

FALL 2023
DSE 12700
VISUAL ANALYTICS

Professor
Madeline Blount
she/her

Week 0



Dall-E 2: a blue jay creating neon data visualizations

**Professor
Madeline Blount
she/her**



REPORT DISCRIMINATION

Search



SOURCE OF INCOME DISCRIMINATION IN CD36

City Council Member: Chi Ossé

Neighborhoods: Bed-Stuy, North Crown Heights

District 36 has the **23rd highest rate of SOI discrimination** in New York City, based on cumulative data (2018 - 2023) from Unlock NYC and Neighbors Together.

The most common denial tactics in CD36 are:

Ghosting: 17 reports

Income requirements: 5 reports

Credit requirements: 3 reports

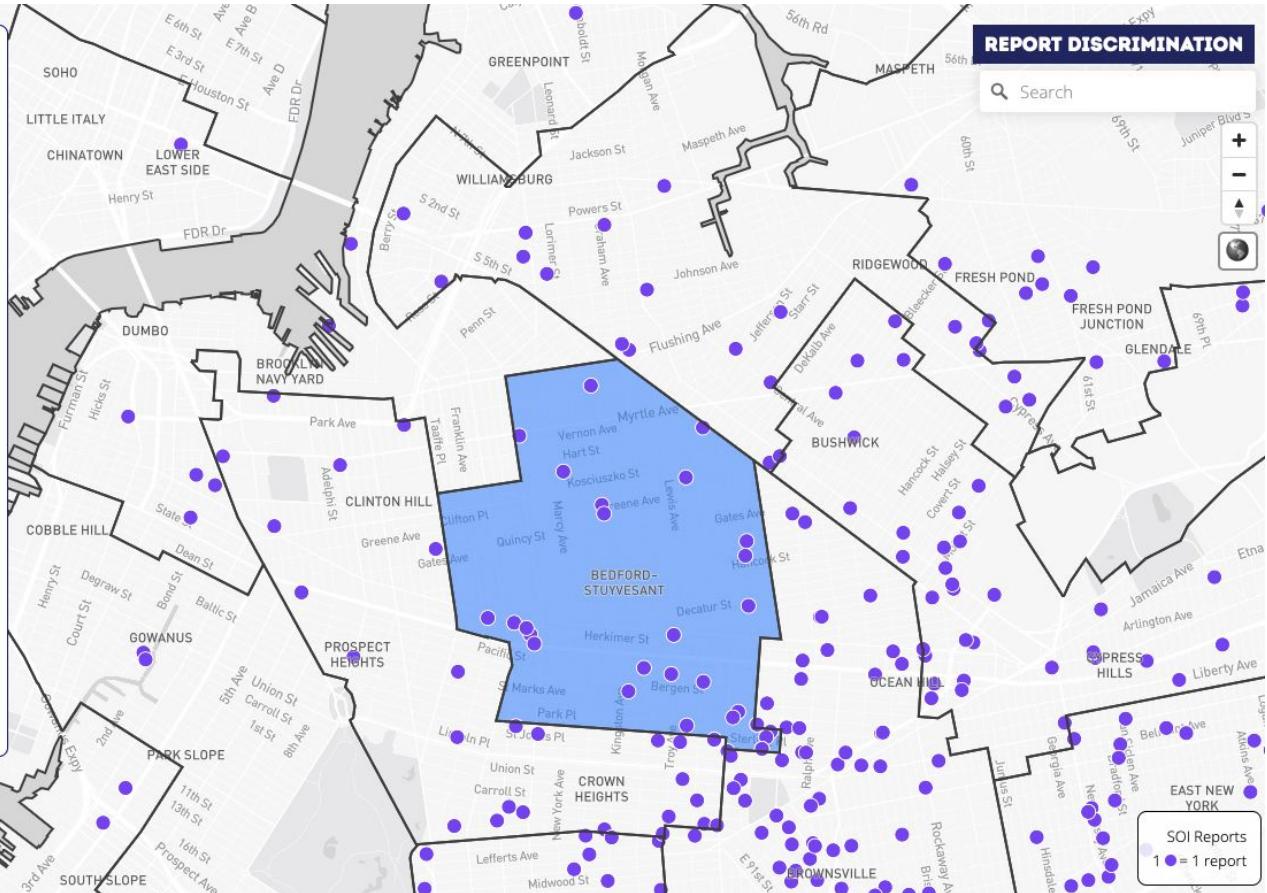
No vouchers: 1 report

Discriminatory ad: 1 report

Scam: 1 report

Do you live in District 36? If so, contact your City Council Member to let them know that you want them to advocate for increased funding for CCHR in the Fiscal Year 2024 budget.

Take Action





NORTH
ATLANTIC
OCEAN

FRANCE

ITALY

SENEGAL

GABON

CHINA

SINGAPORE

INDONESIA

ARABIAN
SEA

RESTART



NETWORKS BEYOND BORDERS

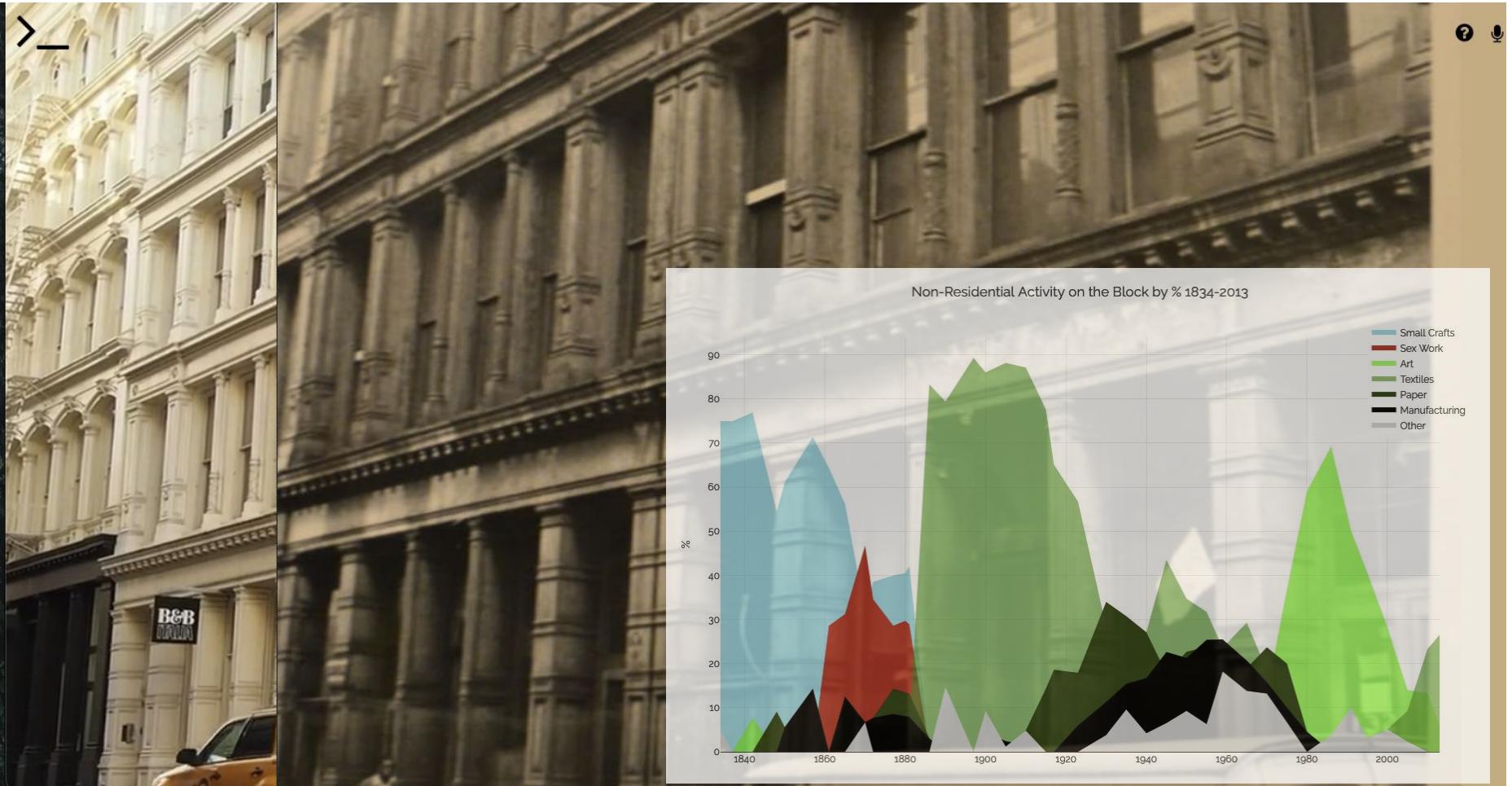
MAP

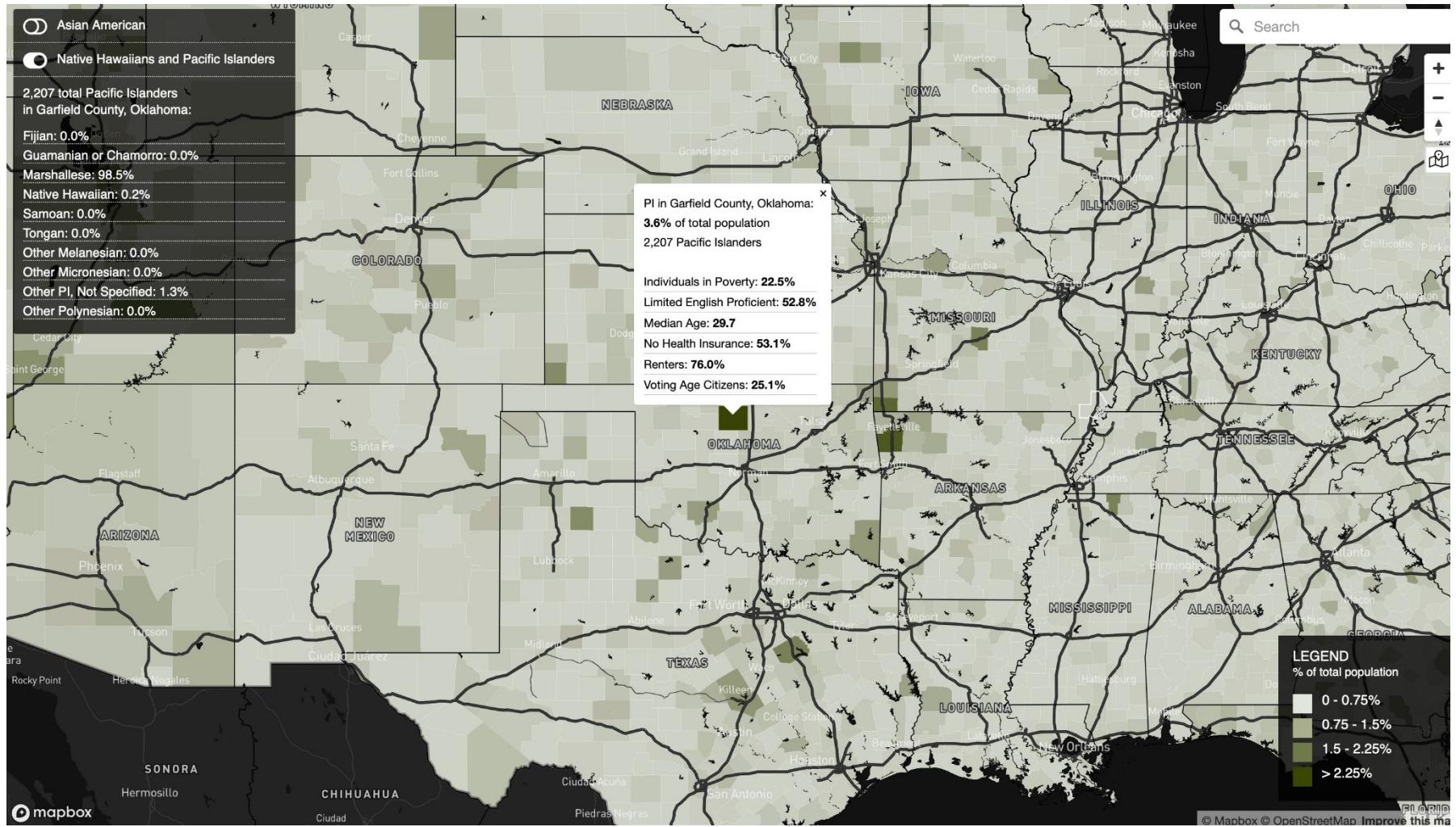
CHAPTERS

ABOUT



>_





what is data visualization?!

- a representation of data to aid human understanding of the world
- **“The purpose of visualization is insight, not pictures.” - Ben Shneiderman**
(CCNY '68, computer scientist/HCI @ University of Maryland)

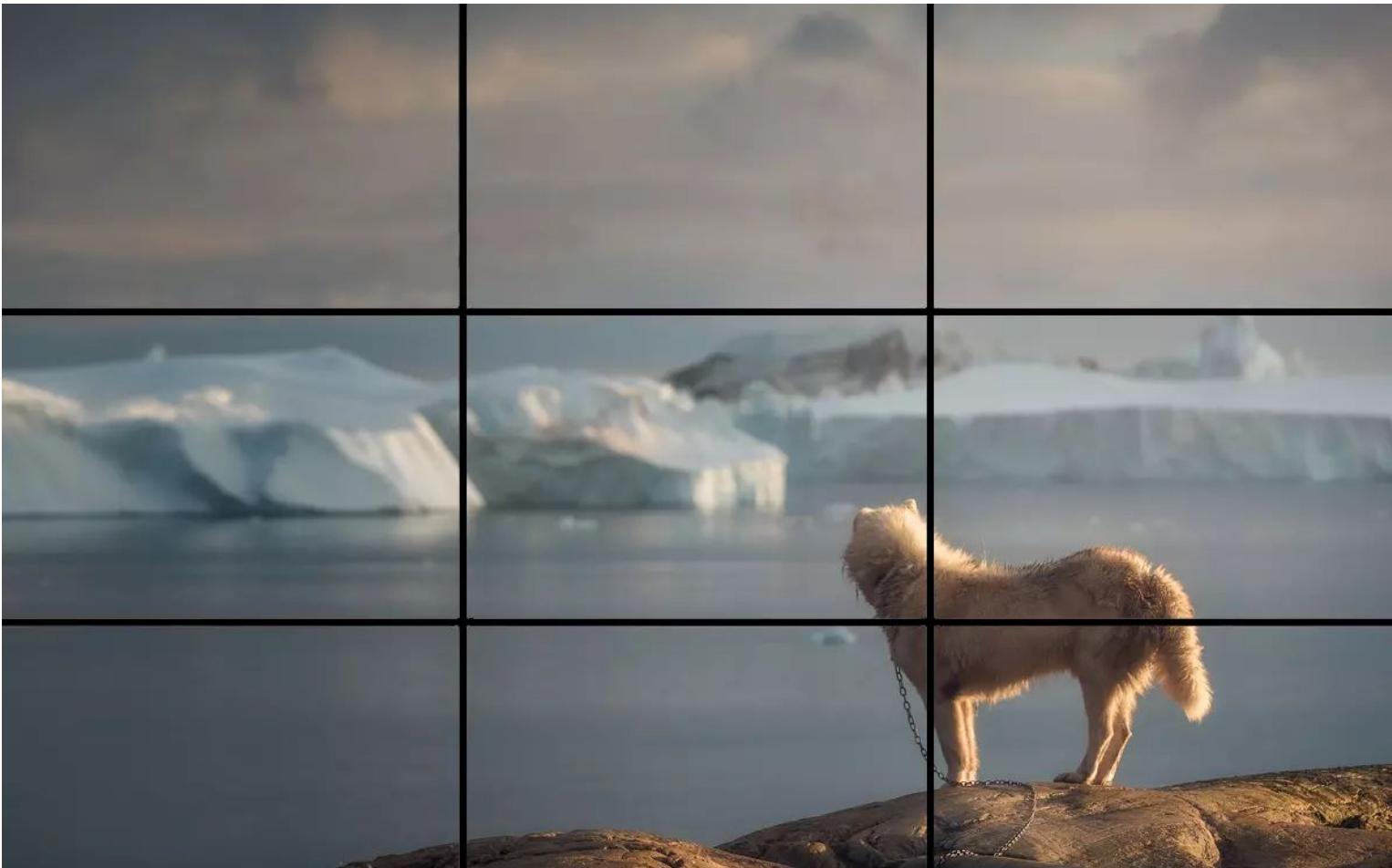
what is data visualization?!

- art + science, principles but not rules
- “**makin**g a **really** good or **really** useful graph
cannot be boiled down to a list of simple
rules to be followed without exception in all
circumstances”
 - Kieran Healy, sociologist @ Duke

what is data visualization?!

- “**Design is choice.** The ... principles should not be applied rigidly or in a peevish spirit; they are not logically or mathematically certain; and it is better to violate any principle than to place graceless or inelegant marks on paper.”
 - Edward Tufte, political scientist + artist, Princeton

The “rule of thirds” ...



... is not really a rule

Lunch atop a skyscraper, 1932
(photographer unknown)



what is data visualization?!

- “**The task of the designer is to give visual access to the subtle and the difficult – that is, the revelation of the complex.**” -Edward Tufte, political scientist + artist, Princeton

what does good data visualization do?

- Answers questions about data
- Encodes information
- Reveals patterns in data
- Supports hypotheses
- Generates hypotheses
- Tells a story
- Inspires us
- Helps us make decisions - could SAVE LIVES
- Helps us make **sense** of the world

Information Anxiety

is produced by the ever-widening gap between what we understand and what we think we should understand. It is the black hole between data and knowledge, and it happens when information doesn't tell us what we want or need to know.

In this breakthrough book **Richard Saul Wurman** explains why the information

continued on back cover



World Map



NEW



U.S. Map



Critical Trends



COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins U...

Total Confirmed
3,157,459

Confirmed Cases by
Country/Region/Sovereignty

1,023,304 US

236,899 Spain

203,591 Italy

169,053 France

162,357 United
Kingdom

160,479 Germany

117,589 Turkey

99,399 Russia

93,657 Iran

83,940 China

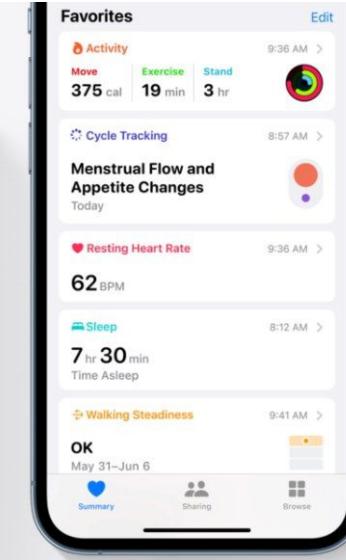
Admin 0

Last Updated at (M/D/YYYY)
4/29/2020, 9:32:30 AM185
countries/regions

Lancet Inf Dis Article: [Here](#). Mobile Version: [Here](#).
Lead by JHU CSSE. Automation Support: Esri Living Atlas team and JHU APL. Contact US. [FAQ](#).

Total Deaths
219,611

27,682 deaths
Italy24,275 deaths
Spain23,660 deaths
France21,678 deaths
United Kingdom17,682 deaths
New York City **New
York US**254,500 tested
Massachusetts US844,994 tested
New York US577,608 tested
California US366,875 tested
Florida US300,384 tested
Texas US210,100 tested
Illinois US140,100 tested
Michigan US130,100 tested
Pennsylvania US120,100 tested
Ohio US110,100 tested
Georgia US100,100 tested
North Carolina US90,100 tested
South Carolina US80,100 tested
Alabama US70,100 tested
Mississippi US60,100 tested
Tennessee US50,100 tested
Arkansas US40,100 tested
Louisiana US30,100 tested
Missouri US20,100 tested
West Virginia US10,100 tested
Vermont US5,100 tested
Rhode Island US3,100 tested
Delaware US2,100 tested
Puerto Rico US1,100 tested
American Samoa US1,100 tested
District of Columbia US1,100 tested
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[Dictionary](#)[Thesaurus](#) Search Dictionary[Games & Quizzes](#)[Word of the Day](#)[Grammar](#)[Wordplay](#)[Word Finder](#)[More ▾](#)

Word of the Day

AUGUST 29, 2023

GENUINE FAKE OXYMORON ☰ WATCHES

[Get the definition, examples, and podcast »](#)

Get Word of the Day in your inbox!

Your email address

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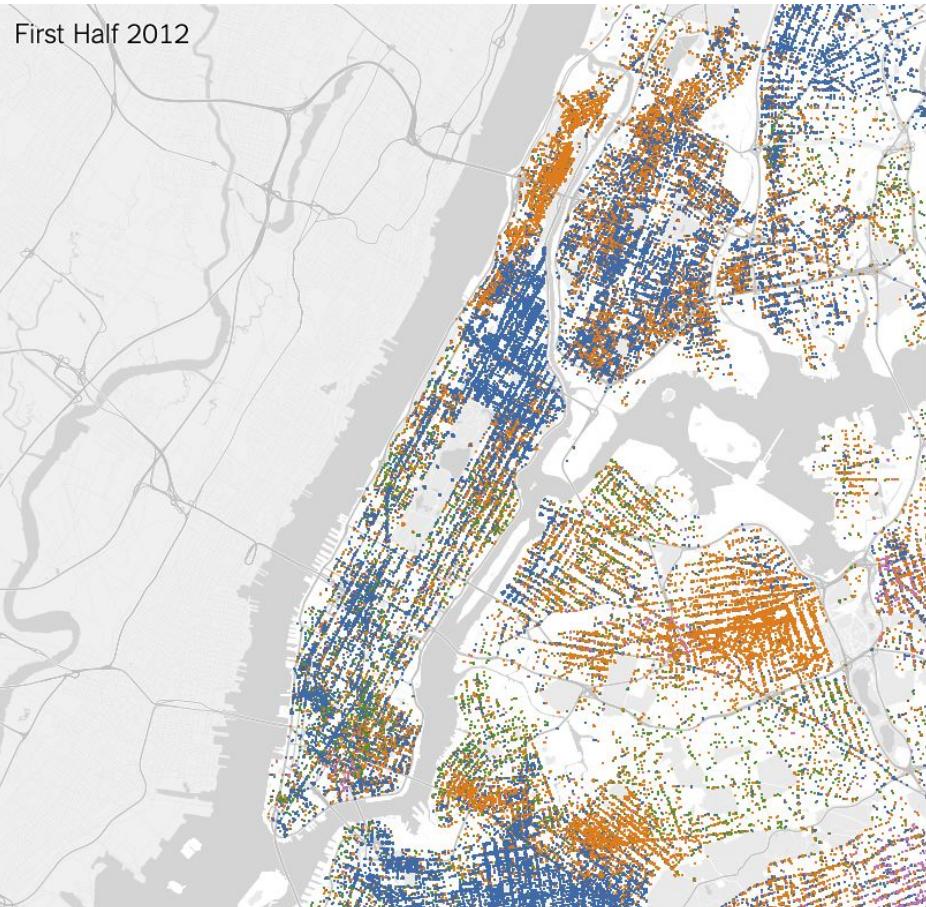
- 1 ash
- 2 fascism
- 3 culture
- 4 gaslighting
- 5 woke
- 6 automatically
- 7 portmanteau
- 8 politics
- 9 communication
- 10 transitive

Visibly damaged or destroyed buildings

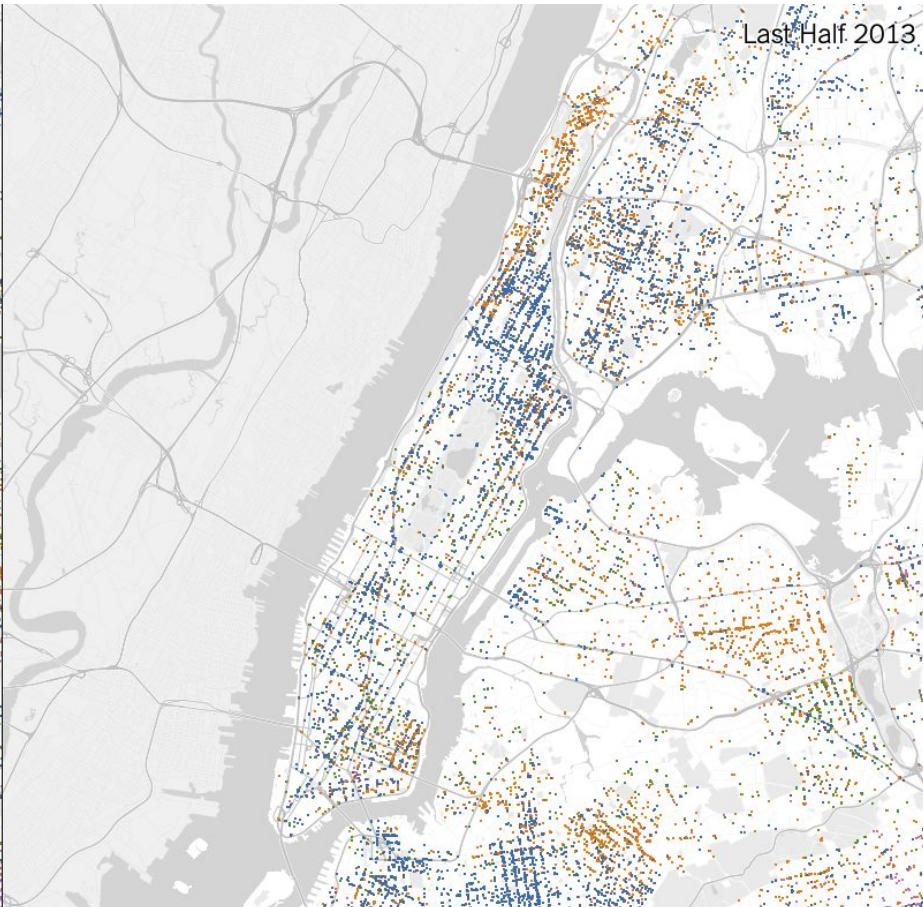
In an analysis of satellite imagery, The Times identified about 1,900 structures that had been visibly damaged or destroyed by the blaze.



First Half 2012



Last Half 2013



Mapping Stop and Frisk in NYC, New York Times Bostock, Fessenden 2014

<https://www.nytimes.com/interactive/2014/09/19/nyregion/stop-and-frisk-is-all-but-gone-from-new-york.html>,

<https://www.nytimes.com/interactive/2014/09/19/nyregion/stop-and-frisk-map.html>

MoMA

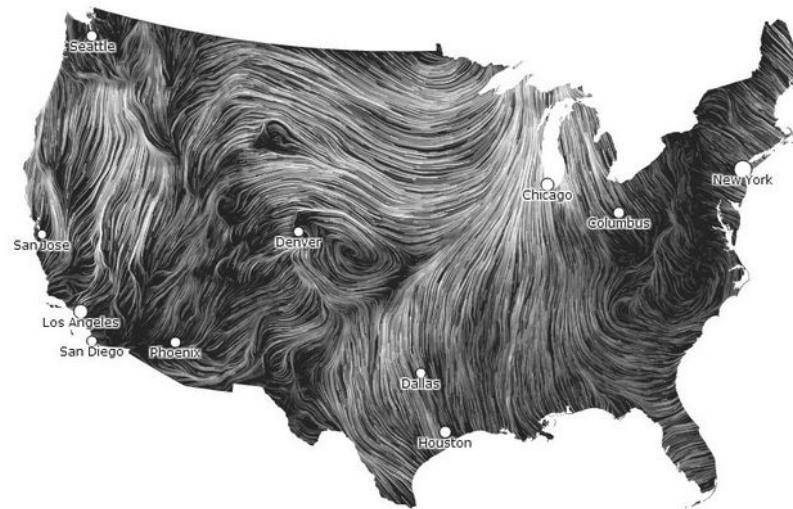
Visit

What's on

Art and artists

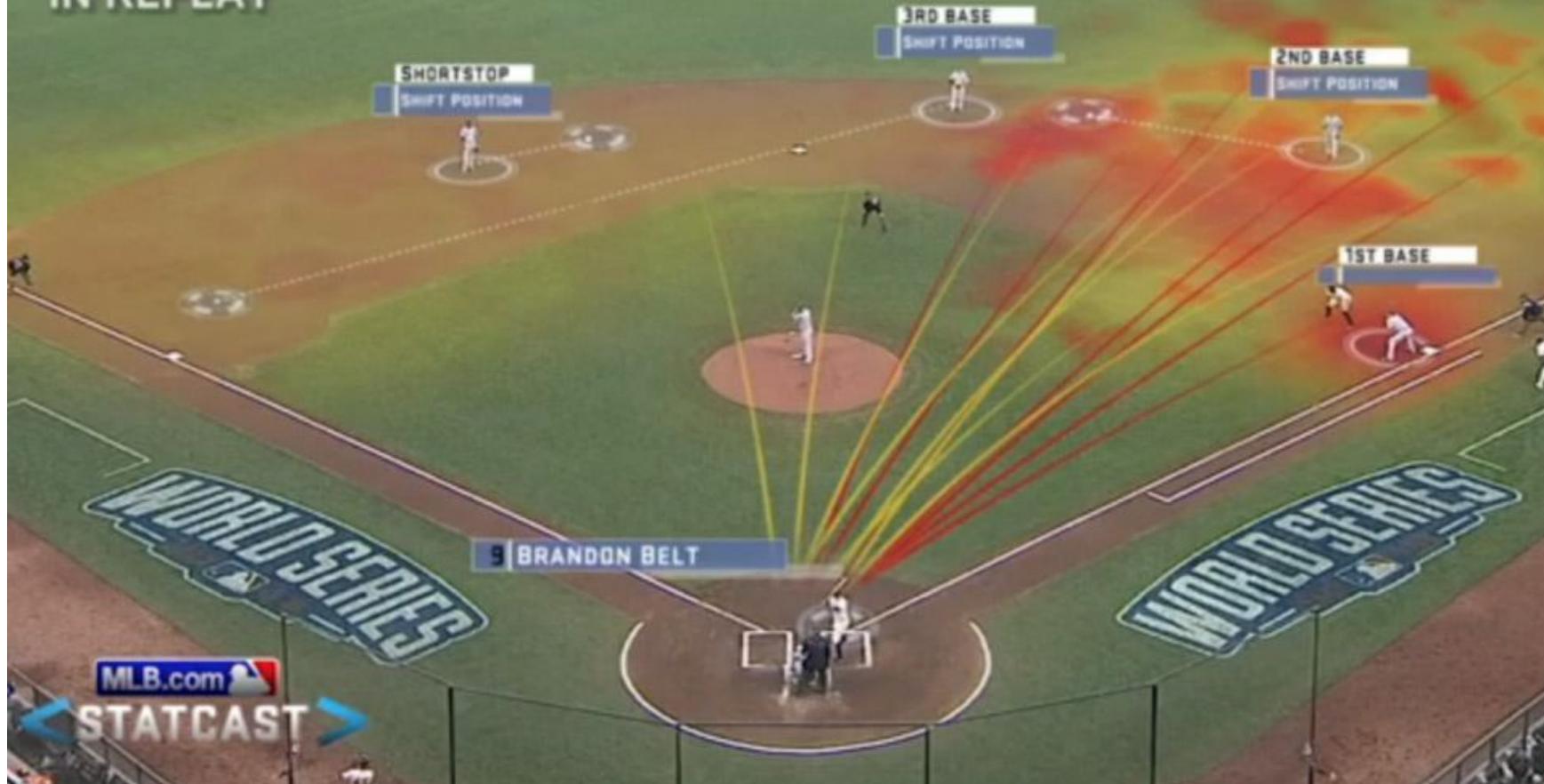
Store

Q



Fernanda Bertini Viégas, Martin Wattenberg
Wind Map
2012

FIXED CAMERA IN REPLAY

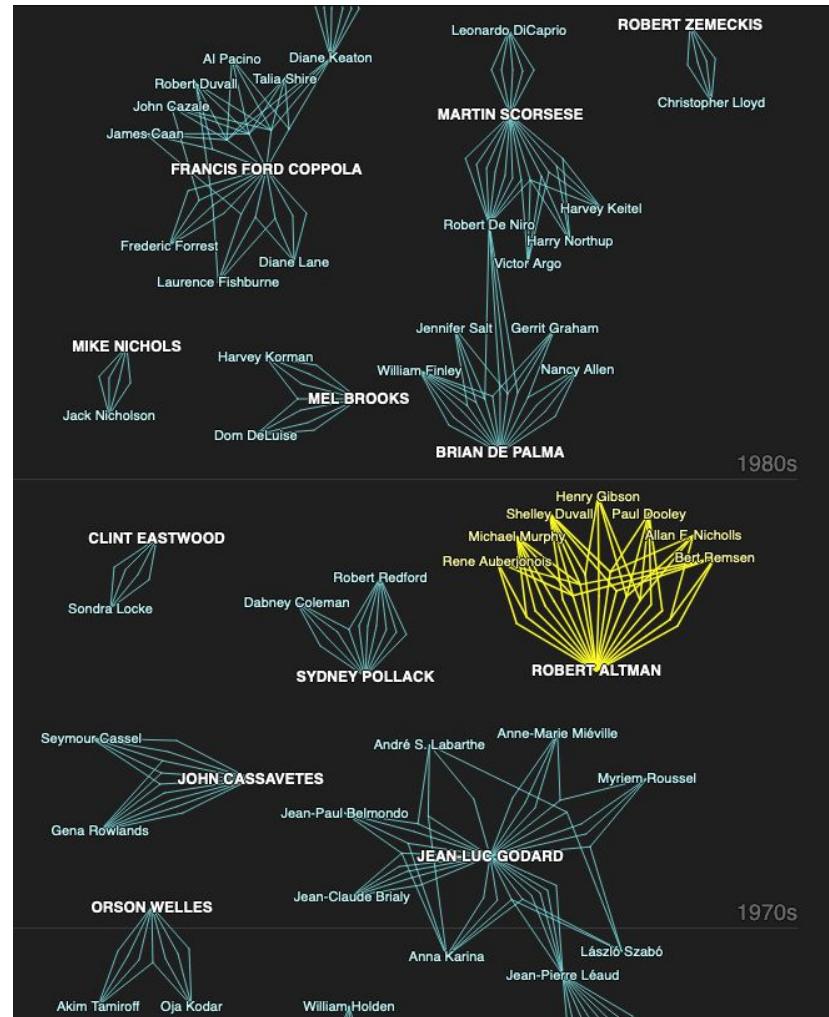


MLB.com

STATCAST >

New York Times: Constellations of Directors and their Stars

<https://www.nytimes.com/newsgraphics/2013/09/07/director-star-chart/index.html>



Stefanie Posavec: *Literary Organism*,
a Visualization of Part I of "On the Road" by Jack Kerouac

LITERARY ORGANISM

A visualization of Part One of
On the Road, by Jack Kerouac

BASIC STRUCTURE

Each literary component can be divided into even smaller parts, the smallest in this diagram being words. The diagram is read clockwise, starting from the first chapter, paragraph, or sentence.



NOTATION

Each quotation can be referred to in On the Road chapter 3.5 paragraph.

3.5
paragraph.

COLORS

All quotations can be referred to in On the Road.

chapter

3.5
paragraph.

- | | | |
|-------------------------------|-----------------------------|--|
| ● Dean Moriarty (Protagonist) | ● Sketches of Regional Life | ● Women, Sex, & Relationships |
| ● Bop & Jazz Music | ● Parties, Drinking & Drugs | ● Illegal Activities & Police Encounters |
| ● Social Events & Interaction | ● Work & Survival | ● Character Sketches |
| ● Travel | ● Sal Paradise (Narrator) | |

WORD COUNT CHART

All sentences are in proportion to the largest sentence in Part One, which is 151 words long.

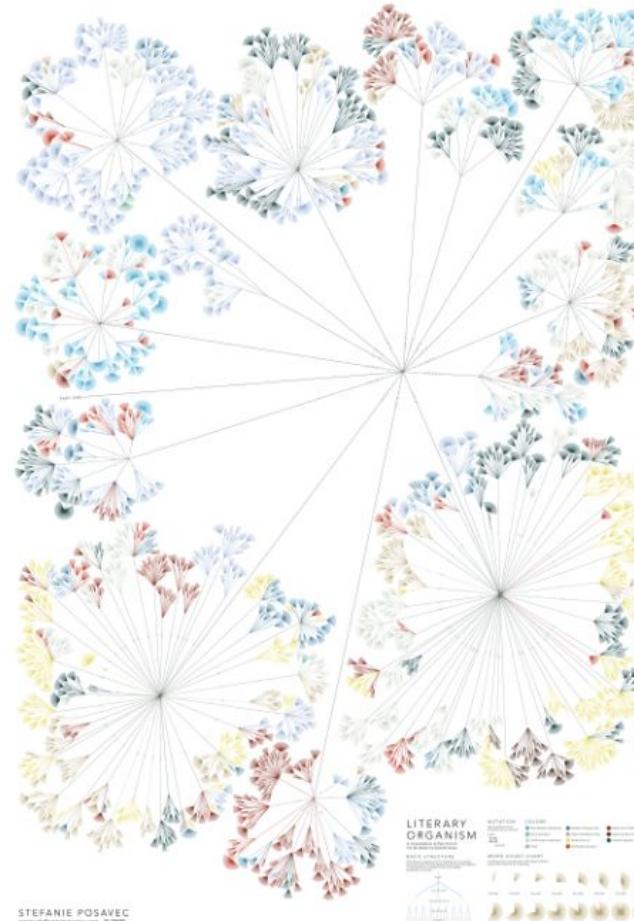
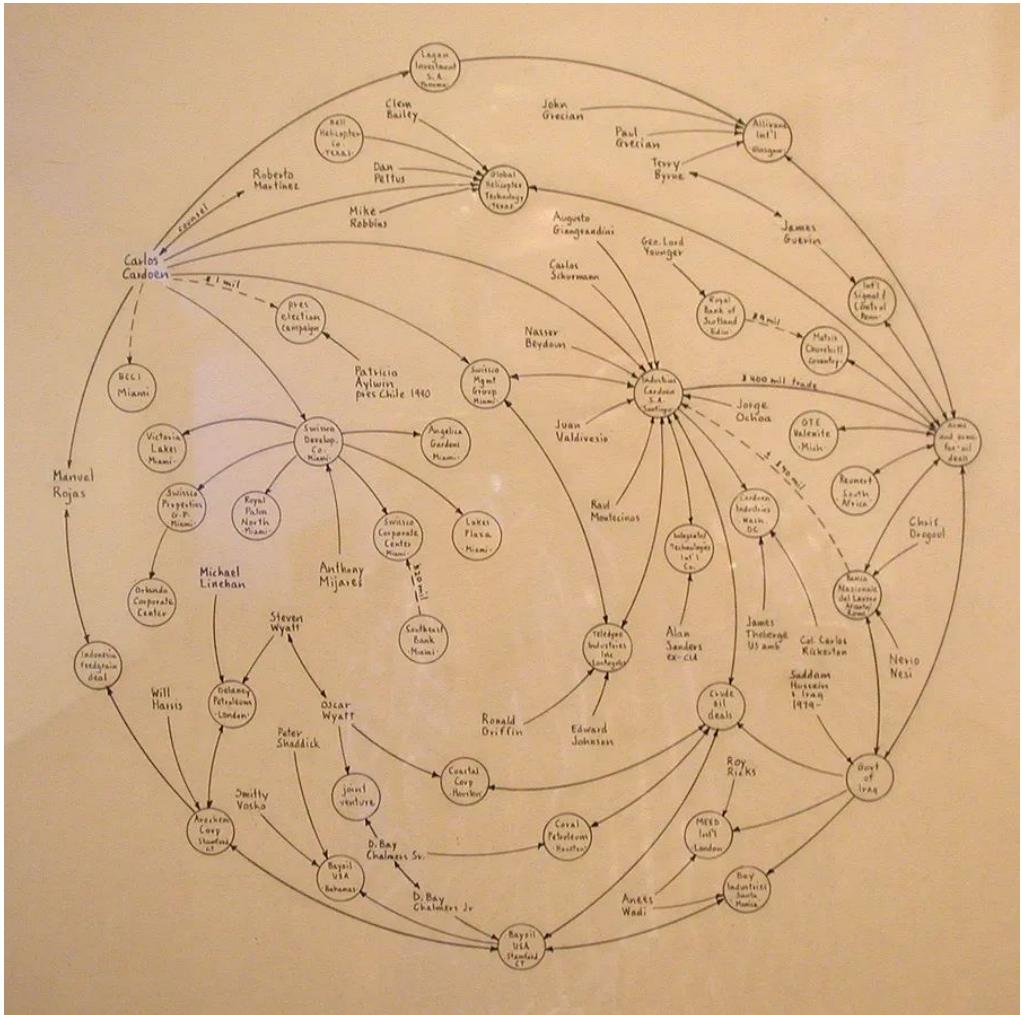
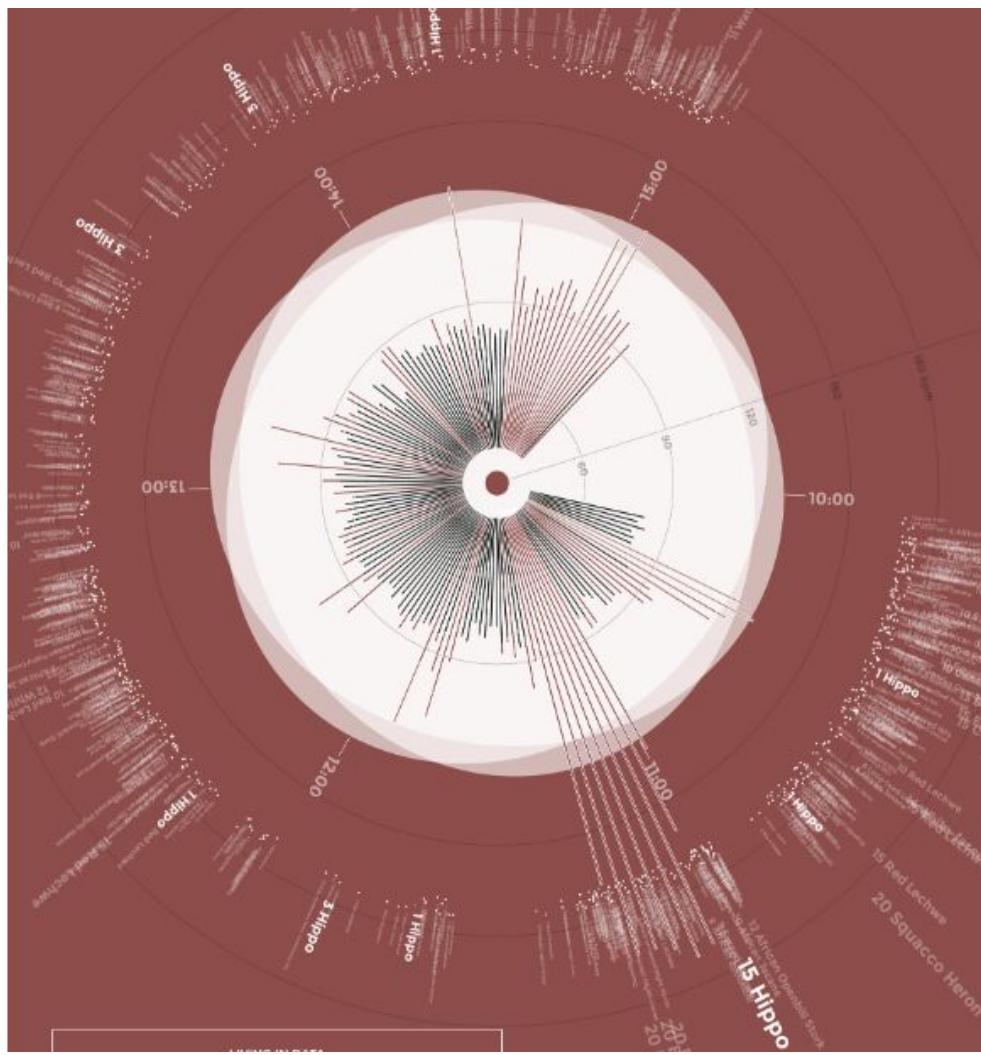


Figure 2 Stefanie Posavec Literary Organism: a Visualization of Part I of "On the Road," by Jack Kerouac (www.itsbeenreal.co.uk). Reproduced with permission.

Mark Lombardi, artist
Mapping political relationship,
scandal; “follow the money”



Jer Thorp, data artist
from *Living in Data*
“These Harrowing Seconds”





NASA, Webb

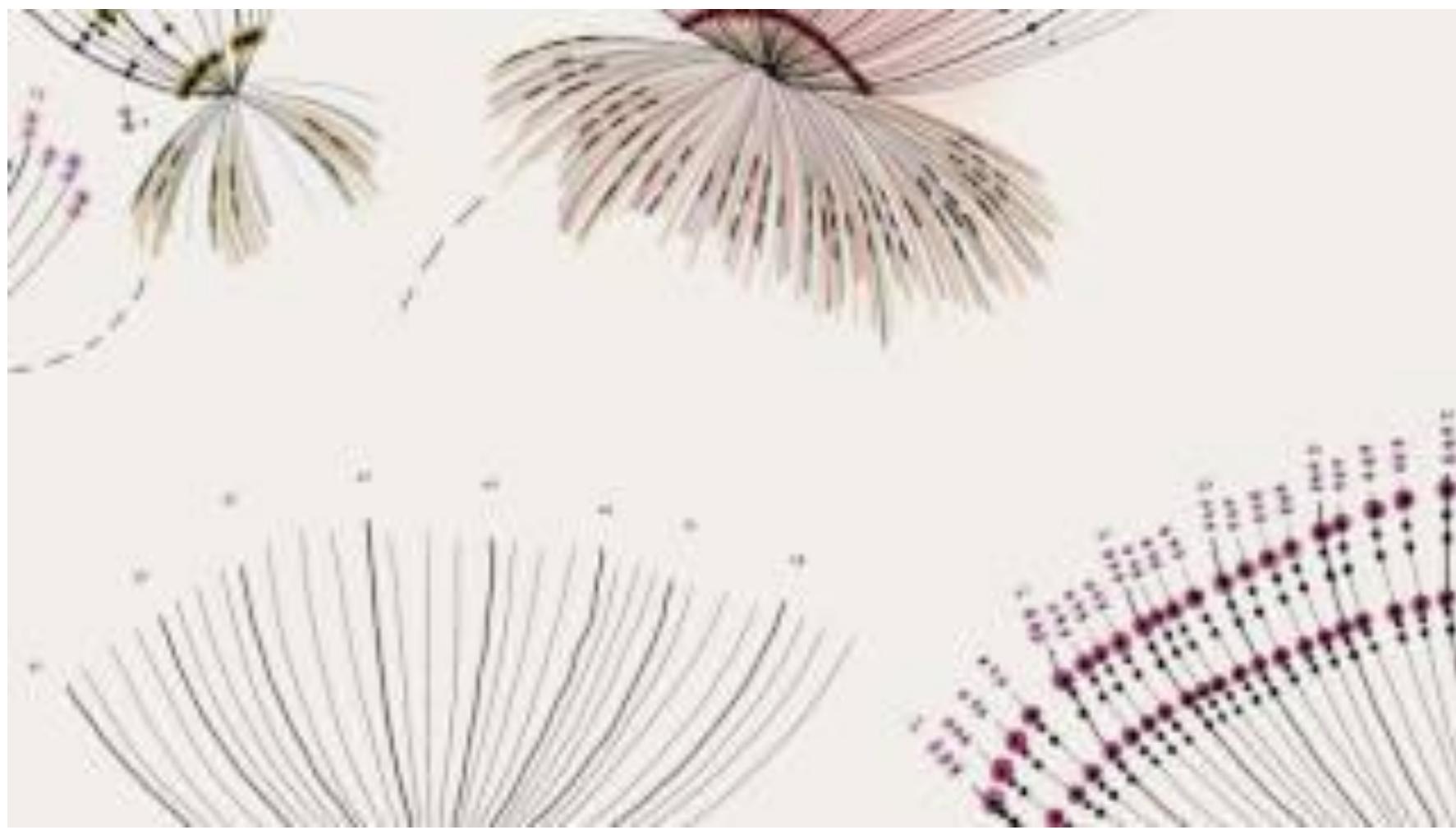


NASA, Webb



CARINA NEBULA

TRANSLATING WEBB DATA INTO SOUND



giogia lupi and Kaki King:

<http://giorgialupi.com/a-dialogue-between-four-hands-my-ongoing-collaboration-with-kaki-king>



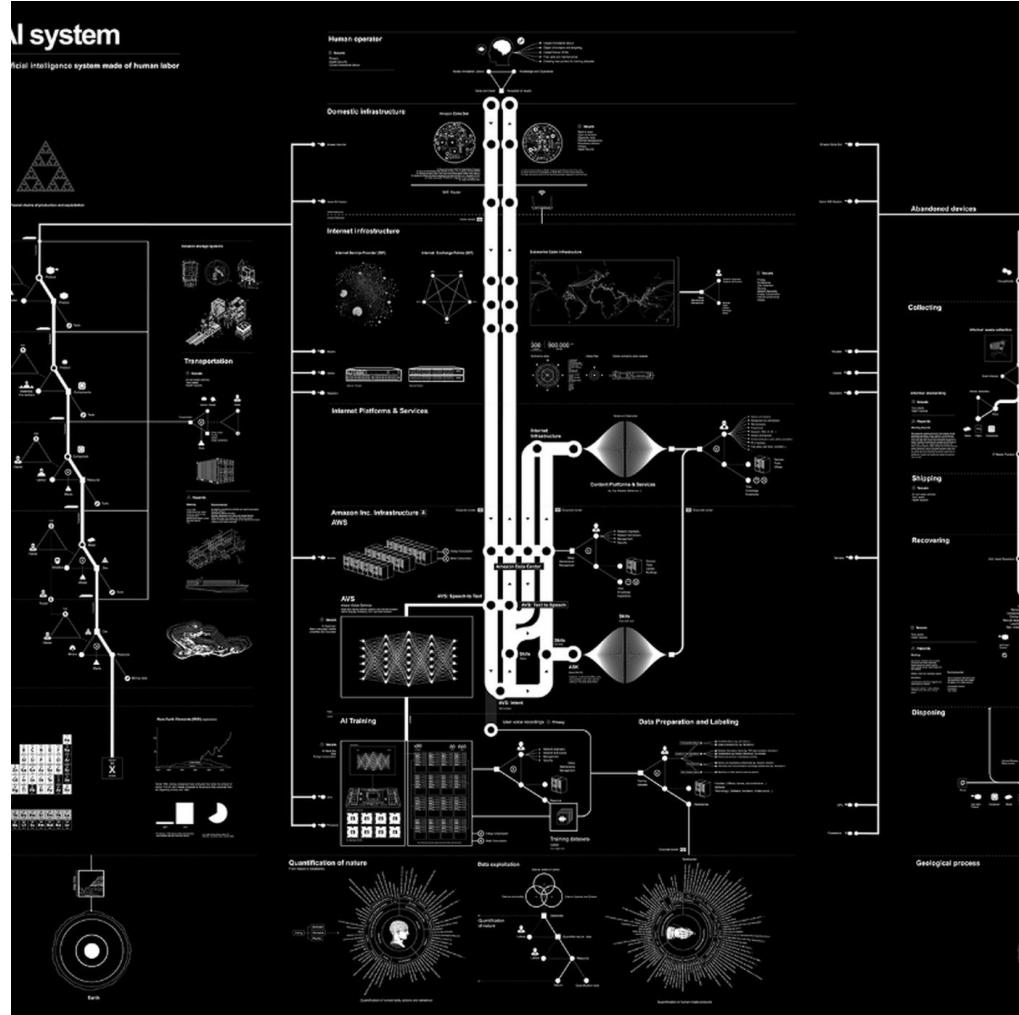
Antoni Reyzhekow, *ARTIKULAT* (2022) <http://raijekov.cc/>



Zuppa Theatre, *The Movements* (2023)

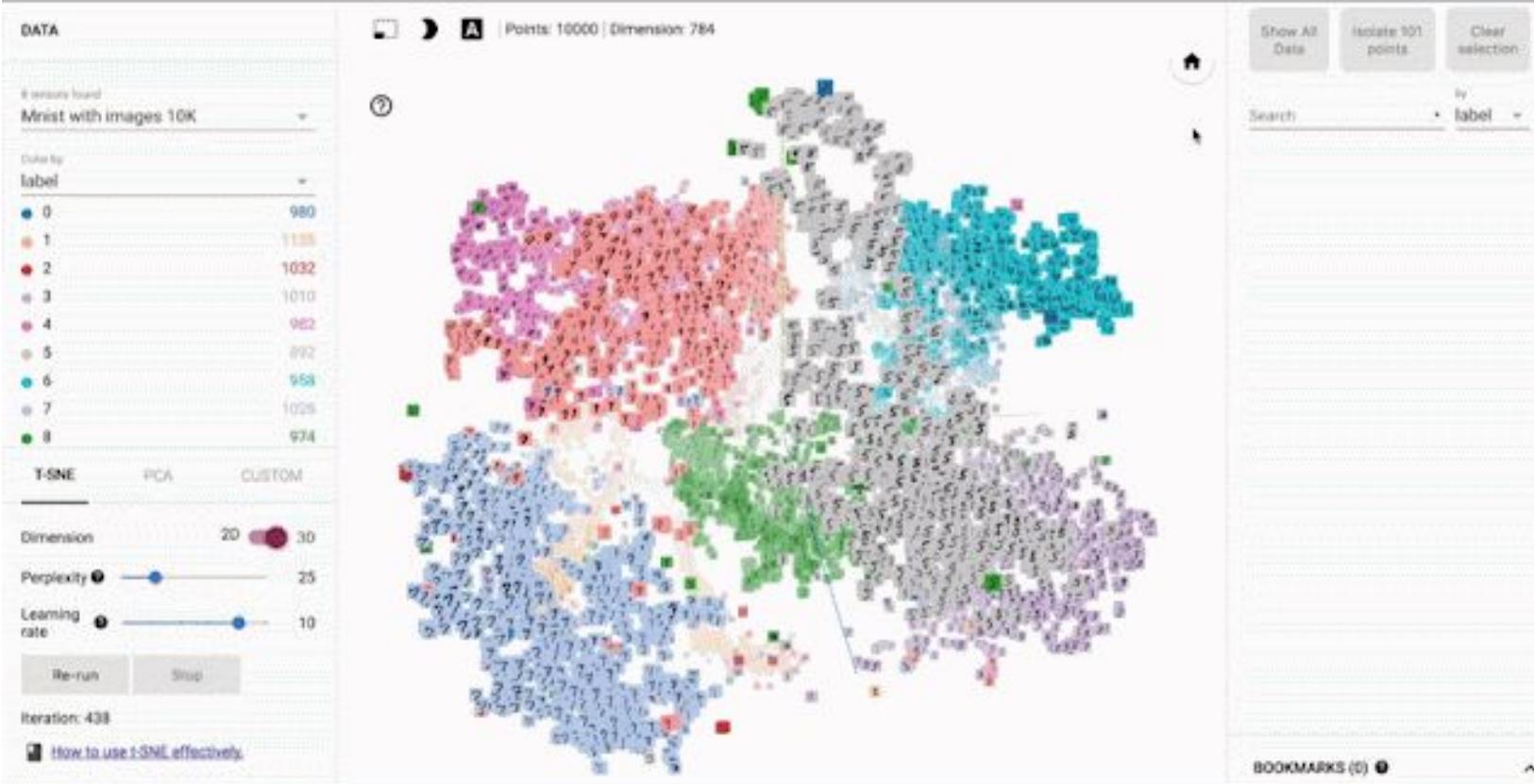
AI system

Artificial intelligence system made of human labor



EXPLANATORY:

Anatomy of an AI system, Crawford and Joler, 2018



EXPLORATORY: Multidimensional ML Data, Google Open Source Blog

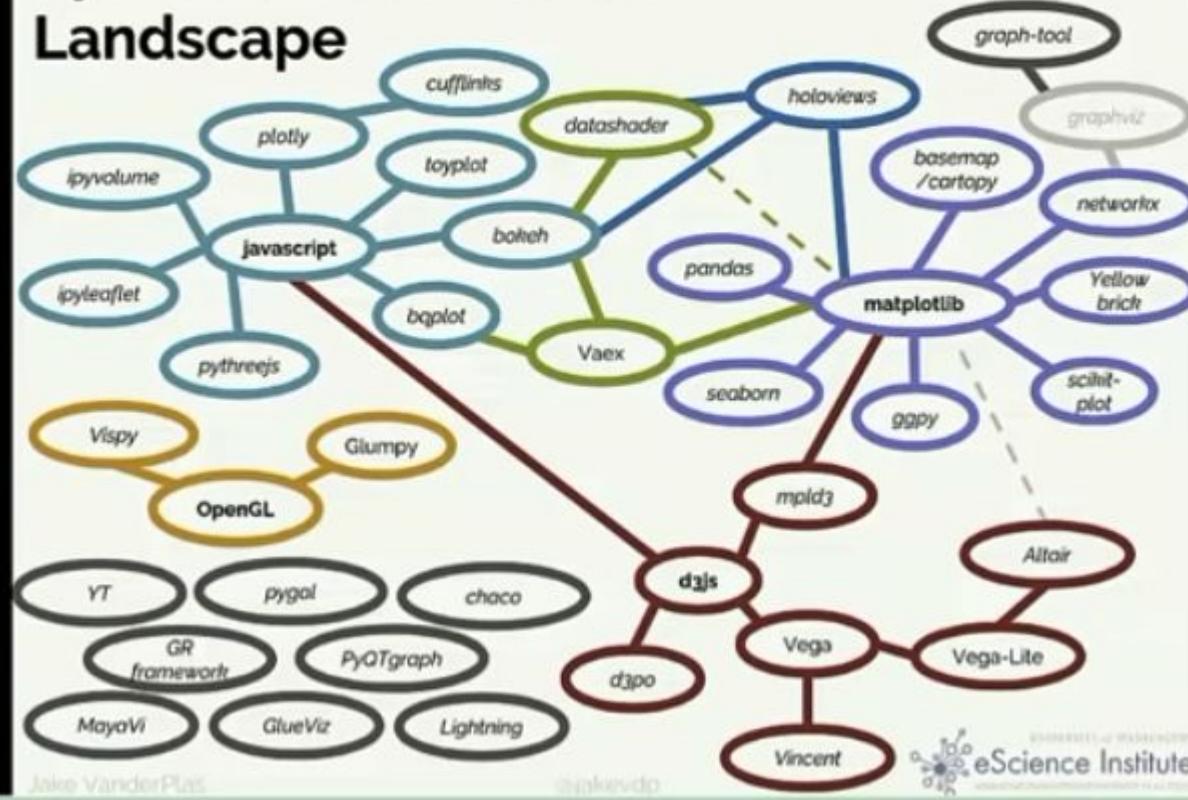
<https://opensource.googleblog.com/2016/12/open-sourcing-embedding-projector-tool.html>



what will we do in this class?

- learn some basic and advanced tools of data visualization in Python and Javascript
- refine our visualizations based on design principles from interdisciplinary sources
- work with real datasets from a wide variety of domains
- develop techniques in interactivity, geospatial mapping, and machine learning visualization
- get comfortable reading documentation and using new tools quickly
- interrogate the concept of data as a form of knowledge production, and learn to approach visualizations critically
- iterate and collaborate on a final data project at the end of the semester

Python's Visualization Landscape



Jake VanderPlas, PyCon 2017

how will we do class?

2.5 hrs, 1x per week Wednesday (now!)

- **Short Lecture + Group Discussion**
 - Based on the readings, due before class each week
 - Readings = often conceptual, contextual, examples
- **Student Presentations**
 - Mini-talk based on visualization found in the world, starting week 2
- **Lab + Workshop**
 - Technical, programming and hands-on work; this will sometimes be guided by the professor, and sometimes involve documentation-based tutorials and group work

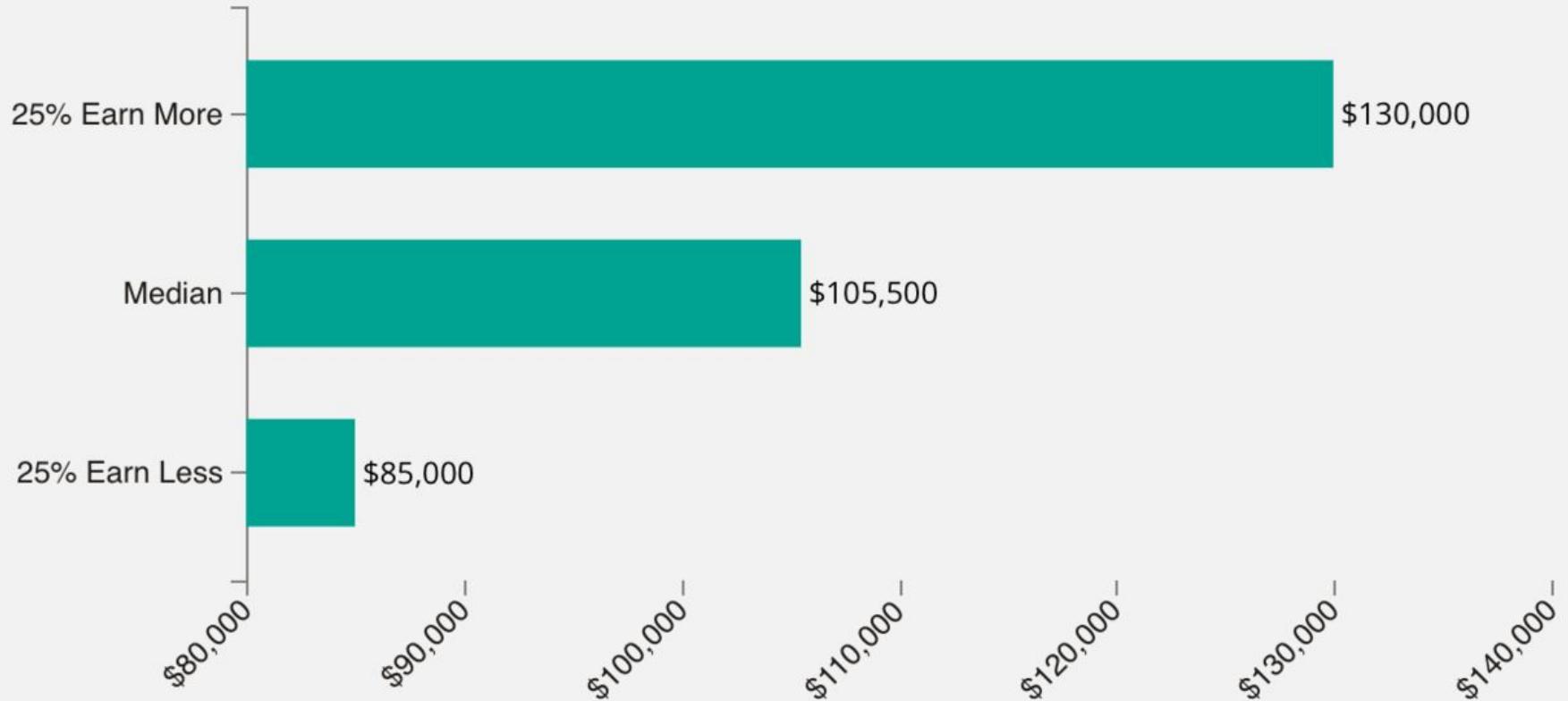
how will we do class?

 **Discord** - post 1x per week, "found data visualizations"

- add an image of the visualization (or a screenshot if it's interactive, multimedia, etc.)
- cite the source: give us the link where you found it (or book! etc.), and name the author if available
- write a short paragraph about how this visualization relates to the week's theme and readings

1 post, 1 response - **due before class @ 4:00pm every week**,
starting in Week 2

more details in syllabus - **read syllabus!**



from wtf.viz; bad

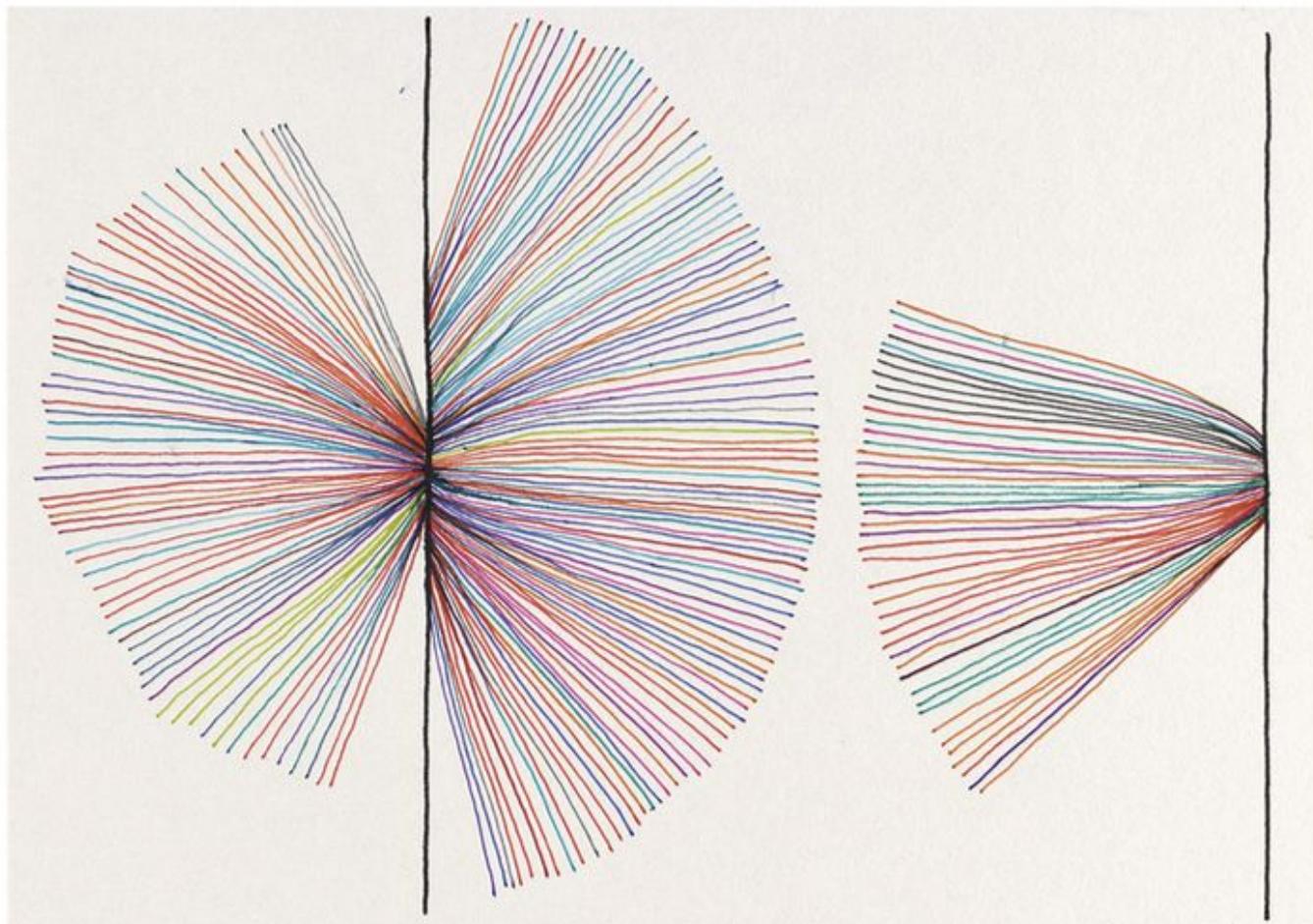
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Salaried Personnel		Jan	Feb	Mar	Apr	may	jun	july	Aug	Sept	Oct	Nov	Dec
2	Utilized 2020	2	24 hrs											
3		1		12hrs										
4		2			36 hrs									
5		4				72 hra								
6		4					76 hrs							
7		3						48hrs						
8		4							72 hrs					
9		2								48 hrs				
10		2									76hrs			
11		4										88 hrs		
12		3											76 hrs	
13		1												48 hrs
14														
15	2021	2	36 hrs											
16		4		84 hrs										
17														

I asked a coworker how much overtime her salaried staff worked last year. I got this. In addition to graphic terrible-ness, all the numbers are entered as text.

from wtf.viz; bad

a week of complaints

Stefanie



Stefanie Posavec, Dear Data (w/Giorgia Lupi)

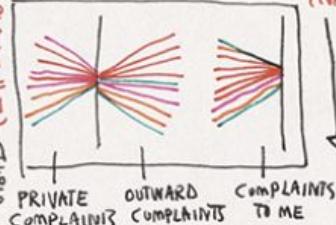
DEAR DATA - WEEK 07

A WEEK OF COMPLAINTS*

AND GENERAL GRUMPINESS

HOW TO READ IT: (I THREW DOWN MY

4 PENS WHEN I FINISHED)
(COMPLAINT #7) WHAT IS WRONG W/MG??



TYPE OF COMPLAINT:

WEATHER	HEALTH
HUSBAND	HUNGER
ANIMALS	MYSELF
FAMILY	TECHNOLOGY/ MEDIA
SOCIETY	MONEY
THE WORLD TODAY	INANIMATE OBJECTS
ACQUAINTANCES/ STRANGERS	TRANSPORT
MY APPEARANCE	
FRIENDS	
WORK	

THIS PEN (COMPLAINT #8) LEAKED + SMUDGED
MY DRAWING + GOT ALL OVER MY HANDS!
MY STUPID LEFT HAND!!

*AND A WEEK OF COMPLAINTS ABOUT HOW I F***ED UP THIS DRAWING! (COMPLAINT #5)

FROM:
S POSAVEC
LONDON
UK



TO:

GIORGIA LUPI

BROOKLYN, NY

USA

DELIVERED BY

HAND (SPECIAL NYC
DELIVERY!)

Stefanie Posavec, Dear Data (w/Giorgia Lupi)

Exercise:

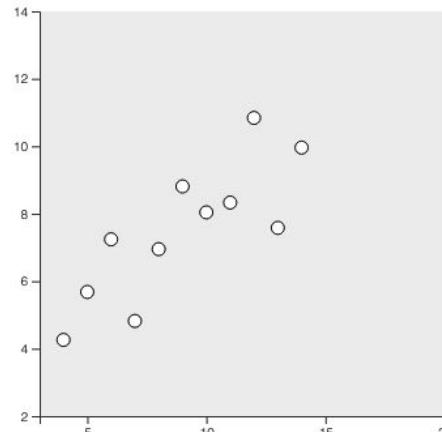
1. Form groups of 3-4
2. Introduce each other
3. Choose 1 “data point” to collect about the group, represent it visually, sketch
4. Discuss the data @ the right - how would you as a group choose to visualize this? What might it mean?

X1	Y1	X2	Y2	X3	Y3	X4	Y4
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	4.26	4.0	3.10	4.0	5.39	19.0	12.50
12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

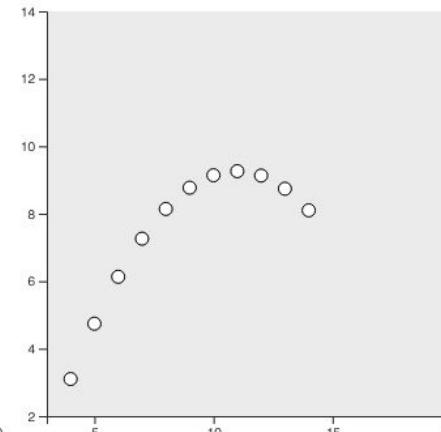
STATS ONLY: DATA TABLE SUMMARY

group	x mean	y mean	x median	y median	x variance	y variance	correlation
1	9.00	7.50	9.00	7.58	11.00	11.00	0.45
2	9.00	7.50	9.00	8.14	11.00	11.00	0.45
3	9.00	7.50	9.00	7.11	11.00	11.00	0.45
4	9.00	7.50	8.00	7.04	11.00	11.00	0.45

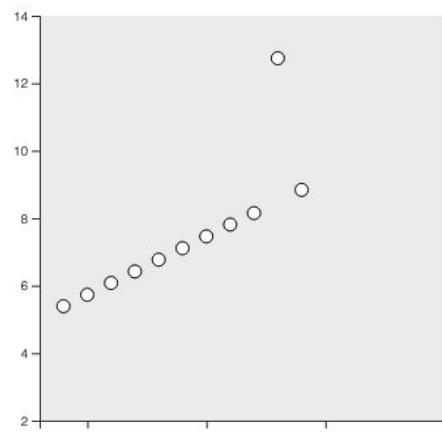
Group 1



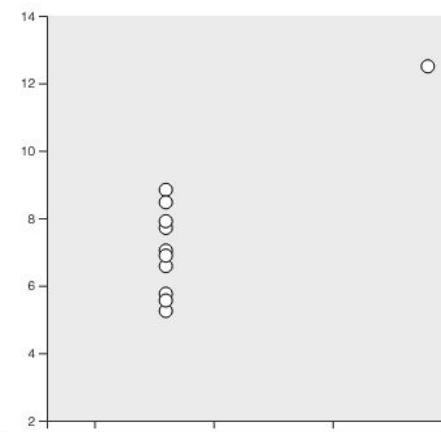
Group 2



Group 3



Group 4



ANSCOMBE'S QUARTET (1973) -
visualization makes a difference!

- SURVEY DUE: Friday Sept. 1st, 5pm
- WEEK 1 READINGS = due before class next week
- HAPPY LABOR DAY WEEKEND!