# CSE 519: Data Science

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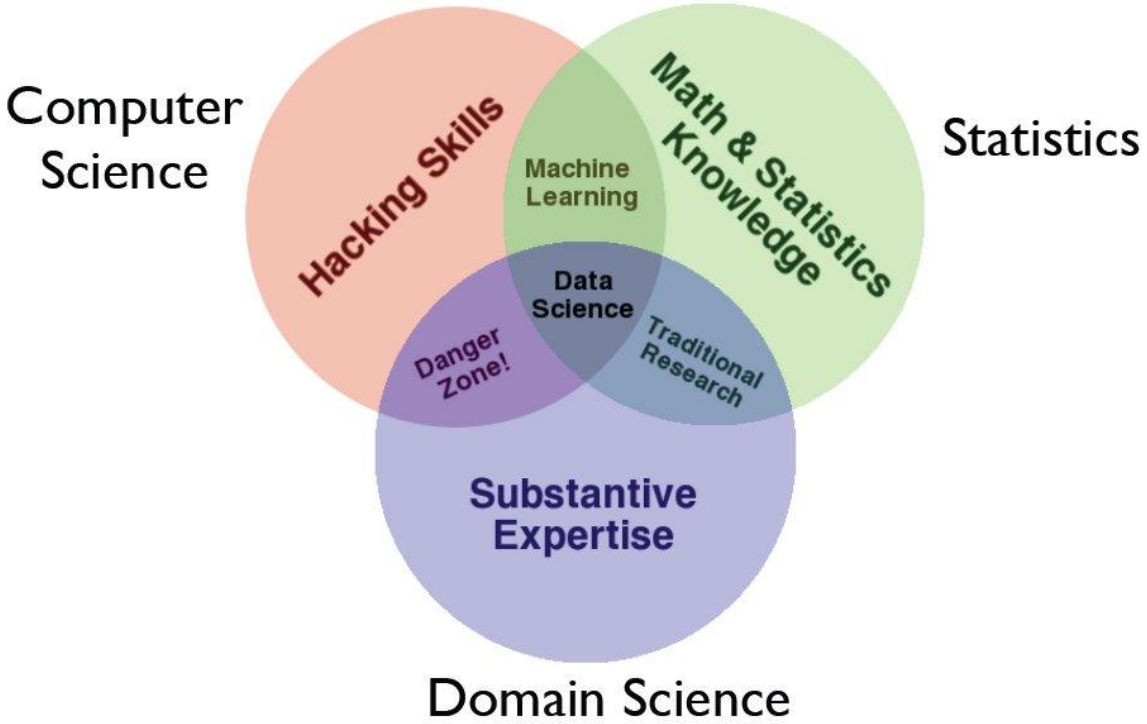
Lecture 1: Introduction to Data Science

# What is Data Science?

Like any emerging field, it isn’t yet well defined, but incorporates elements of:

- Exploratory Data Analysis and Visualization
- Machine Learning and Statistics
- High-Performance Computing technologies for dealing with scale.

# Skill Sets for Data Science



# Appreciating Data

Computer Scientists do not naturally appreciate data: it's just stuff to run through a program.

The usual way to test algorithm performance is to run the implementation on "random data".

But interesting data sets are a scarce resource, which requires hard work and imagination to obtain.

# Computer vs. Real Scientists (1)

- Scientists strive to understand the complicated and messy natural world, while computer scientists build their own clean and organized virtual worlds. Thus:
- Nothing is ever completely true or false in science, while everything is either true or false in Computer Science / Mathematics.

# Computer vs. Real Scientists (2)

- Scientists are data-driven, while computer scientists are algorithm-driven.
- Scientists obsess about discovering things, which computer scientists invent rather than discover.
- Scientists are comfortable with the idea that data has errors; computer scientists are not.

# Genius vs. Wisdom

Software developers are hired to produce code.

Data Scientists are hired to produce insights.

Genius shows in finding the right answer!!!

Wisdom shows in avoiding the wrong answers.

Data science (like most things) benefits more from wisdom than from genius.

# Developing Wisdom

- Wisdom comes from experience.
- Wisdom comes from general knowledge.
- Wisdom comes from listening to others.
- Wisdom comes from humility, observing how often you have been wrong and why/how.

I seek pass on wisdom, by providing experience on the difficulty of making good predictions.

# Developing Curiosity

- The good data scientist develops a curiosity about the domain/application they are working in.
- They talk shop with the people whose data they are working on.
- They read the newspaper every day, to get a broader perspective on the world.

# Asking Good Questions

Software developers are not encouraged to ask questions, but data scientists are:

- What exciting things might you be able to learn from a given data set?
- What things do you/your people really want to know?
- What data sets might get you there?

# Let’s Practice Asking Questions!

Who, What, Where, When, and Why on the following datasets:

- Baseball-reference.com
- International Movie Database (IMBb)
- Google ngrams
- NYC taxi cab records

# Baseball-Reference.com: biosketch

BASEBALL-REFERENCE.COM

S-R: M

play index | players | teams | seasons | managers | leaders | awards | postseason | boxes | japan | nlb | minors | draft

Mobile Site **You Are Here** > Home > Encyclopedia of Players > R Listing > **Babe Ruth Statistics and**

**News:** s-r blog:KBO Stats back to 1999 – Baseball-Reference.com

**Babe Ruth Player Page** » Batting | Pitching | Fielding | Minors | News Archive (1456) | Bullpen | Oracle

## Babe Ruth

Like 1,213 people like this. +1 +25 Recommend this

**George Herman Ruth** (Babe, The Bambino or The Sultan Of Swat)

**Positions**: Outfielder and Pitcher
**Bats:** Left, **Throws:** Left
**Height:** 6' 2", **Weight:** 215 lb.

**Born:** February 6, 1895 in Baltimore, MD
**High School:** St. Mary's HS (Baltimore, MD) (All Transactions)
**Debut:** July 11, 1914 (Age 19.155)
**Rookie Status:** Exceeded rookie limits during 1915 season [*]
**Teams** (by GP): Yankees/RedSox/Braves 1914-1935

**Final Game:** May 30, 1935 (Age 40.113)
**Inducted** into the Hall of Fame by BBWAA as Player in 1936 (215/226 ballots). Induction ceremony in (
View **Babe Ruth Page** at the Baseball Hall of Fame (plaque, photos, videos).
**Died:** August 16, 1948 in New York, NY (Aged 53.192)
**Buried:** Gate of Heaven Cemetery, Hawthorne, NY
**View Player Bio** from the **SABR BioProject**
About biographical information

## Transactions

**July 9, 1914**: Purchased with Ernie Shore and Ben Egan by the Boston Red Sox from Baltimore (International) for more than $25000. more than $25000
**December 26, 1919**: Purchased by the New York Yankees from the Boston Red Sox for $100,000.
**February 26, 1935**: Released by the New York Yankees.
**February 26, 1935**: Signed as a Free Agent with the Boston Braves.

*The transaction information used here was obtained free of charge from and is copyrighted by RetroSheet. We attempt to update transactions throughout the season.*

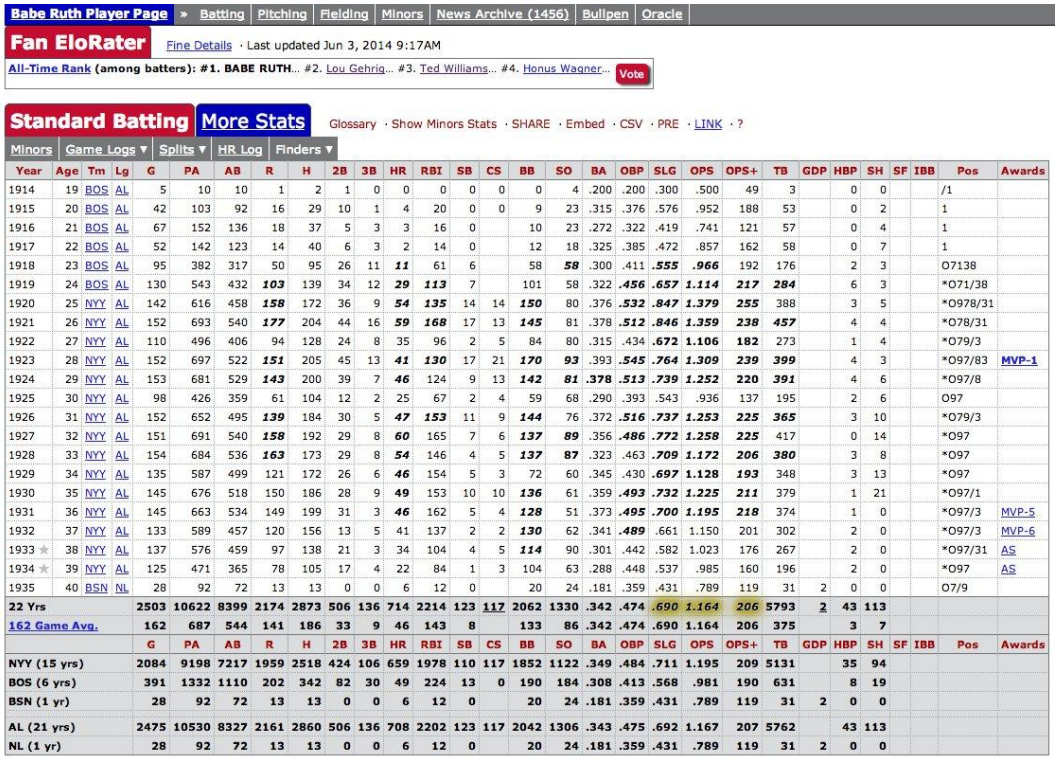
## Salaries

Convert to YYYY $$'s | Salaries may not be complete (especially pre-1985) and may not include some earned bonuses

| Year | Age | Team | Salary | ServTm(OpnDay) | Sources | Notes/Other Sources |
|---|---|---|---|---|---|---|
| 1914 | 19 | Boston Red Sox | $2,500 | ? | Bill James Historical Abstract | Annualized rate; came up late in season |
| 1915 | 20 | Boston Red Sox | $3,500 | ? | Bill James Historical Abstract | |
| 1916 | 21 | Boston Red Sox | $3,500 | ? | Contract at HOF | |
| 1917 | 22 | Boston Red Sox | $3,500 | ? | Contract at HOF | BJHA: $5,000; Baseball Timeline $7,000 |
| 1918 | 23 | Boston Red Sox | $9,000 | ? | Allan Wood, 1918, at 183 | Includes $1,000 midseason raise, $1,000 WS bonus |
| 1919 | 24 | New York Yankees | $10,000* | ? | Michael Haupert research of HOF contracts | Contract at HOF:10000.00, |
| 1920 | 25 | New York Yankees | $20,000* | ? | Michael Haupert research of HOF contracts | Bill James Historical Abstract:20000.00, |
| 1921 | 26 | New York Yankees | $20,000* | ? | Michael Haupert research of HOF contracts | Bill James Historical Abstract:30000.00,Plus $5K for '20 and '21 exhibitions, $50/HR (59)m |
| 1922 | 27 | New York Yankees | $52,000* | ? | Michael Haupert research of HOF contracts | Bill James Historical Abstract:52000.00, |
| 1923 | 28 | New York Yankees | $52,000* | ? | Michael Haupert research of HOF contracts | Bill James Historical Abstract:52000.00, |
| 1924 | 29 | New York Yankees | $52,000* | ? | Michael Haupert research of HOF contracts | Bill James Historical Abstract:52000.00, |
| 1925 | 30 | New York Yankees | $52,000* | ? | Michael Haupert research of HOF contracts | Bill James Historical Abstract:52000.00, |
| 1926 | 31 | New York Yankees | $52,000* | ? | Michael Haupert research of HOF contracts | Bill James Historical Abstract:52000.00, |
| 1927 | 32 | New York Yankees | $52,000* | ? | Michael Haupert research of HOF contracts | 5/23/27 AL letter:70000.00, |
| 1928 | 33 | New York Yankees | $52,000* | ? | Michael Haupert research of HOF contracts | 5/23/27 AL letter:70000.00, |
| 1929 | 34 | New York Yankees | $52,000* | ? | Michael Haupert research of HOF contracts | 5/23/27 AL letter:70000.00, |
| 1930 | 35 | New York Yankees | $70,000* | ? | Michael Haupert research of HOF contracts | Bill James Historical Abstract:80000.00, |
| 1931 | 36 | New York Yankees | $70,000* | ? | Michael Haupert research of HOF contracts | Bill James Historical Abstract:80000.00, |
| 1932 | 37 | New York Yankees | $70,000* | ? | Michael Haupert research of HOF contracts | M. Smelser, Life That Ruth Built, p. 441:75000.00,Plus 25% of all exhibition-game profits |
| 1933 | 38 | New York Yankees | $80,000* | ? | Michael Haupert research of HOF contracts | M. Smelser, Life That Ruth Built, p. 456:52000.00,Plus 25% of revenue from in-season exhibitions |
| 1934 | 39 | New York Yankees | $80,000* | ? | Michael Haupert research of HOF contracts | 1/16/36 TSN, per government report:36696.00,$35,000 salary plus 25% of exhibition profits |
| 1935 | 40 | New York Yankees | $75,000* | ? | Michael Haupert research of HOF contracts | Bill James Historical Abstract:35000.00,Annualized rate; retired early in season |
| 1936 | 41 | New York Yankees | $52,000 | ? | Michael Haupert research of HOF contracts | |
| 1937 | 42 | New York Yankees | $35,000 | ? | Michael Haupert research of HOF contracts | |
| **Career to date (may be incomplete)** | | | **$1,020,000** | | | |

# Statistical Record of Play

Summary statistics of each years batting, pitching, and fielding record, with teams and awards.



Babe Ruth Player Page » Batting | Pitching | Fielding | Minors | News Archive (1456) | Bullpen | Oracle

Fan EloRater — Fine Details · Last updated Jun 3, 2014 9:17AM

All-Time Rank (among batters): #1. BABE RUTH... #2. Lou Gehrig... #3. Ted Williams... #4. Honus Wagner... Vote

Standard Batting | More Stats — Glossary · Show Minors Stats · SHARE · Embed · CSV · PRE · LINK · ?

Minors | Game Logs ▾ | Splits ▾ | HR Log | Finders ▾

| Year | Age | Tm | Lg | G | PA | AB | R | H | 2B | 3B | HR | RBI | SB | CS | BB | SO | BA | OBP | SLG | OPS | OPS+ | TB | GDP | HBP | SH | SF | IBB | Pos | Awards |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1914 | 19 | BOS | AL | 5 | 10 | 10 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | .200 | .200 | .300 | .500 | 49 | 3 | | 0 | 0 | | | /1 | |
| 1915 | 20 | BOS | AL | 42 | 103 | 92 | 16 | 29 | 10 | 1 | 4 | 20 | 0 | 0 | 9 | 23 | .315 | .376 | .576 | .952 | 188 | 53 | | 0 | 2 | | | 1 | |
| 1916 | 21 | BOS | AL | 67 | 152 | 136 | 18 | 37 | 5 | 3 | 3 | 16 | 0 | | 10 | 23 | .272 | .322 | .419 | .741 | 121 | 57 | | 0 | 4 | | | 1 | |
| 1917 | 22 | BOS | AL | 52 | 142 | 123 | 14 | 40 | 6 | 3 | 2 | 14 | 0 | | 12 | 18 | .325 | .385 | .472 | .857 | 162 | 58 | | 0 | 7 | | | 1 | |
| 1918 | 23 | BOS | AL | 95 | 382 | 317 | 50 | 95 | 26 | 11 | ***11*** | 61 | 6 | | 58 | ***58*** | .300 | .411 | ***.555*** | ***.966*** | 192 | 176 | | 2 | 3 | | | O7138 | |
| 1919 | 24 | BOS | AL | 130 | 543 | 432 | ***103*** | 139 | 34 | 12 | ***29*** | ***113*** | 7 | | 101 | 58 | .322 | ***.456*** | ***.657*** | ***1.114*** | ***217*** | ***284*** | | 6 | 3 | | | *O71/38 | |
| 1920 | 25 | NYY | AL | 142 | 616 | 458 | ***158*** | 172 | 36 | 9 | ***54*** | ***135*** | 14 | 14 | ***150*** | 80 | .376 | ***.532*** | ***.847*** | ***1.379*** | ***255*** | 388 | | 3 | 5 | | | *O978/31 | |
| 1921 | 26 | NYY | AL | 152 | 693 | 540 | ***177*** | 204 | 44 | 16 | ***59*** | ***168*** | 17 | 13 | ***145*** | 81 | .378 | ***.512*** | ***.846*** | ***1.359*** | ***238*** | ***457*** | | 4 | 4 | | | *O78/31 | |
| 1922 | 27 | NYY | AL | 110 | 496 | 406 | 94 | 128 | 24 | 8 | 35 | 96 | 2 | 5 | 84 | 80 | .315 | .434 | ***.672*** | ***1.106*** | ***182*** | 273 | | 1 | 4 | | | *O79/3 | |
| 1923 | 28 | NYY | AL | 152 | 697 | 522 | ***151*** | 205 | 45 | 13 | ***41*** | ***130*** | 17 | 21 | ***170*** | ***93*** | .393 | ***.545*** | ***.764*** | ***1.309*** | ***239*** | ***399*** | | 4 | 3 | | | *O97/83 | MVP-1 |
| 1924 | 29 | NYY | AL | 153 | 681 | 529 | ***143*** | 200 | 39 | 7 | ***46*** | 124 | 9 | 13 | ***142*** | ***81*** | ***.378*** | ***.513*** | ***.739*** | ***1.252*** | ***220*** | ***391*** | | 4 | 6 | | | *O97/8 | |
| 1925 | 30 | NYY | AL | 98 | 426 | 359 | 61 | 104 | 12 | 2 | 25 | 67 | 2 | 4 | 59 | 68 | .290 | .393 | .543 | .936 | 137 | 195 | | 2 | 6 | | | O97 | |
| 1926 | 31 | NYY | AL | 152 | 652 | 495 | ***139*** | 184 | 30 | 5 | ***47*** | ***153*** | 11 | 9 | ***144*** | 76 | .372 | ***.516*** | ***.737*** | ***1.253*** | ***225*** | ***365*** | | 3 | 10 | | | *O79/3 | |
| 1927 | 32 | NYY | AL | 151 | 691 | 540 | ***158*** | 192 | 29 | 8 | ***60*** | 165 | 7 | 6 | ***137*** | ***89*** | .356 | ***.486*** | ***.772*** | ***1.258*** | ***225*** | 417 | | 0 | 14 | | | *O97 | |
| 1928 | 33 | NYY | AL | 154 | 684 | 536 | ***163*** | 173 | 29 | 8 | ***54*** | 146 | 4 | 5 | ***137*** | ***87*** | .323 | .463 | ***.709*** | ***1.172*** | ***206*** | ***380*** | | 3 | 8 | | | *O97 | |
| 1929 | 34 | NYY | AL | 135 | 587 | 499 | 121 | 172 | 26 | 6 | ***46*** | 154 | 5 | 3 | 72 | 60 | .345 | .430 | ***.697*** | ***1.128*** | ***193*** | 348 | | 3 | 13 | | | *O97 | |
| 1930 | 35 | NYY | AL | 145 | 676 | 518 | 150 | 186 | 28 | 9 | ***49*** | 153 | 10 | 10 | ***136*** | 61 | .359 | ***.493*** | ***.732*** | ***1.225*** | ***211*** | 379 | | 1 | 21 | | | *O97/1 | |
| 1931 | 36 | NYY | AL | 145 | 663 | 534 | 149 | 199 | 31 | 3 | ***46*** | 162 | 5 | 4 | ***128*** | 51 | .373 | ***.495*** | ***.700*** | ***1.195*** | ***218*** | 374 | | 1 | 0 | | | *O97/3 | MVP-5 |
| 1932 | 37 | NYY | AL | 133 | 589 | 457 | 120 | 156 | 13 | 5 | 41 | 137 | 2 | 2 | ***130*** | 62 | .341 | ***.489*** | .661 | 1.150 | 201 | 302 | | 2 | 0 | | | *O97/3 | MVP-6 |
| 1933 ★ | 38 | NYY | AL | 137 | 576 | 459 | 97 | 138 | 21 | 3 | 34 | 104 | 4 | 5 | ***114*** | 90 | .301 | .442 | .582 | 1.023 | 176 | 267 | | 2 | 0 | | | *O97/31 | AS |
| 1934 ★ | 39 | NYY | AL | 125 | 471 | 365 | 78 | 105 | 17 | 4 | 22 | 84 | 1 | 3 | 104 | 63 | .288 | .448 | .537 | .985 | 160 | 196 | | 2 | 0 | | | *O97 | AS |
| 1935 | 40 | BSN | NL | 28 | 92 | 72 | 13 | 13 | 0 | 0 | 6 | 12 | 0 | | 20 | 24 | .181 | .359 | .431 | .789 | 119 | 31 | 2 | 0 | 0 | | | O7/9 | |
| **22 Yrs** | | | | **2503** | **10622** | **8399** | **2174** | **2873** | **506** | **136** | **714** | **2214** | **123** | **117** | **2062** | **1330** | **.342** | **.474** | ***.690*** | ***1.164*** | ***206*** | **5793** | **2** | **43** | **113** | | | | |
| 162 Game Avg. | | | | **162** | **687** | **544** | **141** | **186** | **33** | **9** | **46** | **143** | **8** | | **133** | **86** | **.342** | **.474** | **.690** | **1.164** | **206** | **375** | | **3** | **7** | | | | |
| | | | | **G** | **PA** | **AB** | **R** | **H** | **2B** | **3B** | **HR** | **RBI** | **SB** | **CS** | **BB** | **SO** | **BA** | **OBP** | **SLG** | **OPS** | **OPS+** | **TB** | **GDP** | **HBP** | **SH** | **SF** | **IBB** | **Pos** | **Awards** |
| **NYY (15 yrs)** | | | | **2084** | **9198** | **7217** | **1959** | **2518** | **424** | **106** | **659** | **1978** | **110** | **117** | **1852** | **1122** | **.349** | **.484** | **.711** | **1.195** | **209** | **5131** | | **35** | **94** | | | | |
| **BOS (6 yrs)** | | | | **391** | **1332** | **1110** | **202** | **342** | **82** | **30** | **49** | **224** | **13** | **0** | **190** | **184** | **.308** | **.413** | **.568** | **.981** | **190** | **631** | | **8** | **19** | | | | |
| **BSN (1 yr)** | | | | **28** | **92** | **72** | **13** | **13** | **0** | **0** | **6** | **12** | **0** | | **20** | **24** | **.181** | **.359** | **.431** | **.789** | **119** | **31** | **2** | **0** | **0** | | | | |
| **AL (21 yrs)** | | | | **2475** | **10530** | **8327** | **2161** | **2860** | **506** | **136** | **708** | **2202** | **123** | **117** | **2042** | **1306** | **.343** | **.475** | **.692** | **1.167** | **207** | **5762** | | **43** | **113** | | | | |
| **NL (1 yr)** | | | | **28** | **92** | **72** | **13** | **13** | **0** | **0** | **6** | **12** | **0** | | **20** | **24** | **.181** | **.359** | **.431** | **.789** | **119** | **31** | **2** | **0** | **0** | | | | |

# Baseball Questions

- How to best measure individual player's skill, value or performance?
- How fair do trades between teams work out?
- What is the trajectory of player's performances as they mature and age?
- To what extent does batting performance correlate with the position played?

# Demographic Questions

- Do left-handed people have shorter lifespans than right-handers?
- How often do people return to where they were born?
- Do player salaries reflect past, present, or future performance?
- Are heights and weights increasing in the population?

# IMDb: Movie Data

IMDb | Find Movies, TV shows, Celebrities and more... | All | Movies, TV & Showtimes | Celebs, Events & Photos | News & Community | Watchlist


More at IMDbPro »

## It's a Wonderful Life (1946)

Top 5000

Approved | 130 min - Drama | Family | Fantasy - 7 January 1947 (USA)

**Your rating:** ★★★★★★★★★★ -/10

8.7

Ratings: **8.7**/10 from 202,743 users

Reviews: 632 user | 187 critic

An angel helps a compassionate but despairingly frustrated businessman by showing what life would have been like if he never existed.

**Director:** Frank Capra

**Writers:** Frances Goodrich (screenplay), Albert Hackett (screenplay), 4 more credits »

**Stars:** James Stewart, Donna Reed, Lionel Barrymore | See full cast and crew »

+ Watchlist | Watch Trailer | Share...

Edit

### Details

**Country:** USA

**Language:** English

**Release Date:** 7 January 1947 (USA) See more »

**Also Known As:** The Greatest Gift See more »

**Filming Locations:** California, USA See more »

### Box Office

**Budget:** $3,180,000 (estimated)

**Opening Weekend:** £49,845 (UK) (19 December 2008)

**Gross:** £682,222 (UK) (24 December 2010)

See more »

### Company Credits

**Production Co:** Liberty Films (II) See more »

Show detailed company contact information on IMDbPro »

### Technical Specs

**Runtime:** 130 min | 118 min (DVD edition)

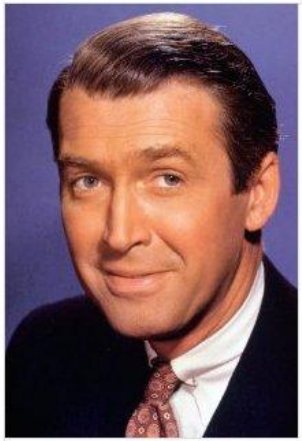
**Sound Mix:** Mono (RCA Sound System)

**Color:** Color (colorized) | Black and White

**Aspect Ratio:** 1.37 : 1

See full technical specs »

# IMDb: Actor Data



**James Stewart** (I) (1908–1997)

Top 5000

Actor | Soundtrack | Director

James Maitland Stewart was born on 20 May 1908 in Indiana, Pennsylvania, where his father owned a hardware store. He was educated at a local prep school, Mercersburg Academy, where he was a keen athlete (football and track), musician (singing and accordion playing), and sometime actor. In 1929 he won a place at Princeton, where he studied ... See full bio »

**Born:** James Maitland Stewart
May 20, 1908 in Indiana, Pennsylvania, USA

**Died:** July 2, 1997 (age 89) in Los Angeles, California, USA

230 photos | 42 videos | 1180 news articles »

**Won 1 Oscar.** Another 25 wins & 19 nominations. See more awards »

## Cast

Edit

Cast overview, first billed only:

| | | | |
|---|---|---|---|
| James Stewart | ... | George Bailey |
| Donna Reed | ... | Mary Hatch |
| Lionel Barrymore | ... | Mr. Potter |
| Thomas Mitchell | ... | Uncle Billy |
| Henry Travers | ... | Clarence |
| Beulah Bondi | ... | Mrs. Bailey |
| Frank Faylen | ... | Ernie |
| Ward Bond | ... | Bert |
| Gloria Grahame | ... | Violet |
| H.B. Warner | ... | Mr. Gower |

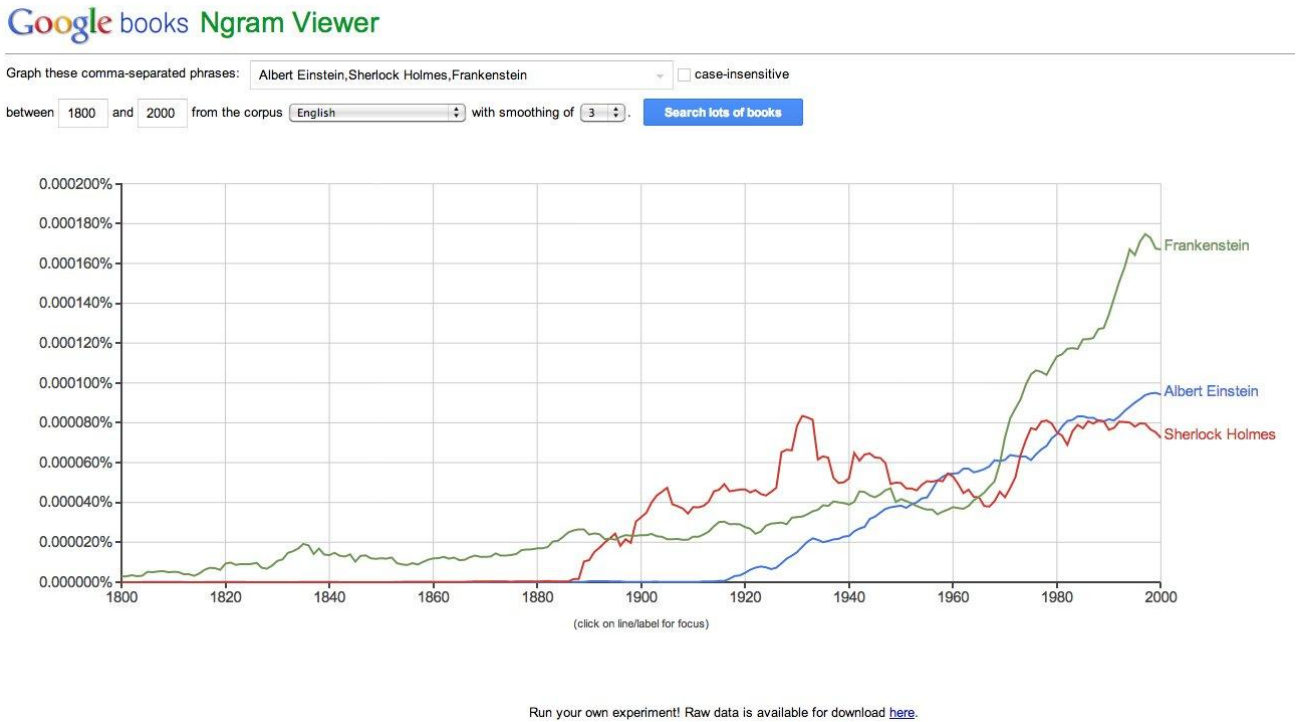
# Movie Questions

- Can we predict how well people will like a movie?  What about its gross?
- What does the social network of actors look like? (Six degrees of Kevin Bacon)
- What is the age distribution of actors and actresses in film?
- Do stars live longer or shorter lives than the bit players or public?

# Google Ngrams

- Presents an annual time series of the frequency of every “popular” word/phrase with 1 to 5 words occurs in scanned books.
- `Popular’ means appears >40 times in total.
- Google has scanned about 15% of all books ever published, making this resource quite comprehensive.

# Google Ngram Viewer



# Ngram Questions

- How has the amount of cursing changed over time?
- What is the lifespan of fame and technologies? Is it increasing/decreasing?
- How often do new words emerge?  Do they stay in common usage?
- What words are associated with other words, i.e. can you build a language model?

# NYC Taxi Cab Data

- Gives driver/owner, pickup/dropoff location, and fare data for every taxi trip taken.
- Data obtained from NYC via Freedom of Information Act Request (FOA)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | | | | | | | | | | | | | |
| 5 | Trip data, 2013 -> | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | |
| 7 | medallion | hack_license | vendor_id | rate_code | pickup_datetime | dropoff_datetim | passenger_c | trip_time_ | trip_distance | pickup_longitud | pickup_latitude | dropoff_longitude | dropoff_latitude |
| 8 | 89D227B655E5C82AEC | BA96DE419E7116 | CMT | 1 | 1/1/13 15:11 | 1/1/13 15:18 | 4 | 382 | 1 | -73.978165 | 40.757977 | -73.989838 | 40.751171 |
| 9 | 0BD7C8F5BA12B88E0B | 9FD8F69F0804BD | CMT | 1 | 1/6/13 0:18 | 1/6/13 0:22 | 1 | 259 | 1.5 | -74.006683 | 40.731781 | -73.994499 | 40.75066 |
| 10 | 0BD7C8F5BA12B88E0B | 9FD8F69F0804BD | CMT | 1 | 1/5/13 18:49 | 1/5/13 18:54 | 1 | 282 | 1.1 | -74.004707 | 40.73777 | -74.009834 | 40.726002 |
| 11 | ... | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | |
| 14 | Fare data, 2013 -> | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | |
| 16 | medallion | hack_license | vendor_id | pickup_datetime | fare_amount | surcharge | mta_tax | tip_amou | tolls_amount | total_amount | | | |
| 17 | 89D227B655E5C82AEC | BA96DE419E7116 | CMT | 1/1/13 15:11 | 6.5 | 0 | 0.5 | 0 | 0 | 7 | | | |
| 18 | 0BD7C8F5BA12B88E0B | 9FD8F69F0804BD | CMT | 1/6/13 0:18 | 6 | 0.5 | 0.5 | 0 | 0 | 7 | | | |
| 19 | 0BD7C8F5BA12B88E0B | 9FD8F69F0804BD | CMT | 1/5/13 18:49 | 5.5 | 1 | 0.5 | 0 | 0 | 7 | | | |

# Taxicab Questions

- How much do drivers make each night?
- How far do they travel?
- How much slower is traffic during rush hour?
- Where are people traveling to/from at different times of the day?
- Do faster drivers get tipped better?
- Where should drivers go to pick up their next fare?