

# Optimization of NYC MTA Station-based Marketing (Code Name: Benson)

The A Team  
30-June-2017

# Your A team:

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# Where are the women in tech?

- 26% of computing jobs<sup>1</sup> held by women
- 18% of Undergraduate CS/IT degree recipients are women, down from 37% (in 1985)<sup>1, 3</sup>
- Number of boys who take the AP CS exam outnumbers girls 4:1<sup>2</sup>

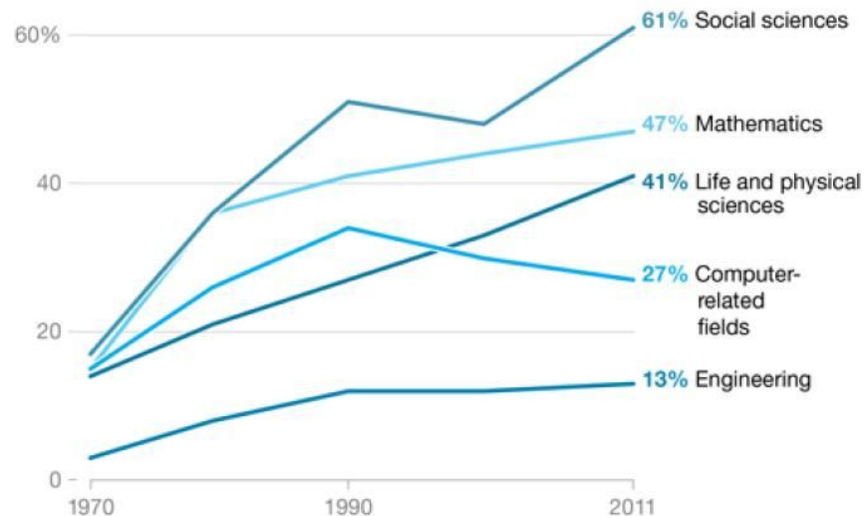
1: [https://www.ncwit.org/sites/default/files/resources/btn\\_03232017\\_web.pdf](https://www.ncwit.org/sites/default/files/resources/btn_03232017_web.pdf)

2: <http://www.computerscience.org/resources/women-in-computer-science/>

3: [https://nces.ed.gov/programs/digest/d12/tables/dt12\\_349.asp](https://nces.ed.gov/programs/digest/d12/tables/dt12_349.asp)

## Women working in STEM occupations

Share of total STEM workers



<http://news.nationalgeographic.com/news/2014/11/141107-gender-studies-women-scientific-research-feminist/>

# Goals

- Email signups for WTWY's summer gala
- Fundraising potential
- Spread the message

# Strategy

- Entry/exit data of the MTA turnstile data<sup>1</sup>
- Overall transit volume
- Morning vs. Evening commute
- Weekday vs. Weekend
- Location<sup>3</sup>, Median income<sup>2</sup>, startup presence<sup>4,5</sup>

1:<http://web.mta.info/developers/turnstile.html>

2:<http://zipatlas.com/us/ny/new-york/zip-code-comparison/median-household-income.htm>

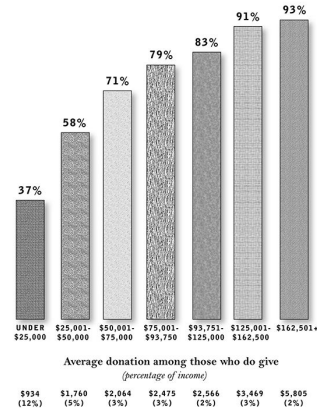
3:<https://data.cityofnewyork.us/Transportation/Subway-Entrances/drex-xx56>

4:<http://www.builtinnyc.com/2016/08/09/nyc-fundings-zipcode-2016>

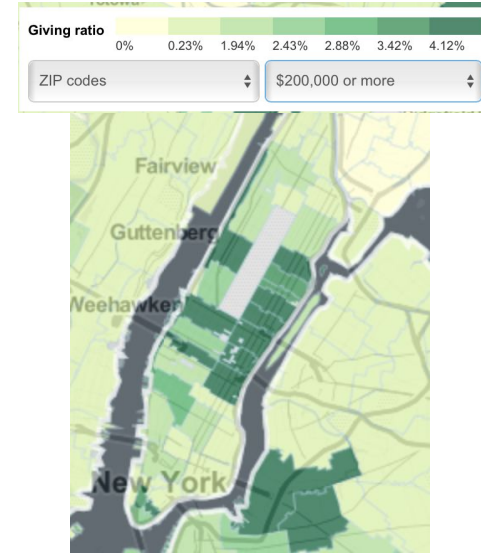
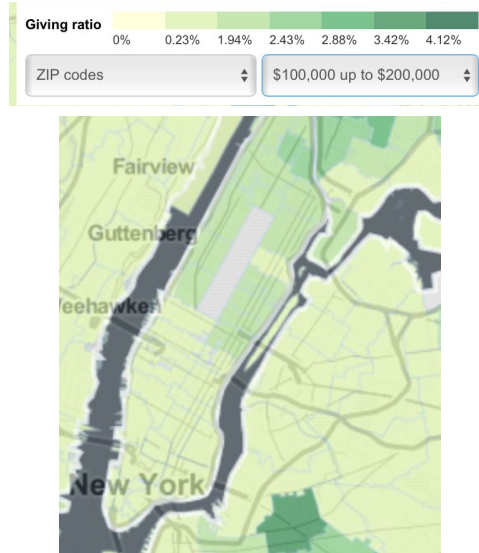
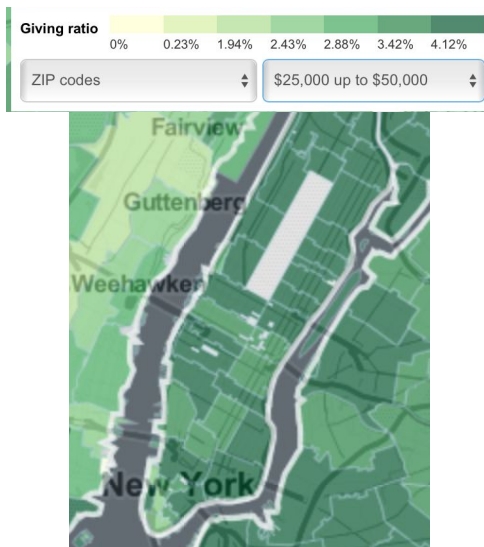
5:<https://www.citylab.com/life/2013/08/how-east-coast-tech-startups-became-downtown-phenomenon/6301/>

# Balance: interest in cause and charitable giving

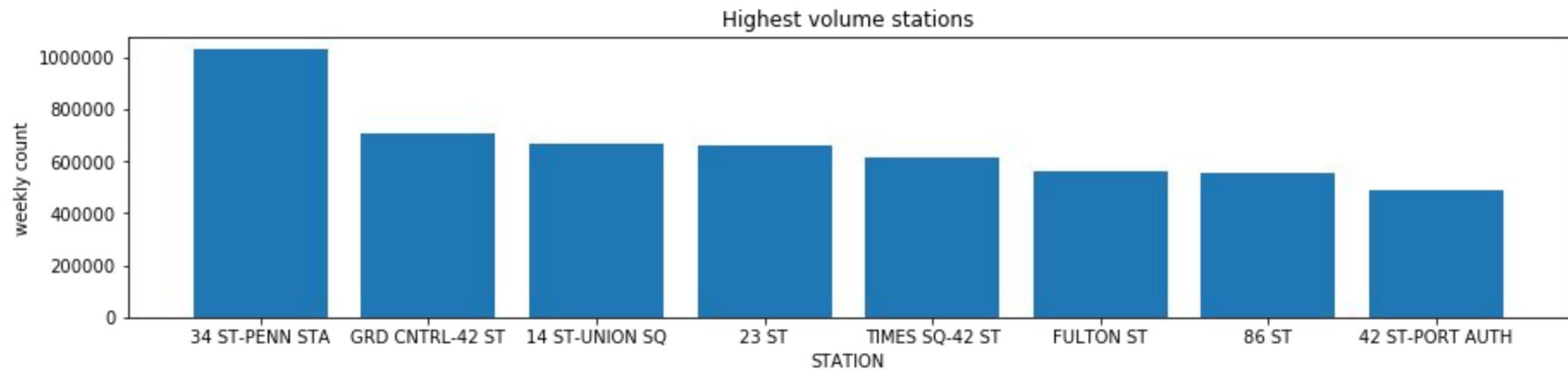
Graph 11:  
Percentage of Households Giving  
to Charity By Annual Income



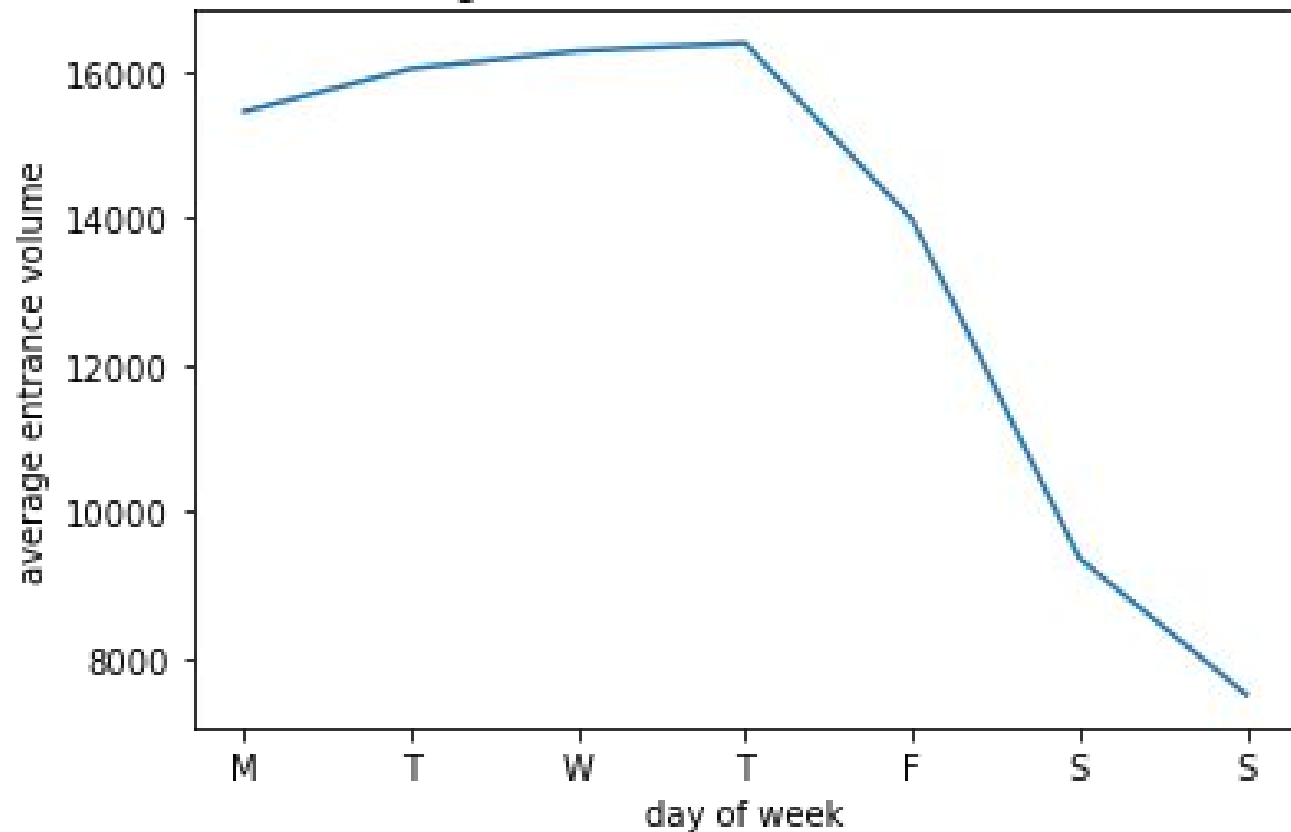
Source: Panel Study of Income Dynamics data, in "The Market for Charitable Giving" by John List, Journal of Economic Perspectives, Editor's adjustment to 2014 dollars.



1. <http://www.philanthropyroundtable.org/almanac/statistics/>
2. <https://www.philanthropy.com/interactives/how-america-gives#search>

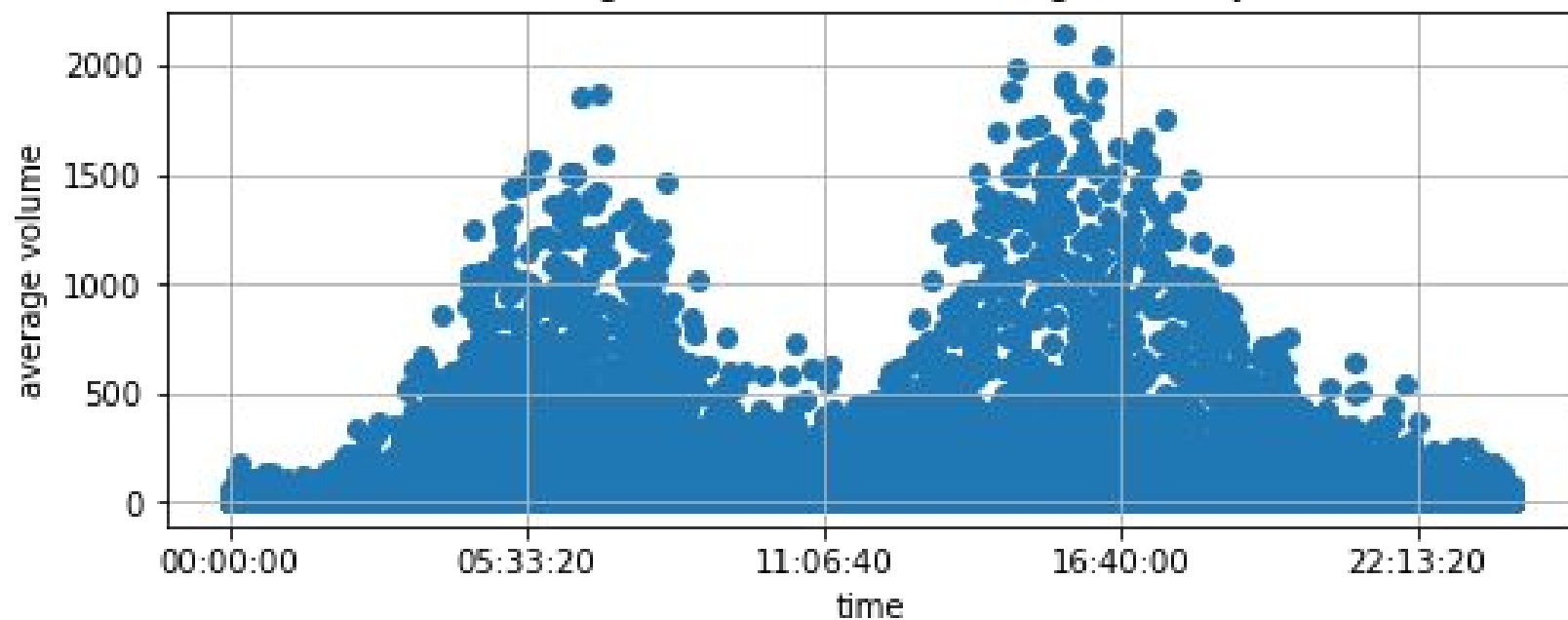


Average entrance volume over the week





Average transit volume through the day



# WEEKDAY MORNING COMMUTES

FIRST ATTEMPT: MTA MORNING EXIT VOLUME.

The top ten are...

<u>Rank</u>	<u>Exits</u>	<u>Station Stop</u>
1	37677	34 ST-HERALD SQ
2	35638	47-50 STS ROCK
3	35428	GRD CNTRL-42 ST
4	33000	TIMES SQ-42 ST
5	28443	34 ST-PENN STA
6	28109	23 ST
7	24753	LEXINGTON AV/53
8	24034	14 ST-UNION SQ
9	21237	CANAL ST
10	20822	FULTON ST



# WEEKDAY MORNING COMMUTES

SECOND ATTEMPT: TAKE THE GREATEST DIFFERENCE BETWEEN MONDAY MORNING AND SATURDAY MORNING EXIT COMMUTES TO FOCUS ON BUSINESS DISTRICTS:

The top ten are...

Rank	Exits	Station Stop
1	31473	47-50 STS ROCK
2	26357	GRD CNTRL-42 ST
3	22257	34 ST-HERALD SQ
4	21610	LEXINGTON AV/53
5	21455	TIMES SQ-42 ST
6	17642	23 ST
7	16562	42 ST-BRYANT PK
8	16330	WALL ST
9	15682	FULTON ST
10	12926	CHAMBERS ST



# WEEKDAY MORNING COMMUTES

THIRD ATTEMPT: ALSO TAKE INTO ACCOUNT LARGEST TECH EMPLOYER LOCATIONS (400+ Employees)

Amazon	BuzzFeed	Information Builders	Spotify	Yext
AOL	ETrade	MediaRadar	Tumblr	Zocdoc
Apple	Etsy	Microsoft/LinkedIn	Twitter	
AppNexus	Facebook	Oscar	VICE Media	
Bloomberg	Fresh Direct	Salesforce	WeWork	
Blue Apron	Google	Shutterstock	Yelp	

Source: <http://www.builtinnyc.com/2016/10/28/nyc-top-100-list>

*Built In NYC's Top 100 is a ranking of the largest digital tech employers in the New York City area based on local, full-time employee count as of September 1, 2016.*

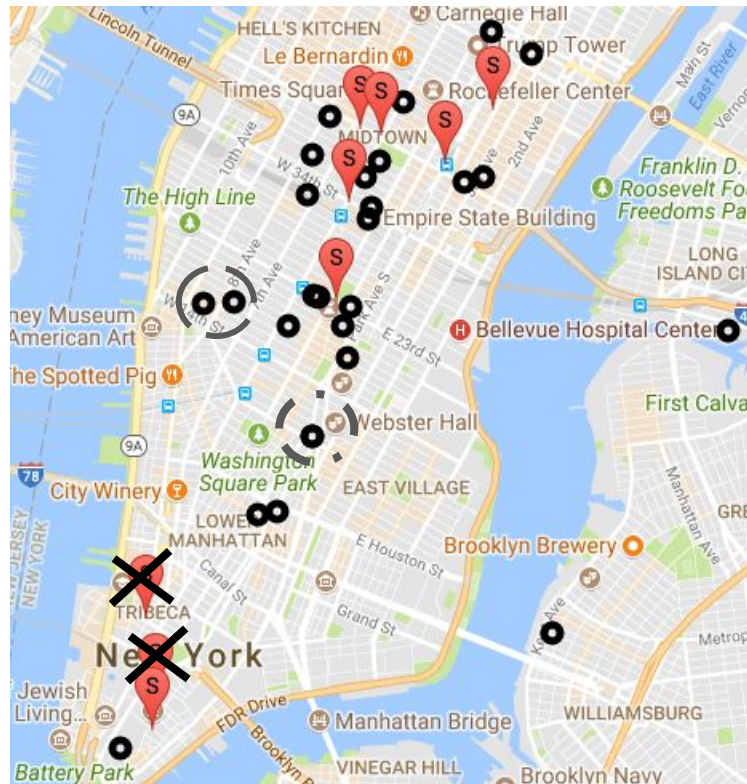
*This ranking is compiled by submissions to the Built In NYC website and market survey as well as public company database research.*

# WEEKDAY MORNING COMMUTES

Superimpose the highest volume subway differences on the tech locations:

Observations:

- Twitter and Google are not near a stop and neither is Facebook.
- Three stops in the financial district only have one large tech firm.



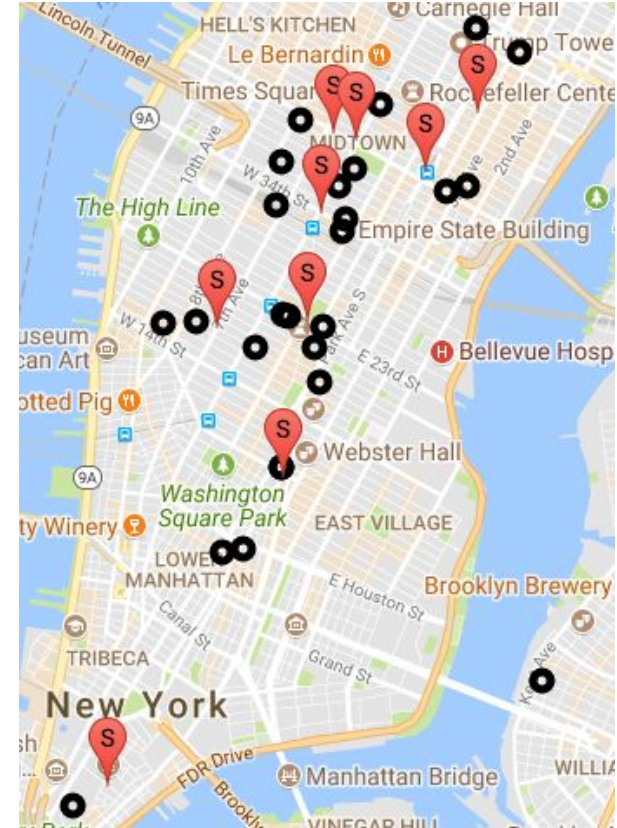
# WEEKDAY MORNING COMMUTES

## Final Recommendation:

- Maximize difference between Mon and Sat morning exits
- Replace two stops in the financial district with stations near Facebook, Google, Twitter (Astor Pl and 18th St).

**47-50 STS ROCK\***  
**GRD CENTRL-42 ST**  
**34 ST-HERALD SQ**  
**23 ST**  
**ASTOR PLACE**  
**18TH ST**  
LEXINGTON AV/53  
TIMES SQ-42 ST  
42 ST-BRYANT PK  
WALL ST

\*Bold = VC presence and higher median income



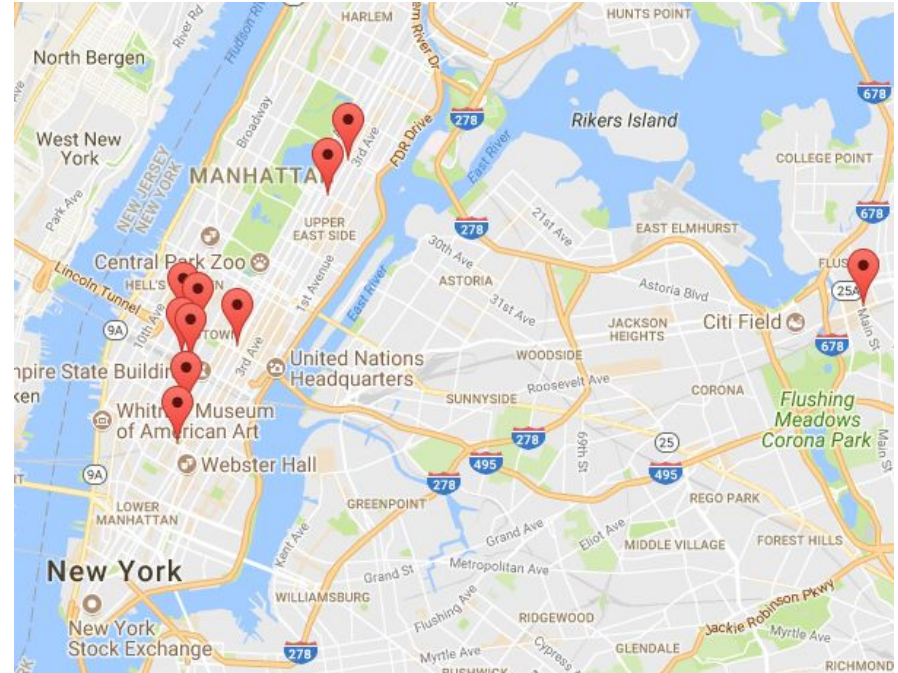


# WEEKNIGHTS AND WEEKENDS

These recommendations are based solely on  
Monday evening exit volume.

Top ten:

1	48607	34 ST-PENN STA
2	31490	GRD CNTRL-42 ST
3	31241	34 ST-HERALD SQ
4	24981	42 ST-PORT AUTH
5	23290	86 ST
6	22750	TIMES SQ-42 ST
7	20234	14 ST-UNION SQ
8	19350	23 ST
9	17233	FLUSHING-MAIN
10	16182	96 ST



# Future Considerations

Day of the week:

- Average Tuesday-Thursday, compare with Monday or Friday
  - Consider as likely work-from-home, vacation days

Longitudinal studies:

- Data over a longer time period to minimize fluctuations

Residential data:

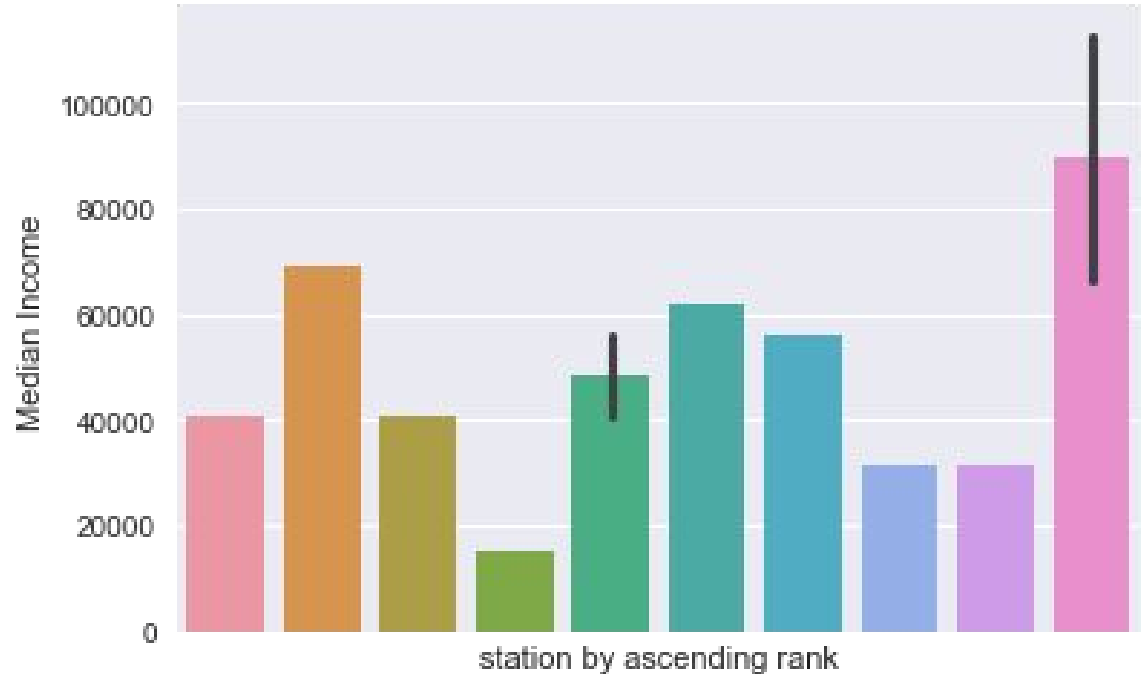
- Population Density, Wealth
- Demographics by gender



# Further Considerations

## Wealth and Funding:

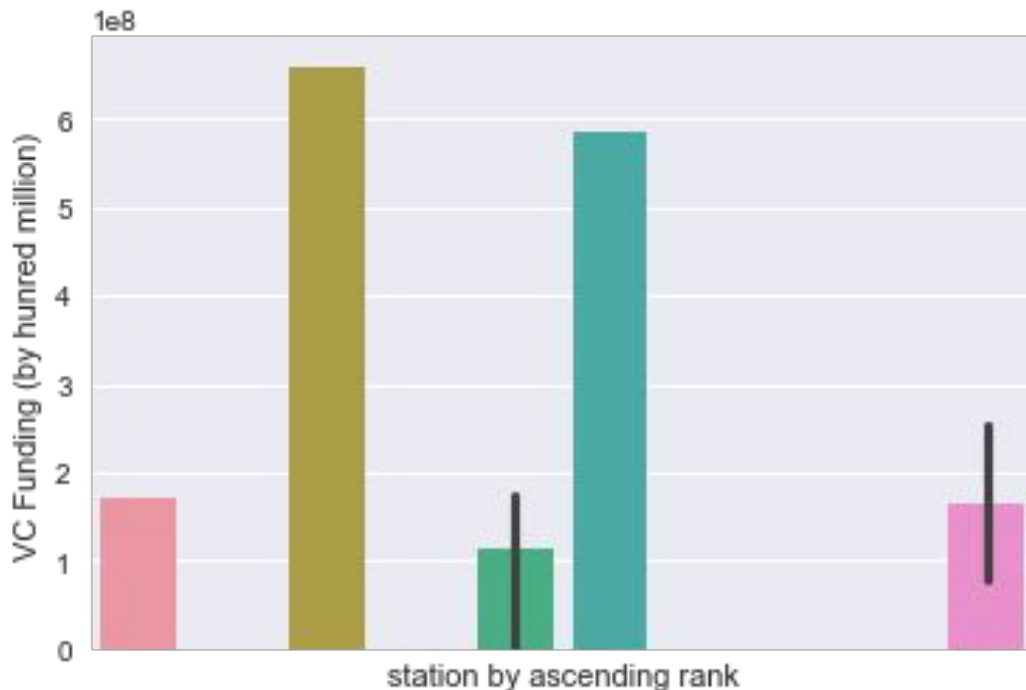
- Median Income Data by Zip Code
- VC Funding by Zip Code
- Needs to be refined to target differences between work and residential areas



# Further Considerations

## Wealth and Funding:

- Median Income Data by Zip Code
- VC Funding by Zip Code
- Needs to be refined to target differences between work and residential areas



Thank you for your attention!

# Tools

## Tools:

- Python
  - pandas, geopy, matplotlib
- Google Maps API
- StackOverflow.com

## Datasets:

- <http://web.mta.info/developers/turnstile.html>
- <http://zipatlas.com/us/ny/new-york/zip-code-comparison/median-household-income.htm>
- <https://data.cityofnewyork.us/Transportation/Subway-Entrances/drex-xx56>

# Higher income brackets are less charitable than lower income brackets

