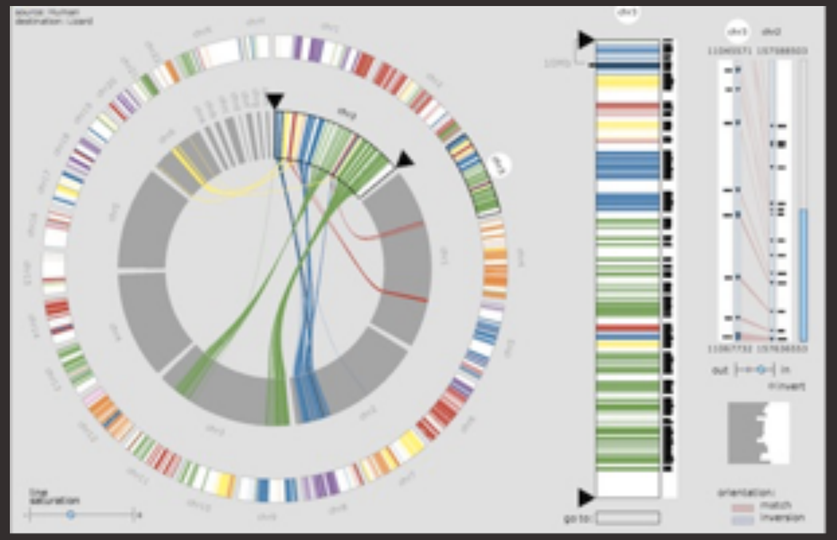
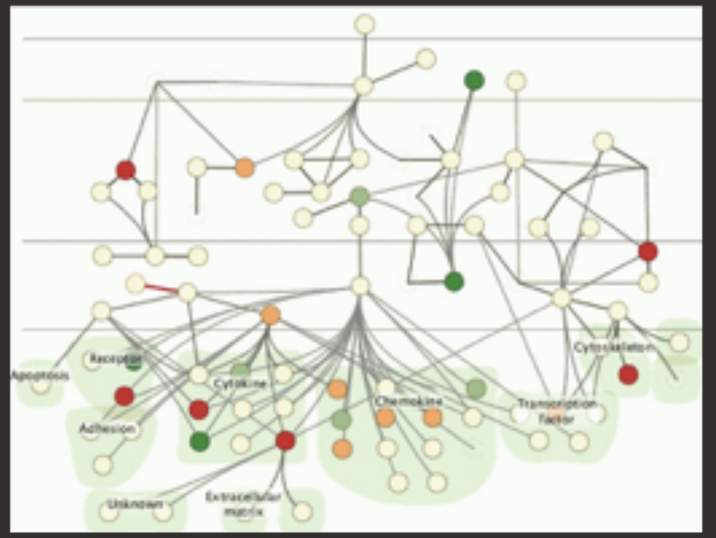
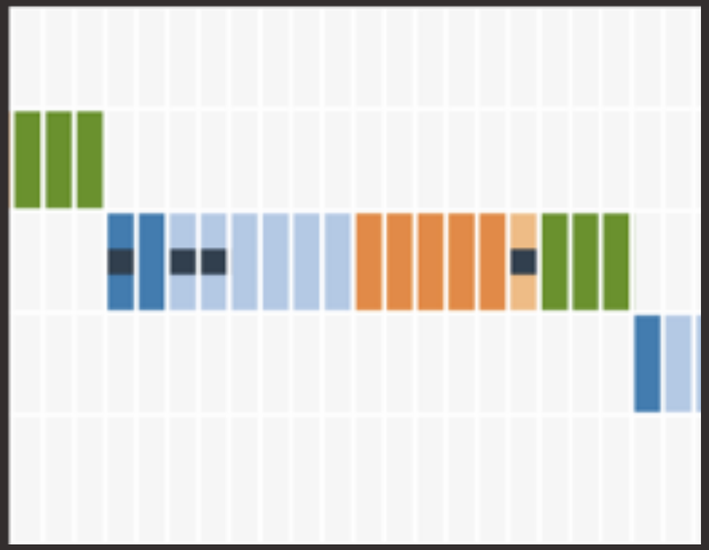
The purpose of visualization is insight, not pictures.

Visual analytics allows us to detect the expected, and discover the unexpected.

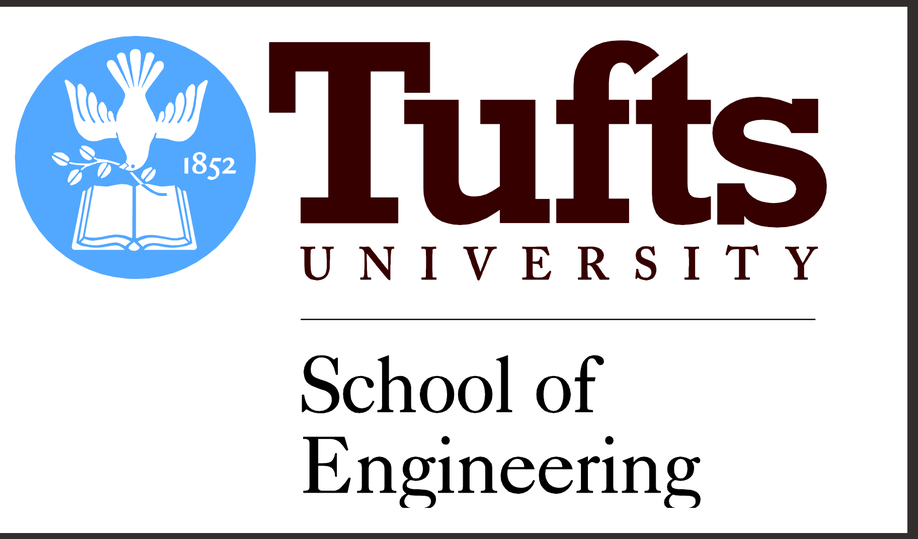






Biovisualization

I'm Lane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Tufts
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[v]alt
Visual Analytics Laboratory @ Tufts


PhD at WPI
quals
breadth
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research
proposal
defense
PhD at UMMS
WPI
SATURDAY MAY 14,2011
FUR PEACE RANCH
FUR PEACE STATION
SAT AUG 9 2008
FACE MASKS
WEBSTER'S DICTIONARY
WPI

Matt Ward

Administrative

(Stuff)

Course Description

“In this course we will study the use of interactive data and information visualization to model and analyze biological information, structures, and processes.

Topics include the fundamental principles, concepts, and techniques of visualization and how visualization can be used to study biological data at the genomic, cellular, molecular, organism, and population levels.”

Course Goals

Course Goals

(What's in it for you?)

1. Critically evaluate and deconstruct data visualizations.

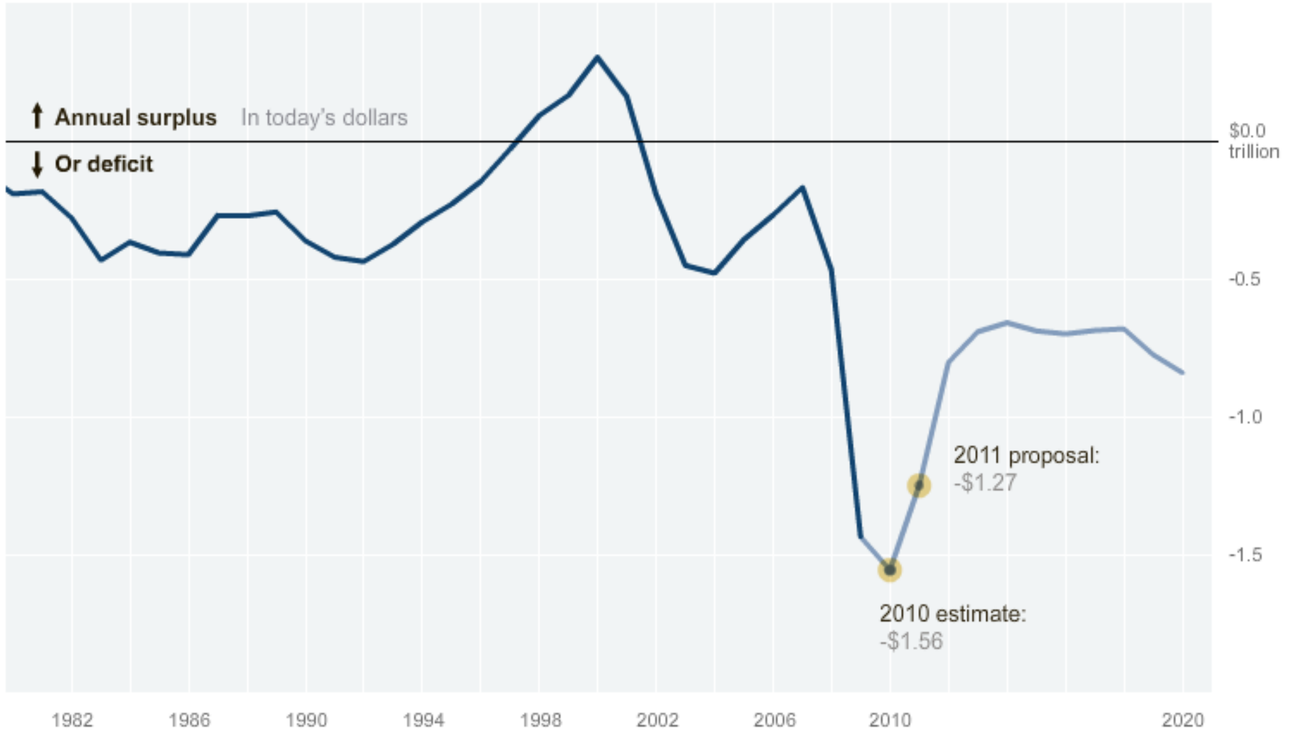
Published: February 2, 2010

Budget Forecasts, Compared With Reality

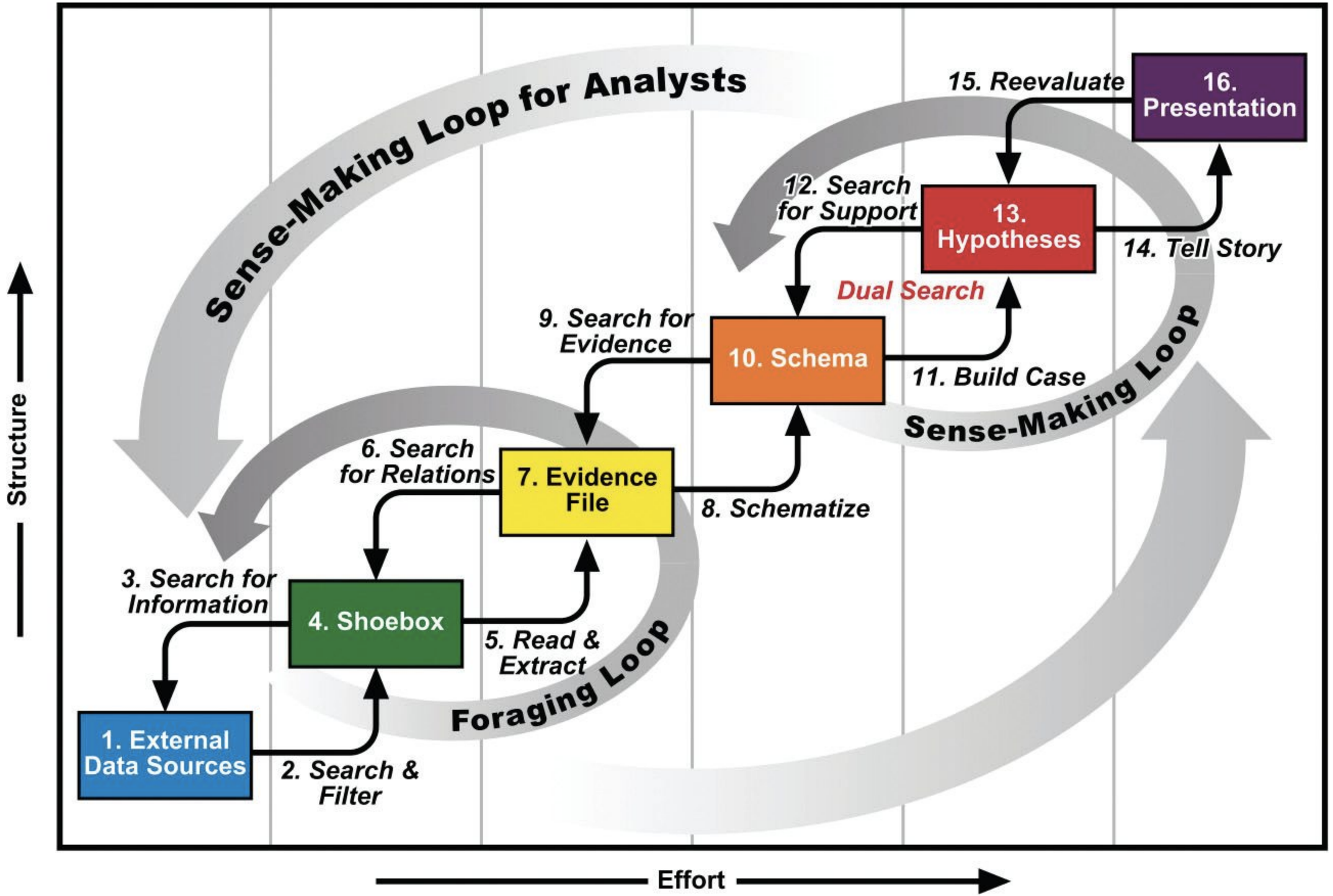
Just two years ago, surpluses were predicted by 2012. How accurate have past White House budget forecasts been?

Falling short

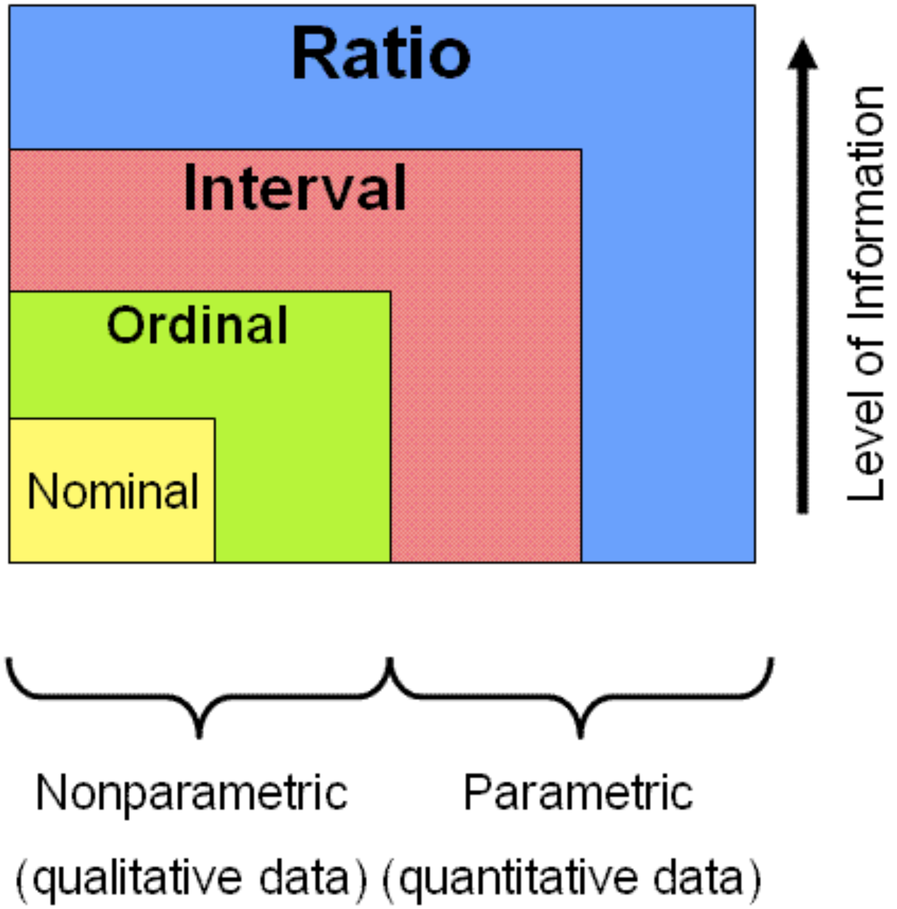
President Obama's budget proposal estimates a deficit of $1.6 trillion for the current fiscal year and $1.3 trillion in 2011.



2. Identify application areas for visualization in biological analysis workflows.


Sense-Making Loop for Analysts
15. Reevaluate
16. Presentation
12. Search for Support
13. Hypotheses
14. Tell Story
Dual Search
9. Search for Evidence
10. Schema
11. Build Case
Sense-Making Loop
6. Search for Relations
7. Evidence File
8. Schematize
3. Search for Information
4. Shoebox
5. Read & Extract
Foraging Loop
1. External Data Sources
2. Search & Filter
Structure
Effort

3. Evaluate the characteristics and structure of data you encounter to refine design options.



DATA

D

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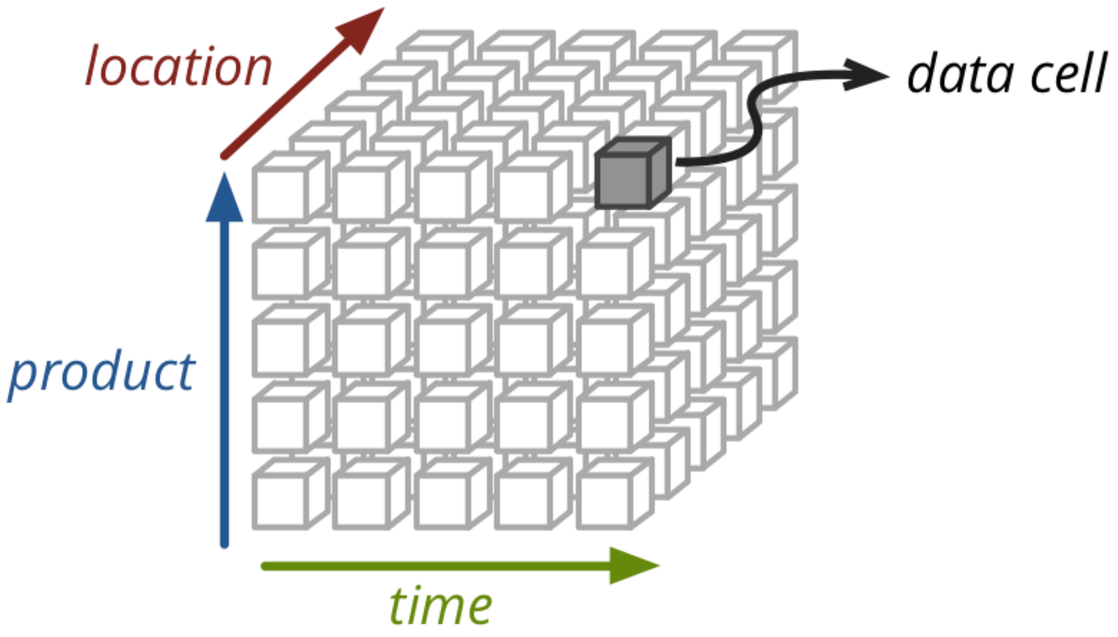
DATA

4. Use algorithms, aggregation, sampling, and similar techniques to refine and manipulate data.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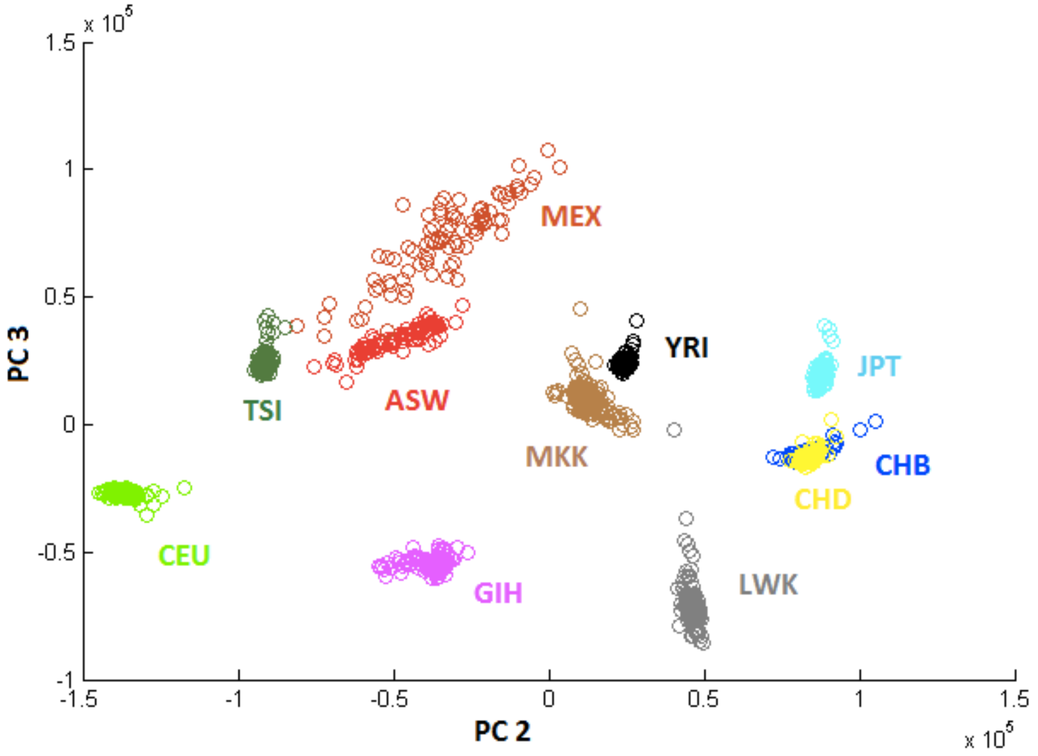
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x 10^5
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TSI
ASW
MKK
CHB
CHD
CEU
GIH
LWK

5. Apply knowledge of how people perceive and reason with visualizations in your designs.


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Stress (Pa)


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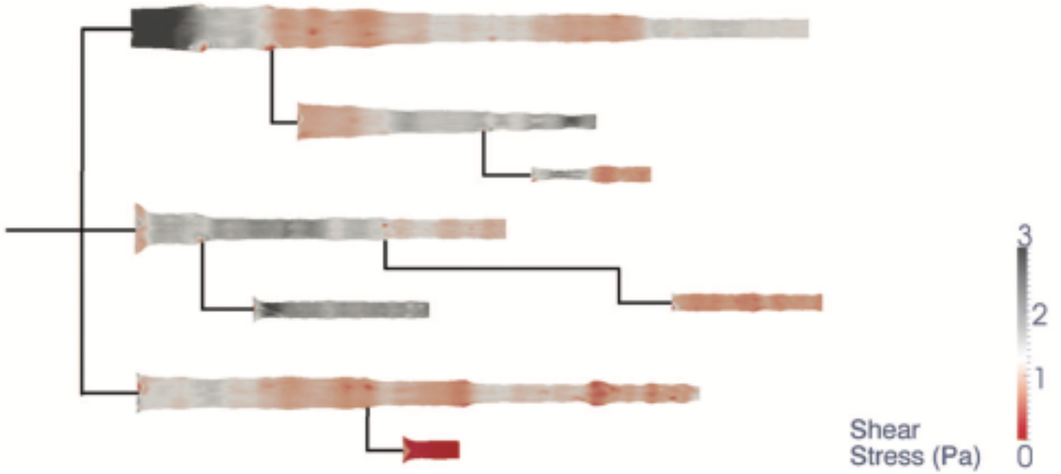
Shear
Stress (Pa)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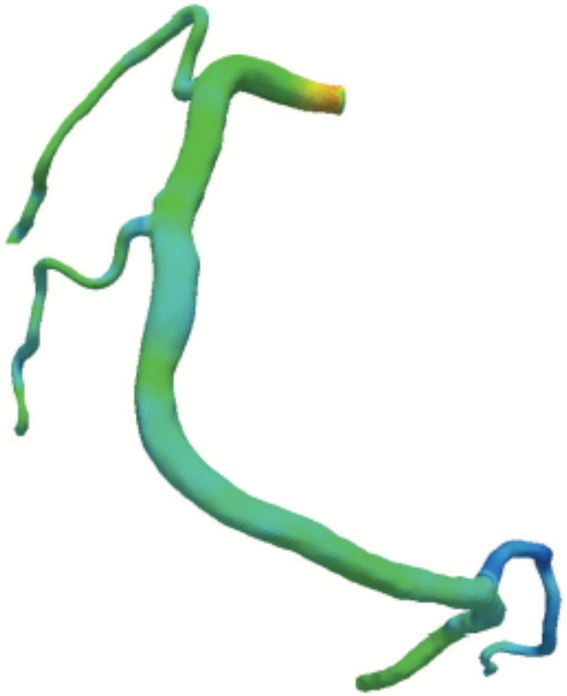

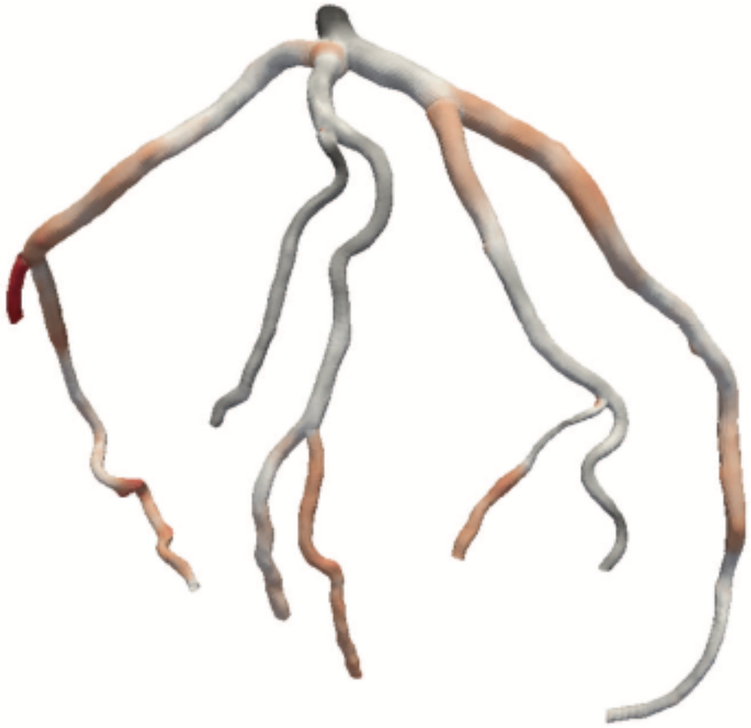

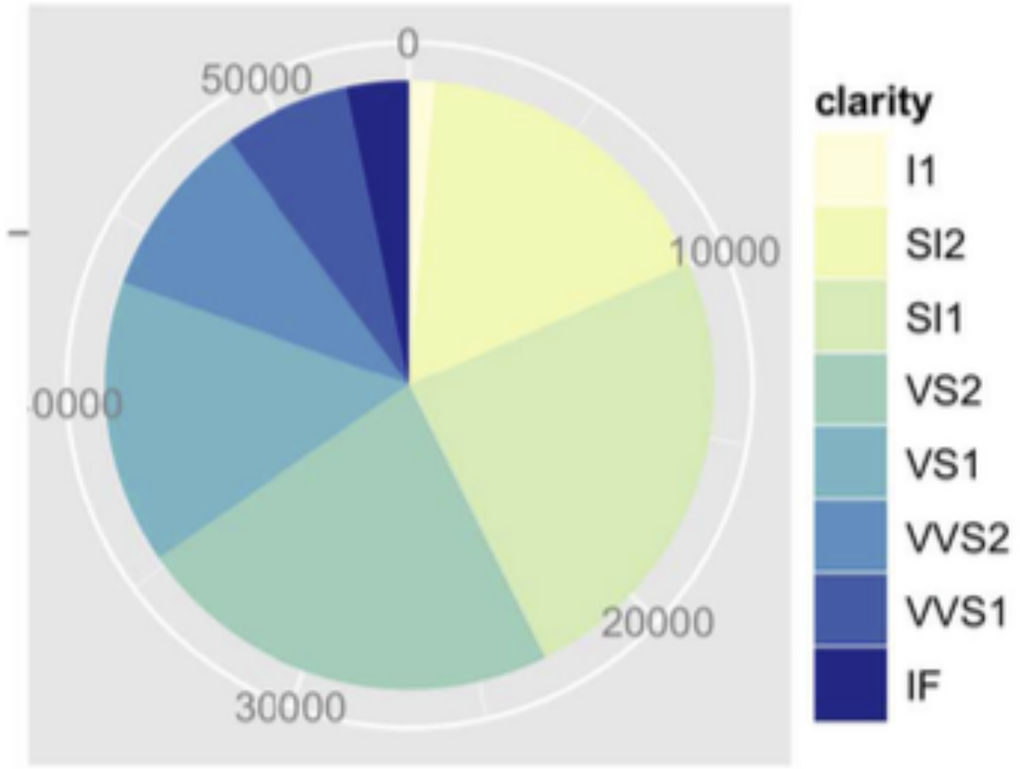
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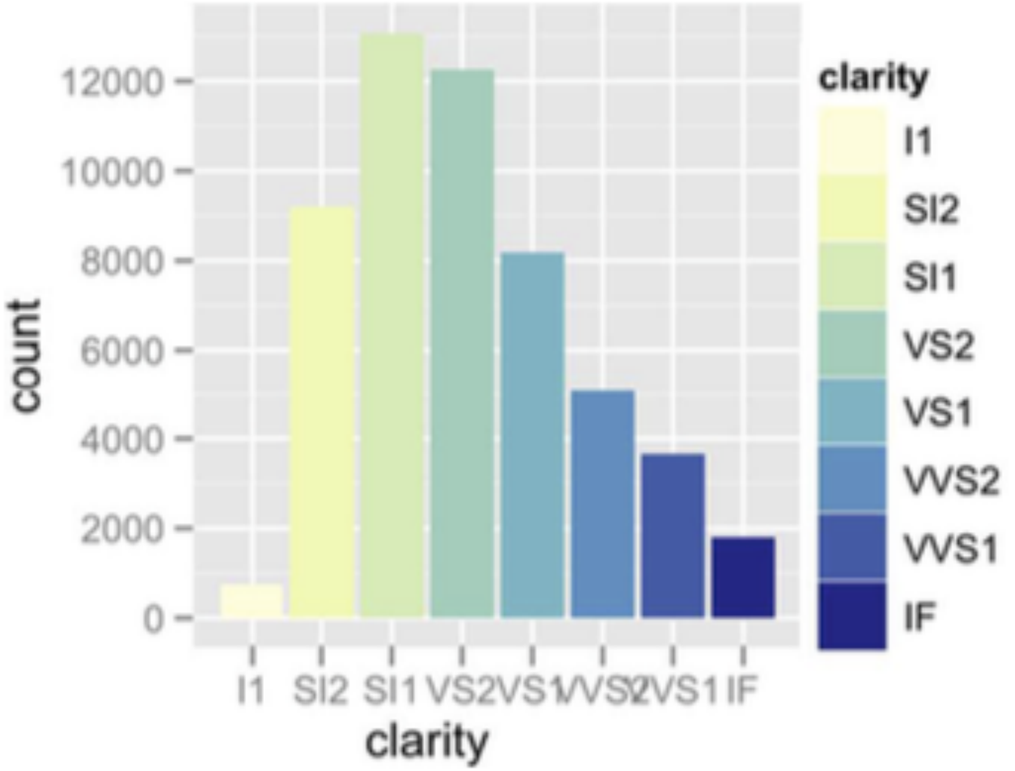
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VS1
VVS2
VVS1
IF

6. Design and develop interactive data visualizations for biological data.

Domain situation
Observe target users using existing tools

Data/task abstraction

Visual encoding/interaction idiom
Justify design with respect to alternatives

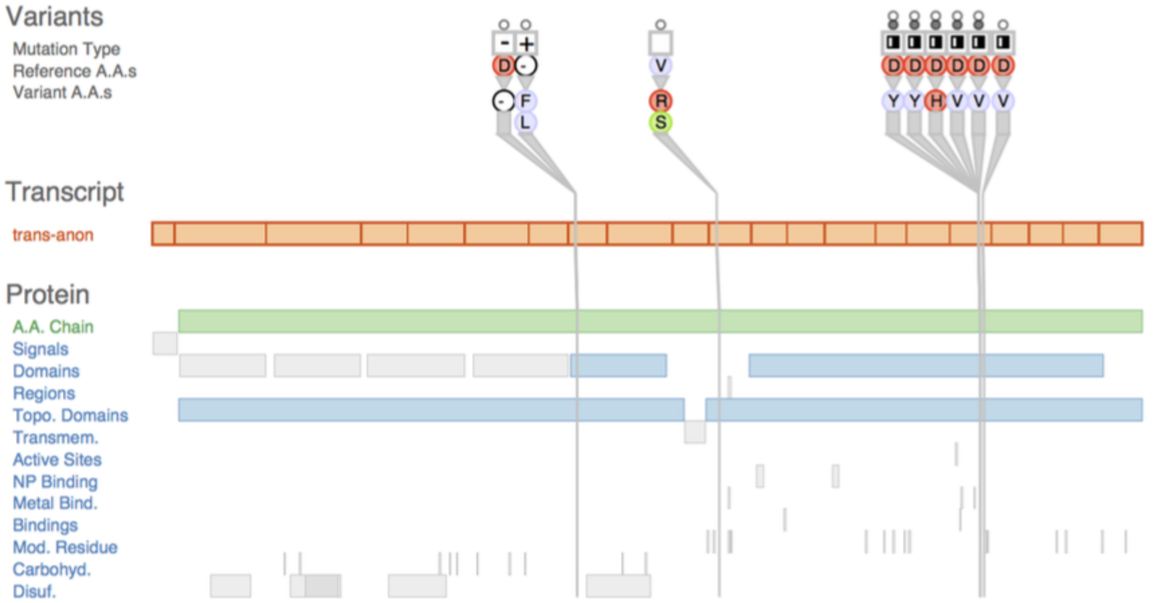
Algorithm
Measure system time/memory
Analyze computational complexity

Analyze results qualitatively

Measure human time with lab experiment (*user study*)

Observe target users after deployment (*field study*)

Measure adoption



7. ???

7. Tell me what your goals are.

Course Structure

Lectures 1/wk

Prof. Liz Ryder

Lab 1/wk

4 (ish) Assignments

1-2 Chapters / wk

Grading

Undergrad:

60% assignments

40% labs

Grad:

45% assignments

25% labs

20% final project

10% paper presentation

Assignments

Language:
Choose your own Adventure

A0: Getting Started

A1: The Game of Life - the effects of surroundings and contacts

A2: Tree of Life - how are things related

A3: Experiments in Biology - how to analyze tables of numbers

A4: Structures in Biology - 1D sequences

A5: …

85/100 for minimum requirements

writeup with every assignment:
+ 7.5 for Biological relevance
+ 7.5 for Technical achievement

A5: Revisions and Refinements

Labs

How to Read

Why read?

(I'll know.)

a0: Getting Started