Society of Actuaries in Ireland

Sports and the Actuary:

Thinking Outside the Lines

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March 19, 2024

Disclaimer

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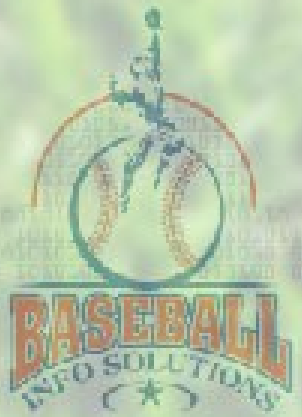

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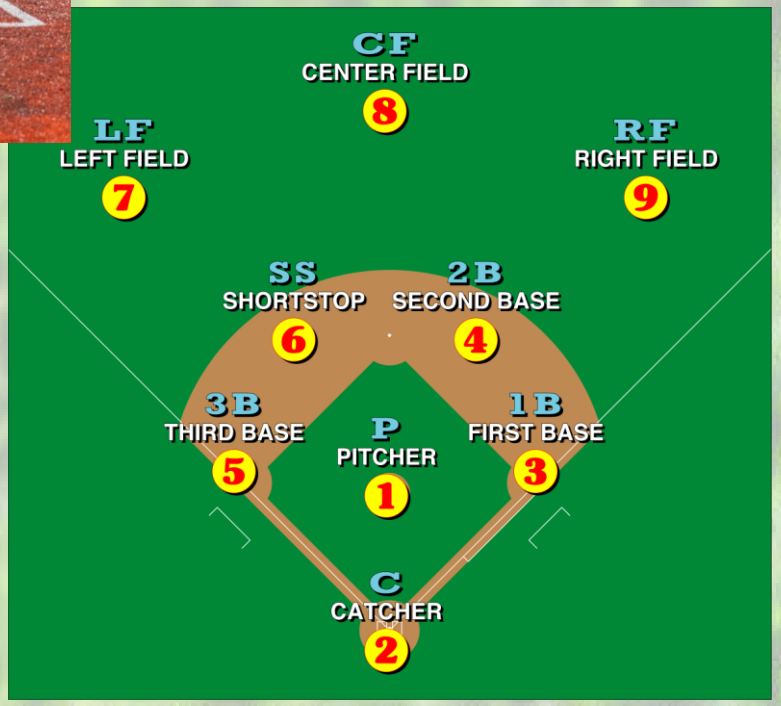
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CENTER FIELD
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SS
SHORTSTOP
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2B
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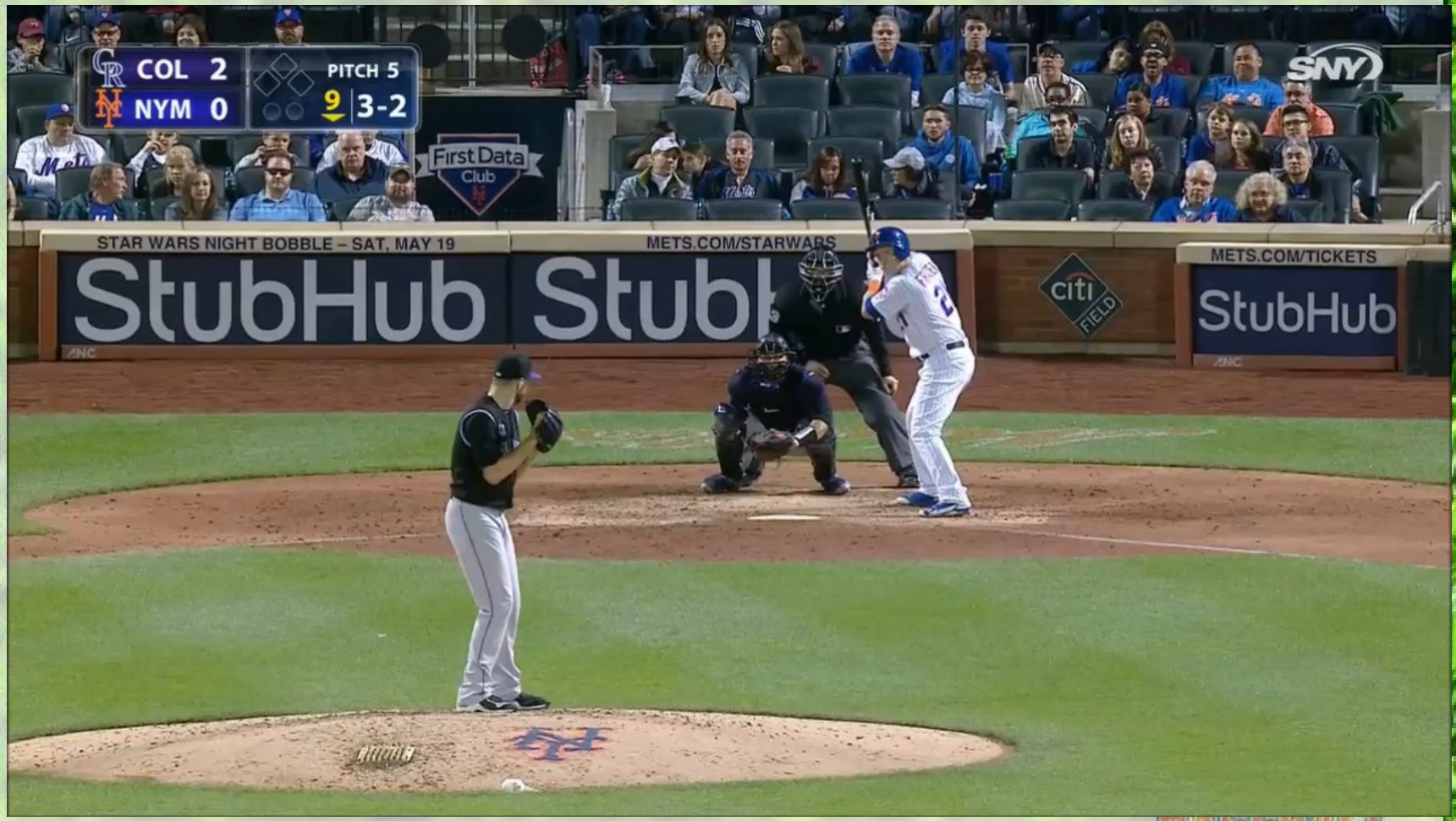
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3-2
First Data Club
SNY
STAR WARS NIGHT BOBBLE – SAT, MAY 19
METS.COM/STARWARS
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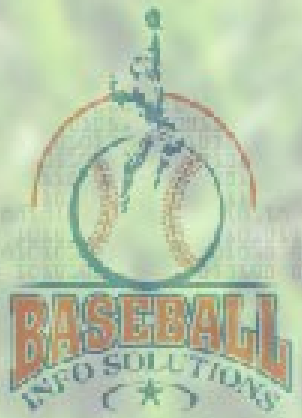
CITI FIELD

Can you detect a pattern?

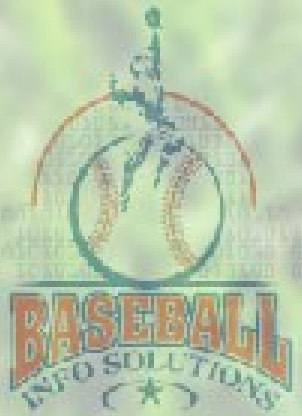


Discovery

- Age 8 – First baseball game and learned to “track data” on a paper scoresheet
- Age 13 – Compiling stats
- Age 17 – Career day
- Age 18 – Working part-time in an Actuarial Dept while going to Loyola University Chicago

The Beginning

- Degree in Math and Computer Science
- But first…
- For three months after graduation
  - Mission Honduras working with the poorest of the poor
  - Learned how blessed I was



The First Career

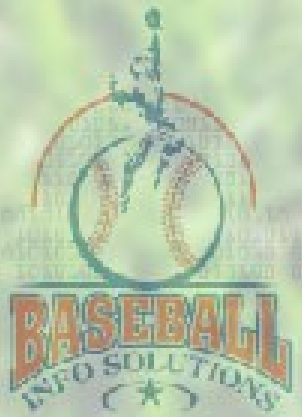
- First career as an insurance actuary
- Fellow of Society of Actuaries
- Worked as both life and casualty actuary
- Headed two Actuarial departments
  - Group Long Term Disability
  - Automobile Extended Warranties

Mesmorized

- Bill James Baseball Abstract
- Bill doing analytics with sports the same way I was doing insurance
- Sports numbers more fun than insurance numbers!
- Bill James became my partner
- Project Scoresheet and STATS, Inc.

The Second Career

- Collect data
- Develop products we want ourselves
- Money is not the object
- Just make a living
- Have fun!



The Second Career

- Bedroom Office – STATS Inc. first office
- Key clients: AP, USA Today, ESPN
- Growing every year – new office every year
- David vs. Goliath – twice!
- 100+ Full-Time Employees
- Sale to Rupert Murdoch and FOX

The Michael Jordan Effect - 1993

1992: STATS tracks basketball

Fourth Quarter Comebacks (down 15+ points)

- Bulls win NBA crown beating Portland after trailing by 15 entering 4th quarter
- How hard is this?
  - **1992-93 league record: 1-259 (excluding Bulls)**
- The Bulls?
  - **Bulls record: 3-3**
- Jordan leaves Bulls
  - **Bulls record: 0-8**
- Jump ahead to comeback season
  - **League record 0-168 (excluding Bulls)**
  - **Bulls record 1-1**

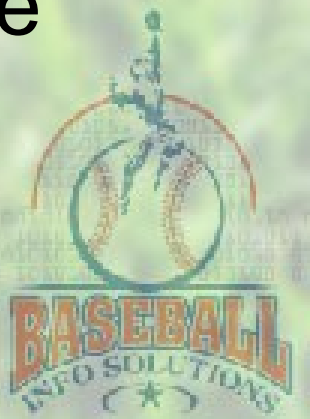
The Third Career

Now two jobs:

- Baseball Info Solutions
  - 25 of 30 MLB teams are clients
  - *The Fielding Bible* – 5 volumes published
- Dewan Foundation created
  - Opportunity for education for marginalized
  - Working with agencies addressing homelessness

Data Mining in Sports

- Revolution in Major League Baseball
- Combining sabermetrics with scouting
- Finally!
- *Moneyball* by Michael Lewis
- Billy Beane finds a statistical edge
- Deification of Bill James
- Finally!



Samples of SIS Work

- Baseball Game Charting
- Baseball Shift Analysis
- Football

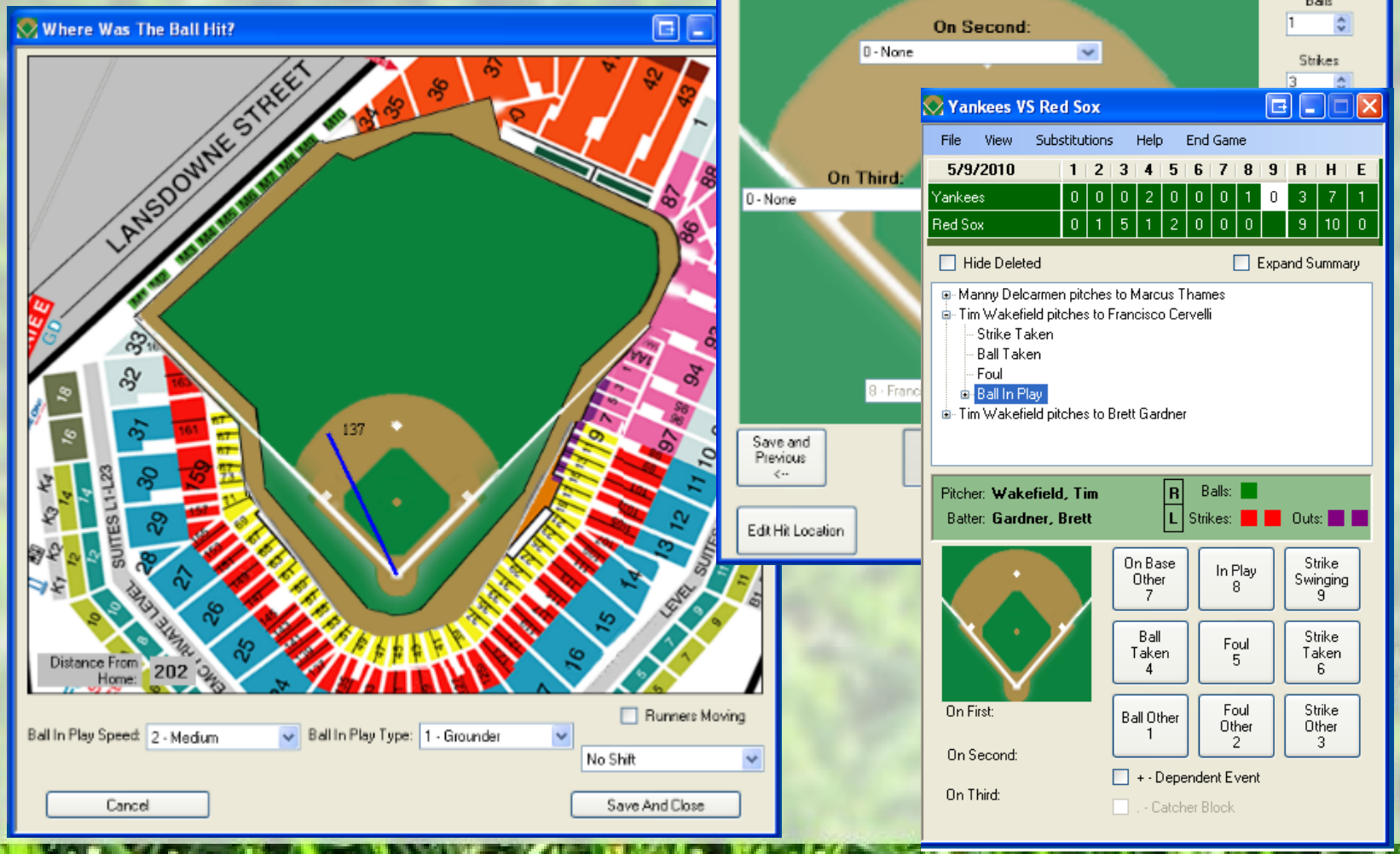
Football Factoid

1.06 EPA

Game Charting at BIS

- Video scouts review every MLB game (12 hours for 3-hour game)
- Every play entered into a computer
- Sample game scoring screen:

BIS Scoring Software



Pixels to Data

- 28,000 pixels on the screen
- Location of every batted ball converted:
  - Distance from home plate measured in one-foot increments
  - 360 vectors (90 in fair territory) emanating from home plate

Also Chart:

- Batted Ball Timer
  - Convert to velocity for groundballs
  - Hang time for balls in the air

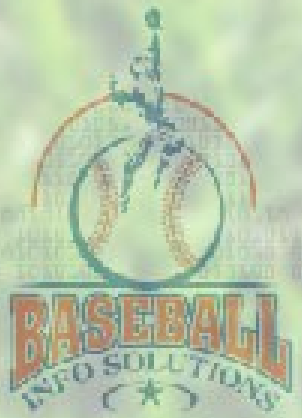
- Defensive alignments – e.g. shifts

Back to the Video

- Did you detect the pattern?
- Don’t worry if you didn’t…
- It’s been in plain sight for 70+ years—and hardly anyone noticed!

Origin of the Ted Williams Shift

“The work of science is to substitute facts for appearances and demonstrations for impressions.”



“The Shift”

Baseball’s Newest Trend in Defense

Video: 10 Todd Frazier Plays

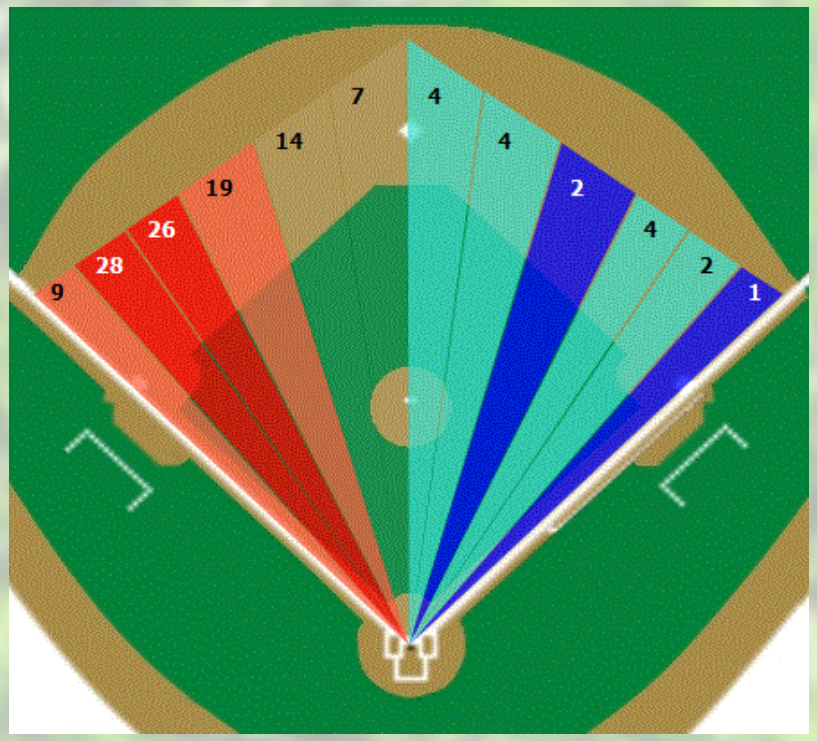
- Four included a Full Shift
  - All four plays were converted into outs
- One included a Partial Shift
  - Play was not made, but may have been with a Full Shift
- Five did not include any shift
  - Three resulted in hits. Would they have been made with a Full Shift?
  - One hit to right field, but the other two…

PIT 3
NYM 3
PITCH 27
10 2-2
SNY
First Data Club
deGROM BOBBLEHEAD – SAT, JULY 7
METS.COM/BOBBLE
METS.COM/TICKETS
TOYOTA
TOYOTA
citi FIELD
UPMC
LIFE CHANGING MEDICINE
43

Todd Frazier in BIS-D

Last 120 grounders and short liners

Shift Candidate (86% left of 2B)



2 bunt attempts in last 300 plate appearances

Increase in Shifting

MLB teams buy in

Year	Shifts
2010	2,463
2013	6,892
2016	17,895
2019	50,363
2022	70,865

Does It Work?

- Top five teams in shift usage averaged more than 1,700 shifts
  - They saved an average of 20 runs
- Bottom five teams in shift usage averaged fewer than 600 shifts
  - They saved an average of 7 runs
- The more you shift, the more runs you save

Don’t Blind ’em with Science

2018 Season	Full Ted Williams Shift On	No Shift	Difference
Batting Average on Grounders and Short Liners	.222	.268	46 points

The Way of the Future?

The Way of the Future?

- Took me over 15 years to get teams to understand. But…
- Nope!
- Full Ted Williams shift outlawed last year
- Did The Shift disappear?

Decrease in Shifting

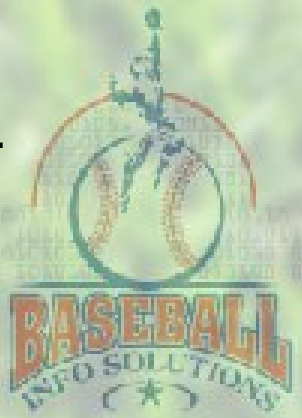
Not much! Going to Partial Shifts

Year	Shifts
2013	6,892
2016	17,895
2019	50,363
2022	70,865
2023	68,526

Football

Two Plays from the biggest sporting event in the United States:

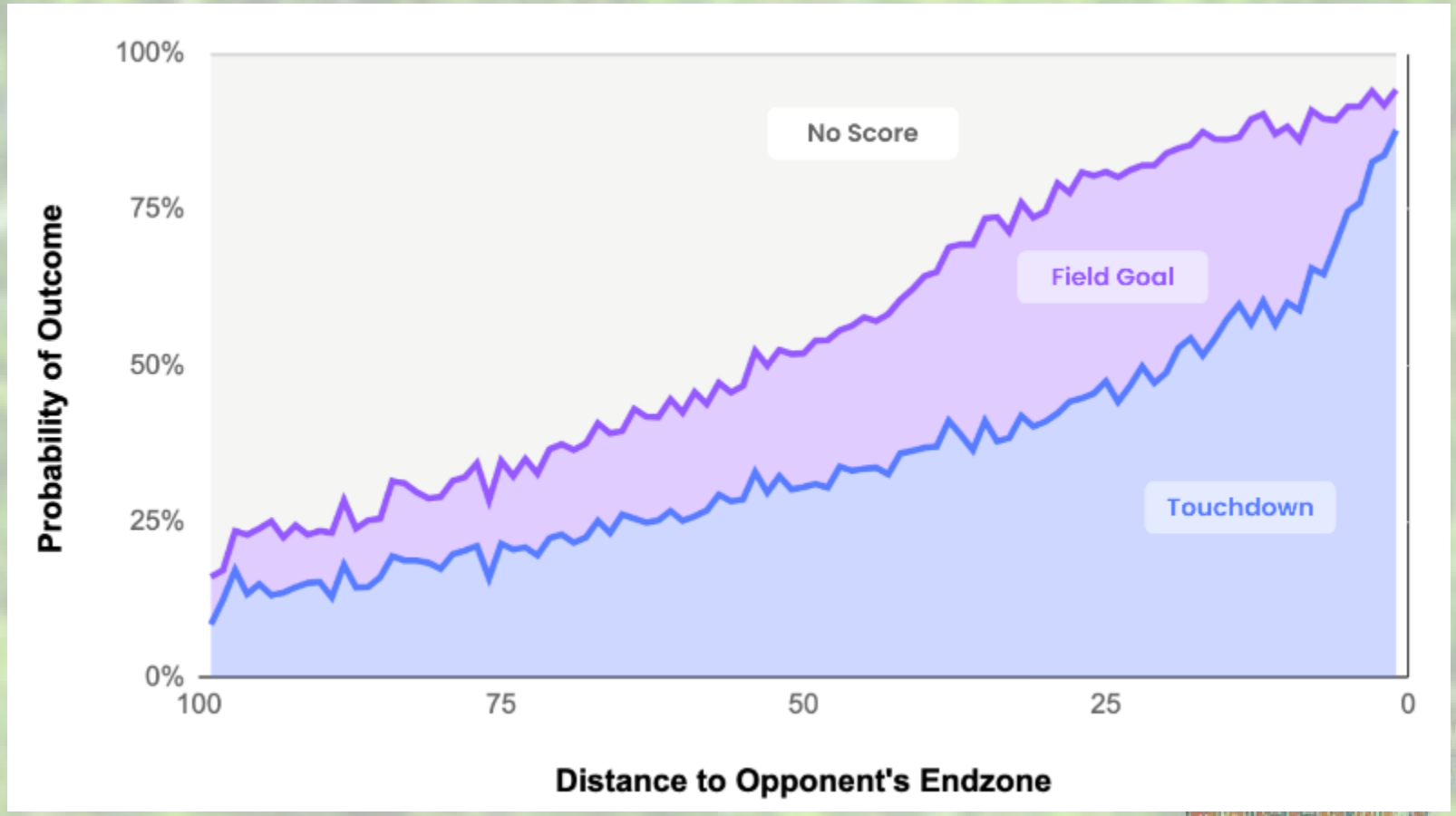
<u>Superbowl LVIII last month</u>



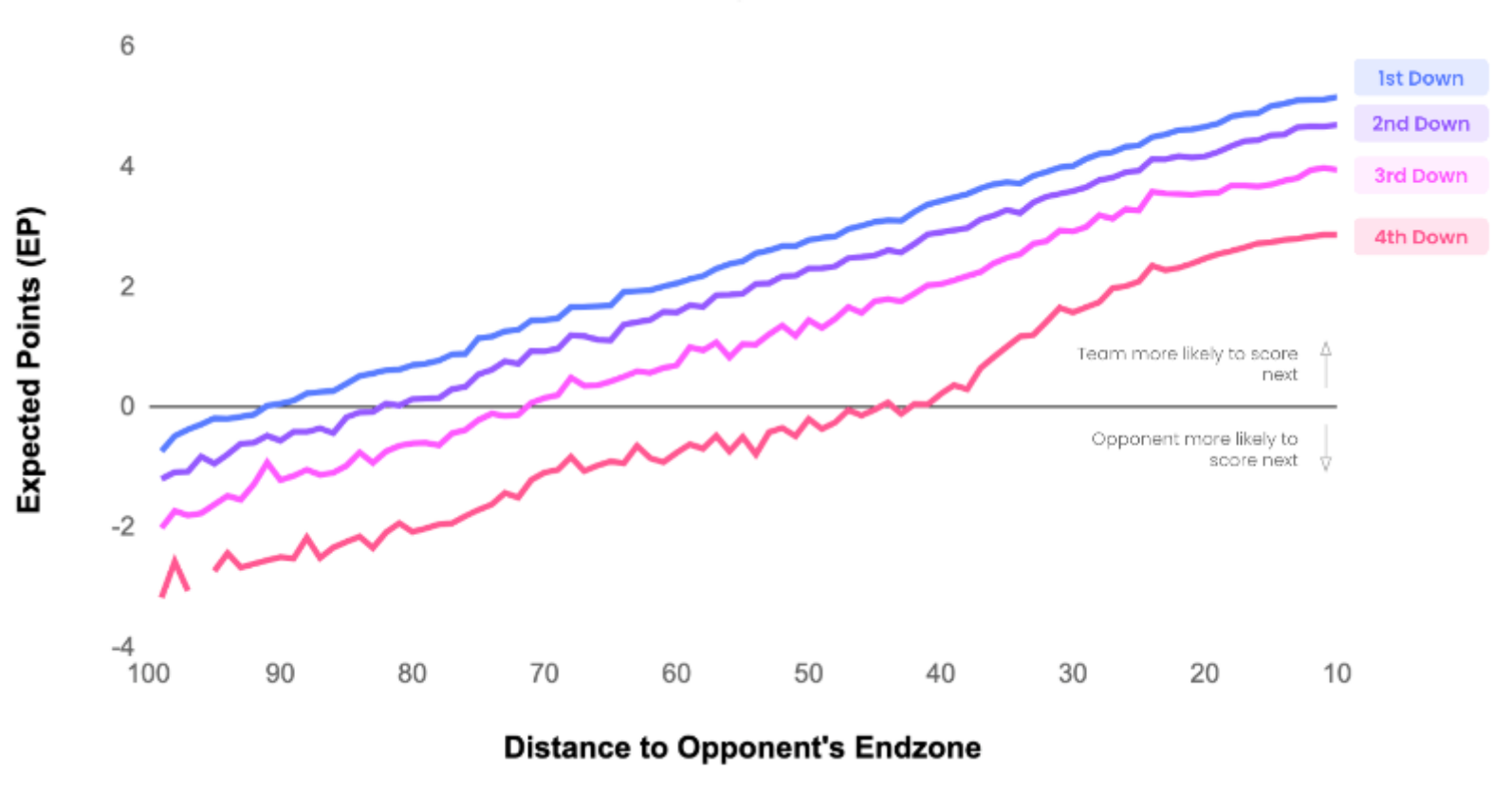
Football

Expected Points Added and Total Points

Expected Points Added



Expected Points Added



Expected Points Added

Football Factoid

1.06 EPA

Two Different Plays, Same EPA

	Play 1	Play 2
Time in game	Q1 14:24	Q4 15:00
Down and Distance	2nd and 4	1st and 10
Ball On	SF 31	KC 42
Offensive Personnel	2 RB, 1 TE, 2 WR	2 RB, 1 TE, 2 WR
Defensive Alignment	Base (4-3/3-4)	Base (4-3/3-4)
Play Type	Play action/QB roll out, short pass	QB dropback, pass down the field
Play Description	Brock Purdy pass complete short right to Kyle Juszczyk for 18 yards	Brock Purdy pass complete deep middle to Brandon Aiyuk for 20 yards
Expected Points Added	1.06	1.06

Total Points

- Allocates Expected Points by player/position
- Allows for comparison of players at different positions
- Different metrics used for calculation depending on position
    - OL: block vs blown block, involvement in batted pass or QB pressure
    - QB: air yards, yards after catch before contact, sacks, interceptions, etc
    - WR: air yards, yards after catch before/after contact, etc
    - RB: broken tackles, yards before/after contact, etc

Two Different Plays, Different Allocation of Total Points

Play 1

Player	Position	Total Points
Kyle Juszczyk	FB	.924
Brock Purdy	QB	.530
Offensive Line (combined)	OL	.282

Play 2

Player	Position	Total Points
Brock Purdy	QB	.693
Brandon Aiyuk	WR	.655
Offensive Line (combined)	OL	.335

Communication

- Don’t want the lyrics to the 1980’s hit by Thomas Dolby:
  - “She blinded me with science!
    And hit me with technology!”
- We need to speak their language
- We use the language of sports:
  - baseball: batting average and runs
  - Football: points

Baseball's Currency: Runs and Wins

- Goal is to increase understanding of a complicated system
- Convert from plays to runs
- Convert from runs to wins

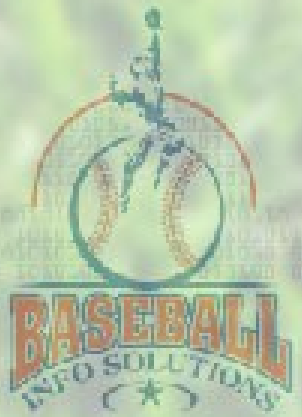
Fourth Career and Going Strong

- Sold majority share of SIS
- Focus on Dewan Foundation
- Promoting Solar panel installations
  - The marginalized will be most affected by our climate emergency
- A dozen solar installations in the last 2 years

Getting Into Sports

- Learn Computer Programming
  - Coding, machine learning, AI
- Apply for an internship
- Stay on top of sabermetric research
- Do your own research and publish it
- Develop your writing skills

- The most important of these:
  Computer Programming



Three Presentation Principles

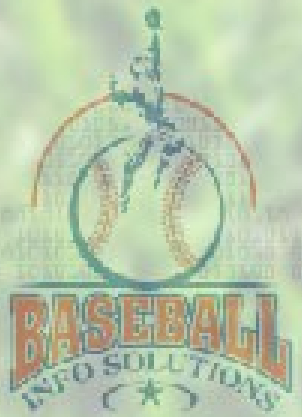
- Don’t blind ’em with science
- Use visuals
- Be persistent

Three Career Principles

- Strive for excellence
- Money is not the primary motive
- Enjoy what you are doing!

Websites

- StatOfTheWeek.com
- DewanFoundation.org
- DewanSolar.com



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