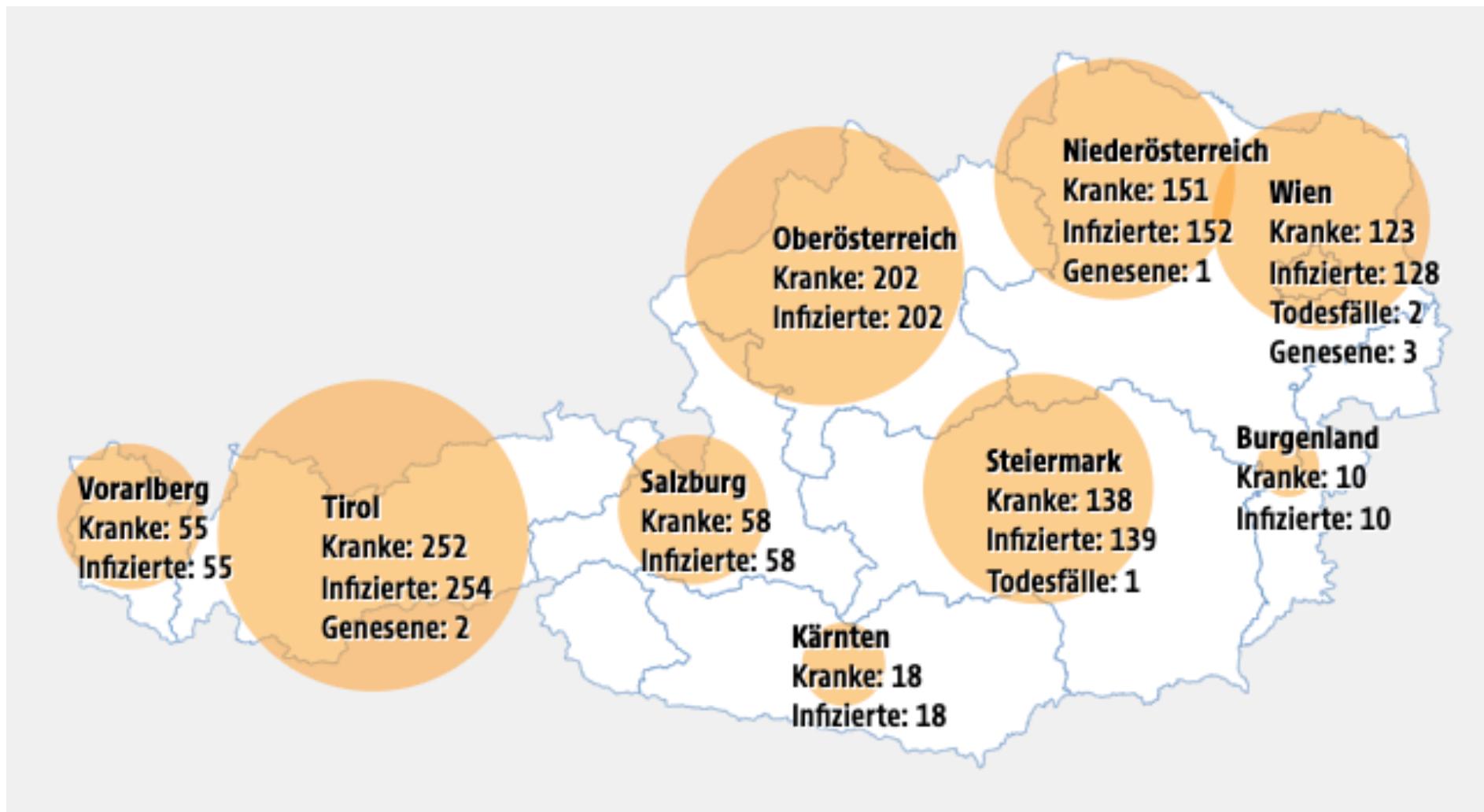


ORF.AT

WAHL19



WAHL



As of Mar 16, 2020, 3pm

→ HOW MANY STARS WILL THERE BE IN THE SECOND GAIA DATA RELEASE?



position & brightness on the sky

surface temperature

red colour

blue colour

parallax and proper motion

radius & luminosity

Solar System
objects

radial velocity

amount of dust along
the line of sight

variable sources

→ HOW MANY STARS WILL THERE BE IN THE SECOND GAIA DATA RELEASE?



position & brightness on the sky

1 692 919 135

surface temperature

161 497 595

red colour

1 383 551 713

blue colour

1 381 964 755

parallax and proper motion

1 331 909 727

radius & luminosity

76 956 778

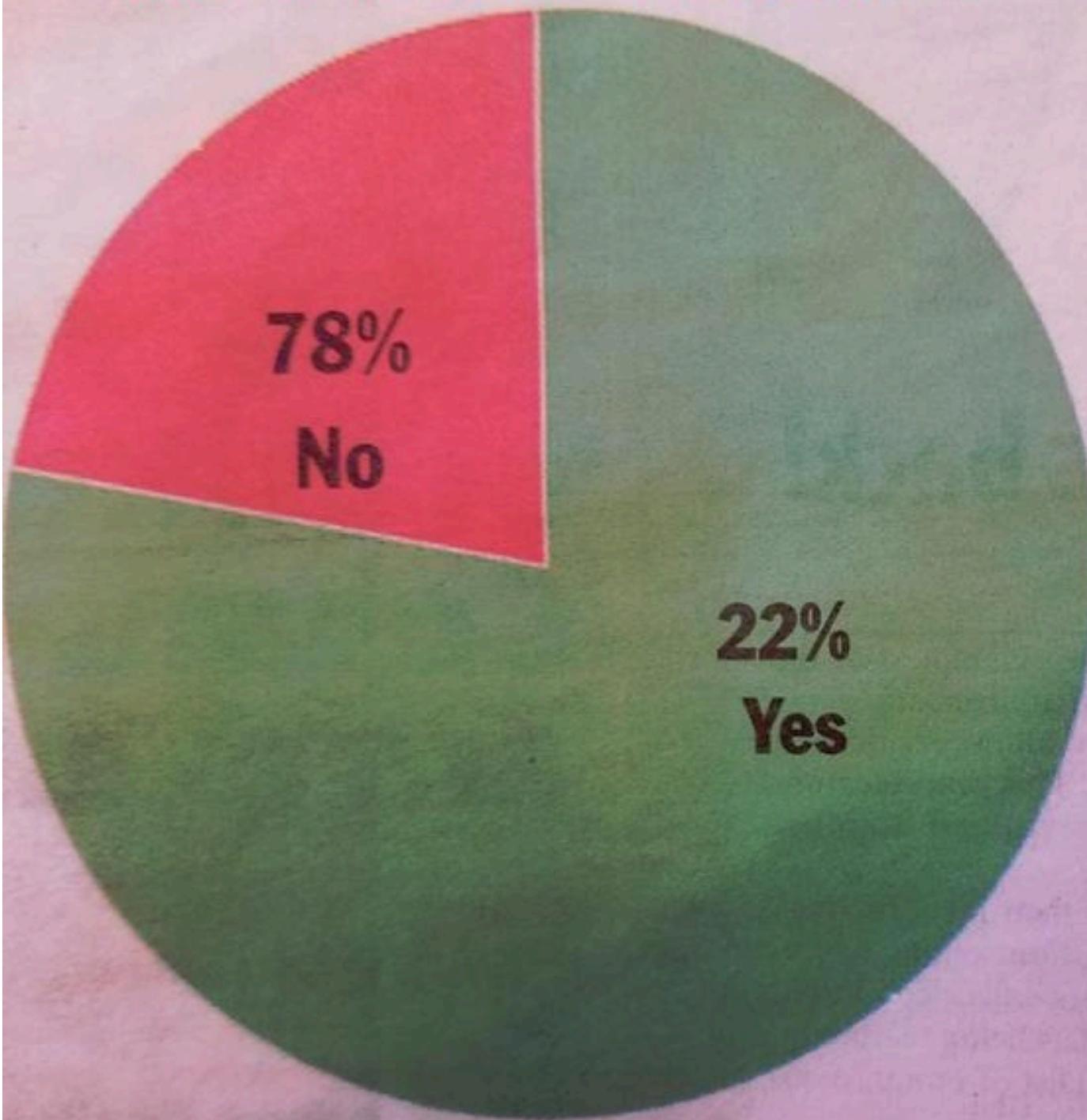
14 099
Solar System
objects

radial velocity
7 224 631

550 737
variable sources

amount of dust along
the line of sight
87 733 672

ARE YOU SATISFIED WITH YOUR LIFE?



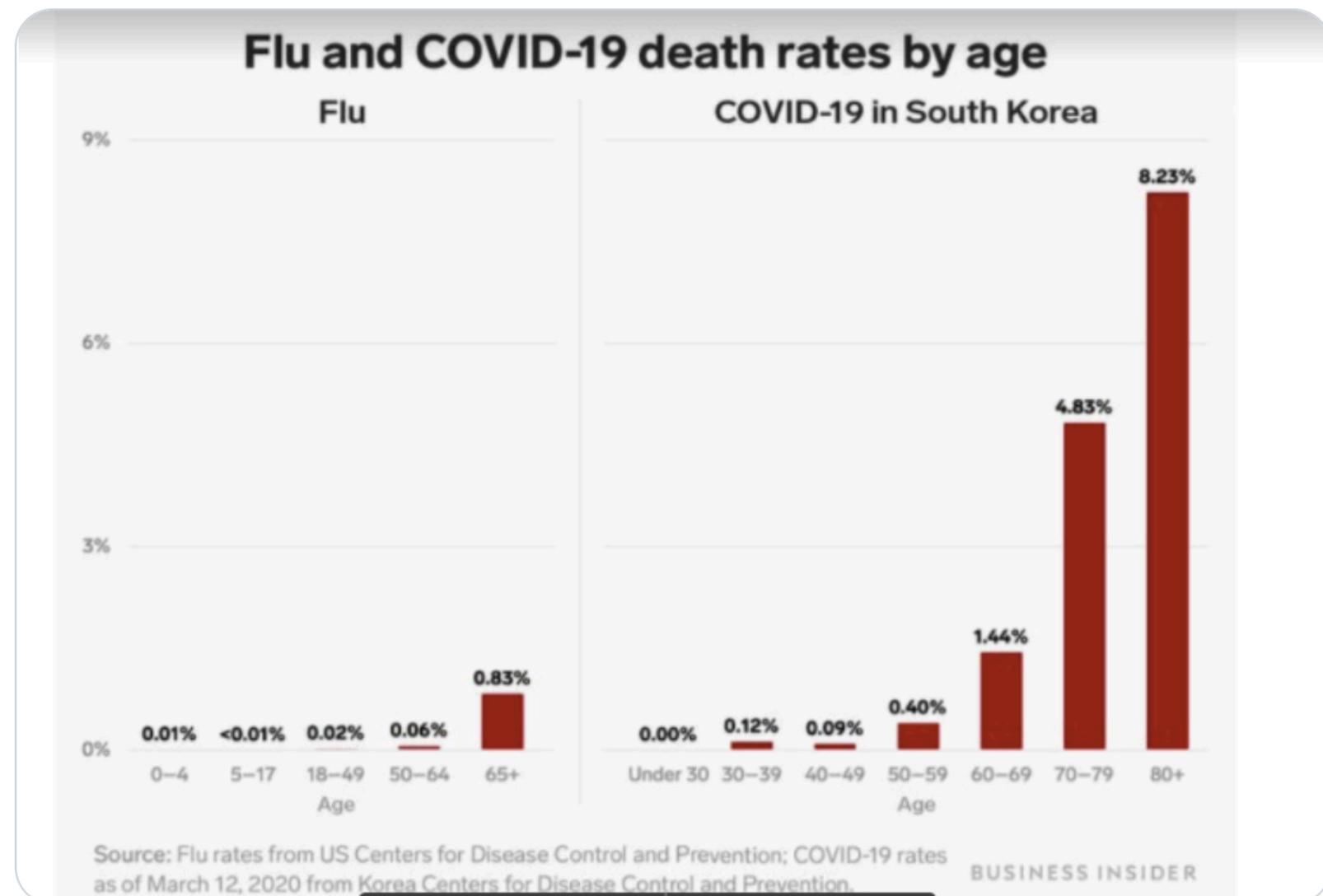


Ann Coulter

@AnnCoulter



For people under 60, coronavirus is LESS dangerous than the seasonal flu:



1:11 PM · Mar 24, 2020



053622 Visual and Exploratory
Data Analysis (VU) &
136013 Visualization of humanities
data (UE)

Acil Cetin + Manfred Klaffenböck +
Christian Knoll + Torsten Möller +
Sebastian Ratzenböck + Florian
Windhager

What is Visualization?

- What?
- Why?
- Who?
- How?

Sources

- Selective contributions from
 - Raghu Machiraju
 - Tamara Munzner
 - Hanspeter Pfister
 - Melanie Tory
 - Daniel Weiskopf

What is Visualization?

- What?
- Why?
- Who?
- How?

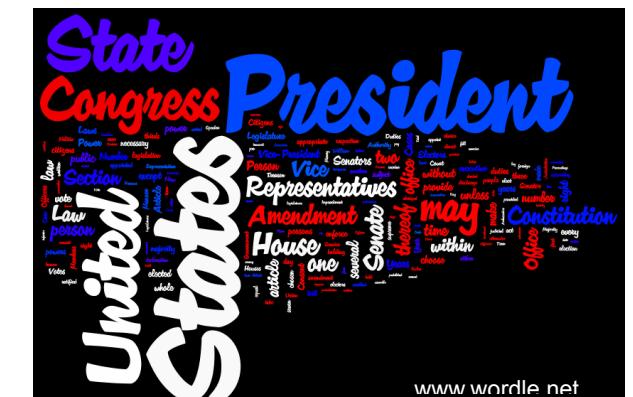
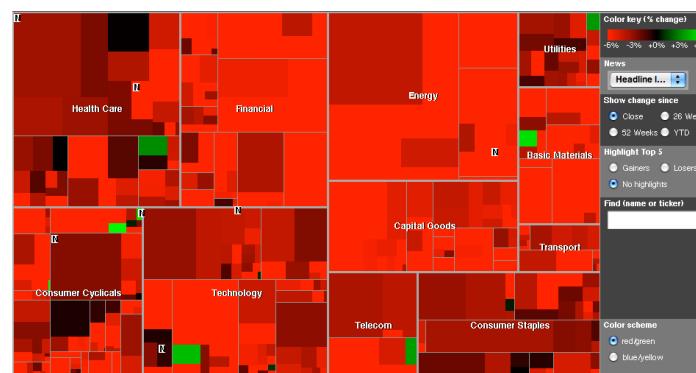
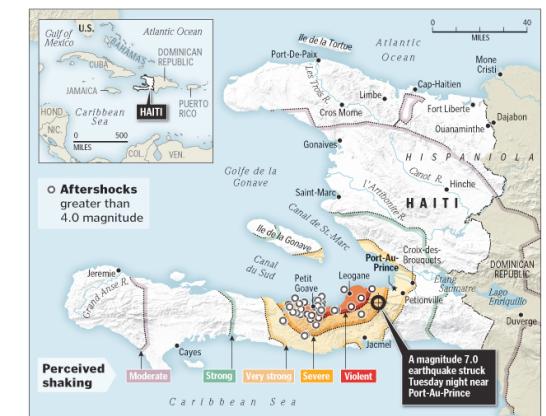
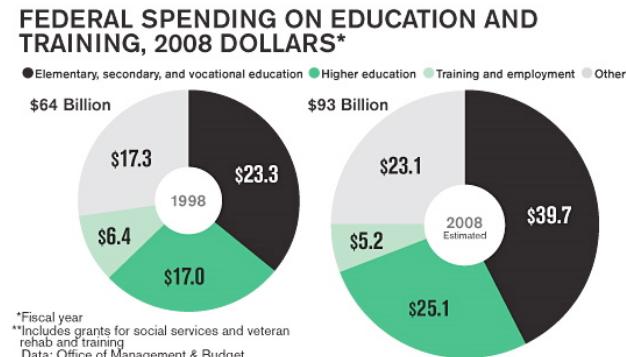
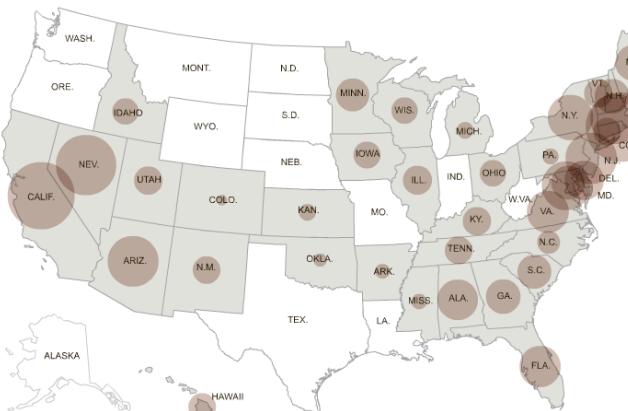


vi·su·al·ize

1. To form a mental image of
2. To make visible

Visualization

To convey information through visual representations



Definitions

- B. McCormick, T. DeFanti, and M. Brown:

Visualization is a method of computing. It transforms [the symbolic into the geometric](#), enabling researchers to observe their simulations and computations. Visualization offers a method for [seeing the unseen](#). It enriches the process of scientific discovery and fosters profound and unexpected insights. In many fields it is already revolutionizing the way scientists do science.

McCormick, B.H., T.A. DeFanti, M.D. Brown, **Visualization in Scientific Computing**, Computer Graphics 21(6), November 1987

Definitions

- Tamara Munzner, 2012:

Computer-based visualization systems provide visual representations of datasets intended to help people carry out some task more effectively.

T. Munzner: **Visualization Design and Analysis: Abstractions, Principles, and Methods**, AK Peters, 2014

Definitions

- Tamara Munzner, 2012:

Computer-based visualization systems provide visual representations of datasets intended to **help people** carry out some task more effectively.

T. Munzner: **Visualization Design and Analysis: Abstractions, Principles, and Methods**, AK Peters, 2014

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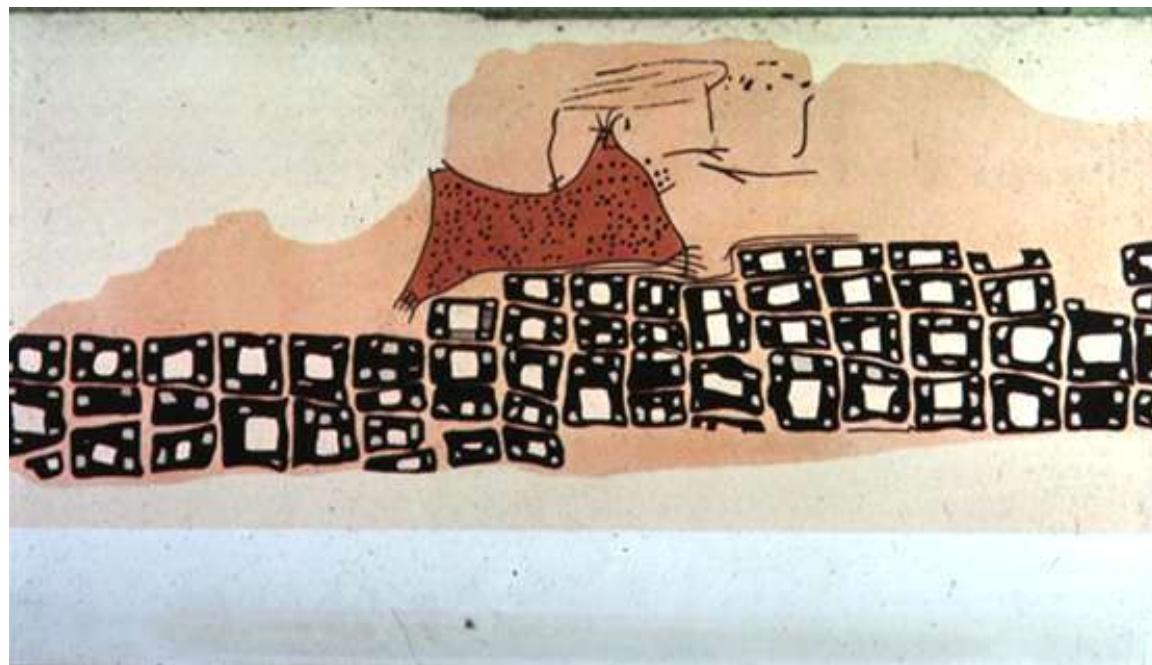
- Tamara Munzner, 2012:

Computer-based visualization systems provide visual representations of datasets intended to help people carry out some task **more effectively**.

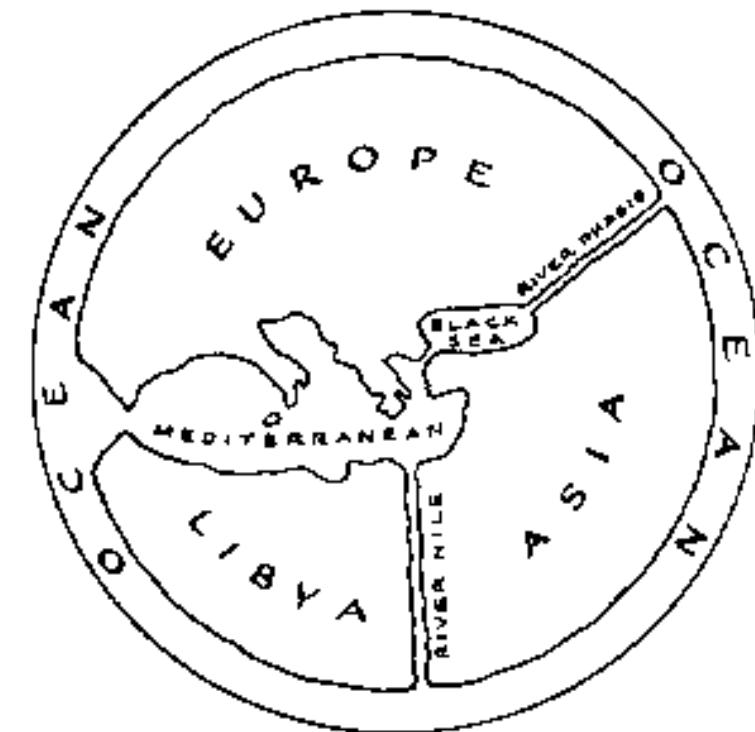
T. Munzner: **Visualization Design and Analysis: Abstractions, Principles, and Methods**, AK Peters, 2014

Visualization Goals

Map

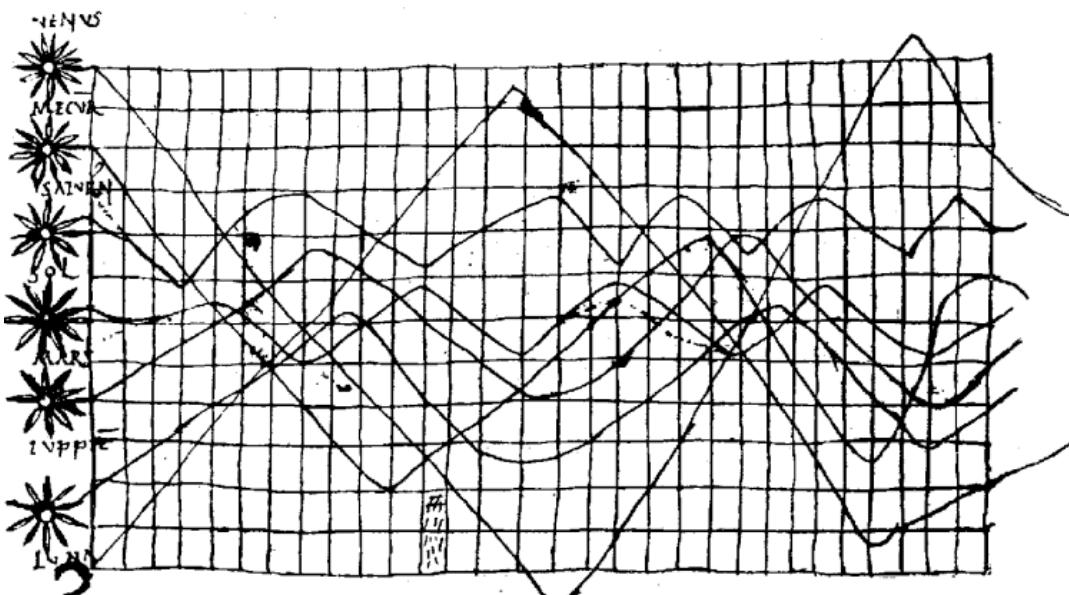


Konya town map, Turkey, c. 6200 BC

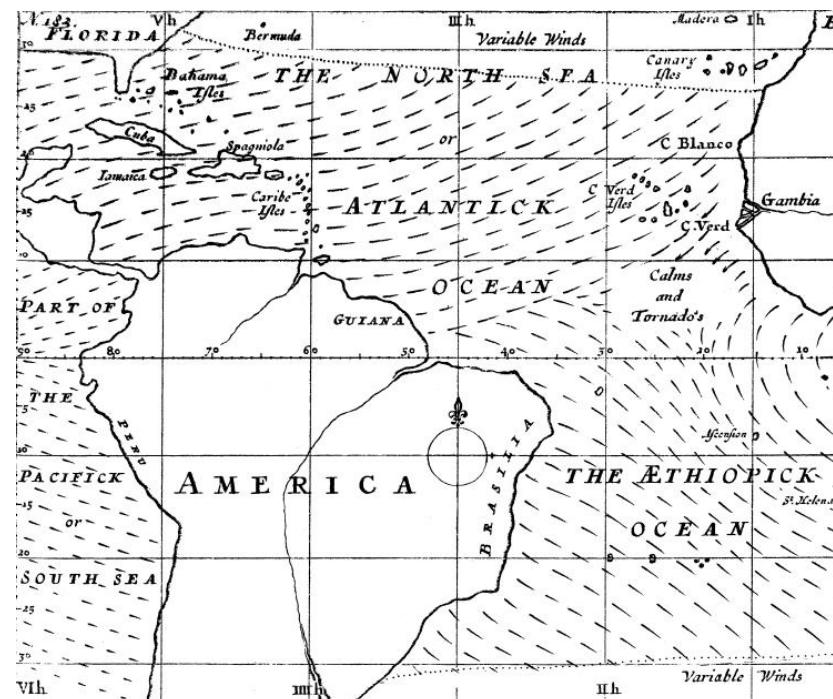


Anaximander of Miletus, c. 550 BC

Map

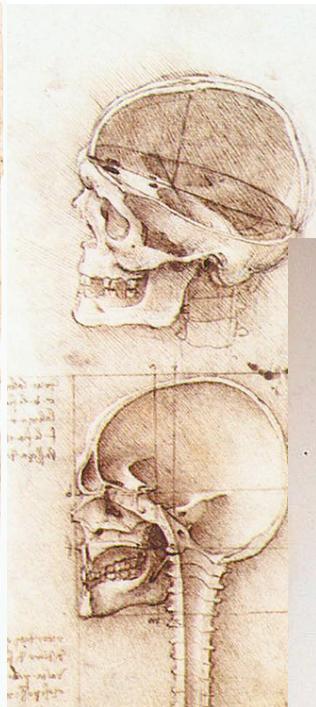


Planetary Movement Diagram, c. 950



Halley's Wind Map, 1686

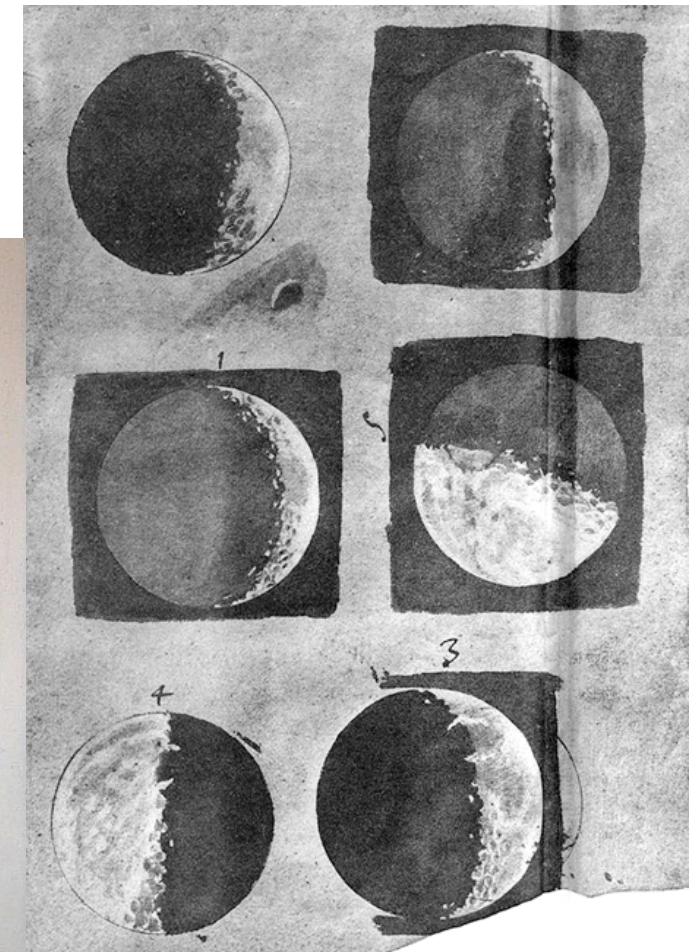
Record



Leonardo Da Vinci, ca. 1500

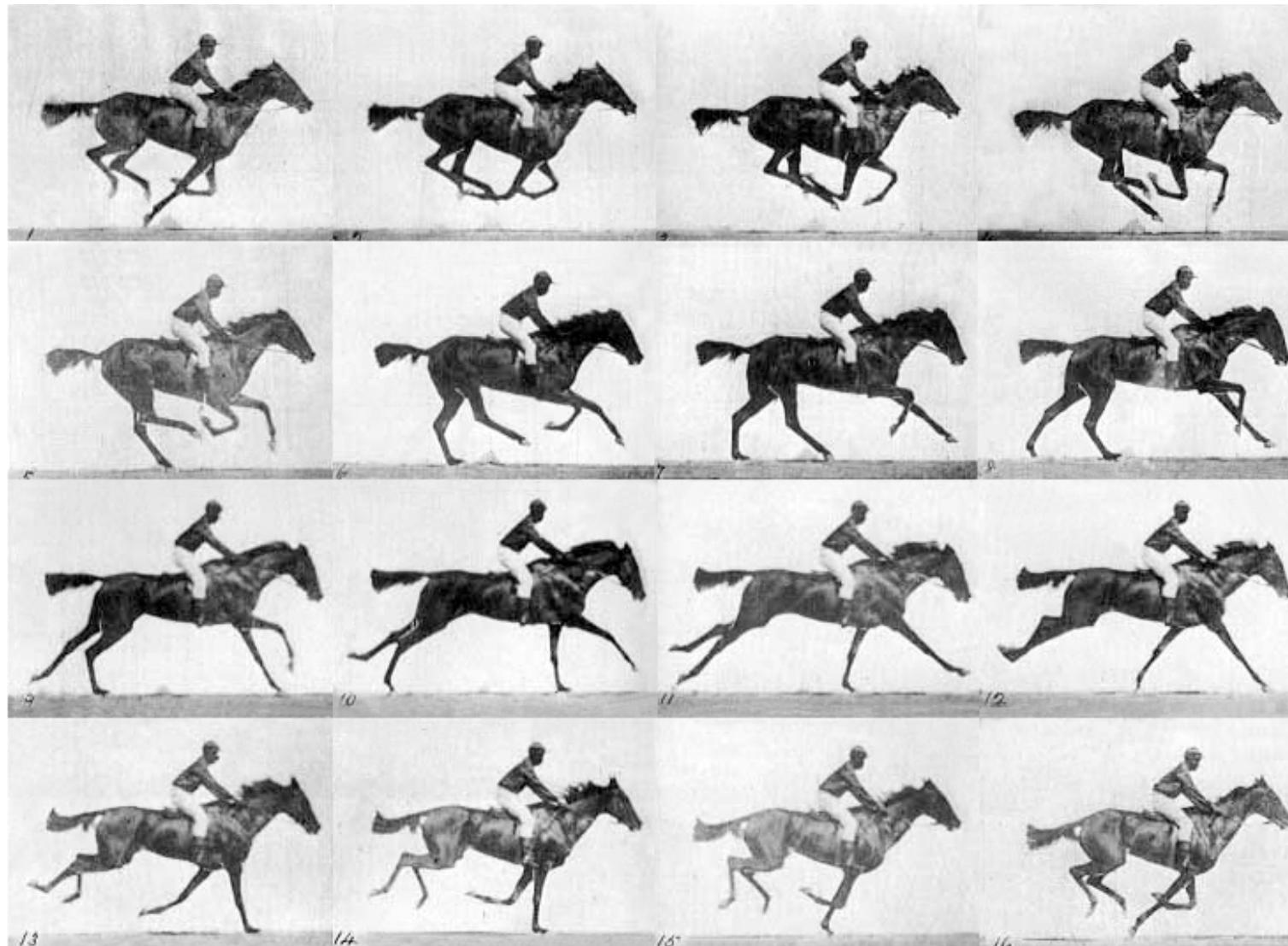


William Curtis (1746-1799)



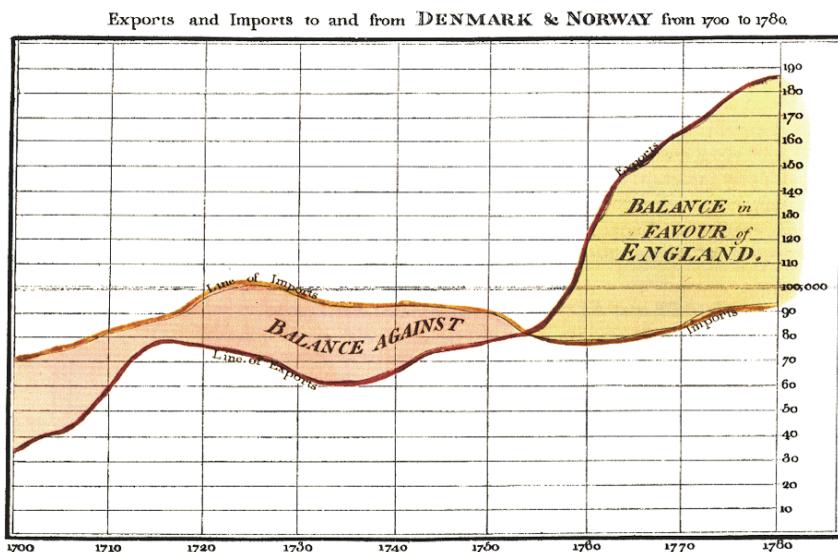
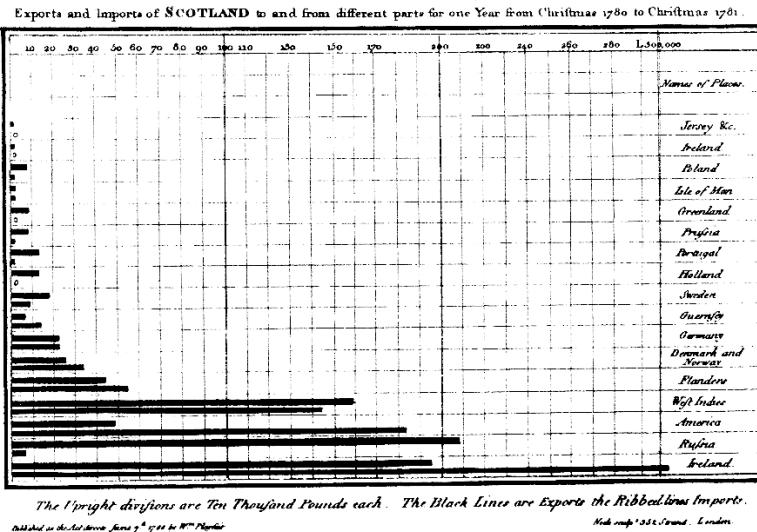
Galileo Galilei, 1616

Record

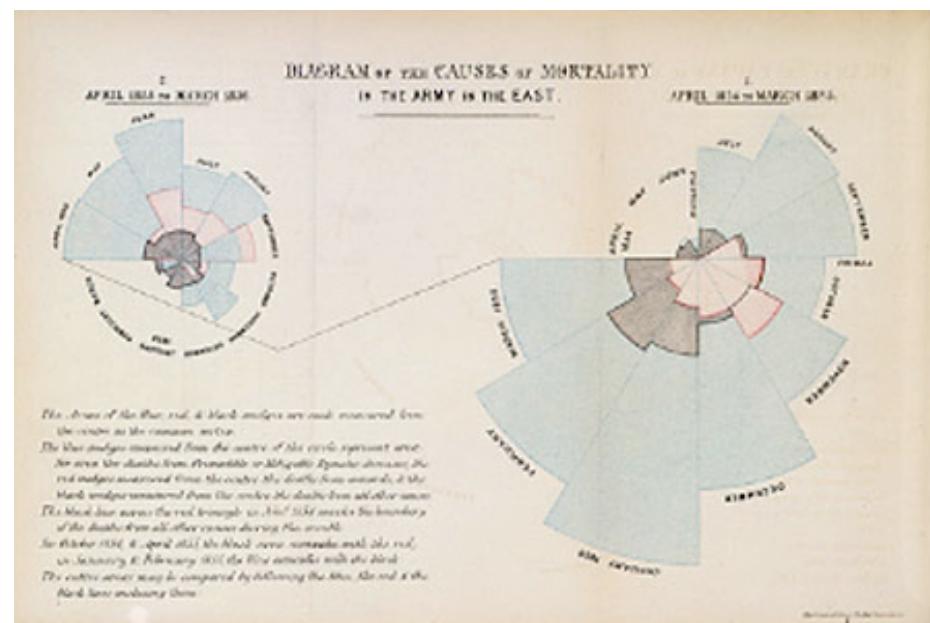


E. J. Muybridge, 1878

Abstract

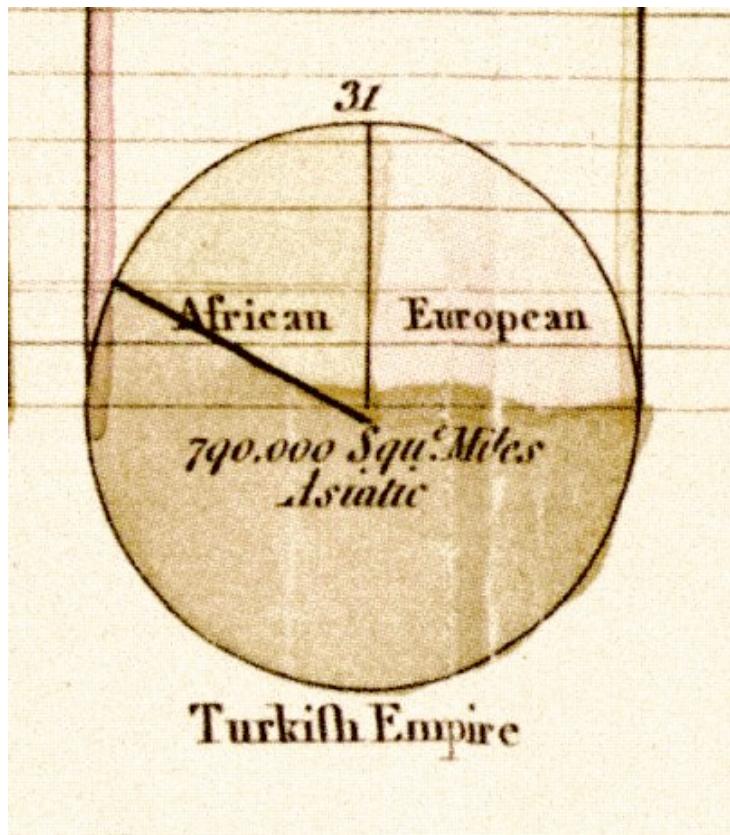


W. Playfair, 1786

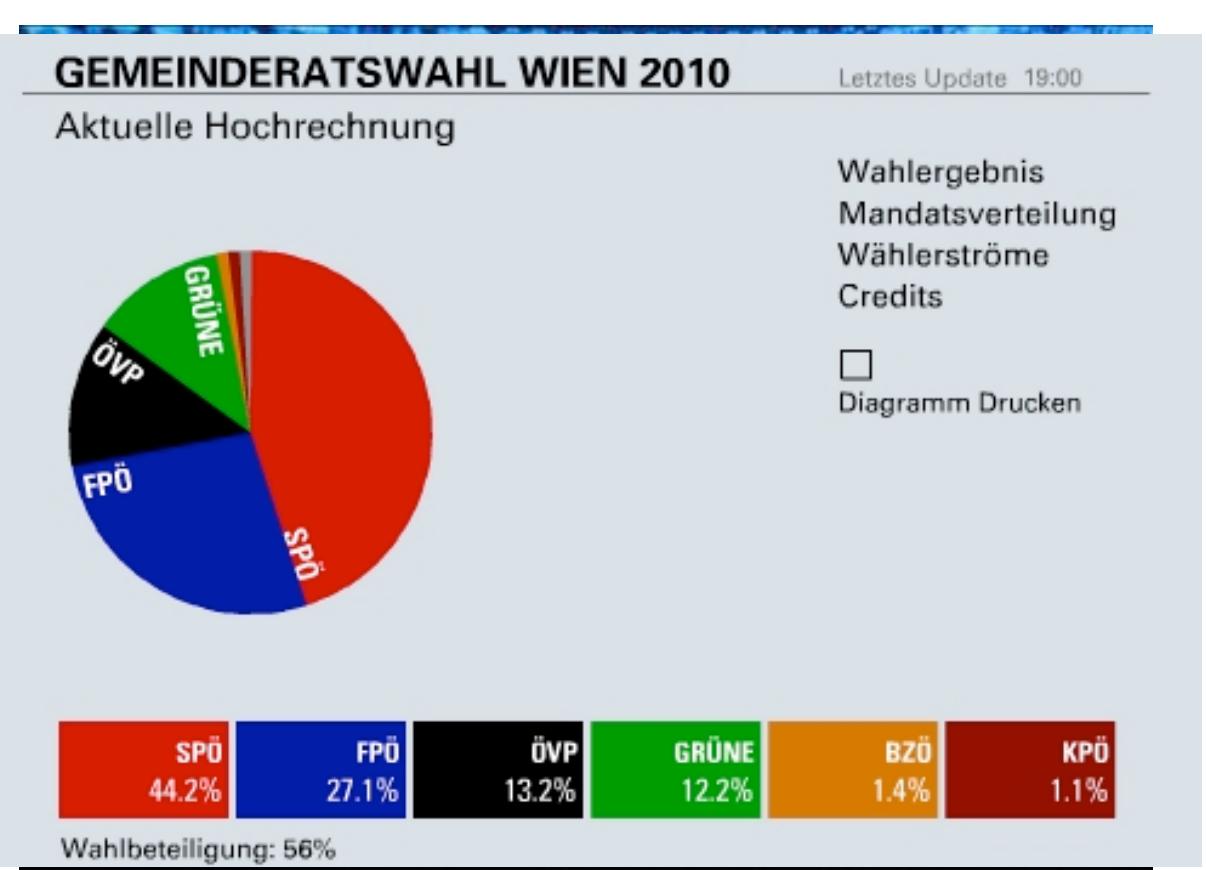


F. Nightingale, 1856

Abstract



W. Playfair, 1801



derStandard.at, 2010

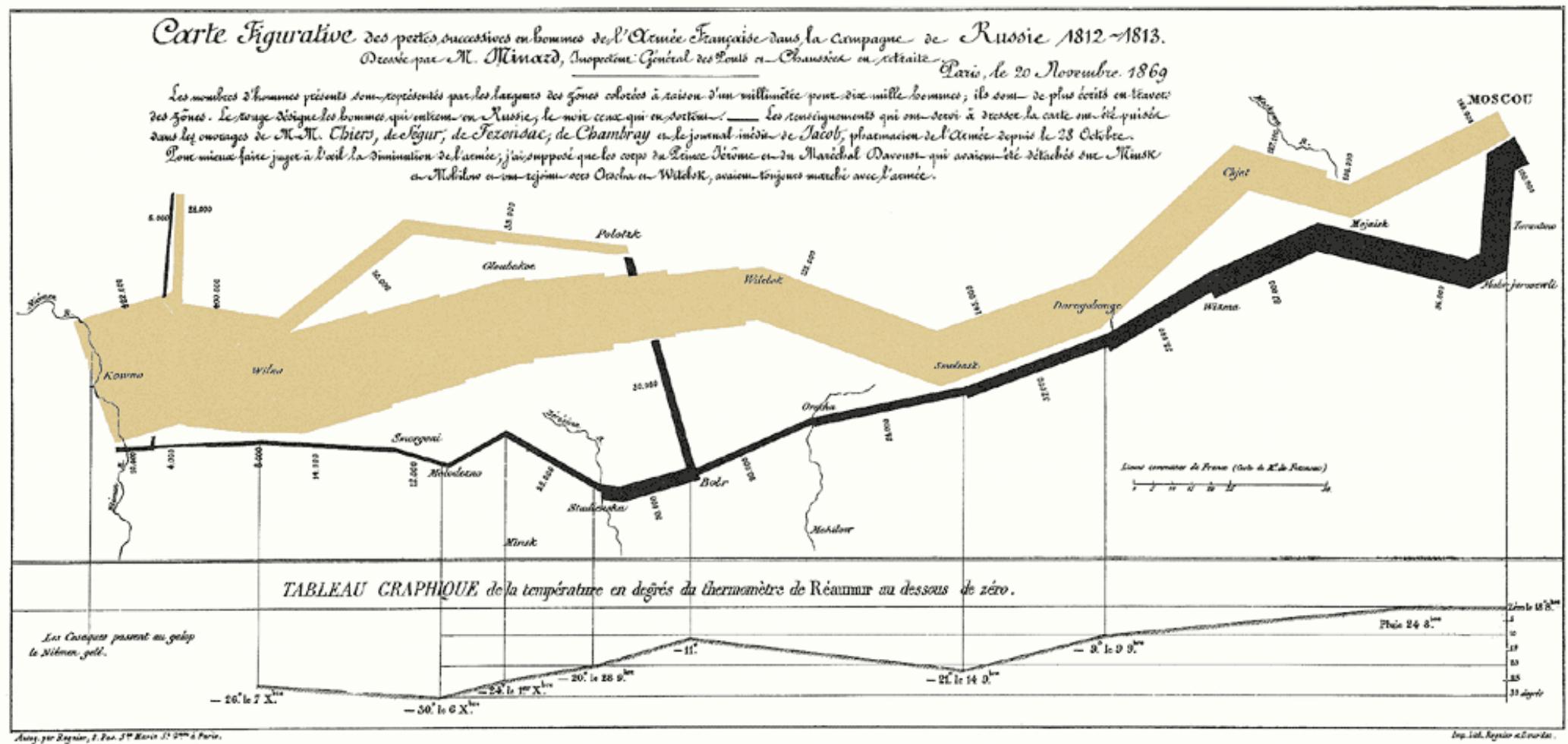
Discover



John Snow, 1854

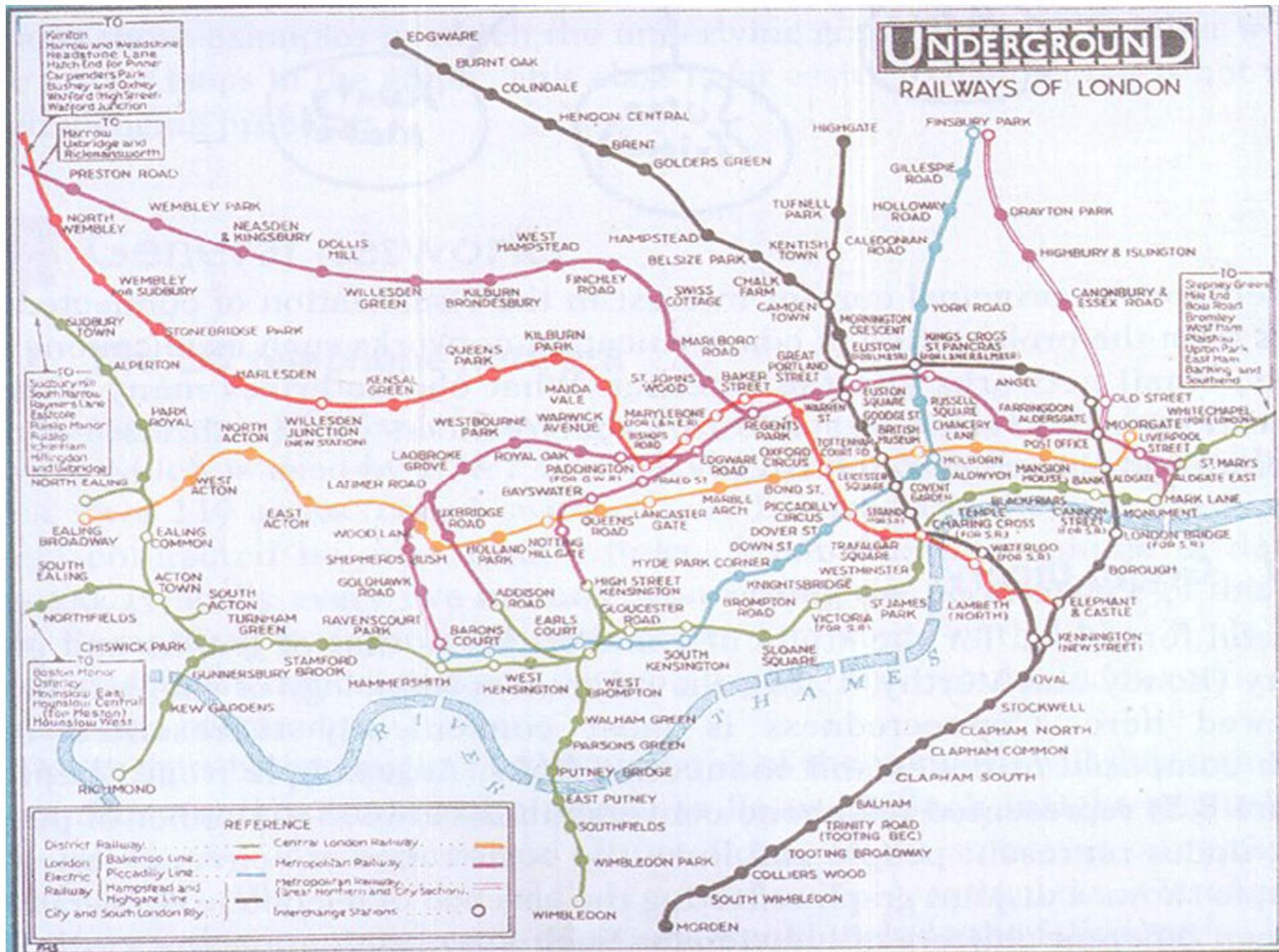
E. Tufte, Visual Explanations, 1997

Discover



C.J. Minard, 1869

Clarify



London Subway Map, 1927

Clarify



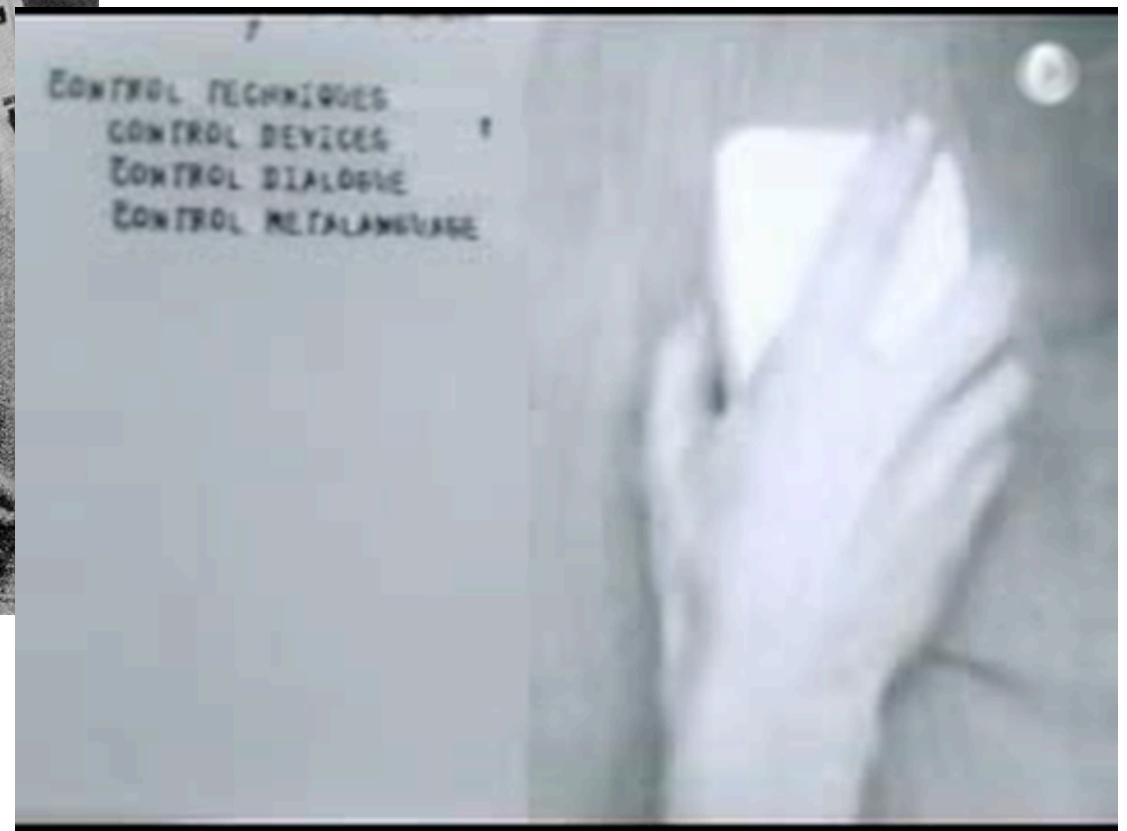
Harry Beck, 1933

29

Interact

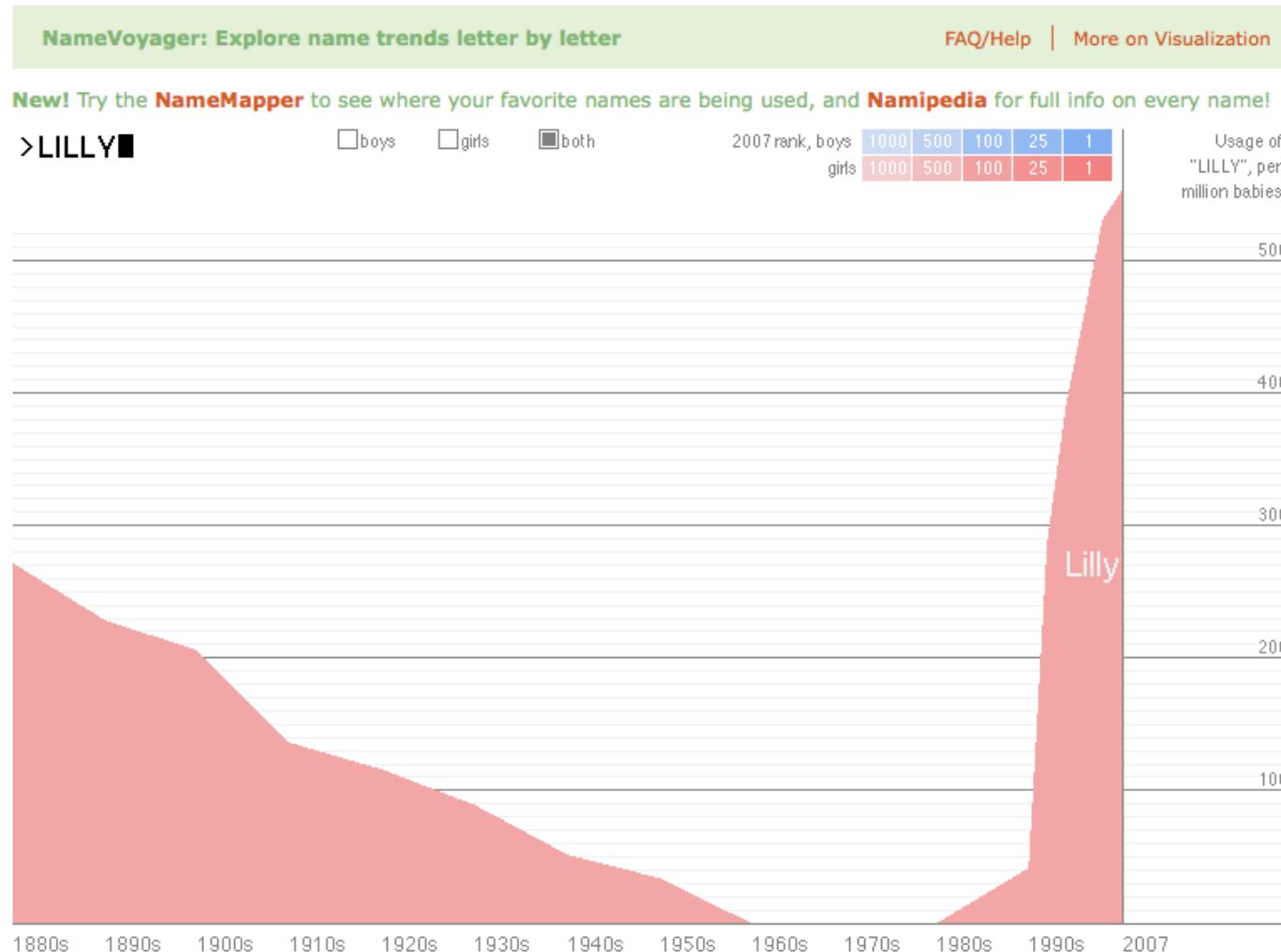


Ivan Sutherland, Sketchpad, 1963



Doug Engelbart, 1968

Interact

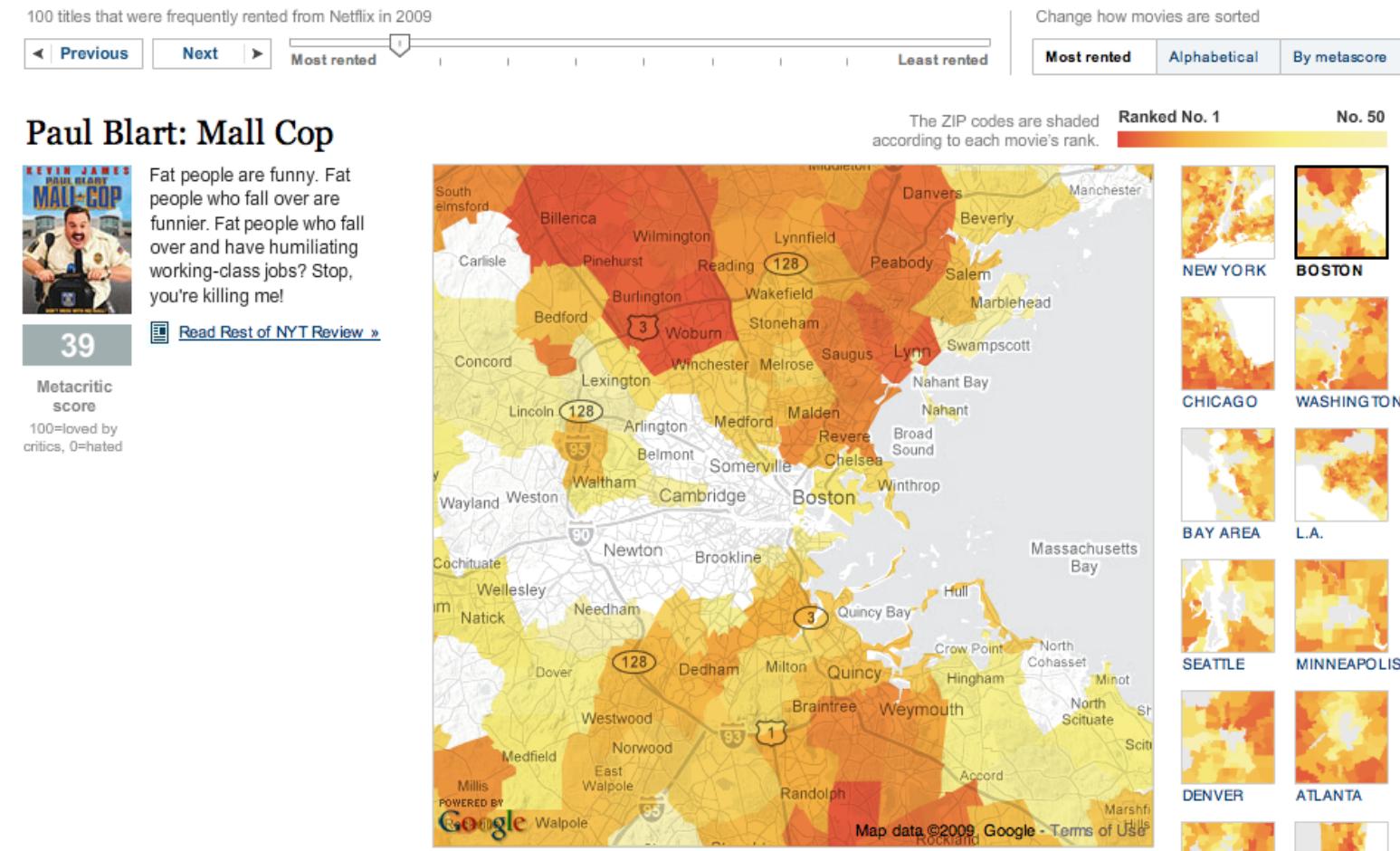


M. Wattenberg, 2005

Interact

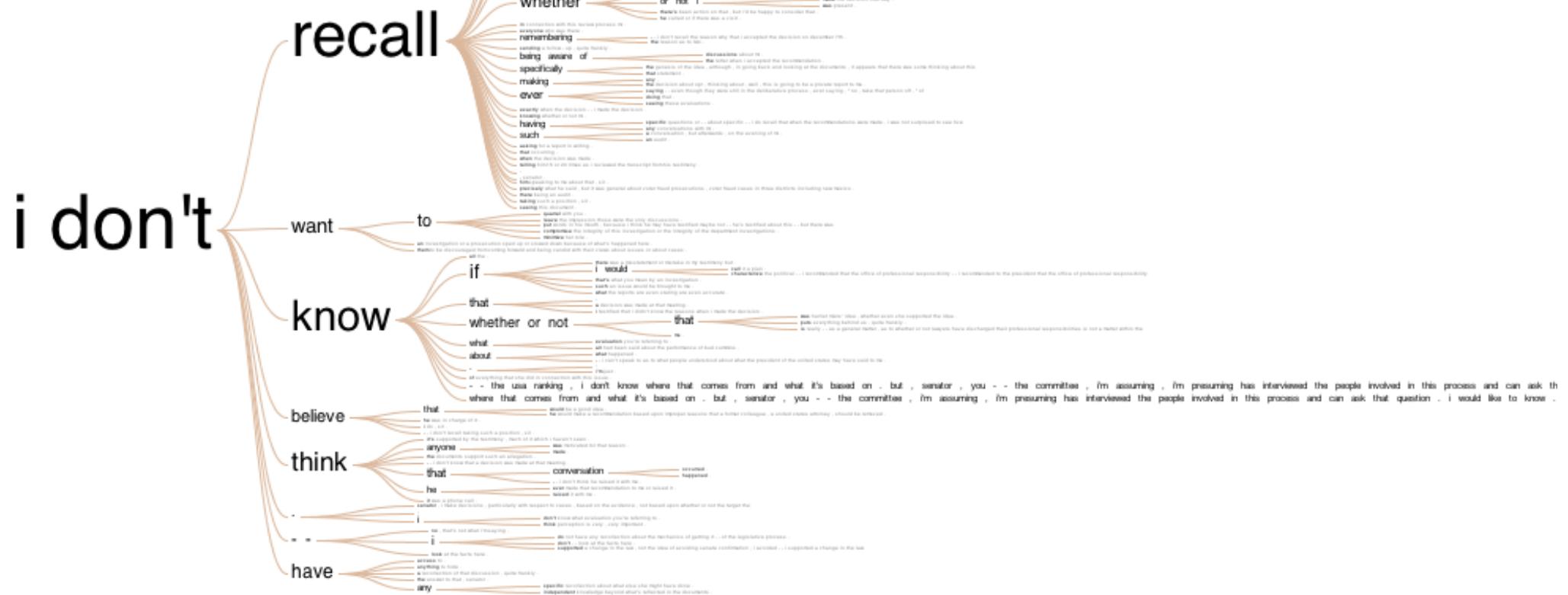
A Peek Into Netflix Queues

Examine Netflix rental patterns, neighborhood by neighborhood, in a dozen cities. Some titles with distinct patterns are **Mad Men**, **Obsessed** and **Last Chance Harvey**. [Comments \(131\)](#)



Communicate

118
hits



Many Eyes, 2007

Communicate

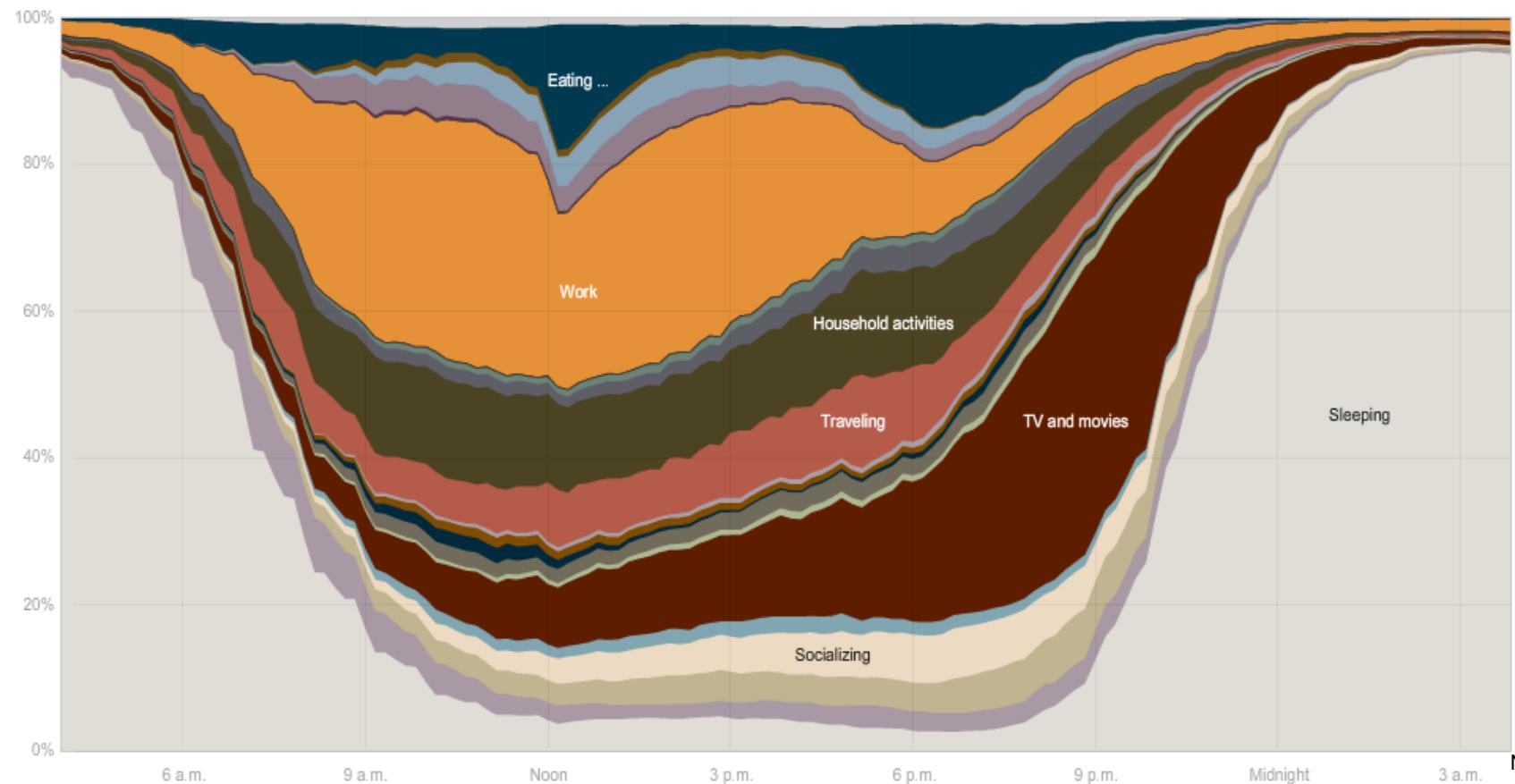
How Different Groups Spend Their Day

The American Time Use Survey asks thousands of American residents to recall every minute of a day. Here is how people over age 15 spent their time in 2008. [Related article](#)

Everyone

Sleeping, eating, working and watching television take up about two-thirds of the average day.

Everyone	Employed	White	Age 15-24	H.S. grads	No children
Men	Unemployed	Black	Age 25-64	Bachelor's	One child
Women	Not in lab...	Hispanic	Age 65+	Advanced	Two+ children



Inspire / Tell a Story



Visualization

- To convey information through visual representations

Map

Clarify

Record

Interact

Abstract

Communicate

Discover

Inspire

Goals

- Insight and analysis
 - Extract the information content
 - Make things/coherences visible that are not apparent
 - Analyze the data by means of the visual representation
- Communication
 - Allow the non-expert to understand
 - Present specific information in a way that all of us understand
 - Guide the expert into the right direction
- Exploration
 - Interactively control and drive your application
 - Use the visual representation to understand the phenomena as soon as possible
- “The purpose of computing is insight not numbers”
(Hamming 1962)

What is Visualization?

- What?
- Why?
- Who?
- How?

Information Explosion

Google Reader (1000+)

TinyURLI mss-01 Google Reader keybr.com - Be prod... CourseCalendar - HF... Archive in Yojimbo Bookmark in Yojimbo Google Scholar lastfm Gmail Calendar Documents Photos Reader Web more ▾ hpfister@gmail.com | Offline | Settings | My Account | Help | Sign out

Home All items (1000+) Stared items Trends Your shared items Friends' shared items (78) dig (78) Add subscription Discover Show: updated - all CreativeIQ How to Change the World kottke.org (9) Obscure Desire Design (42) Because We Can blogs beyond bullets Cool Hunting (4) deezne (2) NOTCOT.ORG (24) Presentation Zen

A look at what's new

Data Mining: Text Mining, Visualization and Social Media (2)

Wired - The Secret Life of a Blog Post TechMeme - Beyond the List The Host with the Most Calvin and Hobbes (Unofficial) (2)

Subtraction (2)

Calvin and Hobbes for January 26, 2008 Calvin and Hobbes for January 25, 2008

daily dose of imagery (2)

mozart's house Salzburg, Austria... corner streetcar and cobblestones in Prague, Czech Republic. Smaller size on

Top Recommendations View all JMLR Lightroom-Blog.Com decor

Recently starred How to Shave Ten Hours Off Your Work Week from From Where I Sit Sensor Size and Depth of Field from O'Reilly Digital Media Blog

Tips and tricks Have your own blog? You can display your shared items in your blog as a "clip".

See more from Visualization (3) > See more from WebDesign (5) > See more from Misc (4) >

Wikipedia

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WIKIPEDIA

English Free Encyclopedia 2192 000+ articles

Deutsch Die freie Enzyklopädie 697 000+ Artikel

Polski Wolna encyklopedia 463 000+ haseł

Neder De vrije encyclopedie 403 000+ artikelen

Português A encyclopédia livre 352 000+ artigos

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facebook

Barack Obama for President in 2008

Information

Group Info

Name: Barack Obama for President in 2008
Type: Student Groups – Political Groups
Description: In July 2006, we began asking of students across the country: "Will you join this group to help encourage Senator Barack Obama of Illinois to run for President of the United States in 2008?" Over 60,000 young Americans responded to the call.

On February 10, 2007, Senator Barack Obama declared, "I stand before you today to announce my candidacy for President of the United States."

Congratulations to Senator Obama! Congratulations to all of us!

Students for Barack Obama, a group formed as a result of the dedication to Senator Obama displayed by students on Facebook, is now thrilled to embark upon the second part of our mission: Electing Senator Barack Obama President of the United States in 2008.

To learn more or to get involved, please e-mail: info@studentsforbarackobama.com

STUDENTSFOR BARACKOBAMA

View Discussion Board Join this Group Report Group Officers

Digg / All News, Videos, & Images

TinyURLI mss-01 Google Reader keybr.com - Be prod... CourseCalendar - HF... Archive in Yojimbo Bookmark in Yojimbo Google Scholar lastfm Search Digg...

digg

All News Videos Images Podcasts Customize Technology World & Business Science Gaming Lifestyle Entertainment Sports Offset

News, Videos, Images Most Recent Top in 24Hr 7 Days 30 Days 365 Days

Look beneath the surface of Digg

Barack Obama wins South Carolina Democratic primary

Driver Who Killed Teen Sues for Damaged Vehicle

The naked truth about women in Russian politics

The Terrible Secret Behind the World's Greatest Card Trick

How to Reverse a Car Out of a Moving Plane

The Internet Was a Real Pile of Shit

New Jersey Douche Bags!

Scariest airport EVER [PIC]

But how? The only clues were the pictures on the camera

Sean Macfarlane Wrote Short: Writers Strike Negotiation

URGENT: Oppose Telecom Immunity and Contact Your Senator

Scientists Build First Man-Made

dig labs

Top in All Topics all news videos images

5682 The Internet Was a Real Pile of Shit 3737 New Jersey Douche Bags! 3542 Scariest airport EVER [PIC] 2576 But how? The only clues were the pictures on the camera 2590 Sean Macfarlane Wrote Short: Writers Strike Negotiation 1485 URGENT: Oppose Telecom Immunity and Contact Your Senator 1778 Scientists Build First Man-Made

Clear

What are you doing? 140

hpfister

14 following 0 followers 0 updates

Home @Replies Direct Messages 0 Favorites Everyone Following add 7 new follower requests! Device Updates

Latest: Check out this SlideShare Presentation : Oooold http://tinyurl.com/5rttme about 1 month ago update

guykawasaki Ancestor For All Animals Identified http://adjix.com/awh9 Also see http://science.alltop.com about 1 hour ago from Adix

guykawasaki RT @szetela: screen capture illustrating why Contextual Advertising sometimes sucks: http://twitpic.com/1812f Kawasaki Steel? about 1 hour ago from TweetDeck

guykawasaki RT @roehmholdt Funny comic referencing my mantra belief: http://bit.ly/fwZE about 1 hour ago from TweetDeck

timoreilly RT @bobgourley: Blogging:The Future of Cyber Security and Cyber Conflict http://tinyurl.com/asgj4b about 1 hour ago from twurl

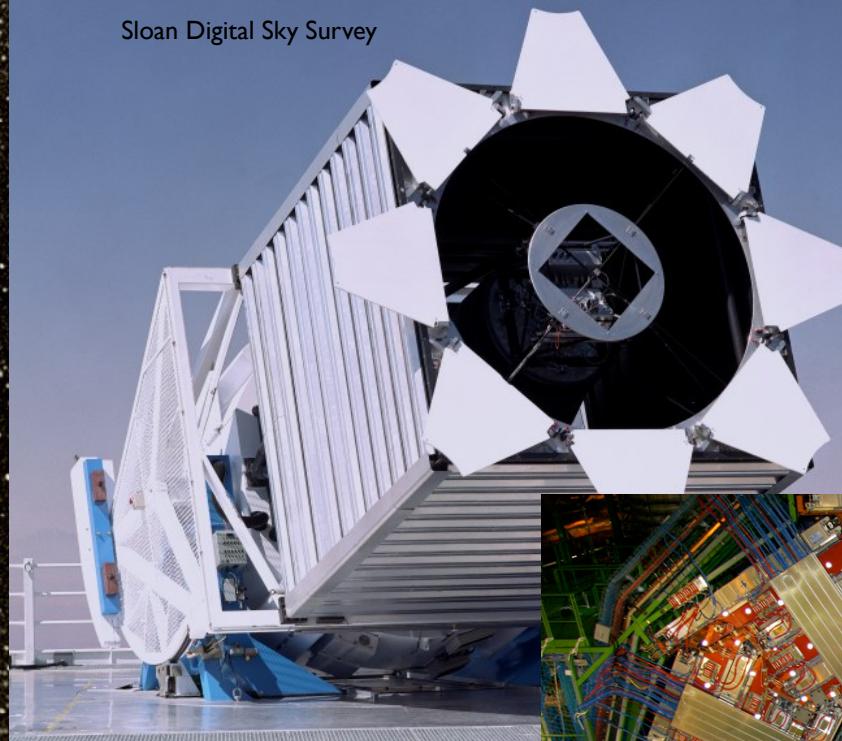
guykawasaki Wii Check-up Channel will link you to health professionals http://adjix.com/tr93 Also see http://gaming.alltop.com about 2 hours ago from Adix

presentationzen My new Starbucks tumbler from Osaka http://i.kn/hSA about 2 hours ago from Picstitch

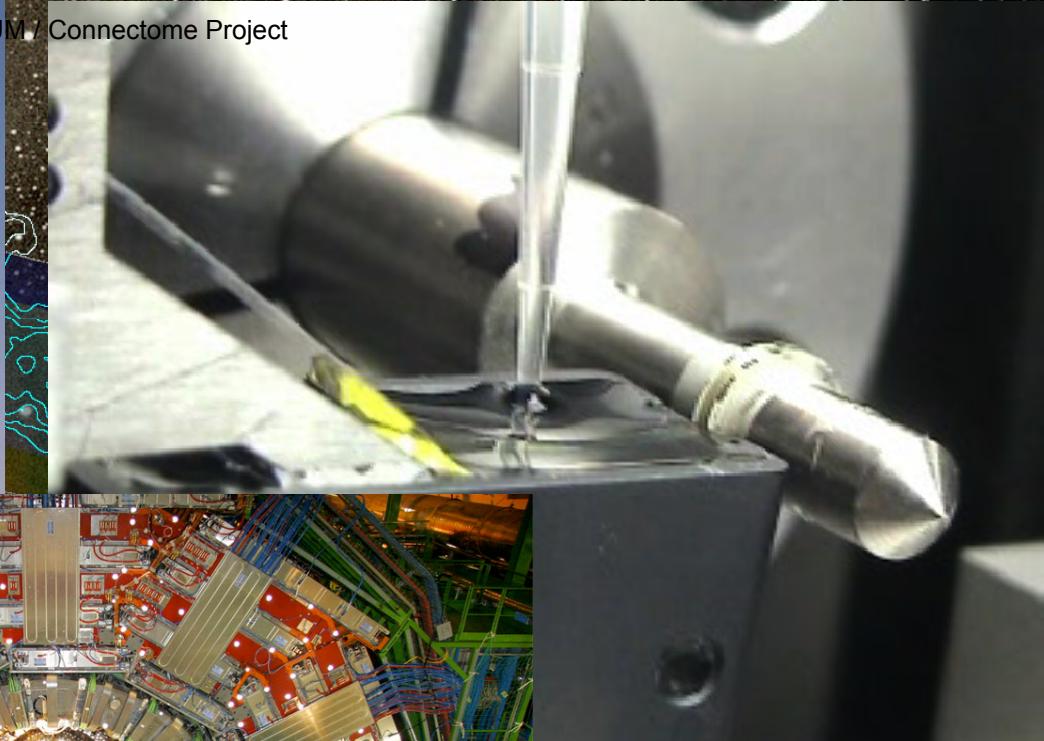
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Instrument Data Explosion

Sloan Digital Sky Survey

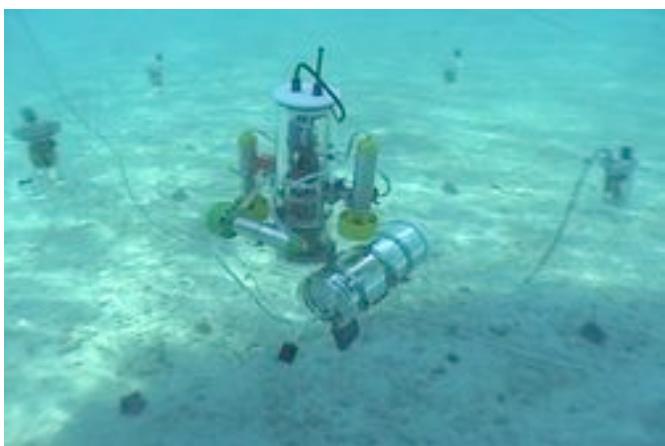
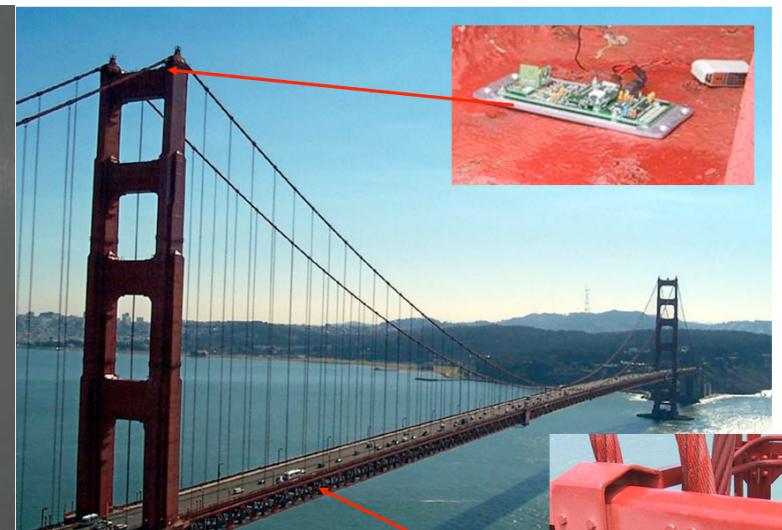
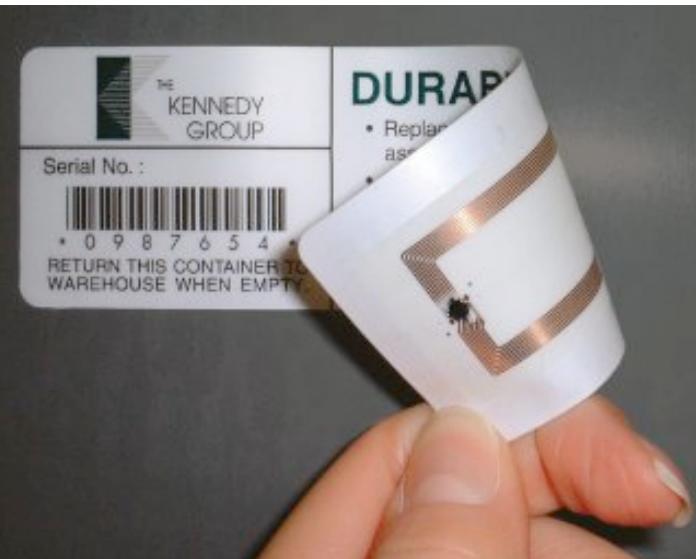
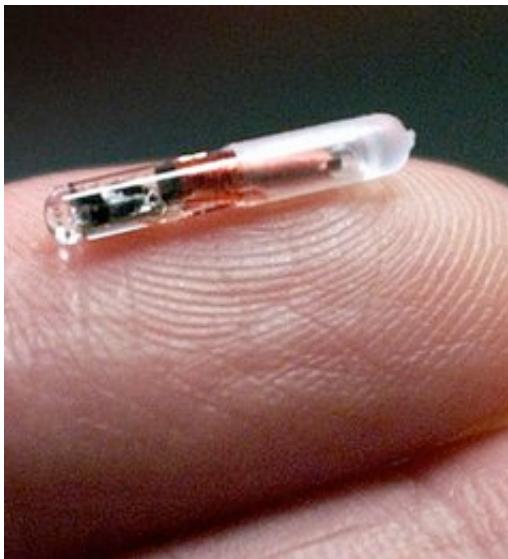


ATLUM / Connectome Project



“The Industrial Revolution of Data”

Joe Hellerstein, UC Berkeley



Limits of Cognition



Daniel J. Simons and Daniel T. Levin, Failure to detect changes to people during a real world interaction, 1998

“It is things that make us smart.”

Donald Norman



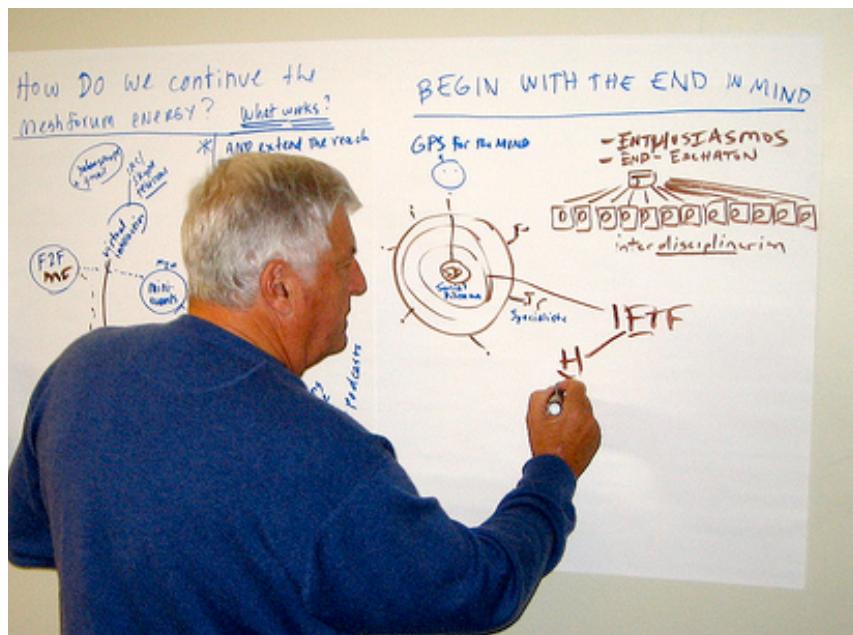
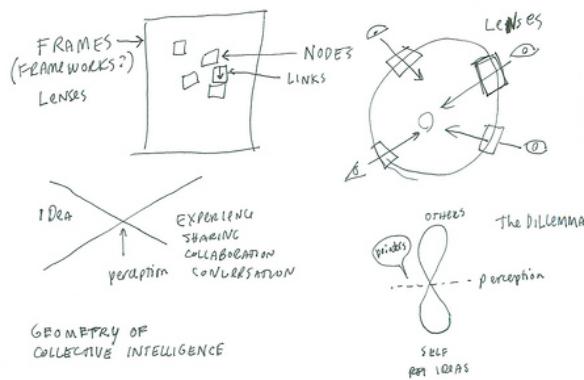
“It is things that make us smart.”

Donald Norman



“It is things that make us smart.”

Donald Norman

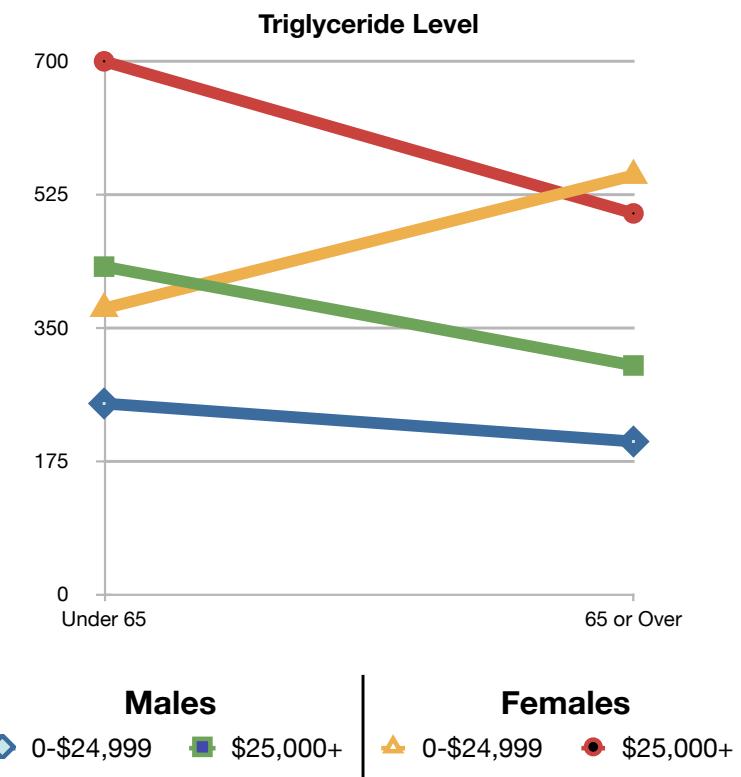


Mental Queries

Which gender or income level group shows different effects of age on triglyceride levels?

Income Group	Males		Females	
	Under 65	65 or Over	Under 65	65 or Over
0-\$24,999	250	200	375	550
\$25,000+	430	300	700	500

Visual Queries



Visualization

- Helps us think
- Reduces load on working memory
- Offloads cognition
- Uses the power of human perception

What is Visualization?

- What?
- Why?
- Who?
- How?

Our team

- Asil: asil.cetin@univie.ac.at
- Christian: christian.knoll@univie.ac.at
- Florian: Florian.Windhager@donau-uni.ac.at
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sebastian.ratzenboeck@univie.ac.at
- Torsten: torsten.moeller@univie.ac.at
- Tutor Jin: a11717460@unet.univie.ac.at
- Visualization and Data Analysis (VDA) Lab

About You

What is Visualization?

- What?
- Why?
- Who?
- How?

Goals of this course

- Learn basic design and perceptual principles
- Explore different visualization methods
- Implement an interactive visualization

Educational Goals

- Visualization specialist ... practitioner ... novice++
- Theory
 - Classification
 - Algorithms
 - Visual design
- Application
 - Methods
 - Visualization packages
- Experience
 - How to visualize something in the best way

Outline

- Fundamentals
 - What is vis?
 - Design principles
 - The visualization process
 - Data abstractions + Task abstractions
 - Design studies
- Visual Encodings + Algorithms
 - Basic visual encoding principles
 - Tables
 - Spatial data
 - Networks / trees
 - Time-varying data
 - 3D scalar fields (isosurfaces + volume rendering)
 - 3D vector and tensor field visualization
- Perception + Cognition
 - Color
 - Aggregation: Items + Attributes
 - Space / Order; Multiple views
 - Depth / Occlusion; Focus + Context
- Interaction
- Evaluation

Syllabus

See Web Page

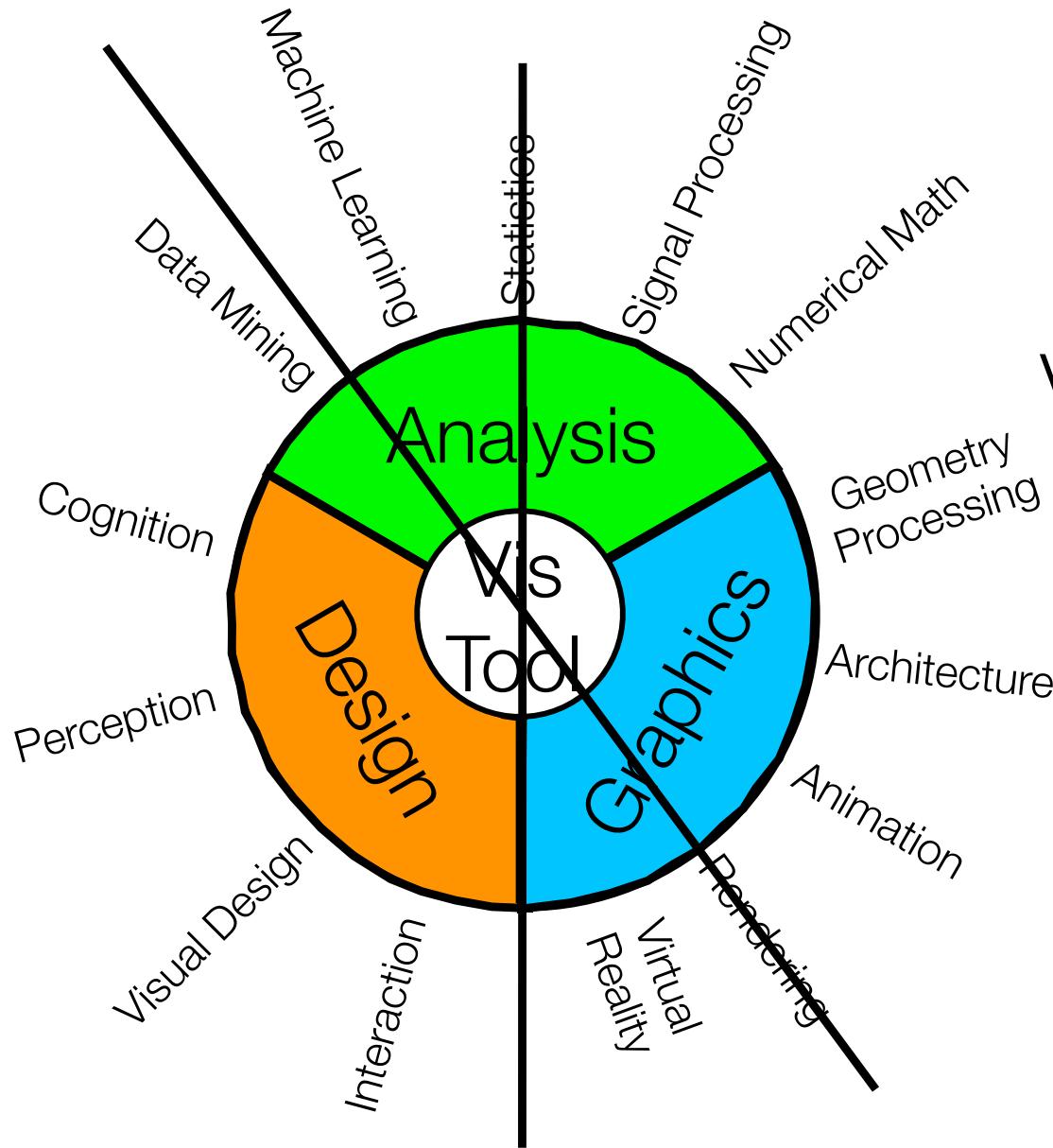
<https://teaching.vda.univie.ac.at/vis/24s/>

Related Fields

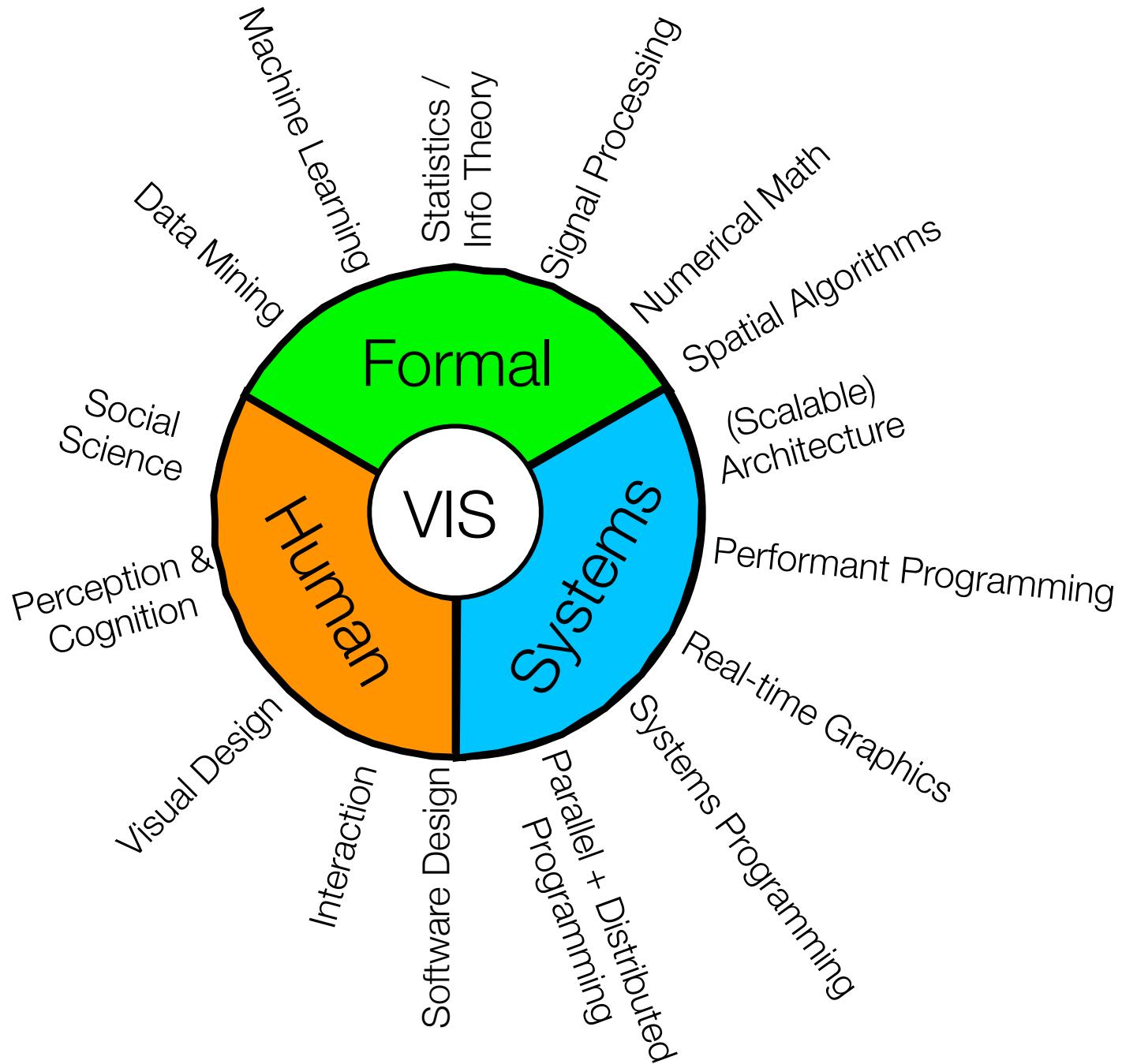
“Visual
Analytics”

“Scientific
Visualization”

“Information
Visualization”



Related Fields



Visualization Flavors

- Spatial Data Vis (aka: Scientific visualization)
 - User Interfaces
 - Data representation/processing
 - Algorithms
 - Visual representations
 - Mainly: *Continuous* models + Mathematical approach
- Non-Spatial Data Vis (aka: Information visualization)
 - Abstract data
 - WWW documents
 - File structures
 - Arbitrary relationships
 - ...
 - Mainly: *Discrete* models + Human-Centered Design

Textbook

- Tamara Munzner, **Visualization Analysis & Design: Abstractions, Principles, and Methods**, CRC Press, 2014

Further Reading

- Primary book on perception and visual design:
 - C. Ware: **Information Visualization: Perception for Design**, Elsevier/Morgan Kaufmann, (1st ed. 2000, 2nd ed. 2004)
 - C. Ware: **Visual Thinking for Design**, Morgan Kaufmann, 2008
- Primary book(s) on Spatial Data / Volume Graphics
 - C.D. Hansen, C.R. Johnson (eds.): **The Visualization Handbook**, Elsevier, 2005
 - K. Engel, M. Hadwiger, J.M. Kniss, C. Rezk-Salama, D. Weiskopf, **Real-time volume graphics**, AK Peters, 2006
- Primary book(s) on Non-Spatial Data
 - Ch. Chen, **Information Visualization: Beyond the Horizon**, Springer Verlag, 2004
 - Card, Mackinlay, and Shneiderman, (eds.), **Readings in Information Visualization: Using Vision To Think**; Morgan Kaufmann 1999

Further Reading

- References:
 - G.M. Nielson, H.Hagen, H. Müller: **Scientific Visualization**, IEEE CS Press, Los Alamitos, 1997
 - W.J. Schroeder, K.W. Martin, B. Lorensen: **The Visualization Toolkit: An Object-Oriented Approach to 3D Graphics**, 4th ed., Kitware, Clifton Park, 2006
 - **The Visualization Toolkit User's Guide**, 11th ed, Kitware, 2010
 - E.R. Tufte, **The Visual Display of Quantitative Information**, Graphics Press 1983
 - E.R. Tufte, **Envisioning Information**, Graphics Press 1990
 - E.R. Tufte, **Visual Explanations**, Graphics Press 1997⁶³

(Spatial) Visualization Tools

- Great / free:
 - VTK (The Visualization Toolkit) <http://www.vtk.org>
- Commercial tools:
 - Amira <http://www.amiravis.com>
 - AVS/Express <http://www.avs.com>
 - IDL <http://www.exelisvis.com/IntelliEarthSolutions/GeospatialProducts/IDL.aspx>
 - IRIS Explorer http://www.nag.co.uk/Welcome_IEC.asp
 - OpenDX (now open software): <http://www.opendx.org>

(Non-Spatial) Vis. Tools

- Tamara's resources page!
<http://www.cs.ubc.ca/~tmm/courses/533-11/resources.html>
 - Free:
 - Processing <http://www.processing.org/>
 - Prefuse (java) <http://prefuse.sourceforge.net/>
 - D3 <http://alignedleft.com/work/d3-book>
 - Xgobi <http://www.research.att.com/areas/stat/xgobi/>
 - Commercial tools:
 - Tableau <http://www.tableausoftware.com/>