

CSE 512 - Data Visualization

# Design Review & Critique



Jeffrey Heer University of Washington

# Final Project

# Final Project

**Create a visualization system, technique, or study.**

**Many options...**

New system for a chosen domain + data set

Novel visualization / interaction technique

Design study or experiment

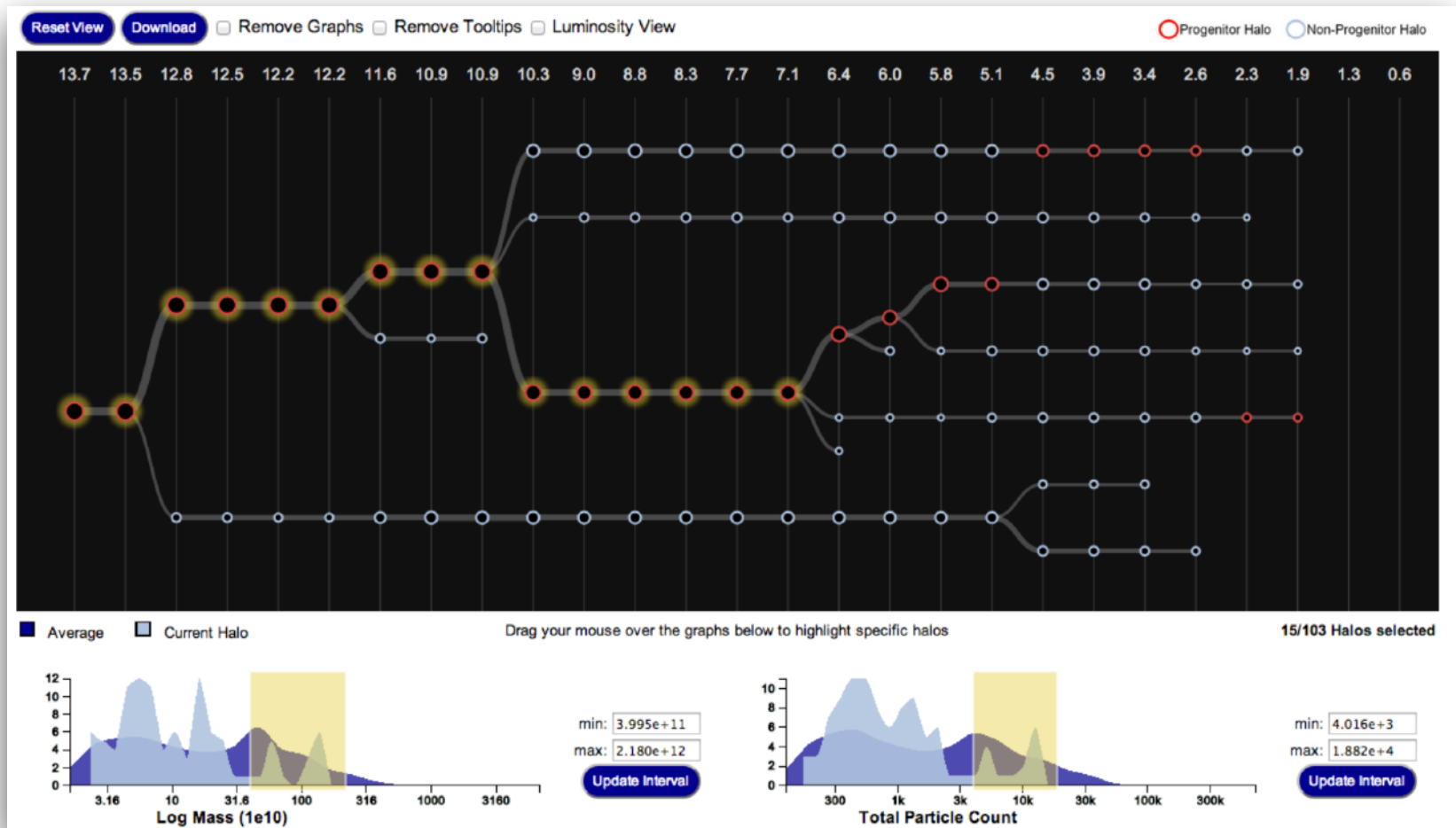
**Deliverables**

Share milestone progress

Project results (software, study results, etc.)

Video demonstration (max. 2 min)

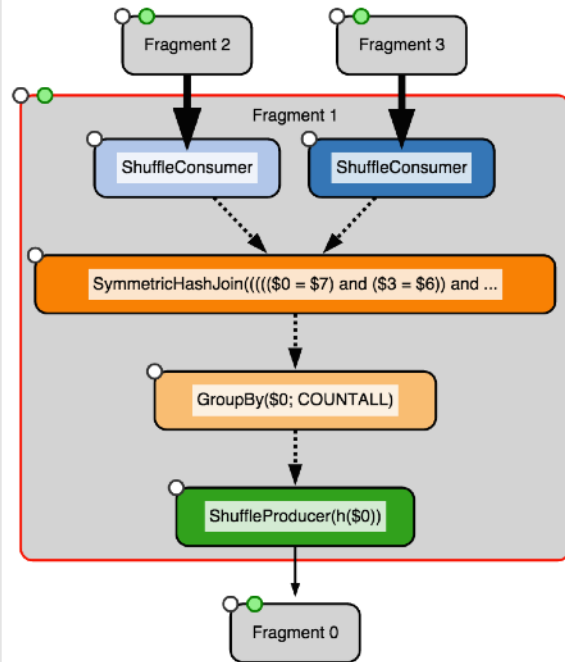
# Visualizing Galaxy Merger Trees



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

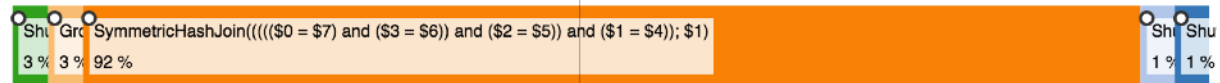
# Perfopticon Distributed Query Performance

Physical Query Plan:

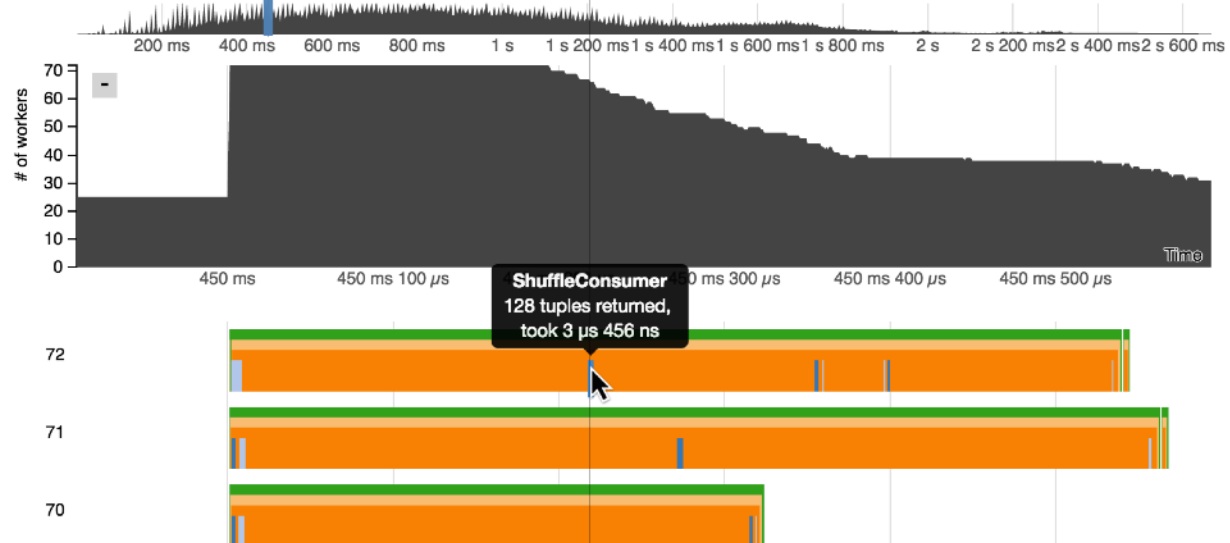


Overview / Operators inside fragment 1

Query time contribution collapse/expand



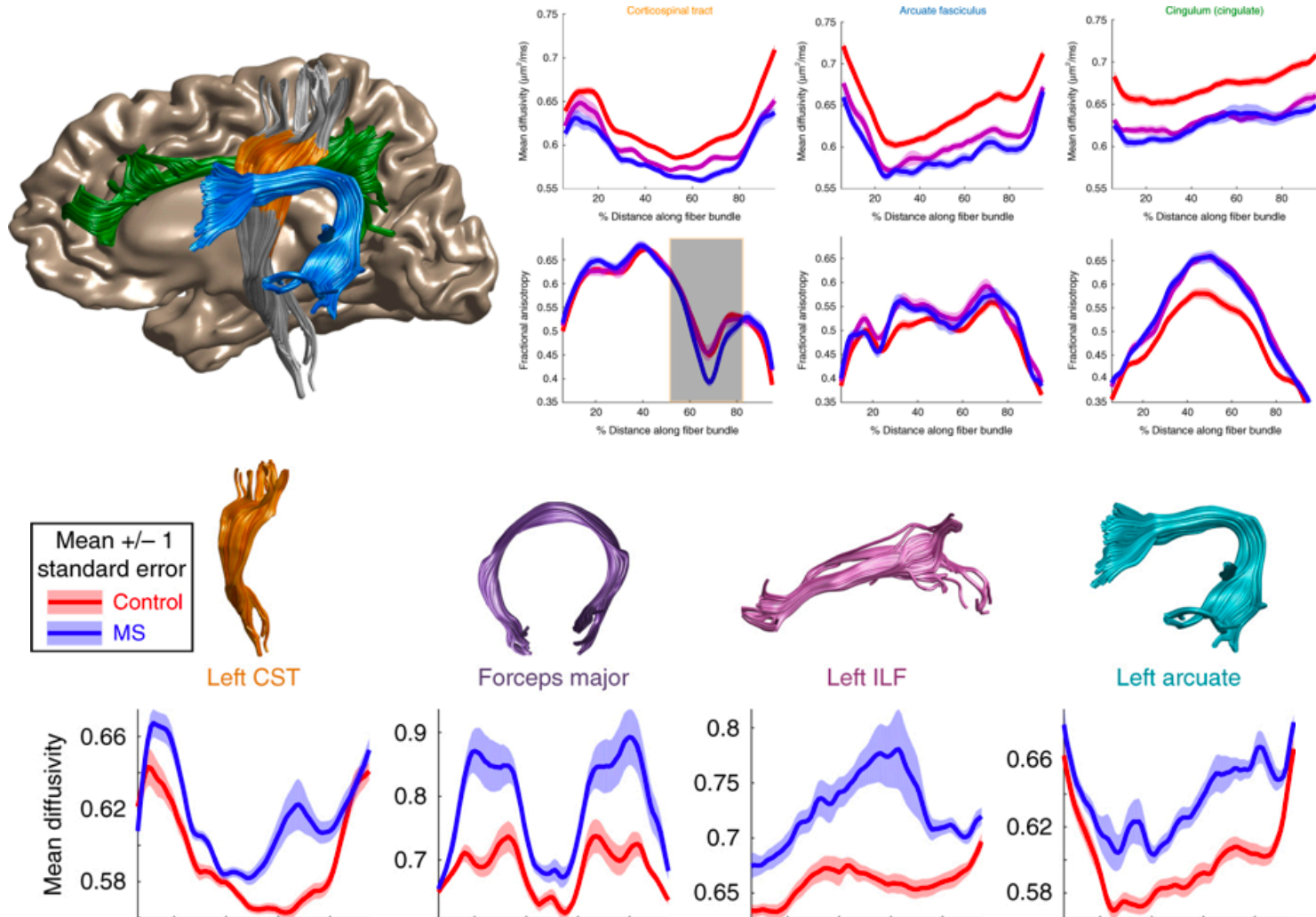
Detailed execution



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

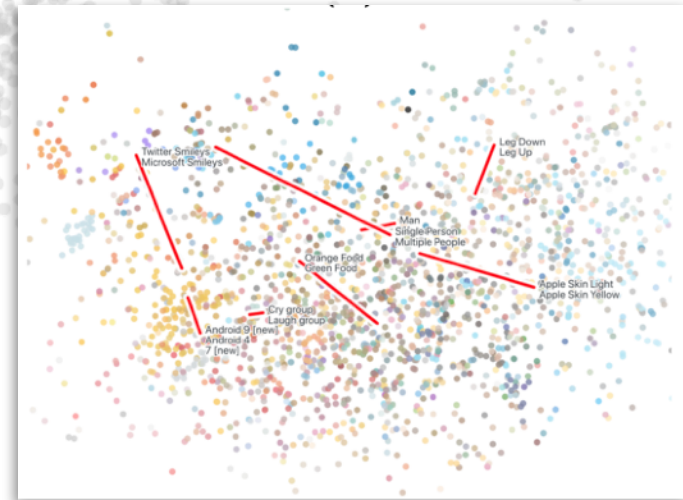
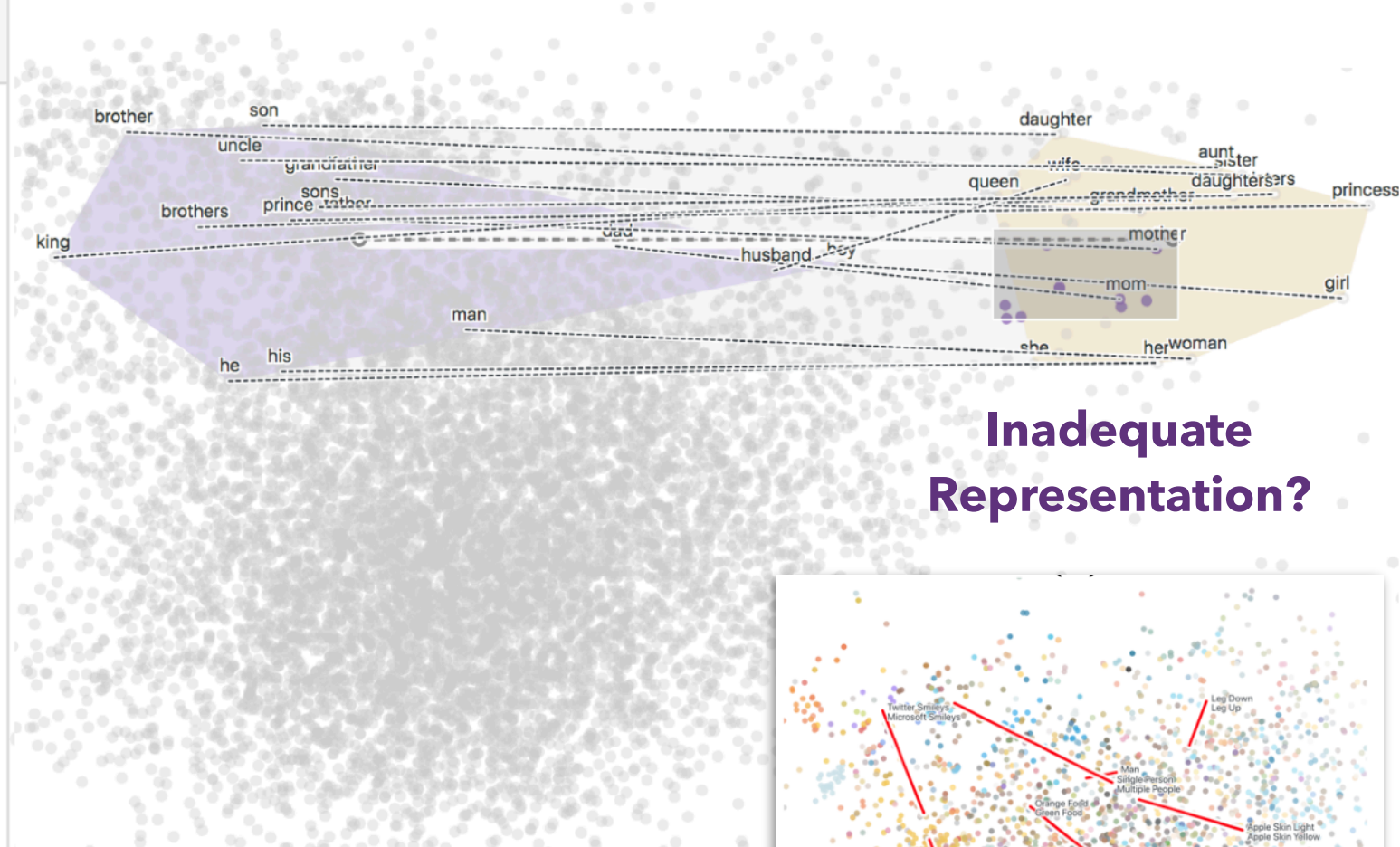
Article | OPEN | Published: 05 March 2018

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



Brushed

- mother +
- ms. +
- wedding +
- pink **Bias?** +
- mom +
- nurse +
- bedroom +
- ladies +
- householder +
- butterfly +



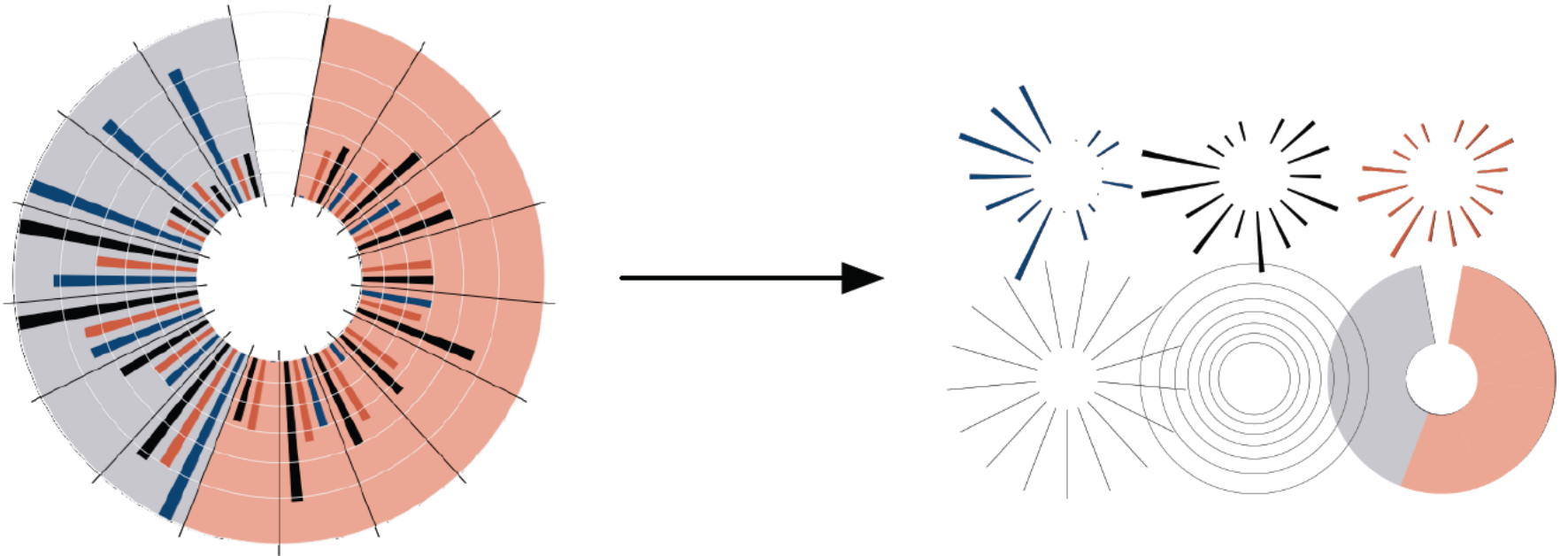
# Latent Space Cartography

## Visual Analysis of Vector Space Embeddings

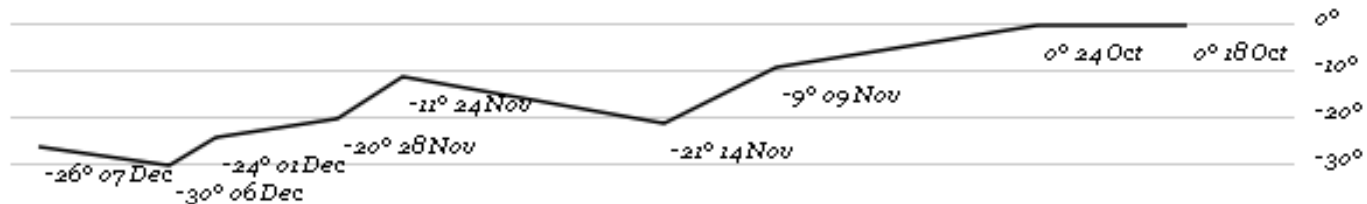
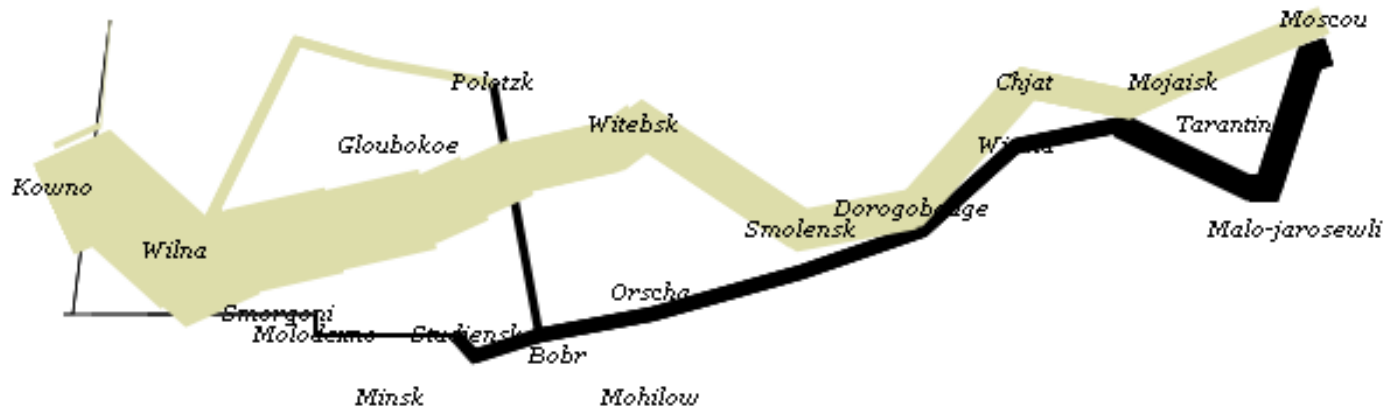
Yang Liu, Eunice Jun, Qisheng Li (CSE 512, Spring '18)

# Protovis: A Graphical Toolkit for Visualization

**Mike Bostock**







```
var army = pd.nest(napoleon.army, "dir", "group");
var vis = new pv.Panel();

var lines = vis.add(pv.Panel).data(army);
lines.add(pv.Line)
  .data(function() army[this.idx])
  .left(lon).top(lat).size(function(d) d.size/8000)
  .strokeStyle(function() color[army[panelIndex][0].dir]);
```

```
vis.add(pv.Label).data(napoleon.cities)
  .left(lon).top(lat)
  .text(function(d) d.city).font("italic 10px Georgia")
  .textAlign("center").textBaseline("middle");
```

```
vis.add(pv.Rule).data([0,-10,-20,-30])
  .top(function(d) 300 - 2*d - 0.5).left(200).right(150)
  .lineWidth(1).strokeStyle("#ccc")
  .anchor("right").add(pv.Label)
  .font("italic 10px Georgia")
  .text(function(d) d+"°").textBaseline("center");
```

```
vis.add(pv.Line).data(napoleon.temp)
  .left(lon).top(tmp) .strokeStyle("#0")
  .add(pv.Label)
  .top(function(d) 5 + tmp(d))
  .text(function(d) d.temp+"° "+d.date.substr(0,6))
```

# Visualizing the Republic of Letters

Daniel Chang, Yuankai Ge, Shiwei Song

## Republic of Letters

1700



## FILTER BY AUTHOR

Clear All

Damien Desormes  
Daniel Cornabs  
Daniel de Pury  
Daniel Defoe  
Daniel Malthus  
Daniel Marc Antoine Chardon  
Daniel Muller

## TOP CITIES AND AUTHORS

Letters received Letters sent



# Final Project Schedule

<i>Proposal</i>	Wed, May 19
<i>Milestone</i>	Thu, May 27
<i>Video</i>	Wed, June 2
<i>Deliverables</i>	Wed, June 9

## **Logistics**

Final project description posted online

Groups of up to 4 people

Select topics and form groups now!

# Possible Project Ideas

Advance your **existing research**.

Pick an **open problem** of interest.

Work in a domain with **real stakeholders**.

# 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!)

# Prototype Peer Critiques

# Critique Questions

What is the purpose of the visualization?

Does it serve its purpose well?

Does it convey the data honestly?

Does it show the appropriate level of detail?

Are expressive & effective visual encodings used?

Do the interactions aid understanding of the data?

Is the design well-organized? Is it innovative?

What would like to change or refine?

How might things be done differently?

# I Like... / I Wish... / What If?

## **I LIKE...**

Praise for design ideas and/or well-executed implementation details. *Example: "I like the navigation through time via the slider; the patterns observed as one moves forward are compelling!"*

## **I WISH...**

Constructive statements on how the design might be improved or further refined. *Example: "I wish moving the slider caused the visualization to update immediately, rather than the current lag."*

## **WHAT IF?**

Suggest alternative design directions, or even wacky half-baked ideas. *Example: "What if we got rid of the slider and enabled direct manipulation navigation by dragging data points directly?"*





# I Like... / I Wish... / What If?

## **I LIKE...**

The goal of supporting developers to improve decoupling.

The "cut-line" interaction to isolate links of interest.

The use of gradients to show edge directionality.

## **I WISH...**

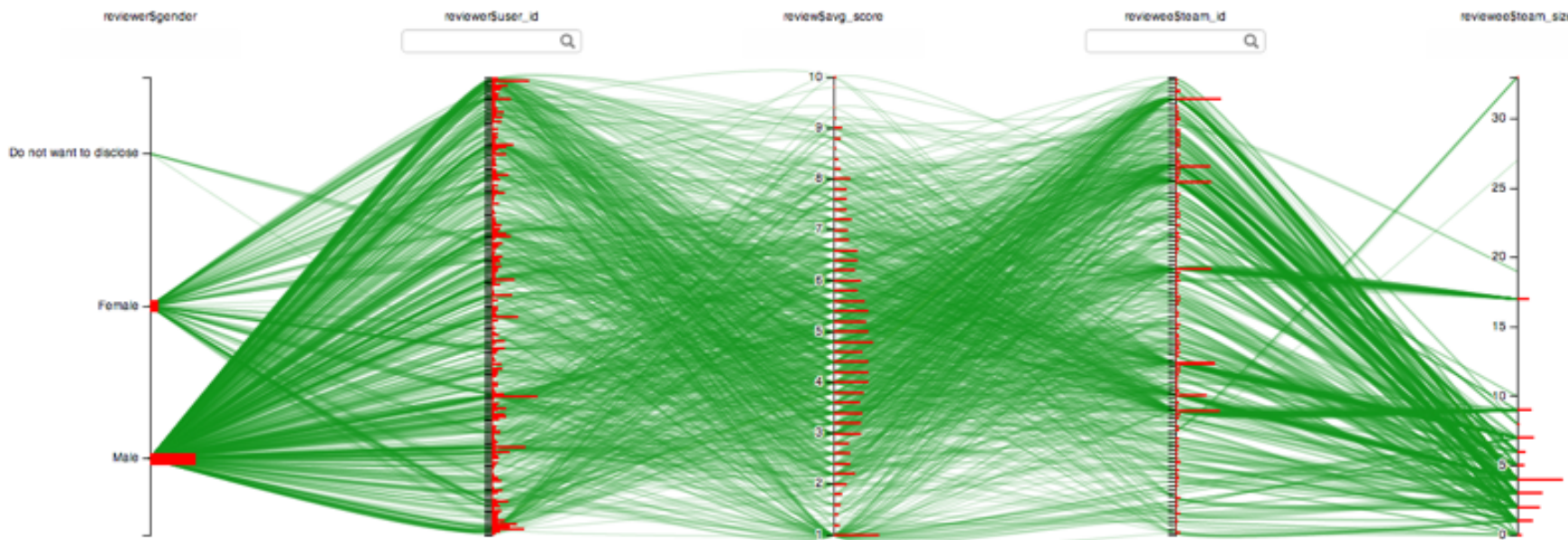
I could author multiple cut-lines for compound queries.

More details on demand were shown upon mouse-hover.

## **WHAT IF?**

You could incorporate information from applications that use this code? How often are different modules used?

- REVIEWER  gpa  academic\_major  age\_range  location  gender  signin\_count  user\_id
- REVIEW  avg\_score  score1  score2  score3  score4  score5
- REVIEWEE  team\_id  team\_size



reviewer\$gpa	reviewer\$acad...	reviewer\$age...	reviewer\$locat...	reviewer\$gender	reviewer\$signi...	reviewer\$user_id	review\$avg_s...	review\$score1	review\$score2	review\$score3	review\$score4	review\$score5	reviewee\$tea...	reviewee\$tea...
NULL	NULL	NULL	NULL	NULL	21	37212	4	4	5	6	4	1	5069	4
NULL	NULL	NULL	NULL	NULL	21	37212	7.4	8	7	7	6	9	5470	17
Does not ...	Science	26-30	Netherlands	Male	124	2230	6.8	7	7	8	7	5	5693	7
Does not ...	Science	26-30	Netherlands	Male	124	2230	2.2	2	1	3	4	1	5836	4
Do not w...	Business	31-35	Spain	Male	80	2848	4.4	4	1	7	9	1	5069	4
3-3.49	Other	21-25	Spain	Female	75	2826	5	5	5	5	5	5	5215	4
3-3.49	Engineering	over 50	United St...	Male	110	19502	3.6	5	5	2	3	3	5215	4
3.5-4.00	Science	36-40	Greece	Male	125	27386	3.6	3	6	5	3	1	5250	3
3-3.49	Engineering	over 50	United St...	Male	110	19502	7	9	5	9	6	6	5693	7

# I Like... / I Wish... / What If?

## **I LIKE...**

The 1D histograms on the parallel coordinates display.  
The use of brushing and linking between components.  
Attention to small details, such as white masks for axis labels.

## **I WISH...**

Data fields were configured to focus on the most relevant features.  
The interaction was faster (lower latency).  
A color-blind friendly color palette had been used.

## **WHAT IF?**

One tried to visualize the data using a technique other than parallel coordinates? What encodings work best for the intended audience?

# Critique Categories

## **Visualization Design**

Choice of visual encodings (expressive, effective?)  
Is the appropriate information visible by default?

## **Interaction Design**

Choice of interaction techniques  
Do they enhance understanding of the data?  
Usability, discoverability, performance

## **Overall Design Quality**

Organization, legibility, fitness for chosen goals

# Reminders!

Final Project Proposal Due **Wed 5/19, 11:59pm**

<https://courses.cs.washington.edu/courses/cse512/21sp/fp.html>

Three Peer Evaluations Due **Tue 5/18, 11:59pm**

<https://courses.cs.washington.edu/courses/cse512/21sp/a3-peereval.html>