting, the strategy continues to have its naysayers. Sports Info Solutions has chosen to revisit the topic and look at the 2017 season to see if the positive effects of shifting remain true or if things have changed. This presentation will show our research, which indicates that the shift is continuing to have a net positive effect on what it was intended to do — reduce hits on ground balls and short line drives. We’ll also update how much more valuable a full Ted Williams shift is over a partial shift.

Mark Simon is a Senior Research Analyst for Baseball Info Solutions, joining the company in February 2018 after working for nearly 16 years as a researcher at ESPN. He worked for nine years on ESPN’s “Baseball Tonight” and five years helping run the @ESPNStatsInfo Twitter feed and blog. He also wrote regularly about baseball for ESPN.com, voiced features for ESPN Radio, and was co-host of the podcast “Baseball Today.” He is the author of *The Yankees Index*, published by Triumph Books in 2016.

Research Presentations

Research Presentations 9-10

12:45-1:45 p.m., Sunday, March 11

RP9 and RP10 will take place back-to-back in a single session.

RP9— Alex Vigderman, “Synthetic Statcast Data”

Major League Baseball’s Statcast product has given teams and fans alike the ability to assess players’ skill sets in a way that was previously very difficult to accomplish. This is particularly true of batted ball data, as baseball fans have become increasingly comfortable with terms like “exit velocity” and “launch angle” through online access to the data and the use of those metrics on broadcasts. That data is not without its limitations, though, and so there are a lot of instances where a pitch is missing or a batted ball is either not tracked or tracked poorly. With that in mind, Baseball Info Solutions (BIS) created Synthetic Statcast Data, which uses BIS’s proprietary hit location and timer data to model the primary batted ball launch characteristics that are associated with Statcast (e.g., exit velocity and launch angle).

Our presentation will describe the issues with Statcast data that Synthetic Statcast resolves, the method by which it is created, and illustrate some examples of the data at work. In particular, this will highlight the use of Synthetic Statcast to create batted ball launch data for levels and seasons where such data is not publicly available, in particular the high minor leagues dating back to 2013 and the major leagues dating back to 2010.

Alex Vigderman is a Research Associate at Baseball Info Solutions, where he takes proprietary baseball and football charting data and bakes it into exciting analysis. He was previously an intern with the Boston Red Sox in their analytics department after graduating from the University of Pennsylvania with a degree in Psychology and working in the healthcare software industry.

RP10—Dorion Liston, Raine Chen, Quinn Kennedy, Philip Okafor, Li Li, Maheen Adamson, “Visual Tracking: An Indicator of Health and Performance”

Eye movements are a window to monitor brain health and performance. For decades, researchers in psychology, neurology, and physiology have compiled an extensive catalogue of oculomotor signs of brain insult, injury, and disease. Recent developments in oculomotor physiology have delivered standardized, deployable tests that yield quantitative metrics of dynamic vision along the continuum of health and performance, from disease states to normal to supranormal function.

Ted Williams’ classic text *The Science of Hitting* (1972) relates an exchange between Williams and Ty Cobb that will frame our discussion of dynamic visual performance. Cobb is quoted as saying, “Williams sees more of the ball than any man alive ...”, suggesting exceptional innate dynamic visual skills. In response, Williams thoughtfully noted that his 20/10 static visual acuity was not unusual in professional baseball and therefore cannot account for a 0.400 lifetime batting average. While we cannot resolve this historical argument, physiological studies of component skills underling batting have shown substantial across-subject variability in aspects of dynamic vision (Bahill and LaRitz, 1984, *American Scientist*, 72: 249-253) distinct from static visual acuity, and we are left with related questions that modern baseball analytics can address: Do the gifted hitters of today show visual performance metrics that correlate with batting? Do their visual skills extend beyond static visual acuity? Are these visual skills inherent or have they been modified by deliberate practice?

We will describe methods and an analytical framework to address these questions, discussed within the

Research Presentations

context of visual tracking data from civilian, veteran, and active military populations with brain injury or disease (Parkinson's disease, traumatic brain injury, hepatic encephalopathy), healthy controls, and professional baseball players.

Dorion Liston cofounded neuroFit, a startup company that develops products to make objective, eye-movement-based measurements of neural health and function, stemming from projects for the US Air Force, the US Navy, and NASA.

Raine Chen recently completed her Ph.D. in Cognitive Psychology at Hong Kong University and is Lecturer at United International College.

Quinn Kennedy is Senior Lecturer in the Operations Research Department at the Naval Postgraduate School.

Philip Okafor is Assistant Professor of Gastroenterology and Hepatology at the Stanford School of Medicine.

Li Li is Associate Professor of Neural Science and Psychology at the New York University campus in Shanghai.

Maheen Adamson is Associate Professor of Neurosurgery/Psychiatry, and Behavioral Sciences at the Stanford School of Medicine, and the Senior Scientific Research Director at the Defense & Veterans Brain Injury Center at VA Palo Alto.

Diamond Dollars Case Competition

The SABR Analytics Conference is pleased to host the unique **Diamond Dollars Case Competition**. Undergraduate and graduate students from colleges and universities across the country will compete against each other by preparing an analysis and presentation of a baseball operations decision — the type of decision a team’s GM and his staff is faced with over the course of a season. The case was developed by Vince Gennaro, author of *Diamond Dollars: The Economics of Winning in Baseball*, and consultant to MLB teams. The Case Competition is the first national competition to be based solely on baseball operations issues.

Four- to five-person student teams will be asked to evaluate a baseball operations case problem. Once the student team has prepared its case, they will have the opportunity to present their analysis and recommendations to a panel of judges, which will include MLB front office executives. They will have a dialog, receive feedback and ultimately be evaluated based on the quality of their insights and analysis.

The competition will be divided into graduate/professional and undergraduate divisions. Awards will be presented to winners in each division. The competition will take place beginning at 5:00 p.m. on Friday, March 9 at the Hyatt Regency Phoenix.

Participating schools Friday, March 9

- ◆ **Arizona State University** (Tempe, AZ)
- ◆ **California Polytechnic State University** (San Luis Obispo, CA)
- ◆ **Elon University** (Elon, NC)
- ◆ **Indiana University** (Bloomington, IN)
- ◆ **Johns Hopkins University** (Baltimore, MD)
- ◆ **Kenyon College** (Gambier, OH)
- ◆ **Maggie L. Walker Governor’s School** (Richmond, VA)
- ◆ **NYU-Tisch Institute for Global Sport** (New York, NY)
- ◆ **Oklahoma State University** (Stillwater, OK)
- ◆ **Ryerson University-Ted Rogers School of Management** (Toronto, ON)
- ◆ **St. John Fisher College** (Rochester, NY)
- ◆ **Syracuse University** (Syracuse, NY)
- ◆ **University of Alabama-Manderson School of Business** (Tuscaloosa, AL)
- ◆ **University of Arizona** (Tucson, AZ)
- ◆ **University of Massachusetts-Amherst, Isenberg School of Management** (Amherst, MA)
- ◆ **University of Southern California** (Los Angeles, CA)
- ◆ **University of West Florida** (Pensacola, FL)
- ◆ **Washington University in St. Louis** (St. Louis, MO)

Diamond Dollars Case Competition

Schedule of presentations Friday, March 9

*Opening remarks/introduction by Vince Gennaro at 5:00 p.m. in the Regency Ballroom (1st floor).
Results/winners announced at 9:30 p.m. in the Phoenix Ballroom (2nd floor).*

Phoenix Ballroom, 2nd floor

- ♦ Washington University in St. Louis, 5:15-5:45 p.m.
- ♦ University of Arizona #1, 5:50-6:20 p.m.
- ♦ Syracuse University #1, 6:25-6:55 p.m.
- ♦ BREAK, 6:55-7:25 p.m.
- ♦ Ryerson University, 7:25-7:55 p.m.
- ♦ Oklahoma State University, 8:00-8:30 p.m.
- ♦ University of West Florida, 8:35-9:05 p.m.

Curtis Ballroom, 2nd floor

- ♦ Maggie L. Walker Governor's School #1, 5:15-5:45 p.m.
- ♦ Elon University, 5:50-6:20 p.m.
- ♦ University of Arizona #2, 6:25-6:55 p.m.
- ♦ BREAK, 6:55-7:25 p.m.
- ♦ St. John Fisher College #1, 7:25-7:55 p.m.
- ♦ Indiana University, 8:00-8:30 p.m.
- ♦ University of Massachusetts-Amherst, 8:35-9:05 p.m.

Cowboy Artists Ballroom, 2nd floor

- ♦ Syracuse University #2, 5:15-5:45 p.m.
- ♦ Johns Hopkins University, 5:50-6:20 p.m.
- ♦ Maggie L. Walker Governor's School #2, 6:25-6:55 p.m.
- ♦ BREAK, 6:55-7:25 p.m.
- ♦ University of Southern California, 7:25-7:55 p.m.
- ♦ Arizona State University, 8:00-8:30 p.m.
- ♦ Kenyon College, 8:35-9:05 p.m.

Cassidy Room, 2nd floor

- ♦ University of Alabama, 5:15-5:45 p.m.
- ♦ St. John Fisher College #2, 5:50-6:20 p.m.
- ♦ NYU-Tisch Institute for Global Sport, 6:25-6:55 p.m.
- ♦ BREAK, 6:55-7:25 p.m.
- ♦ California Polytechnic State University, 7:25-7:55 p.m.
- ♦ Maggie L. Walker Governor's School #3, 8:00-8:30 p.m.
- ♦ OPEN, 8:35-9:05 p.m.

SABR Analytics Conference

Research Awards

The **SABR Analytics Conference Research Awards** recognize baseball researchers who have completed the best work of original analysis or commentary during the preceding calendar year. Winners will be announced from 11:15-11:30 a.m. on Sunday, March 11. Here are the 2018 finalists:

Contemporary Baseball Analysis

- ♦ Glenn Healey, “The New Moneyball: How Ballpark Sensors Are Changing Baseball,” *Proceedings of the IEEE* (Vol. 105, No. 11), November 2017.
- ♦ Ben Lindbergh and Mitchel Lichtman, “The Juiced Ball is Back,” *The Ringer*, June 14, 2017.
- ♦ Harry Pavlidis, Jonathan Judge, and Jeff Long, “Introducing Pitch Tunnels,” *Baseball Prospectus*, January 24, 2017.
- ♦ Travis Sawchik, “Dictating the Action with Joey Votto,” *FanGraphs*, May 31, 2017.
- ♦ Stephanie Springer, “Get a Grip,” *The Hardball Times*, October 25, 2017.

Contemporary Baseball Commentary

- ♦ R.J. Anderson, “The Year of Catcher Concussions and MLB’s Battle to Do Better With Head Trauma,” *CBS Sports*, September 28, 2017.
- ♦ Emma Baccellieri, “Major League Baseball’s Statcast Can Break Sabermetrics,” *Deadspin*, December 18, 2017.
- ♦ Sam Miller, “Forget the Ninth Inning — Andrew Miller is Here to Save the Game,” *ESPN The Magazine*, March 30, 2017.
- ♦ Jeff Passan, “The Home Run is the King of Baseball. Is That a Good Thing?” *Yahoo! Sports*, September 19, 2017.
- ♦ Eno Sarris, “Matt Cain: The Giants’ Horse That Changed Baseball Stats ... Twice,” *The Athletic*, September 27, 2017.

Historical Analysis/Commentary

- ♦ Grant Brisbee, “Why Baseball Games Are So Damned Long,” *SB Nation*, March 28, 2017.
- ♦ Jay Jaffe, “Analyzing the ‘Giant’ Controversy Surrounding the Indians’ 22-Game Winning Streak,” *Sports Illustrated*, September 15, 2017.
- ♦ John LaRue, “The Homogenization of Ballparks,” *The Hardball Times*, February 13, 2017.
- ♦ Rob Mains, “One Entire Season of Baseball from the 1960s,” *Baseball Prospectus*, September 11-14, 2017.
- ♦ Stew Thornley and Bob Tholkes, “From Recorder to Judge: The Evolution of the Scorer in the Nineteenth Century,” *SABR Baseball Research Journal*, Fall 2017.

Voting for the winners was conducted online at SABR.org, BaseballProspectus.com, FanGraphs.com, HardballTimes.com and BeyondtheBoxScore.com, with results weighted equally at 20%. Links to read the finalists can be found at SABR.org/analytics.

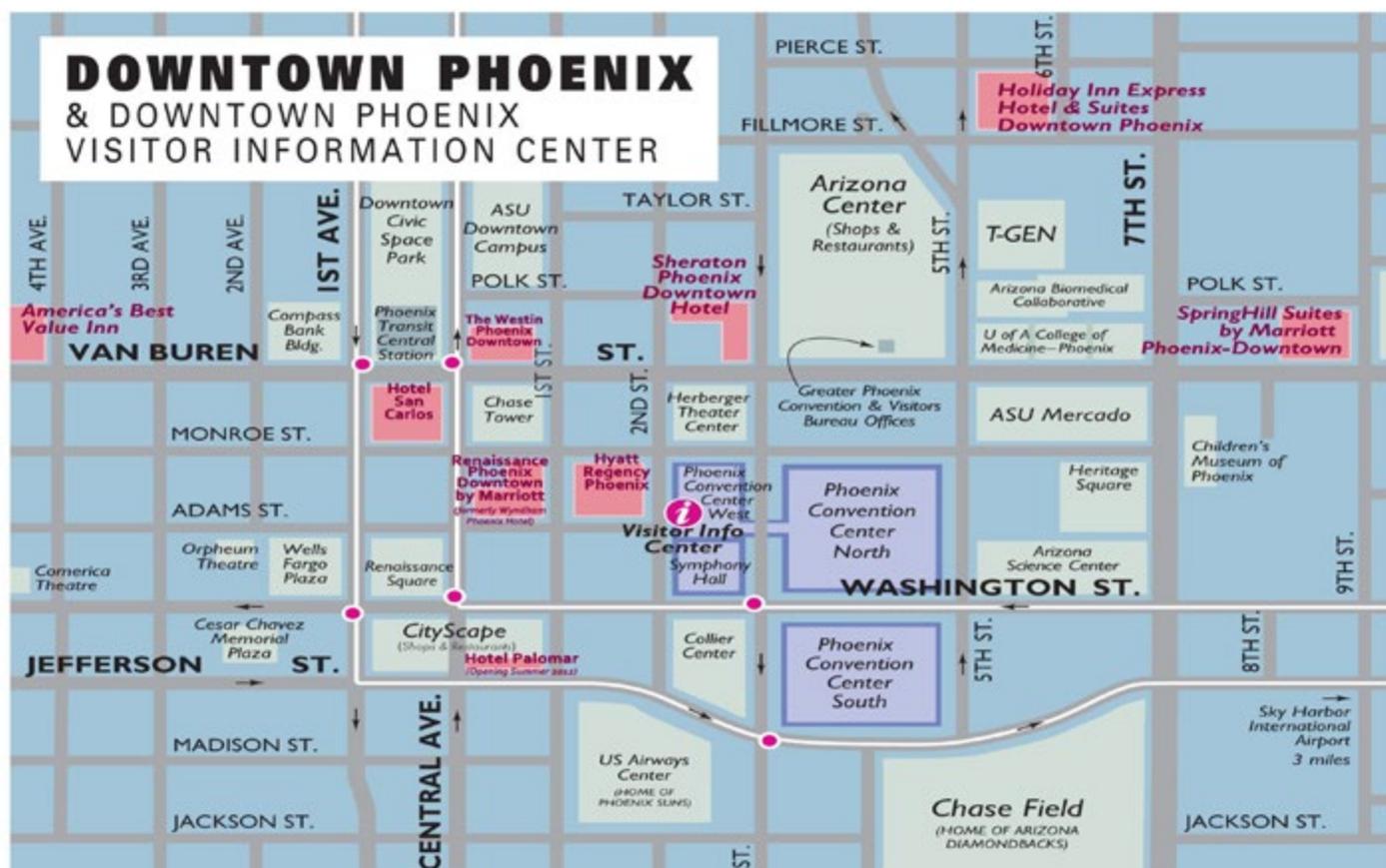
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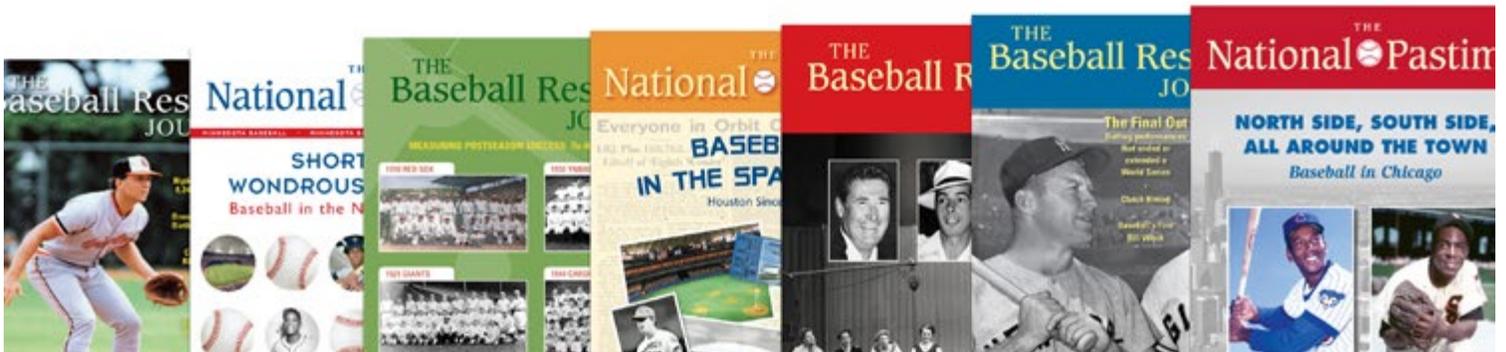


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