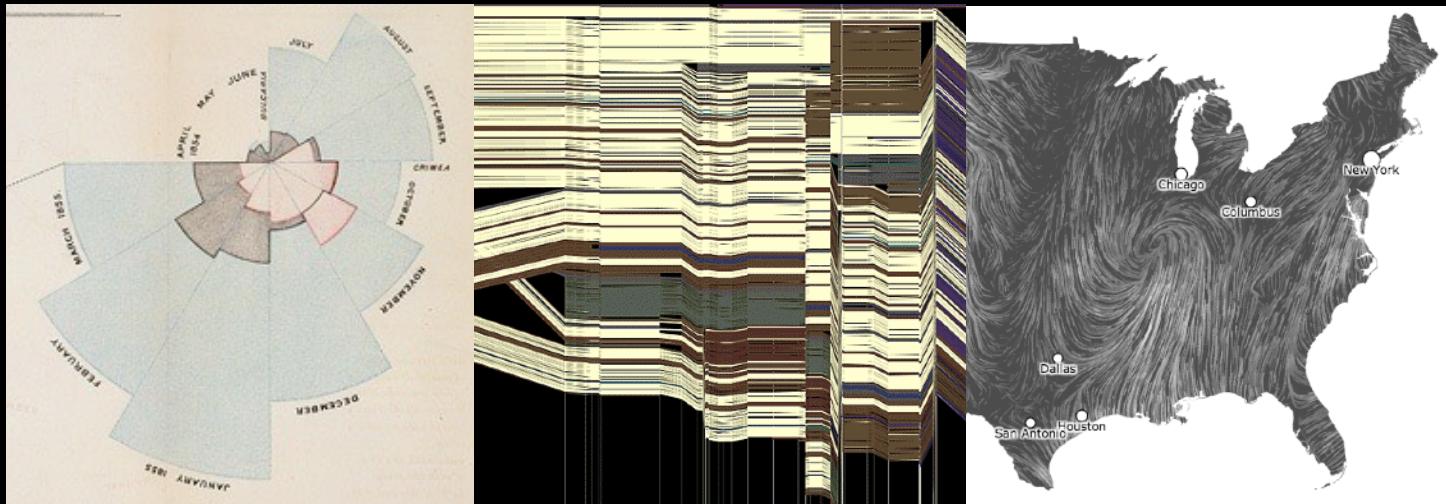


# CSE 442 - Data Visualization

# Final Project



Jeffrey Heer University of Washington

# Final Project

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Produce an **explorable visual explanation**

Initial **prototype** and **design review**

**Final deliverables** and **video presentation**

Submit and **publish online** (GitLab)

Projects from **previous classes** have been:

- Published as research papers
- Shared widely (some in the New York Times!)
- Released as successful open source projects

# Final Project Theme

## **Explorable Explanations**

*Goal: produce an interactive web page that explains a complex subject to the reader.*

The topic could be a scientific phenomenon, a computer science algorithm, a mathematical concept, a sociological theory, or another topic that you're passionate about.

Focus on creating one or more interactive diagrams interlinked with explanatory text or annotations. We urge you to focus on a highly visual, interactive experience. Do not expect a viewer to read large amounts of article text.

# Final Project Schedule

<i>Proposal</i>	Fri Feb 20
<i>Prototype</i>	Wed Mar 4
<i>Demo Video</i>	Wed Mar 11
<i>Video Showcase</i>	Thu Mar 12 (in class)
<i>Deliverables</i>	Mon Mar 16

## **Logistics**

Final project description posted online

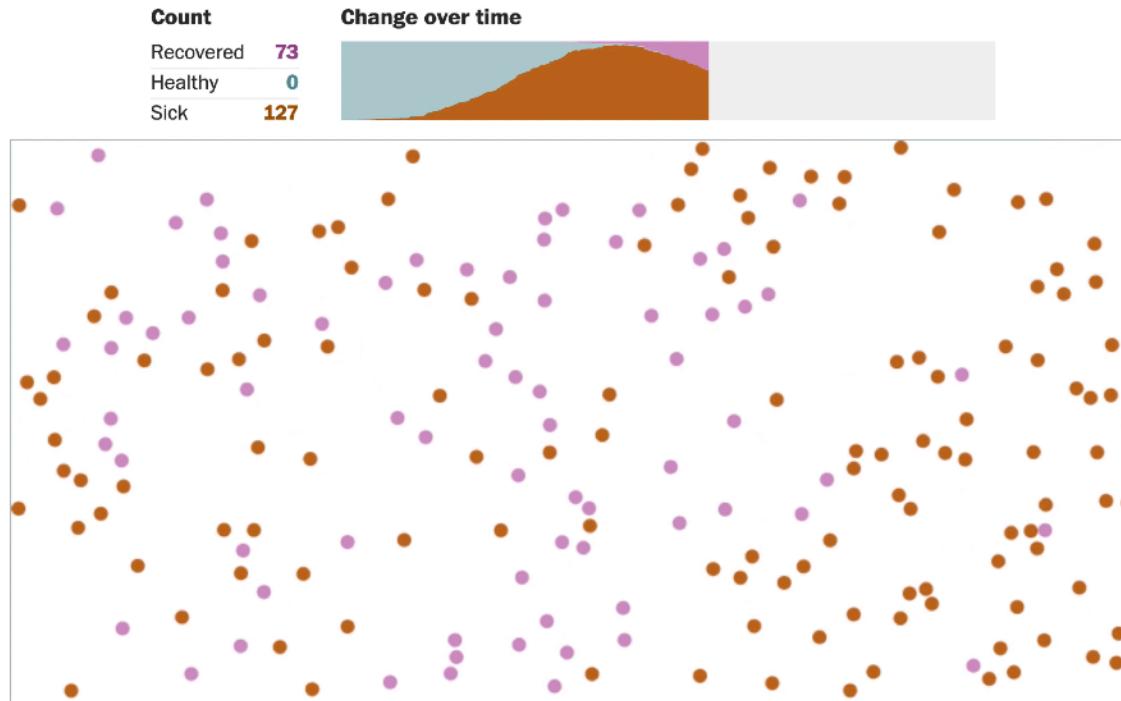
Work in groups of 1-3 (or 4 with permission)

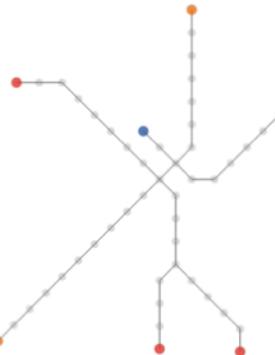
Start determining your project topic!

Inspiration...

# Why outbreaks like coronavirus spread exponentially, and how to “flatten the curve”

Harry Stevens, Washington Post 2020





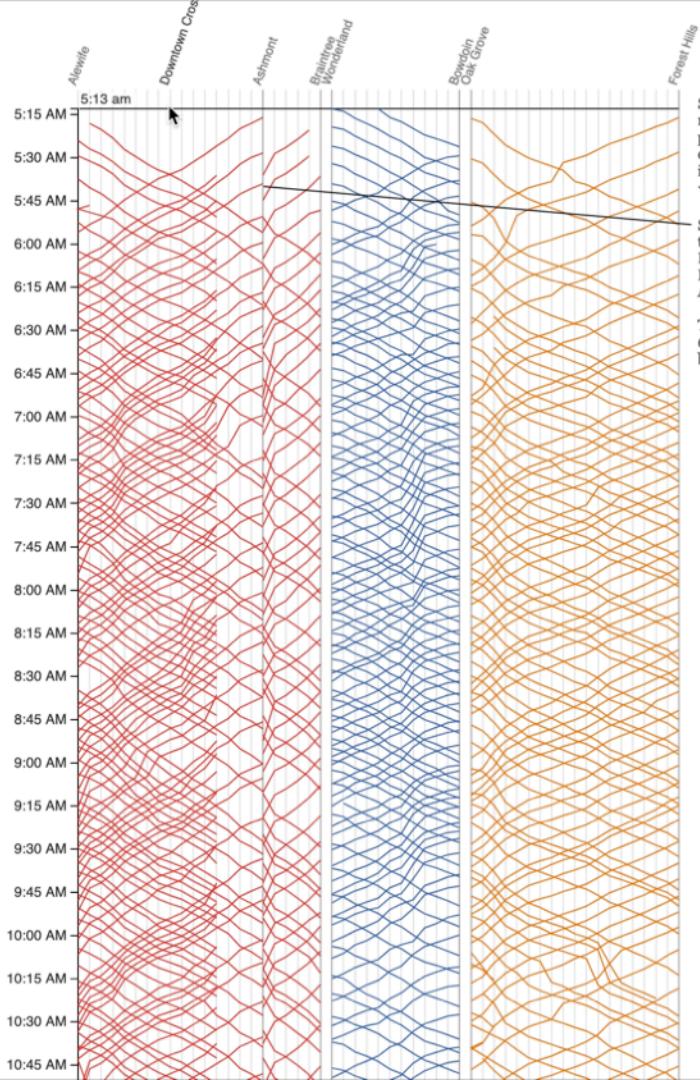
Locations of each train on the [red](#), [blue](#), and [orange](#) lines at 5:13 am. Hover over the diagram to the right to display trains at a different time.

Trains are on the right side of the track relative to the direction they are moving.

See the [morning rush-hour](#), [midday lull](#), [afternoon rush-hour](#), and the [evening lull](#).

# MBTA Viz

Barry & Card

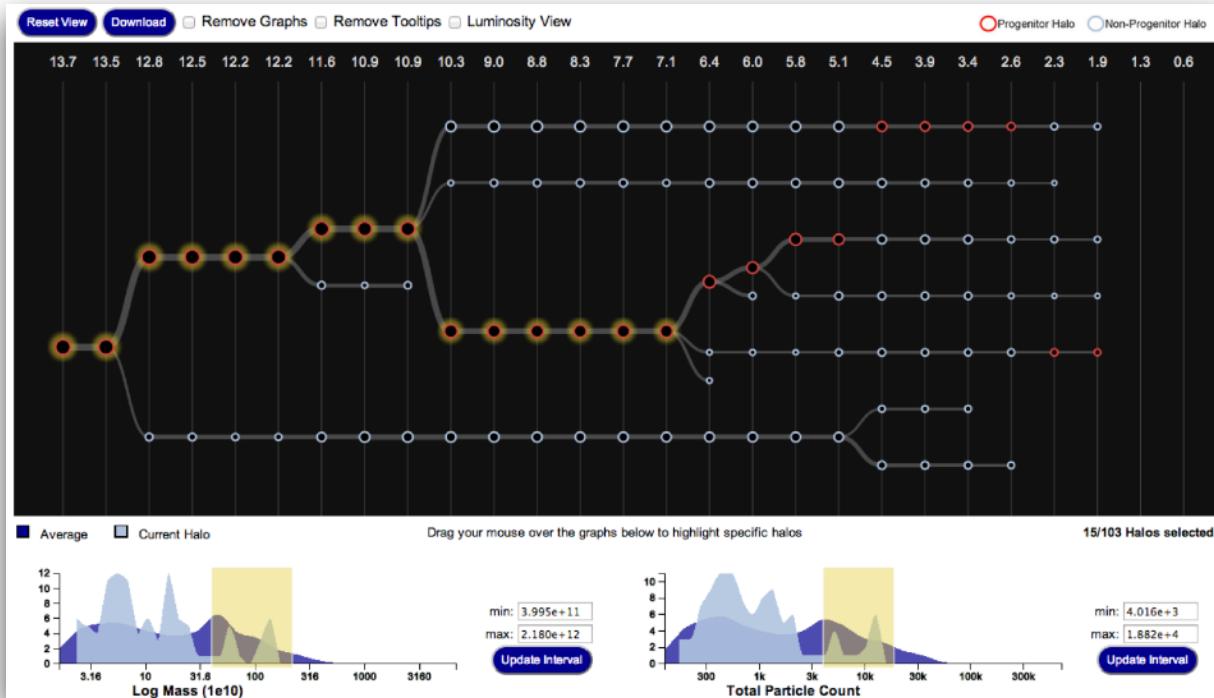


Service starts at 5AM on Monday morning. Each line represents the path of one train. Time continues downward, so steeper lines indicate slower trains.

Since the red line splits, we show the Ashmont branch first then the Braintree branch. Trains on the Braintree branch "jump over" the Ashmont branch.

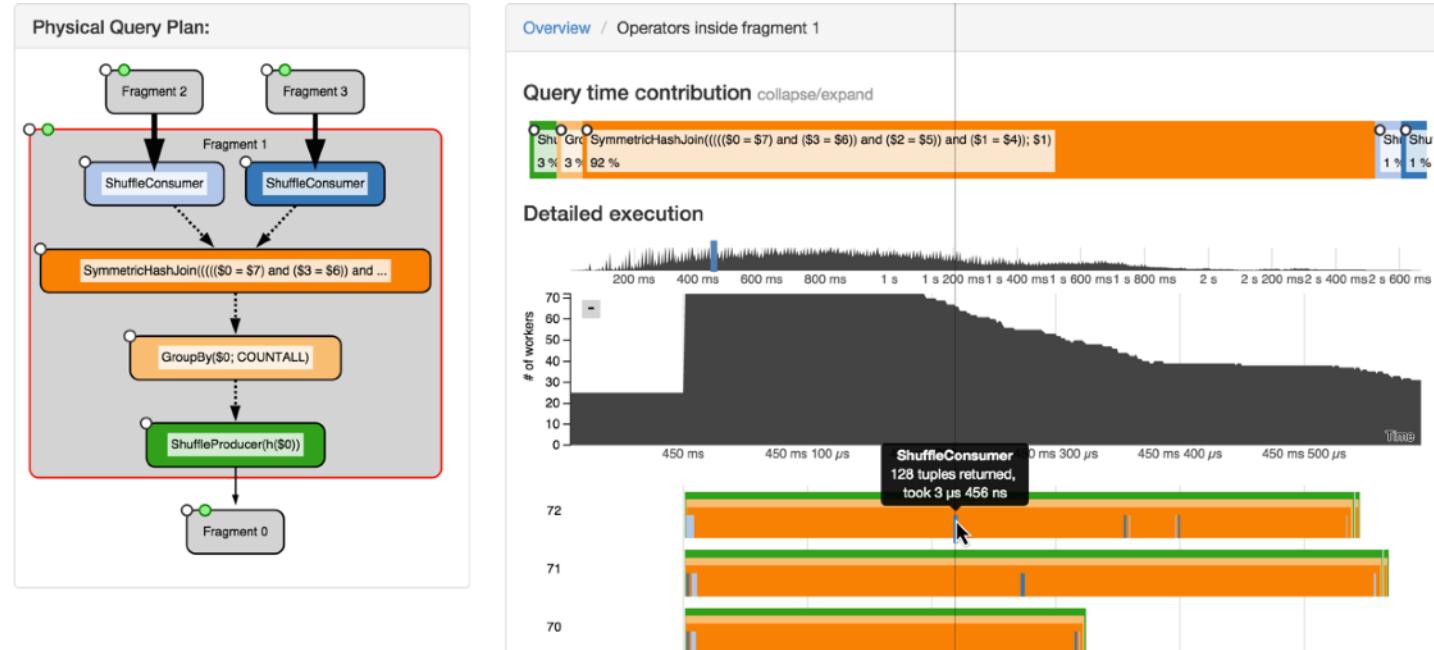
Train frequency increases around 6:30AM as morning rush hour begins.

# Visualizing Galaxy Merger Trees



S. Loebman, J. Ortiz, L. Orr, M. Balazinska, T. Quinn et al. [SIGMOD '14]

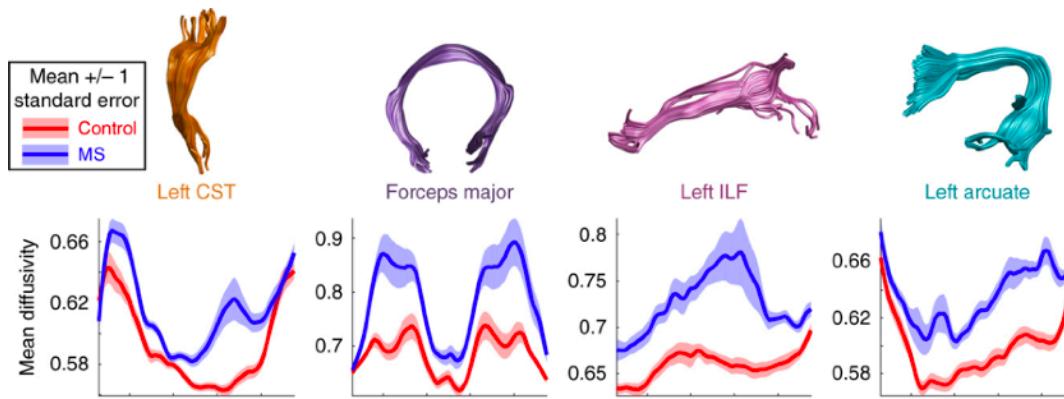
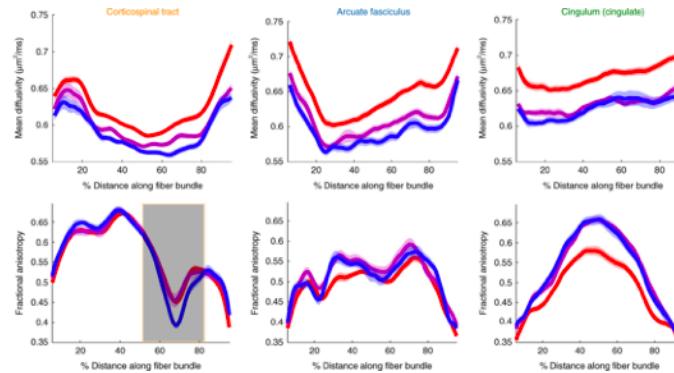
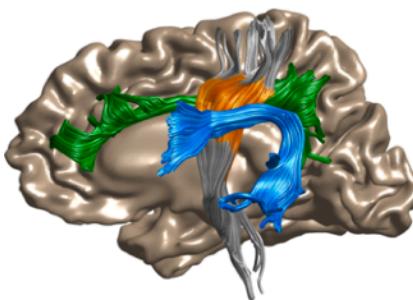
# Perfopticon Distributed Query Performance



Dominik Moritz et al. [EuroVis '15]

# A browser-based tool for visualization and analysis of diffusion MRI data

Jason D. Yeatman , Adam Richie-Halford, Josh K. Smith, Anisha Keshavan & Ariel Rokem 



# KEYBOARD WALKING

Passwords with a “keyboard walking” pattern start at an arbitrary key, then move in a direction (usually right or down) while continuing to hit keys. Sometimes this is combined with holding down the SHIFT key, so that some characters are uppercase or symbols to improve complexity.

While the generated password may seem to be random and unhackable, password crackers [check for these keyboard patterns](#) and guess them early on.

Many passwords in the leaked passwords dataset have a spatial pattern. Other than the numeric passwords like **123456**, common keyboard walking offenders include **qwerty** and **1qaz@wsx**.

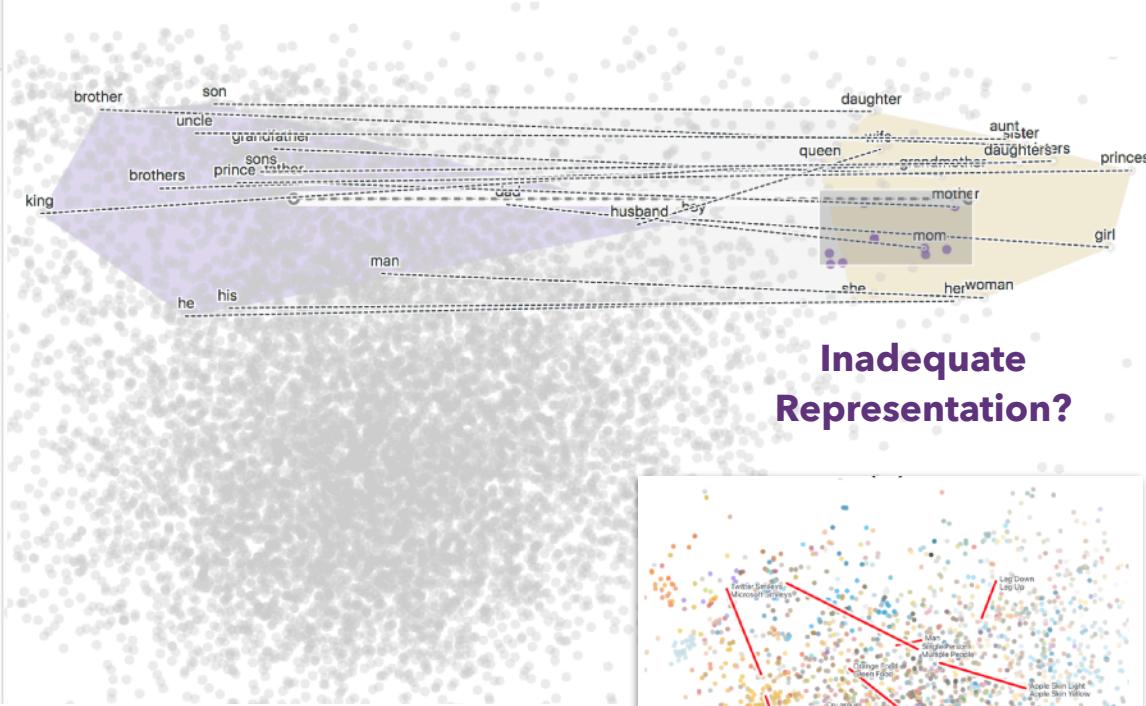
Password: **QwErTyAsDf**      Guess time: 1 minute



## Semantic Passwords

Vishal Devireddy (CSE 512, Spring '21)

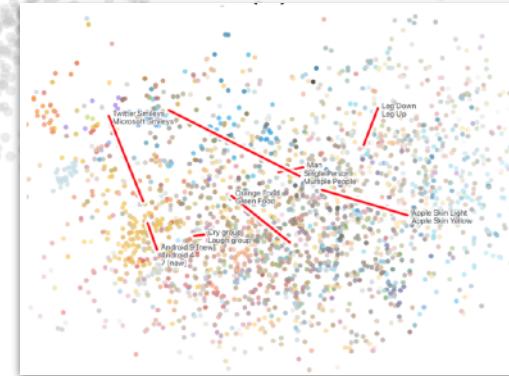
Brushed	
mother	+
ms.	+
wedding	+
pink	<b>Bias?</b>
mom	+
nurse	+
bedroom	+
ladies	+
householder	+
butterfly	+



# Latent Space Cartography

## Visual Analysis of Vector Space Embeddings

Yang Liu, Eunice Jun, Qisheng Li (CSE 512, Spring '18)



# Tips for a Successful Project

Focus on a compelling **real-world problem**.  
How will you gauge success?

Consider **multiple design alternatives**.  
Prototype quickly (use Tableau, R, etc...).

**Seek feedback** (representative users, peers, ...).  
Even informal usage can provide insights.

Choose **appropriate team roles**.

**Start early** (and read the suggested paper!)

# Change Blindness

# Change Blindness



# Change Blindness



# Change Blindness



# Change Blindness



# Change Blindness



[Example from Palmer 99, originally due to Rock]

# Demonstrations

<https://www2.psych.ubc.ca/~rensink/flicker/download/>

<http://www.youtube.com/watch?v=Ahg6qcgoay4>