

# Visual Analytics Introduction

S. Rinzivillo

M. Tesconi

# Who We Are?

- Salvatore Rinzivillo
  - [rinzivillo@isti.cnr.it](mailto:rinzivillo@isti.cnr.it)
- Maurizio Tesconi
  - [maurizio.tesconi@iit.cnr.it](mailto:maurizio.tesconi@iit.cnr.it)

# Who You Are?

- Online questionnaire at
  - <http://goo.gl/O79wqK>



# Goals

- Learn to combine analytical techniques with effective visualization
- Gain practical know-how on visualization methods
- Produce interactive, informative, effective, insightful (and beautiful) visualizations

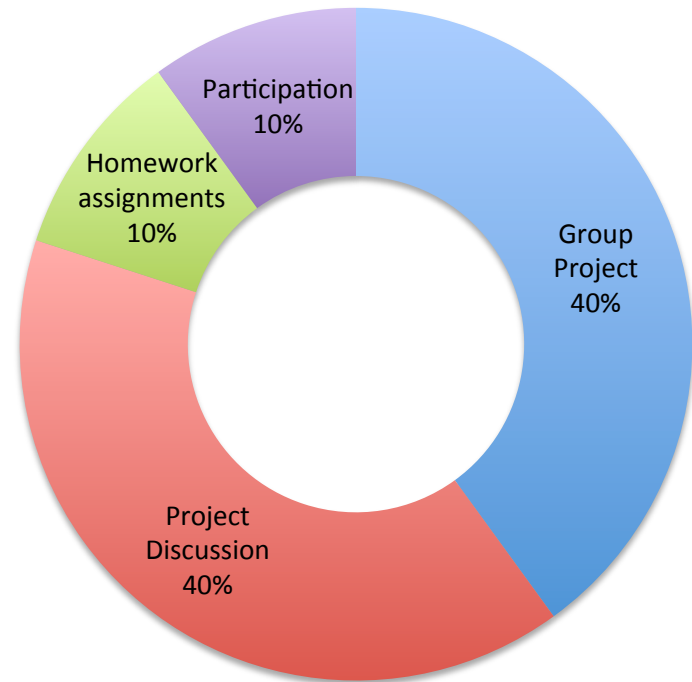


# Schedule

- On Monday
  - 14:00 to 16:00
  - Room: L1
  - Teacher: Salvatore Rinzivillo
- On Tuesday
  - 16:00 to 18:00
  - Room: L1
  - Teacher: Maurizio Tesconi

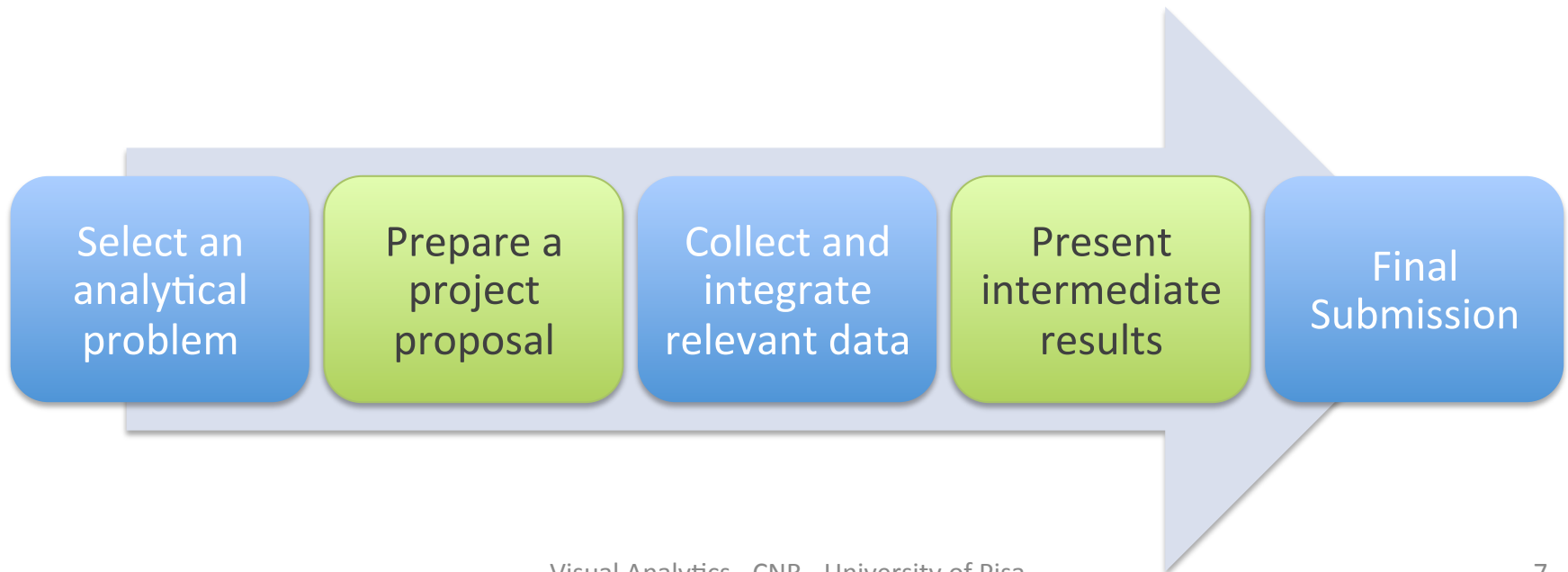
# Grading

- Homework assignments (10%)
  - *In itinere* tasks and small projects
- Group Projects (40%)
  - Up to 2 persons per group
- Project discussion (40%)
- Participation (10%)



# Grading Projects

- Up to 2 persons per group
- Objective: select and present a visual interface for an analytical problem



# Not valid projects

## The Blogging Food Groups

### Whole Wheat & Grains

Hearty and filling, you can quickly dish out this basic content daily.

- How-to posts
- Sharing influencer/third-party posts
- Useful, relevant topics for marketers
- Repurposing old content

### Vegetables

It might not be your favorite, but you know it's good for you.

- Thought leadership pieces
- Guest topics
- Case studies

### Meat

These valuable, time-consuming projects leave your readers begging for more.

- Strategic research and analysis
- POVs
- Big Rock content, or large and unique thought leadership pieces

### Desserts

Sweet and sharable, they'll all want a second helping of these little treats.

- Light-hearted, easily digestible content
- Cultural content (e.g., "Day in the Life")
- Amusing videos, graphics, and stories

### Condiments

Livening up any meal, a dash of this stuff can spread like fire.

- Bold statements with strong point of view
- Helpful links

## Blogging Meal Plan

Here is one week's worth of content for you to try.  
Remember, it's important to find the right, steady diet that works best for your goals.

MONDAY	Vegetables	TUESDAY	Meats

## 11 Ways To Tie A Scarf

*Presented by: Real Men Real Style*

### DRAPE

How to Tie a Scarf Series - 1 of 11

**Features**  
For Medium Length Scarfs • Perfect For Cool Weather (35 to 55 °F / 2 TO 13 °C)

- 
- 
- 

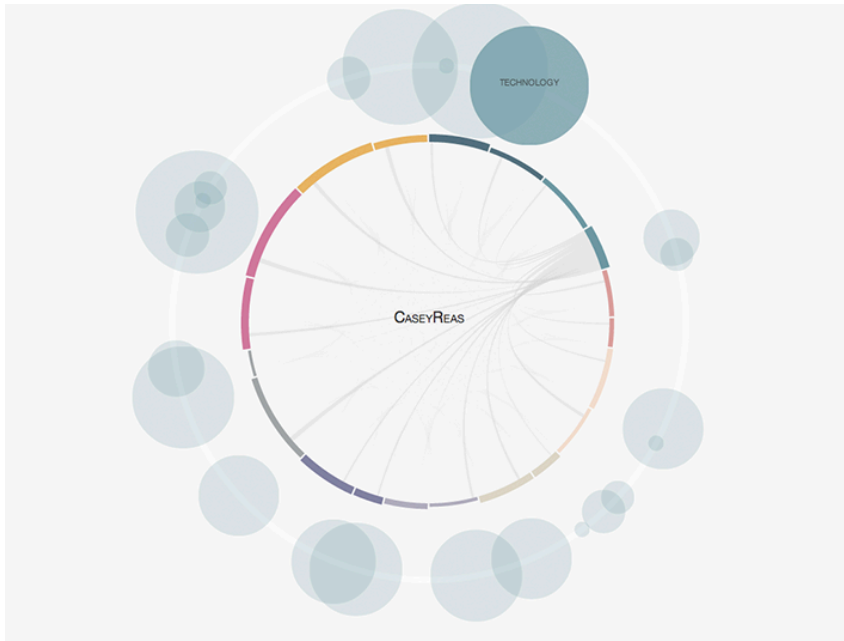
### ONCE AROUND

How to Tie a Scarf Series - 2 of 11

**Features**  
For Medium Length Scarfs • Perfect For Cool Weather (35 to 55 °F / 2 TO 13 °C)

- 
- 
-

# Valid proposals

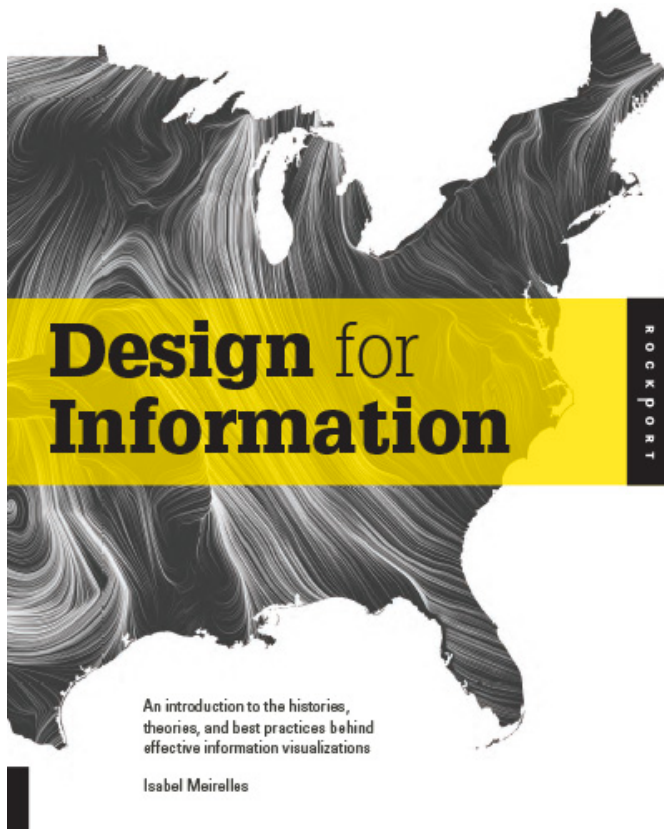


<http://lab.interactivethings.com/substratum-visualization/application.html>

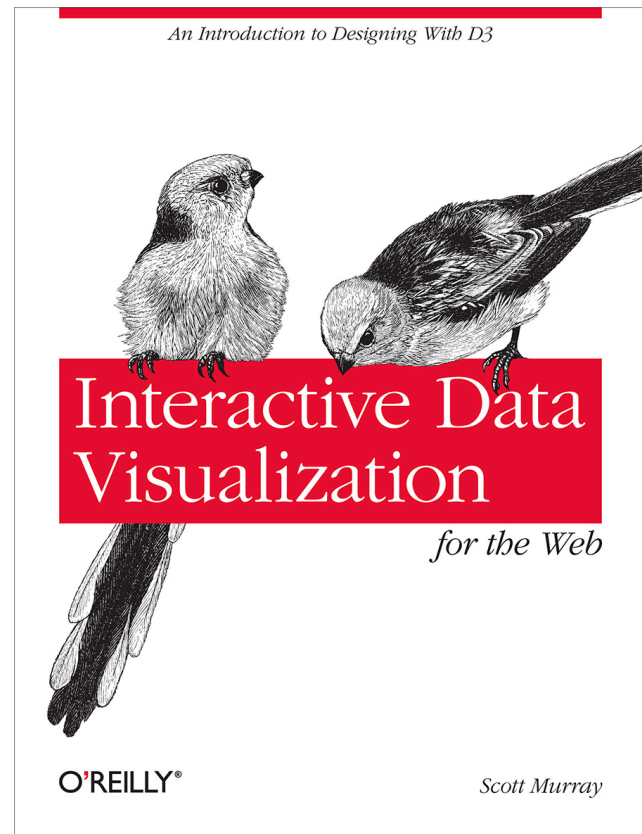
<http://www.atlasvisualdeinnovacion.com/>

# Textbooks

## Design for Information Isabel Meirelles



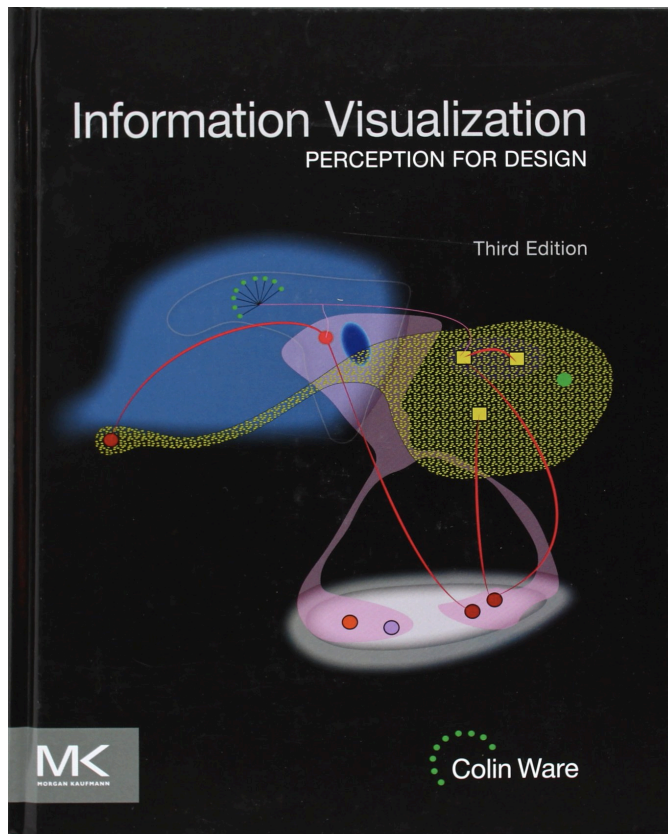
## Interactive Data Visualization Scott Murray



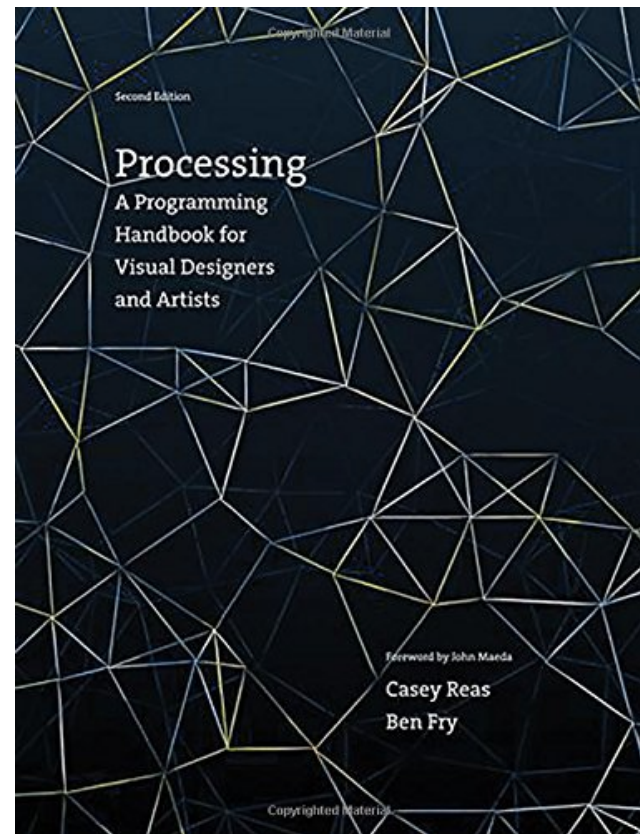


# Textbooks

## Information Visualization Colin Ware



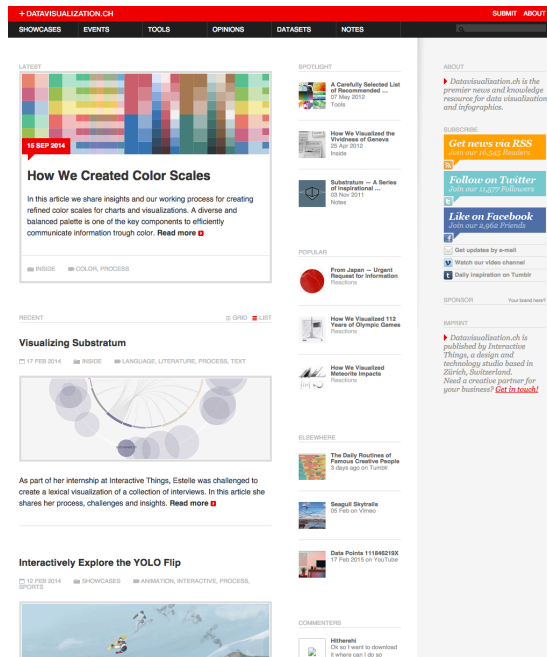
## Processing: Handbook for Visual Designers and Artists Casey Reas, Ben Fry



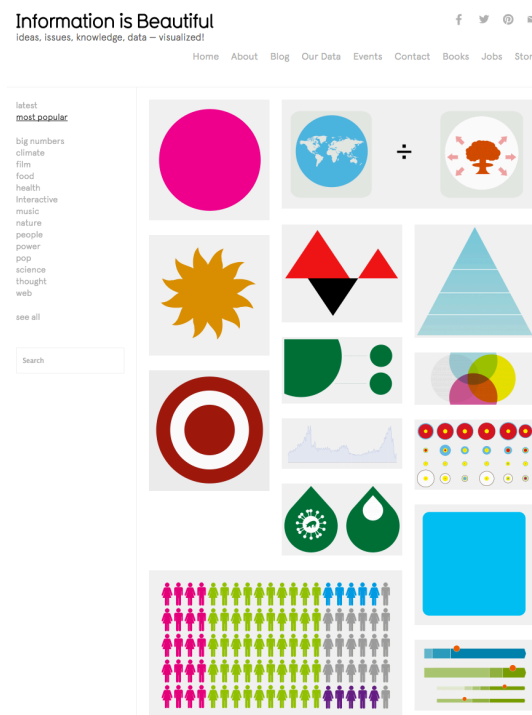
# Other Resources

# Observe how others resolved design problems

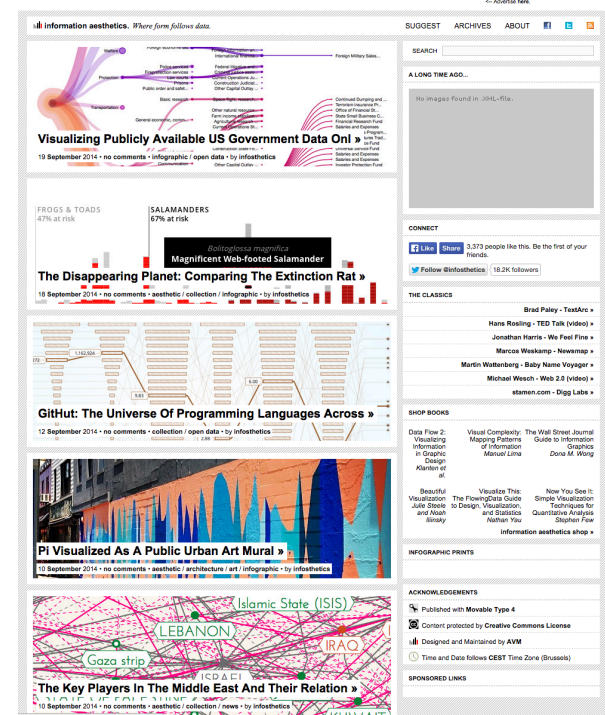
datavisualization.ch



informationisbeautiful.net



infosthetics.com





# **VISUAL ANALYTICS**

# Motivations

- Data everywhere
- No value for raw data
  - Need to extract valuable information
- Information overload:
  - Irrelevant for current task
  - Processed in an inappropriate way
  - Presented in an inappropriate way

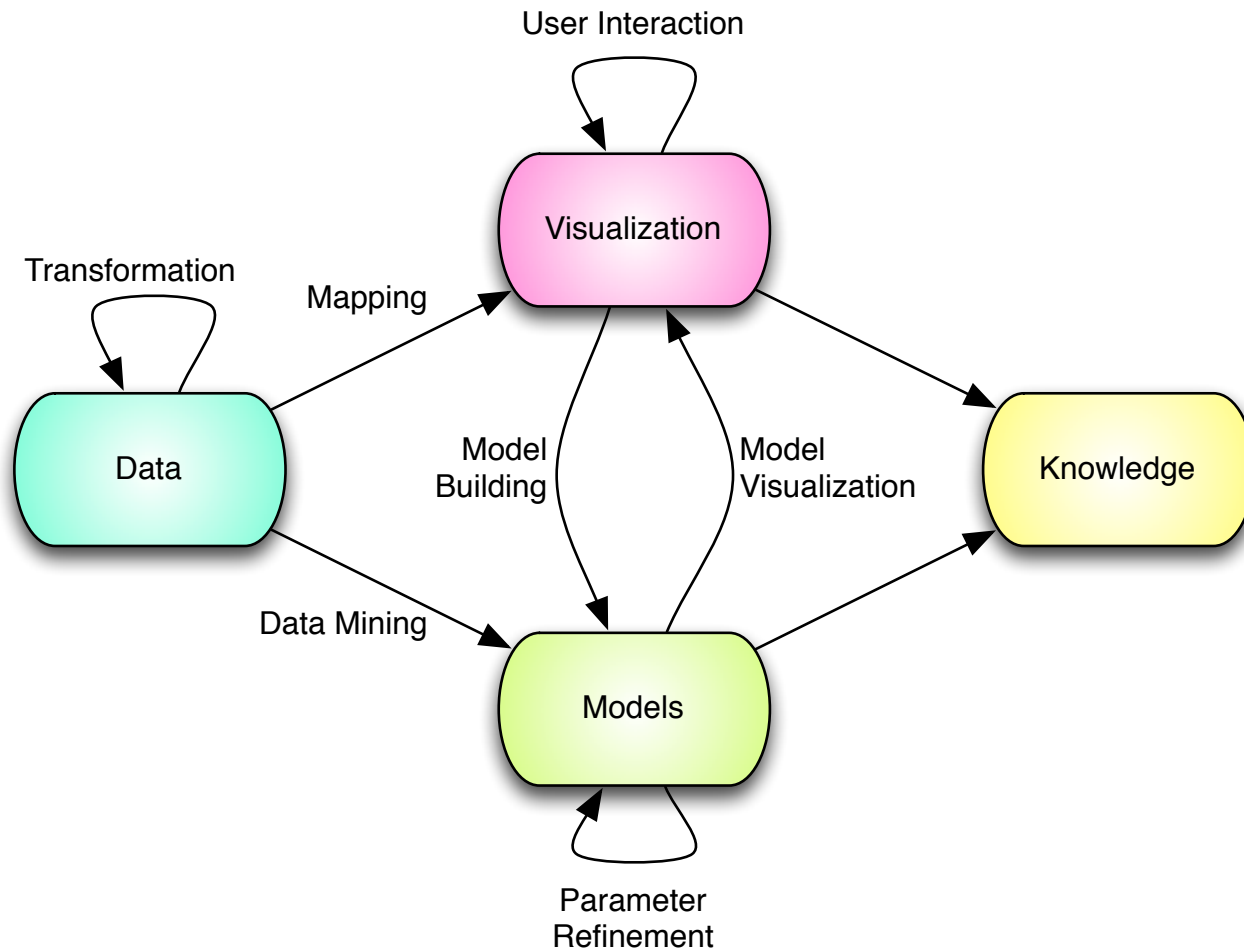
# Visual Analytics Aim

- Make data and information processing transparent
- Combine strengths of humans and computers

**Computers are  
incredibly fast,  
accurate,  
and stupid;  
humans are  
incredibly slow,  
inaccurate  
and brilliant;  
together  
they are powerful  
beyond  
imagination.**

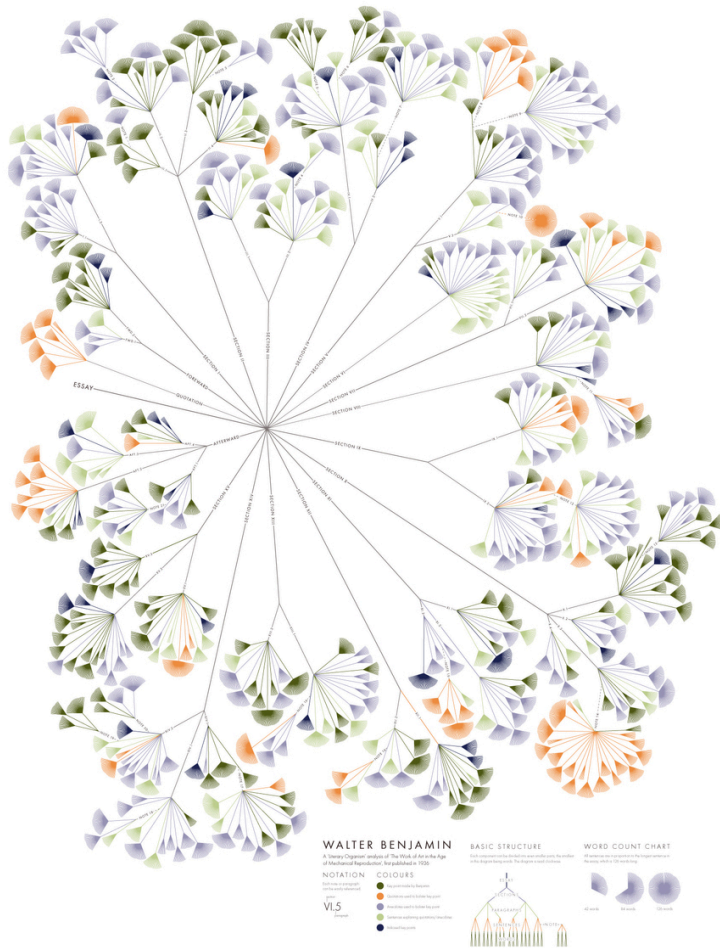
Albert Einstein

# Visual Analytical Process

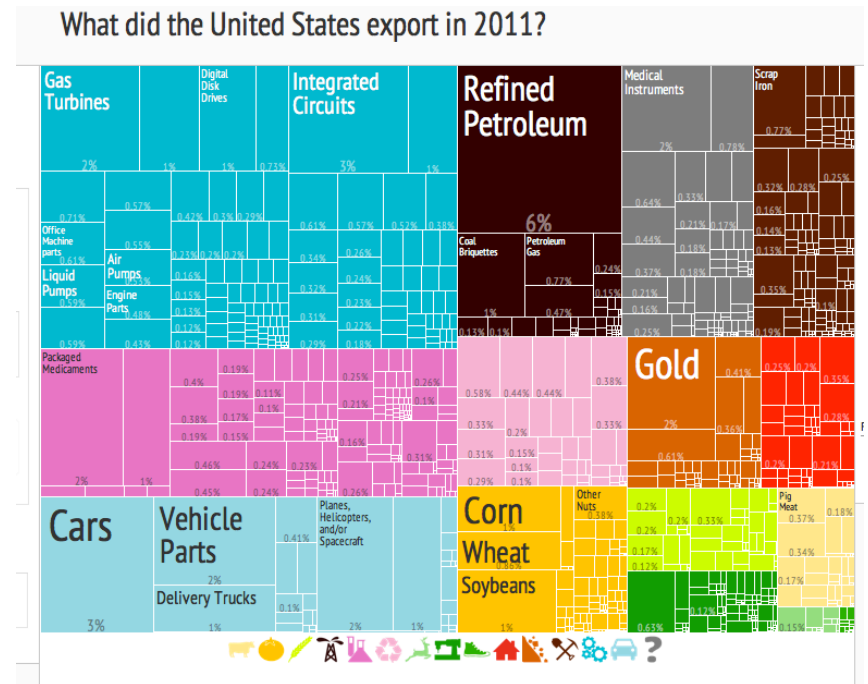


# **COURSE OUTLINE**

# Hierarchical Structures

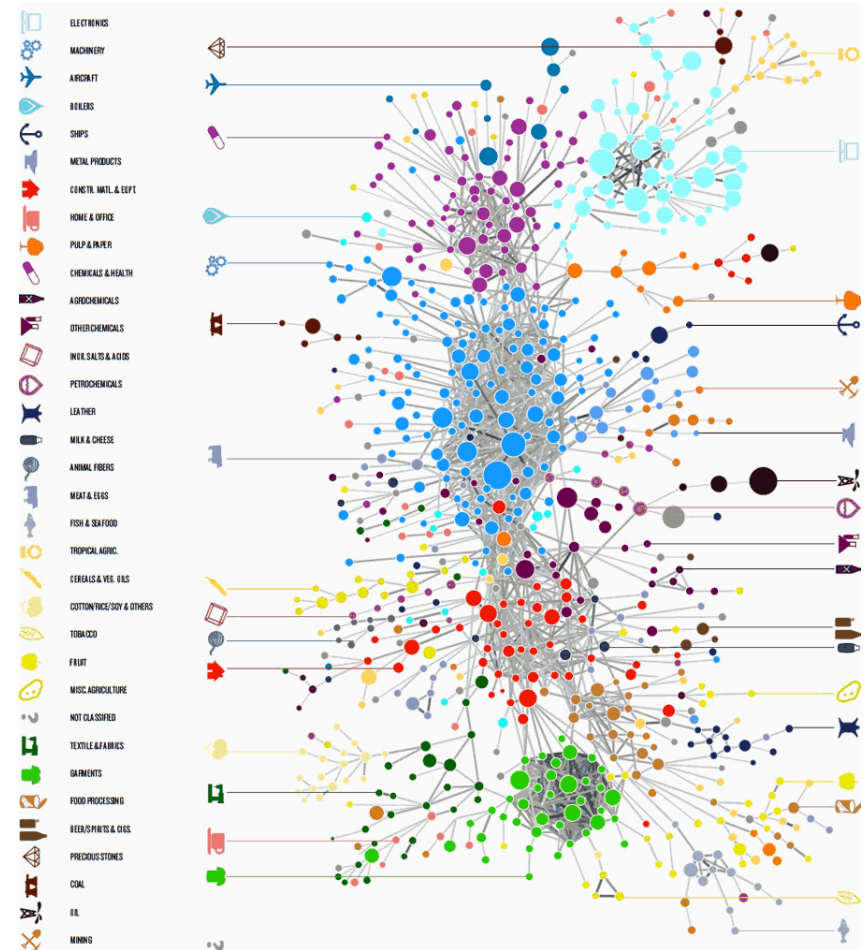
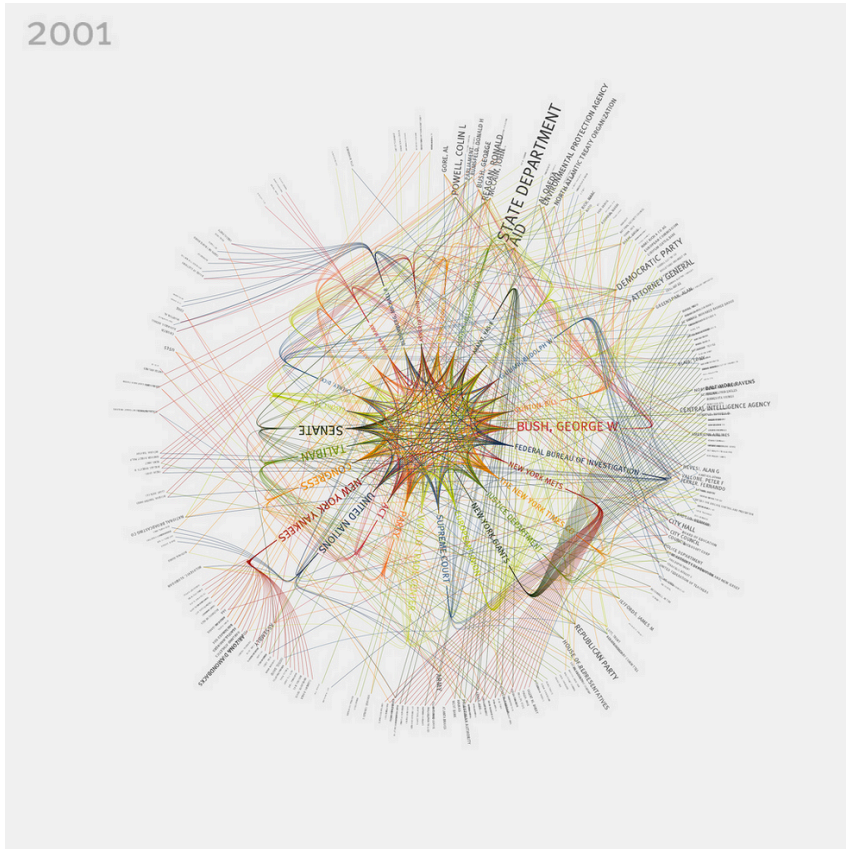


<http://www.stefanieposavec.co.uk/entangled-word-bank/>



<http://atlas.media.mit.edu/>

# Networks



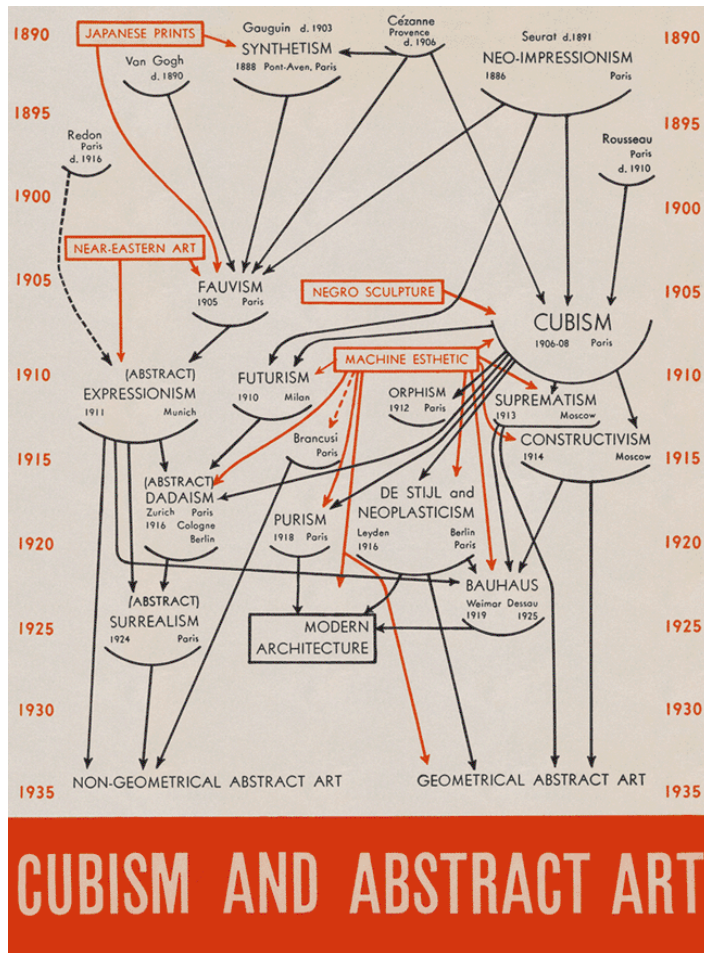
<https://www.flickr.com/photos/blprnt/sets/72157614008027965/>

<http://atlas.media.mit.edu/>

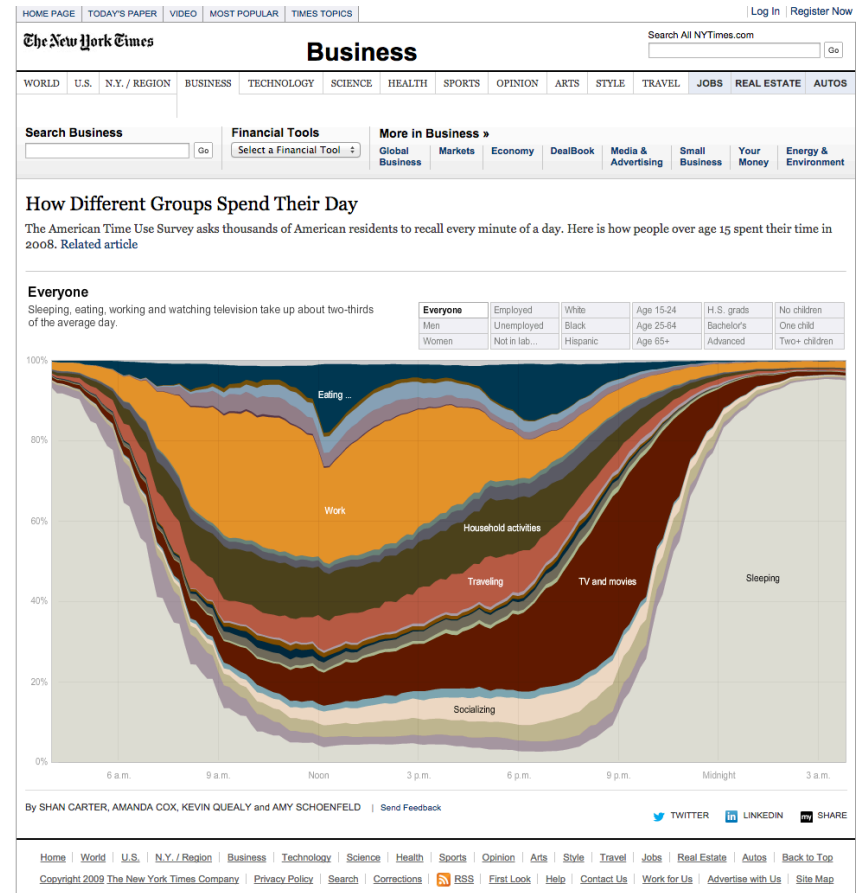
Visual Analytics - CNR - University of Pisa



# Temporal Structures



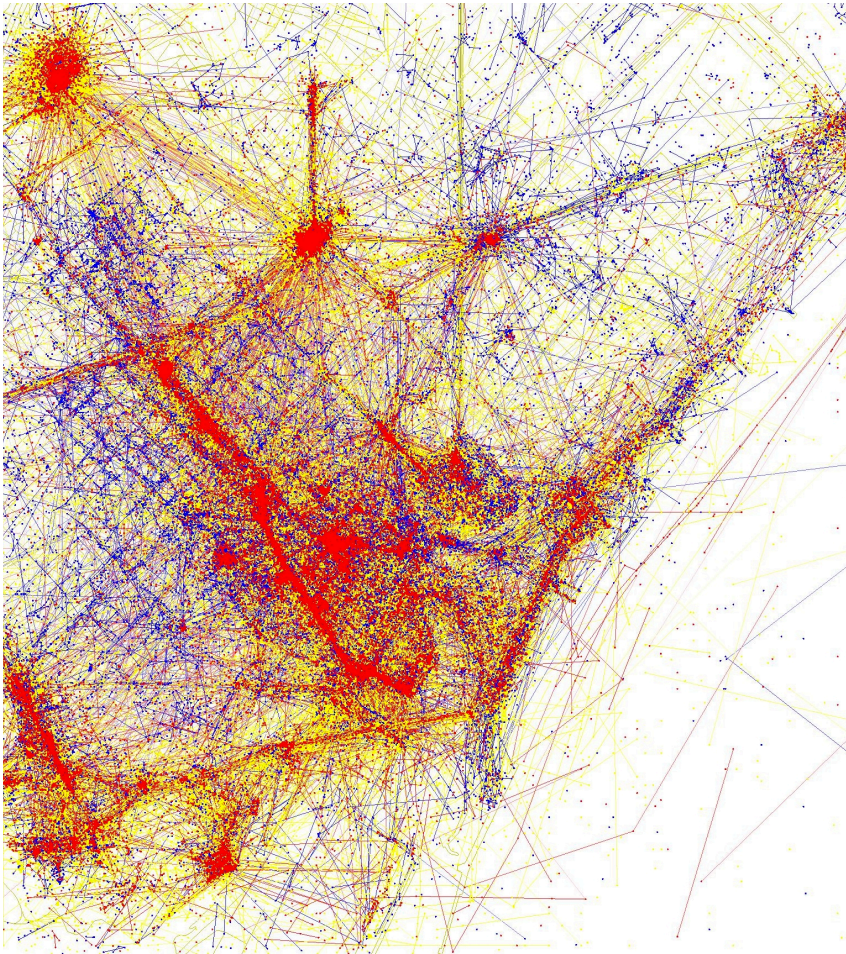
Cubism And Abstract Art (Alfred H. Barr 1936)



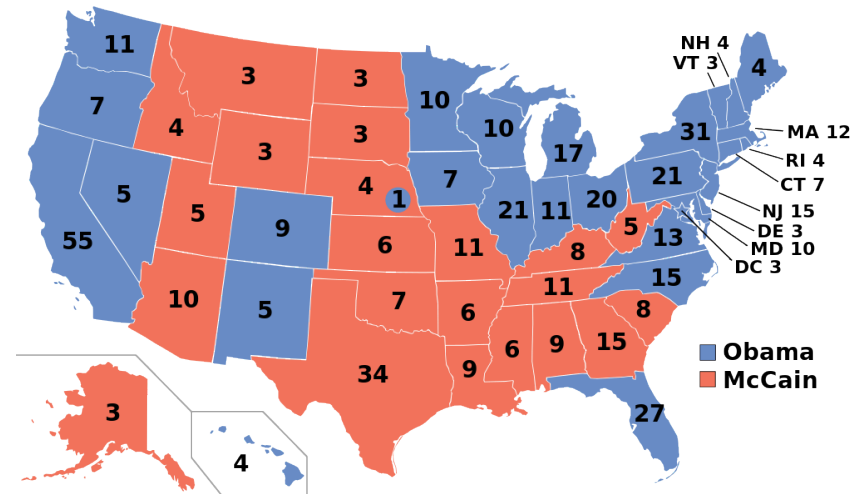
<http://www.nytimes.com/interactive/2009/07/31/business/20080801-metrics-graphic.html>



# Maps

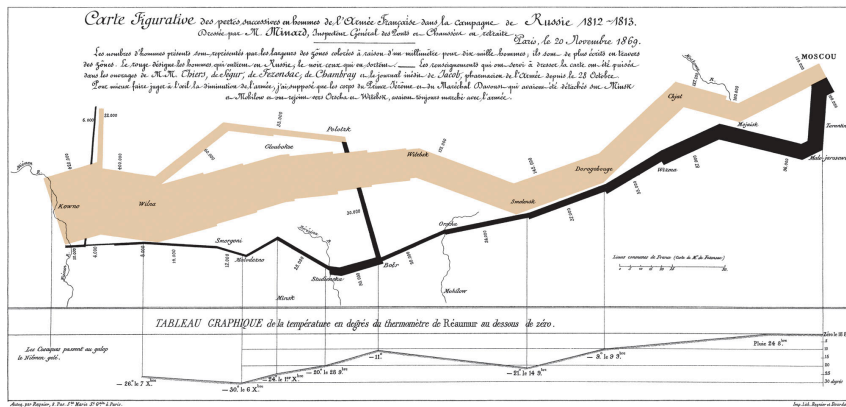


<https://www.flickr.com/photos/walkingsf/sets/72157624209158632/>

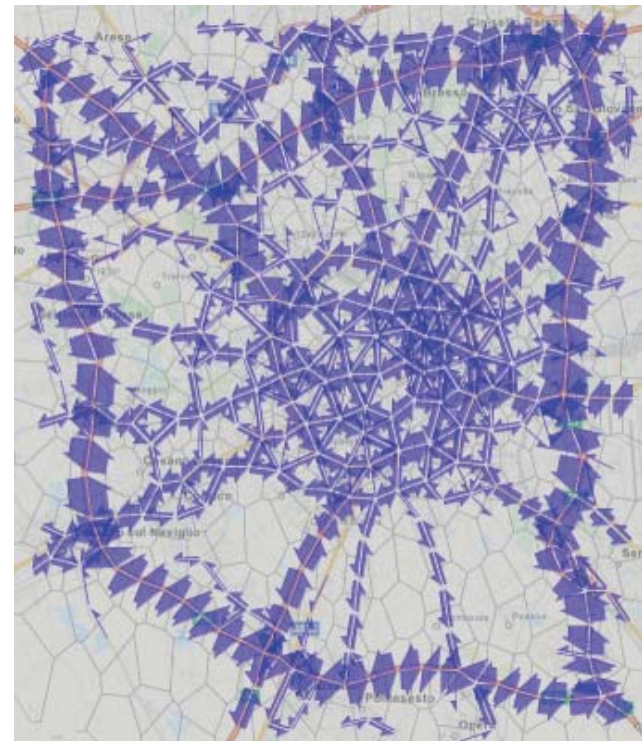


"ElectoralCollege2008" by Gage - Own work. Licensed under Public Domain via Wikimedia Commons - <http://commons.wikimedia.org/wiki/File:ElectoralCollege2008.svg#mediaviewer/File:ElectoralCollege2008.svg>

# Spatio-Temporal data



"Minard" by Charles Minard (1781-1870) - see upload log. Licensed under Public Domain via Wikimedia Commons - <http://commons.wikimedia.org/wiki/File:Minard.png#mediaviewer/File:Minard.png>



N of moves



Total: 2184 objects; active: 1084

Visual Analytics of Movement.

G. Andrienko, N. Andrienko, P. Bak, D. Keim, S. Wrobel

Springer 2013



# Text



<http://benfry.com/writing/archives/529>

# Tools

## Processing processing.org

[Processing](#) [p5.js](#) [Processing.py](#) [Processing Foundation](#)


Processing

[Cover](#)  
[Download](#)  
[Exhibition](#)  
[Reference Libraries](#)  
[Tools](#)  
[Environment](#)  
[Tutorials](#)  
[Examples](#)  
[Books](#)  
[Handbook](#)  
[Overview](#)  
[People](#)  
[» Forum](#)  
[» GitHub](#)  
[» Issues](#)  
[» Wiki](#)  
[» FAQ](#)  
[» Twitter](#)  
[» Facebook](#)

### Exhibition.

A curated collection of projects created with Processing. New software added each month.

Curated by Filip Visnjic of CreativeApplications.net




#### Non-Linear Code

by Dextro

Dextro writes 'non-linear code' drawing inspiration from nature. The results are non-fractal or random programs that iterate without change, with equal rules for all objects. Most of the scripts rely on trigonometry and could be seen as sets of wave generators interacting with one another. Some of these pieces take years to develop but the code is usually short but complex.

Links: [Dextro](#), [Vimeo](#)




#### Computational design methodologies for large-scale 3D printing

by GAD – RC4

With an exponential increase in the possibilities of computation and computer-controlled fabrication, architecture is now facing a novel challenge. Bartlett School of Architecture's RC4 in London researches computational design methodologies for large-scale 3D printing with industrial robots, taking logistical, structural and material constraints as design opportunities.

Links: [GAD – RC4](#), [CreativeApplications.Net](#)




#### Filament Sculptures

by Lia


For about a year now generative artist Lia has been exploring 3d printing by analysing filament and the movements of the printhead. Rather than just having 3d models printed out, Lia has been interested in the possibilities of the process by defining the location of the printhead, the speed of the movement and the amount of filament that should be extruded.

Links: [Lia](#), [liasomething.tumblr.com](#)




#### Fall in Love - Phantogram

by Timothy Saccenti and Joshua



#### Keyflies

by Miles Peyton



#### Petting Zoo

by Minimaforms

## D3.js d3js.org

[Overview](#) [Examples](#) [Documentation](#) [Source](#)



**D3.js** is a JavaScript library for manipulating documents based on data. **D3** helps you bring data to life using HTML, SVG, and CSS. D3's emphasis on web standards gives you the full capabilities of modern browsers without tying yourself to a proprietary framework, combining powerful visualization components and a data-driven approach to DOM manipulation.

[See more examples.](#)

Download the latest version (3.5.5) here:

- [d3.zip](#)

Or, to link directly to the latest release, copy this snippet:

```
<script src="http://d3js.org/d3.v3.min.js" charset="utf-8"></script>
```