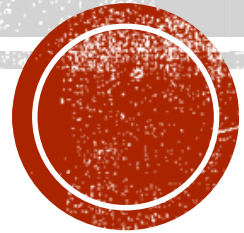
# VISUALIZATION SOFTWARE
## (MOSTLY FREE)



# DATA VISUALIZATION TOOLS

- At the University we see a wide variety
- Focusing on free

1. Preparing Data
2. Visualization

# DATA TOOLS: DATA WRANGLER / TRIFACTA

DataWrangler alpha

TRIFACTA Wrangler

http://vis.stanford.edu/wrangler

https://www.trifacta.com

- Interactive tool for cleaning & rearranging
- Suggests changes
- Wrangler: web tool – data to external site (1000 lines)
- Import: text, CSV, JSON
- Export: CSV, JSON, TDE (Tableau)

# DATA TOOLS: OPEN/GOOGLE REFINE

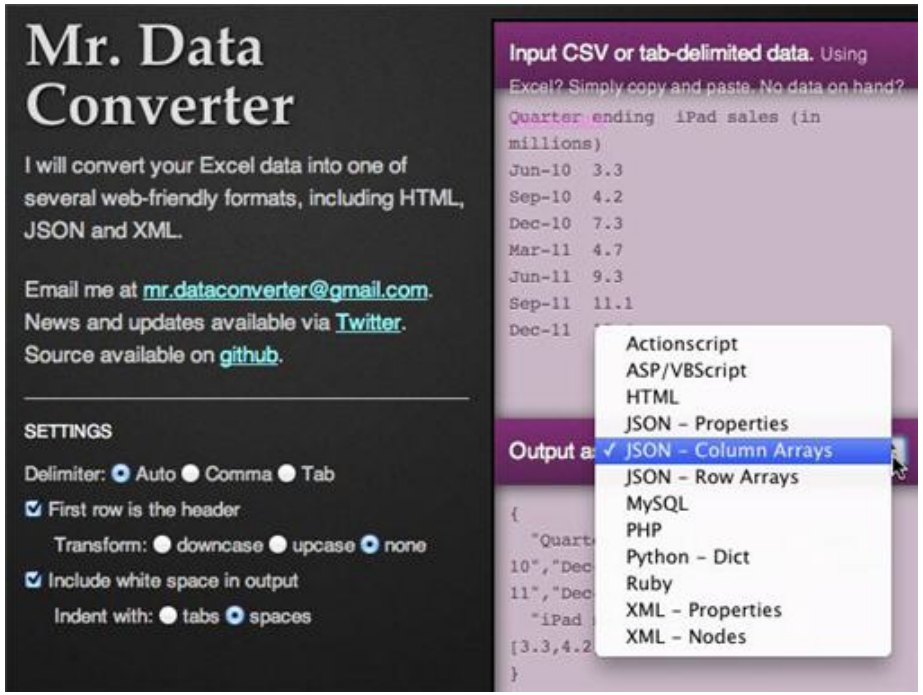
http://openrefine.org/

- Consolidate spelling
- Auto-detect outliers
- Sorting & filtering
- Auto-suggests changes
- Import: Excel, XML, JSON, RDF, CSV
- Export: Excel, CSV, ODF, HTML

# DATA TOOLS: MR DATA CONVERTER

http://shancarter.github.io/mr-data-converter/

- Import: csv, tsv, copy & paste from Excel
- Export: JSON, ASP, ActionScript, MySQL, PHP, Python, Ruby, HTML, XML



# DATA TOOLS: TABULA

Tabula

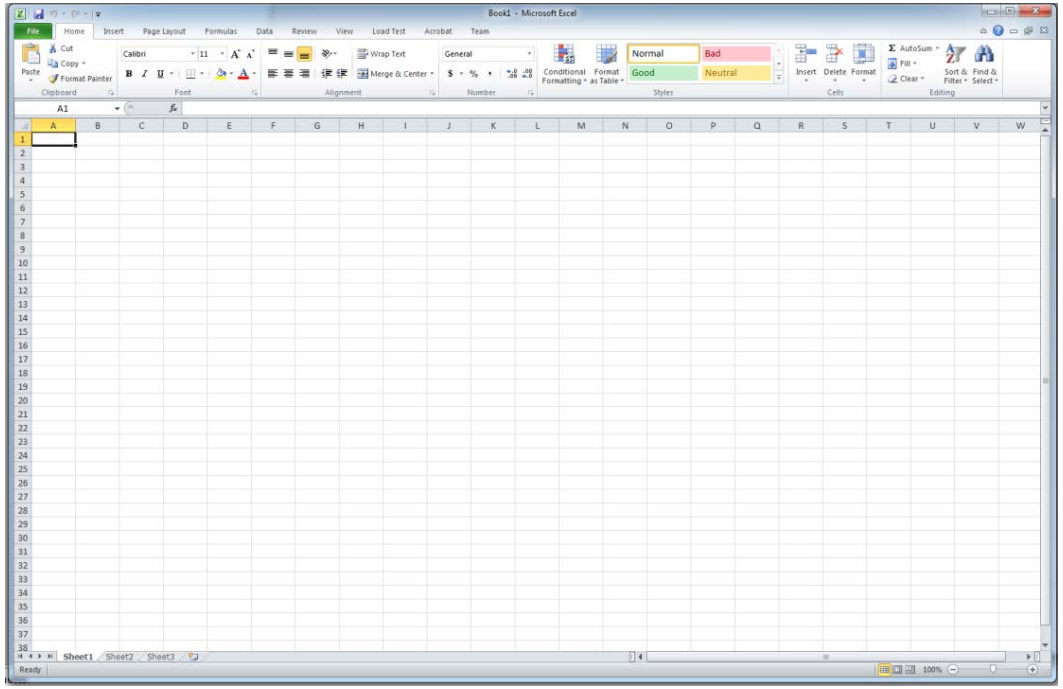
http://tabula.nerdpower.org/

- Extract data from PDFs
- Stand-alone app for Windows/Mac
- Interactively select table
- Output: CSV, Excel

# VISUALIZATION TOOLS

- General Purpose
- Maps & GIS
- Text Analysis
- Programming/APIs

# EXCEL



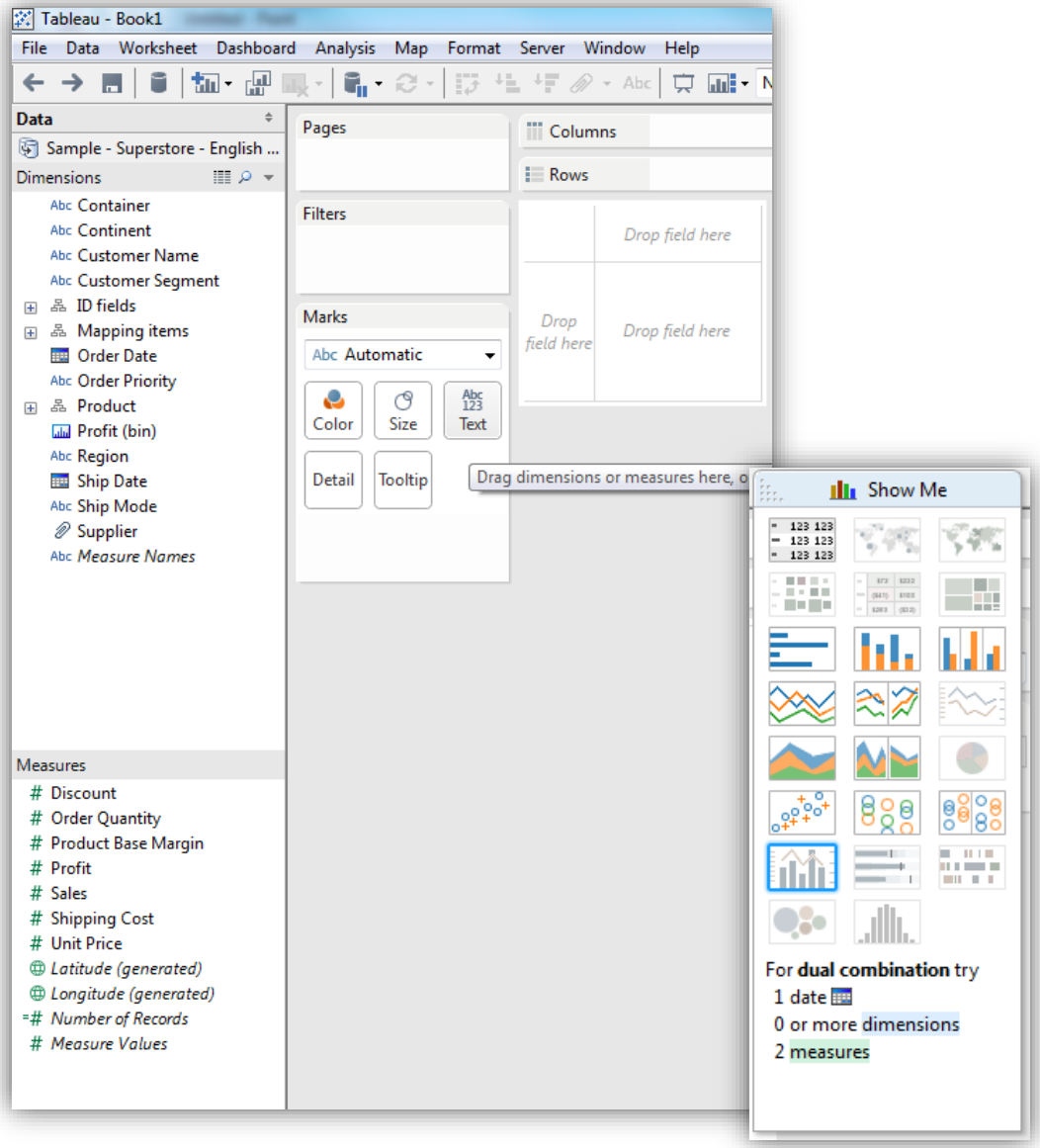
- Simple charts
- Power Pivot
  - Millions of records
  - Must have Excel 2010
  - http://office.microsoft.com/en-ca/excel-help/power-pivot-add-in-HA101811050.aspx
- Poor defaults
- Hard to customize

# VIS TOOLS: TABLEAU

http://www.tableau.com/

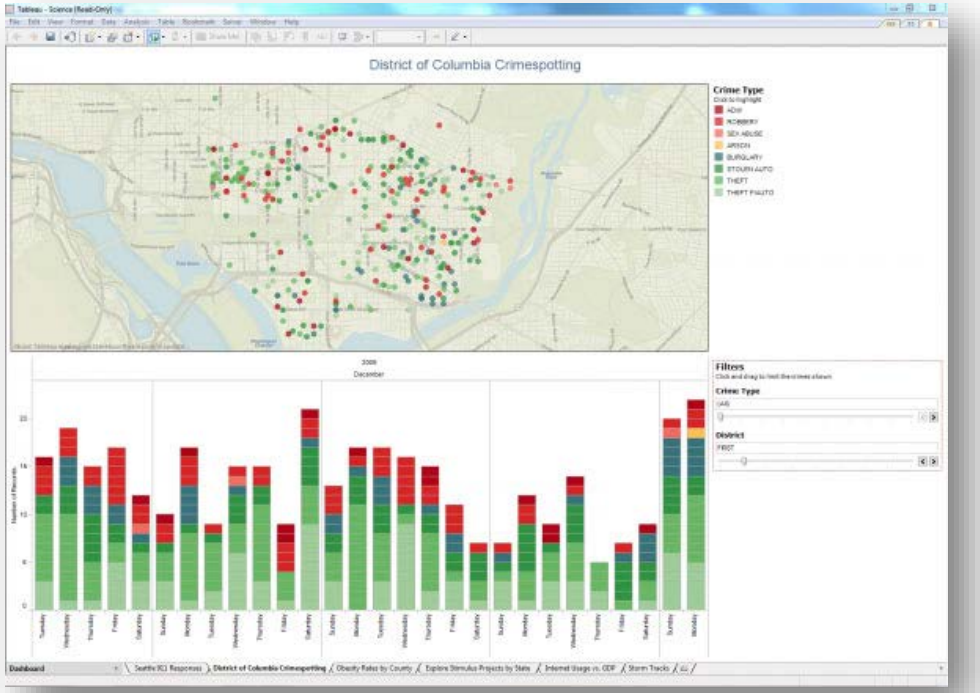
## Strengths:

- Many chart types
- Interactive web output
- Access to underlying data
- Many data sources (live)
- Drag & drop – easy to experiment
- Maps
- Great defaults
- Link visualizations
- R can plugin
- Academic Program - Free for students



# VIS TOOLS: TABLEAU

http://www.tableau.com/




Weaknesses:

- Complex
- Many features, can be hard to find
- Expensive (if not a student)

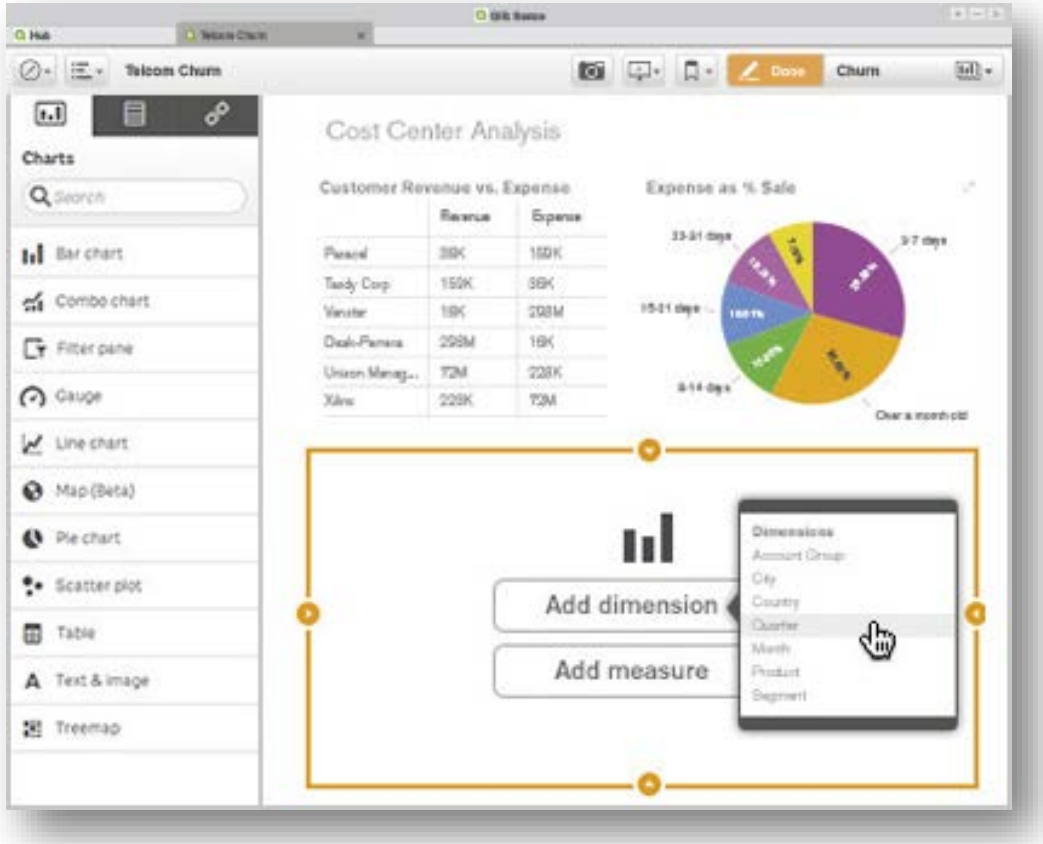
Who Uses It:

- Popular for Business Intelligence & Journalists/Media
- Anyone w/ Data

# VIS TOOLS: QLIK

http://www.qlik.com

- Similar capabilities as tableau
- More focus on dashboards
- Start w/ chart type
- Free for personal or internal use (~$4000 otherwise)
- Developer oriented (API support)
- Exploration not as easy

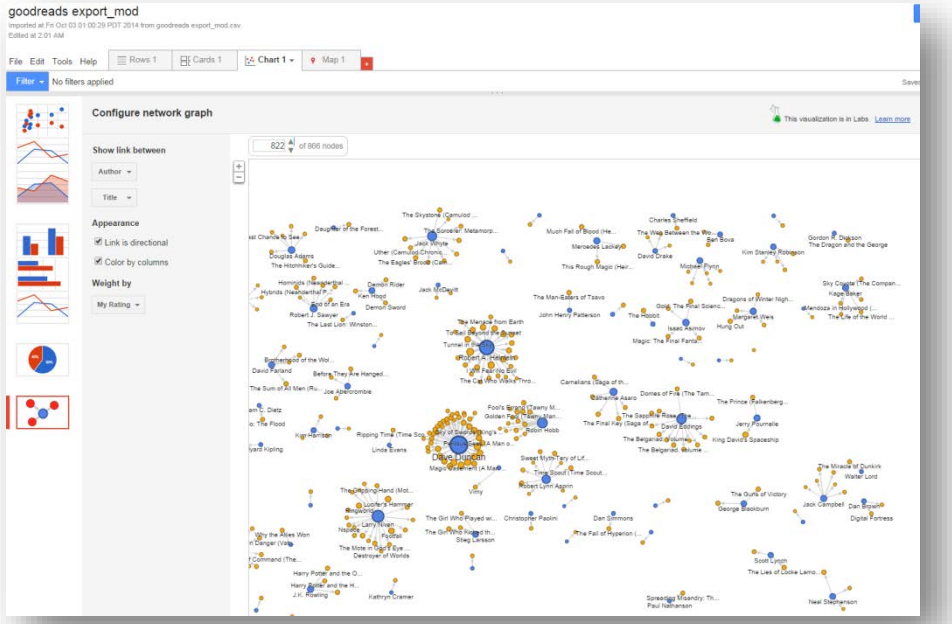


# VIS TOOLS: GOOGLE FUSION TABLES

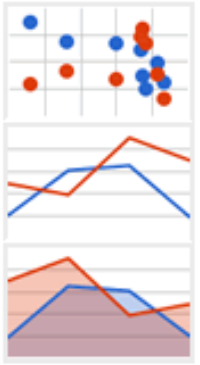
Fusion Tables

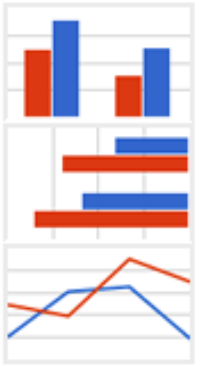
https://www.google.com/fusiontables

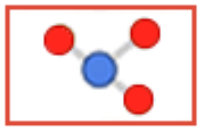
- Merge others' data into your own table
- Collaborative data gathering
- Great for maps
- Resolves geocoding
- data API




- Limited data capacity & customization



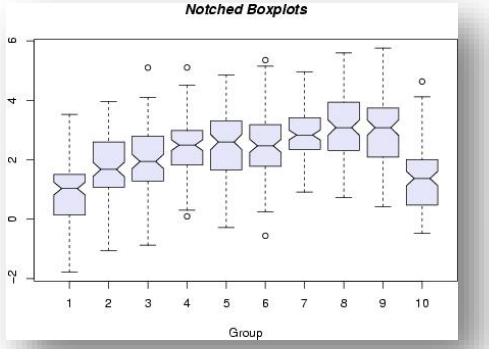


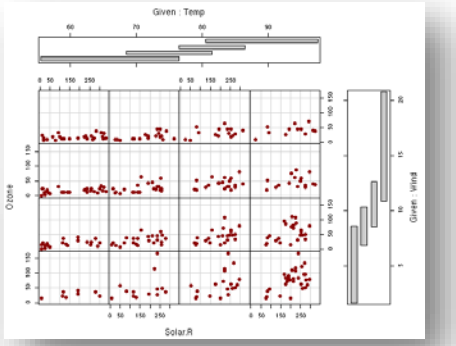


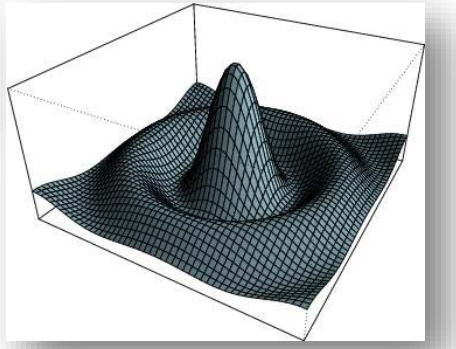
# VIS TOOLS: R

http://www.r-project.org/

- Open-source software for statistics & graphics
- All sorts of advanced stats
  - Regression, linear/nonlinear models, time series analysis, clustering, nonparametric tests
- Data wrangling
- Charts & Plots
- Command line*
- Many add-ons (> 4400)
- 60+ Resources for R
  http://www.computerworld.com/article/2497464/business-intelligence/60-r-resources-to-improve-your-data-skills.html





* Several UIs: e.g., Shiny R, Quick-R, Rstudio, RExcel, etc

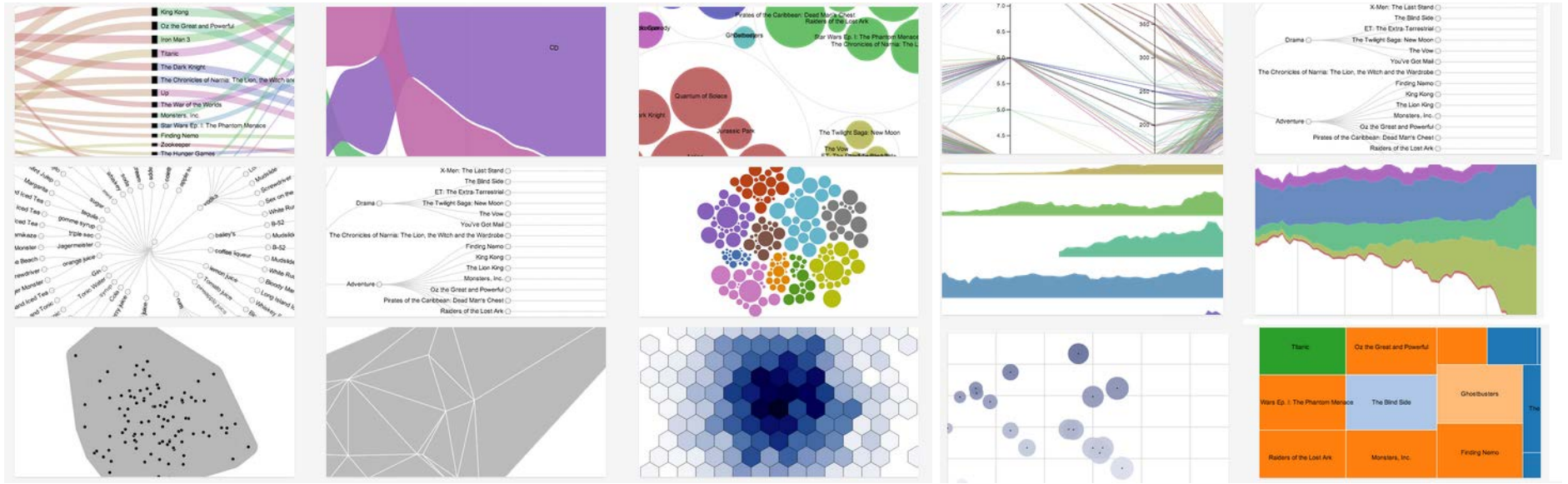
# VIS TOOLS: RAW

**RAW**

The missing link between spreadsheets and vector graphics.

http://app.raw.densitydesign.org

- Create SVG graphics
- Data not uploaded (so remains private)
- 16 charts
- API to create new charts

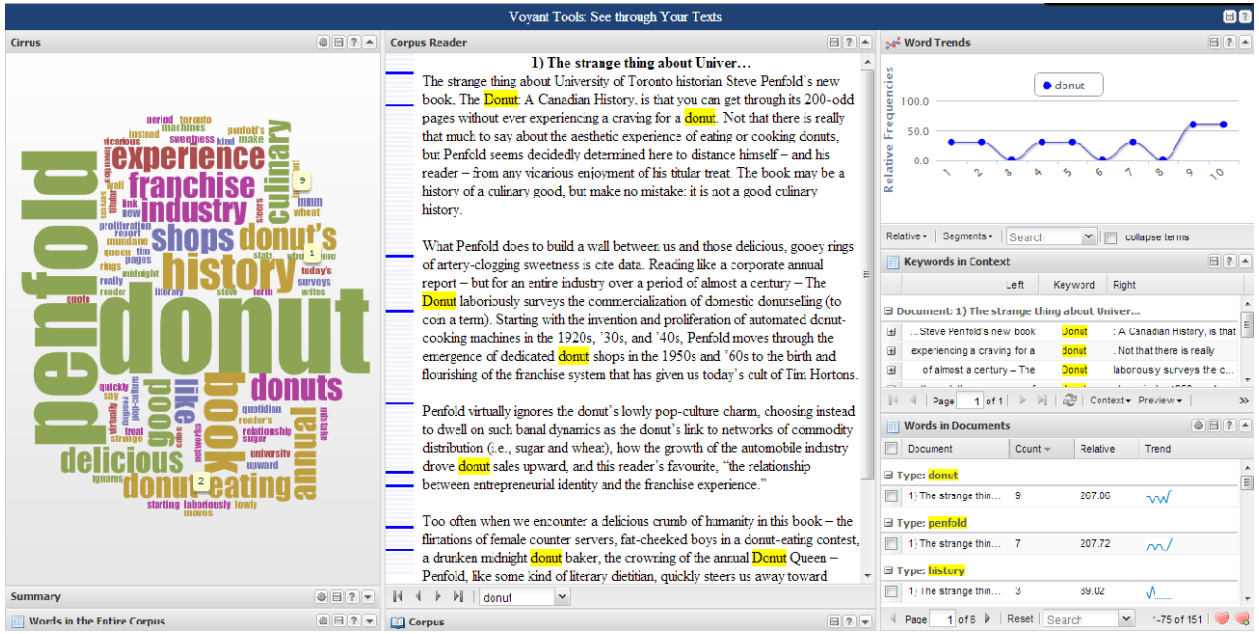


# TEXT ANALYSIS: VOYANT

VOYANT
see through your text

http://voyant-tools.org/

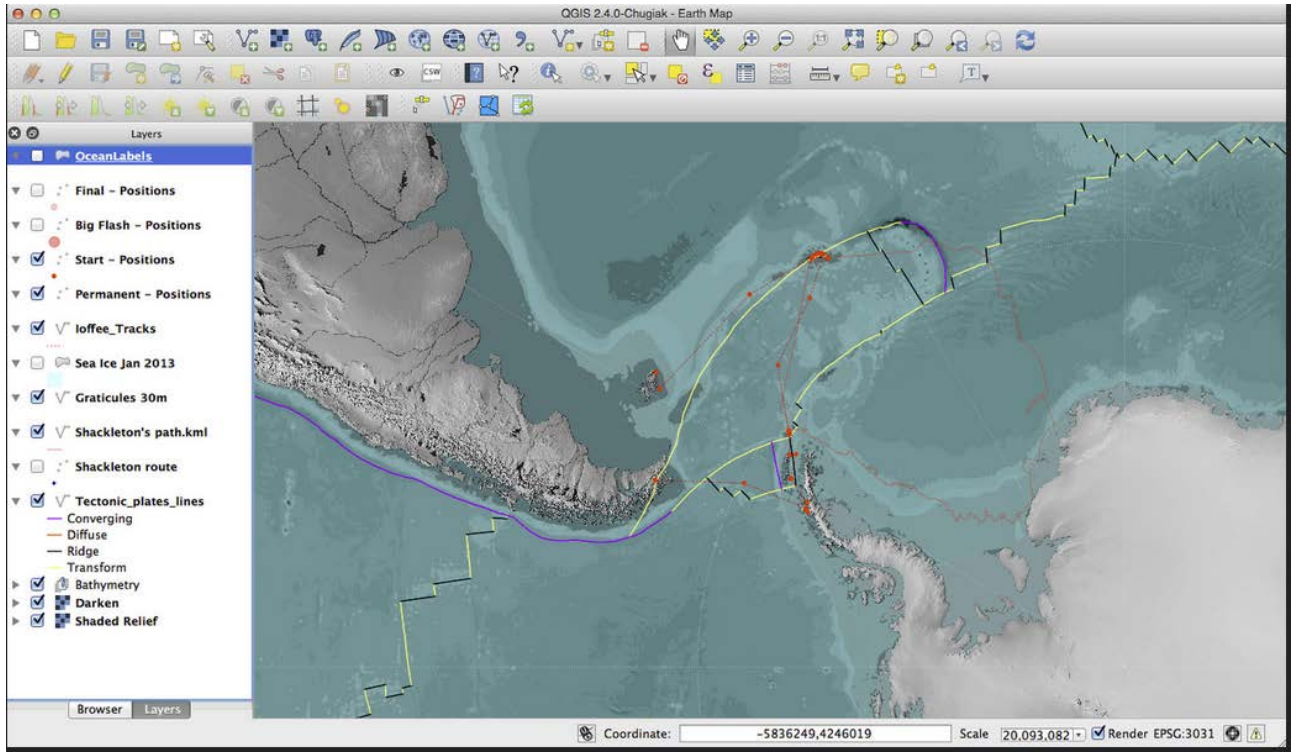
- Import: txt, HTML, XML, PDF, RTF, & Word
- lexical analysis
  - frequency and distribution
- Export: XML, tsv, html widgets



# MAPS/GIS: QGIS

http://www.qgis.org/

- Open Source alternative to ArcGIS
- Linux, Windows, Mac OSX, Unix, Android

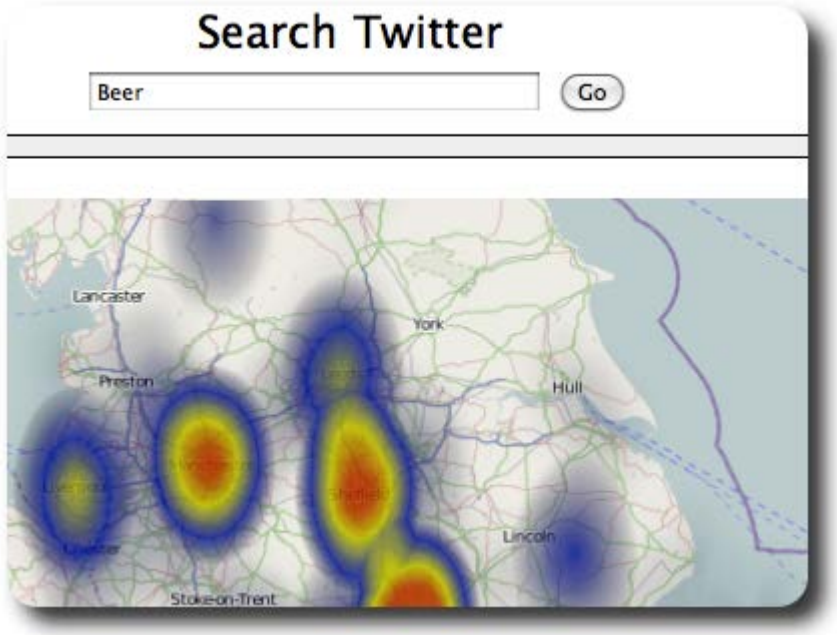


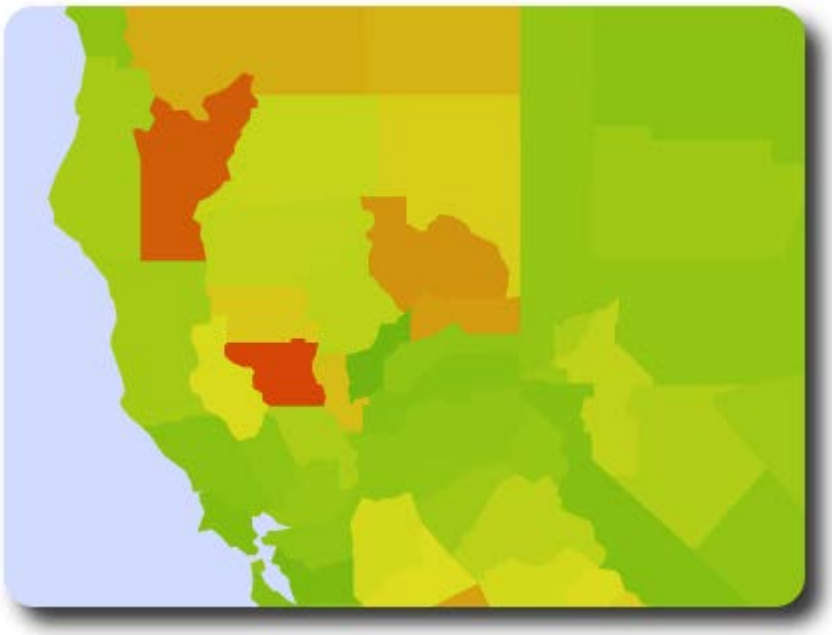
# MAPS/GIS: OPENHEATMAP

OPENHEATMAP

http://www.openheatmap.com/

- Uses OpenStreetMap tiles
- Generates choropleths or heat maps that can be embedded into web pages



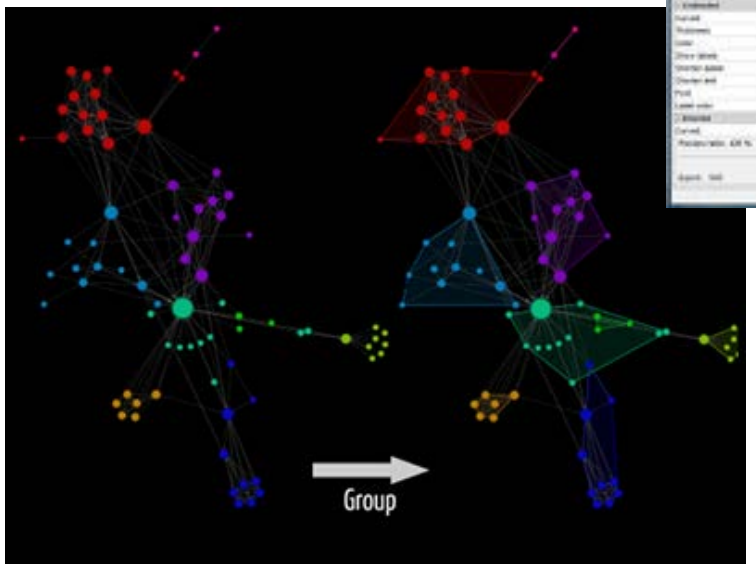



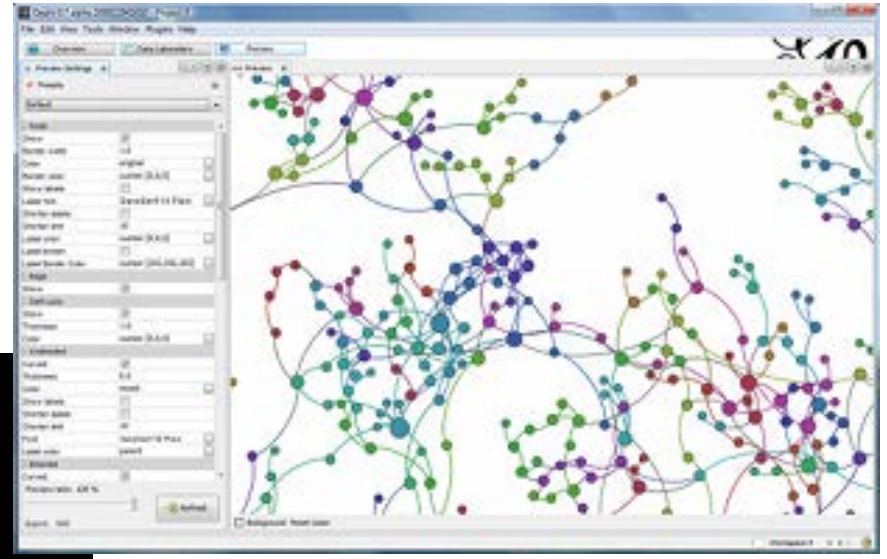
# GRAPHS/NETWORKS: GEPHI

Gephi
makes graphs handy

http://gephi.github.io

- Windows/Linux/OS X
- Can handle 50K nodes & 1000K edges
- Interactive
  - Filter
  - Dynamic layout
  - Clustering/hierarchies



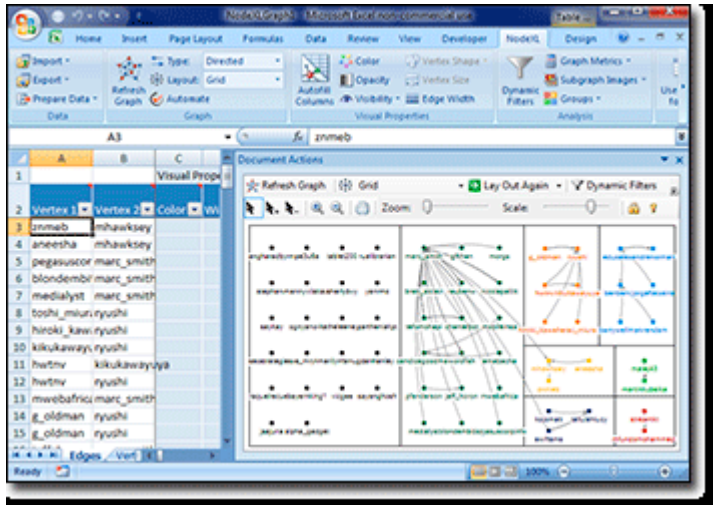



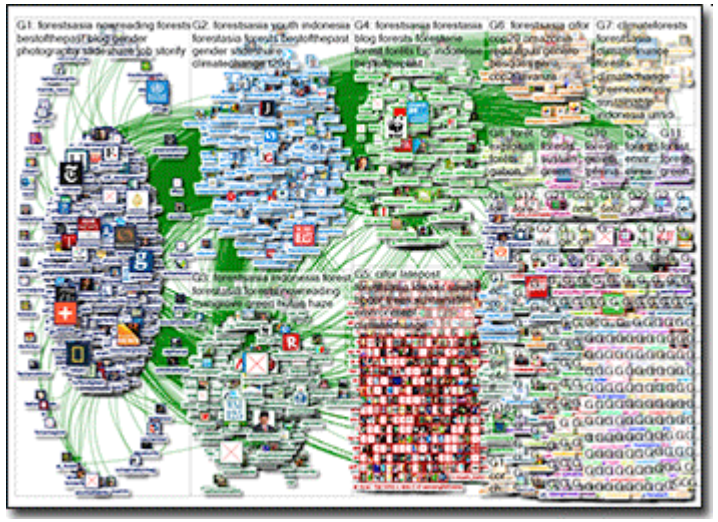
# GRAPHS/NETWORKS: NODEXL

Network Graphs
The Social Media Research Foundation

http://nodexl.codeplex.com/

- Plugin for Excel '07, '10, '13
- Allows exploration of network graphs
- Additional plugins to import from social networks:
  - FaceBook
  - Twitter
  - YouTube
  - email



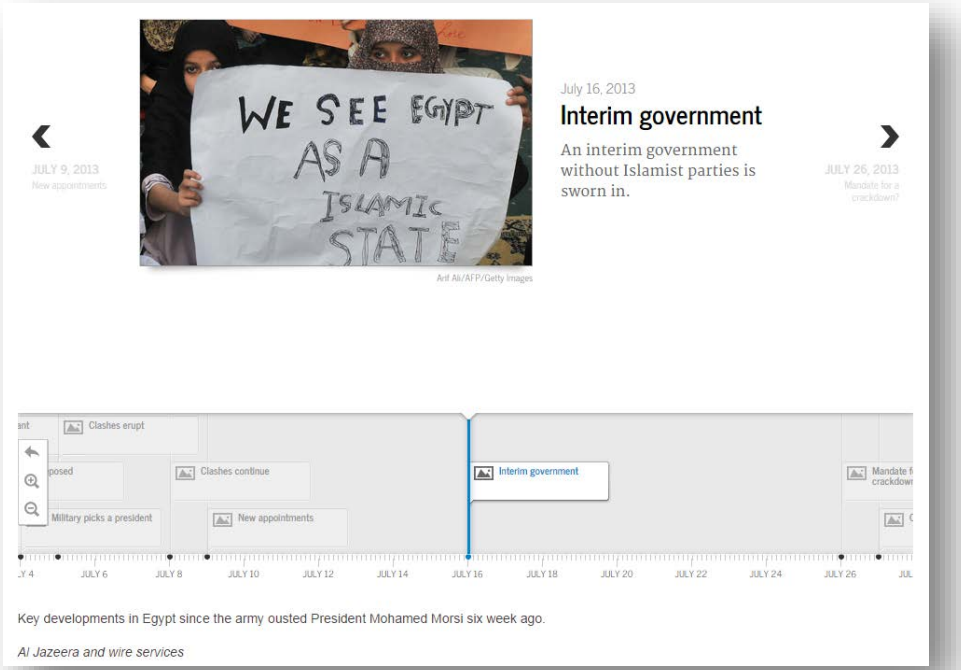


# TIME: TIMELINE JS

Timeline JS

http://timeline.knightlab.com

- Interactive, web timelines
- Link in URLs and web resources
- Built upon Google spreadsheet
- Produces embeddable iframe widget

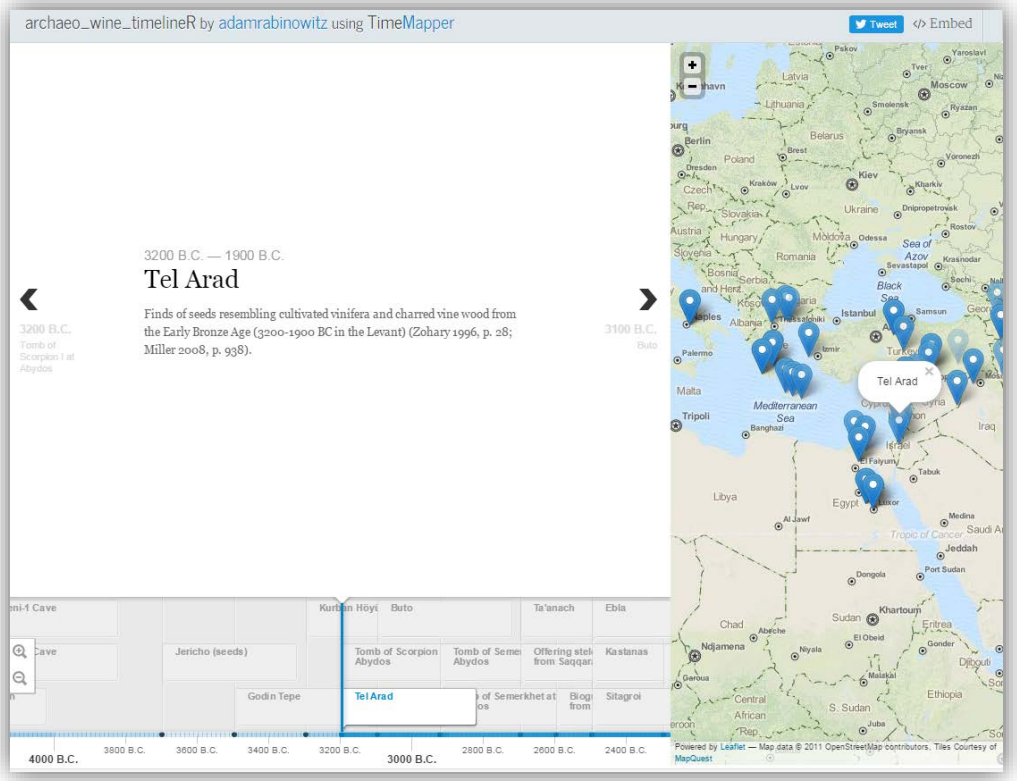


# TIME: TIMEMAPPER

TimeMapper Elegant timelines and maps created in seconds

http://timemapper.okfnlabs.org

- Interactive, web timelines
- Built on Google spreadsheet data
- Adds a map with identified locations
- Creates web page that can be embedded into other sites

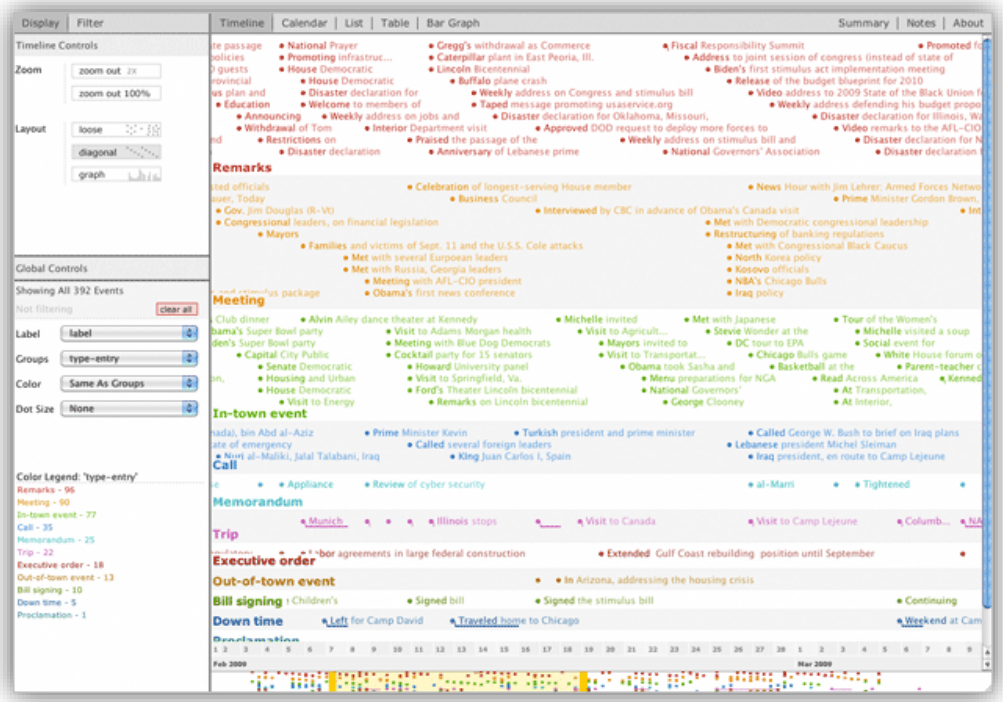


# TIME: TIMEFLOW

FlowingMedia / TimeFlow

http://github.com/FlowingMedia/TimeFlow/wiki

- Tool for temporal analysis
- Several views:
  - timeline,
  - calendar,
  - bar chart,
  - table,
  - list
- Alpha version, no recent updates (2010)



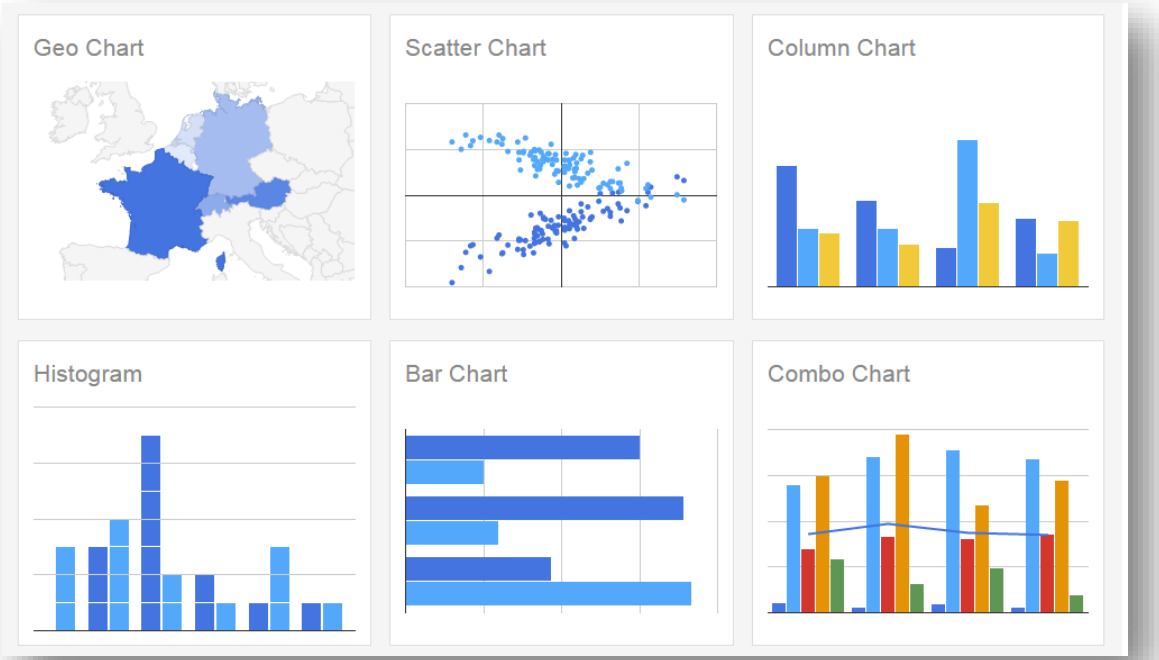
# API: GOOGLE CHARTS

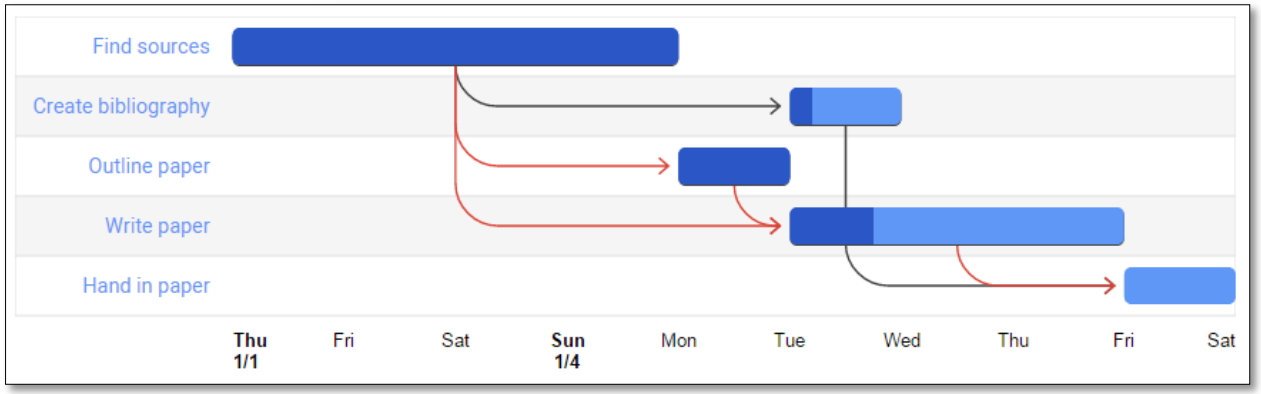
Google Charts

https://developers.google.com/chart/

- Variety of free charts
- Web tool that provides URL or full API
- ~~24~~ 25 different charts

- Limited customization

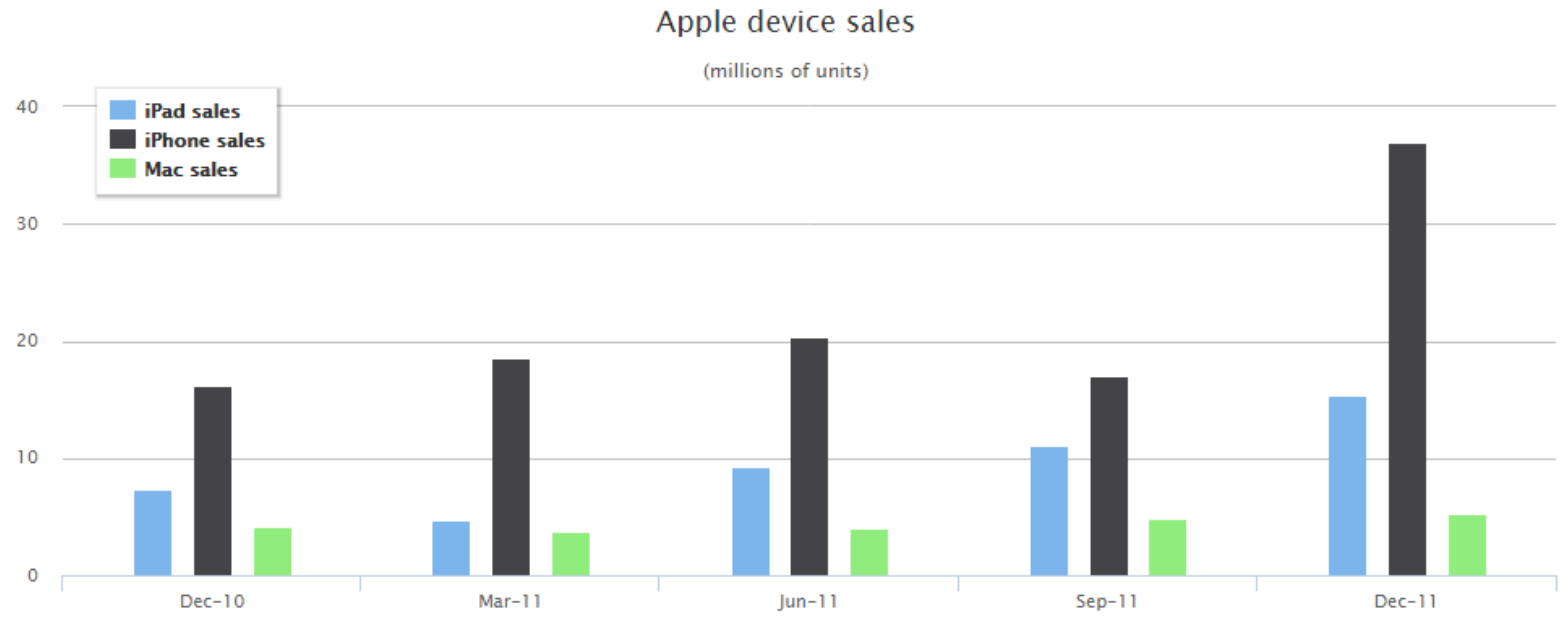


# API: HIGHCHARTS

http://www.highcharts.com/

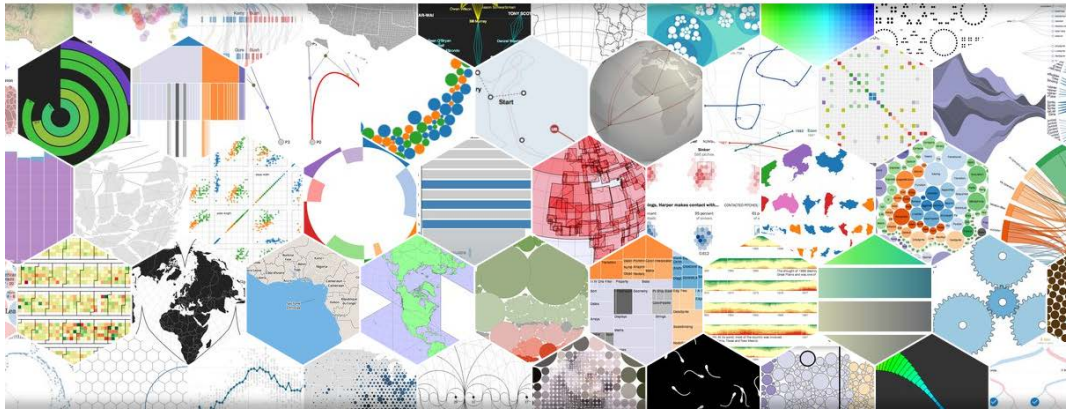
- More customizable, interactive, & dynamic than Google Charts
- Less work than D3
- Free for noncommerical



# API: D3

http://d3js.org/

Data-Driven Documents



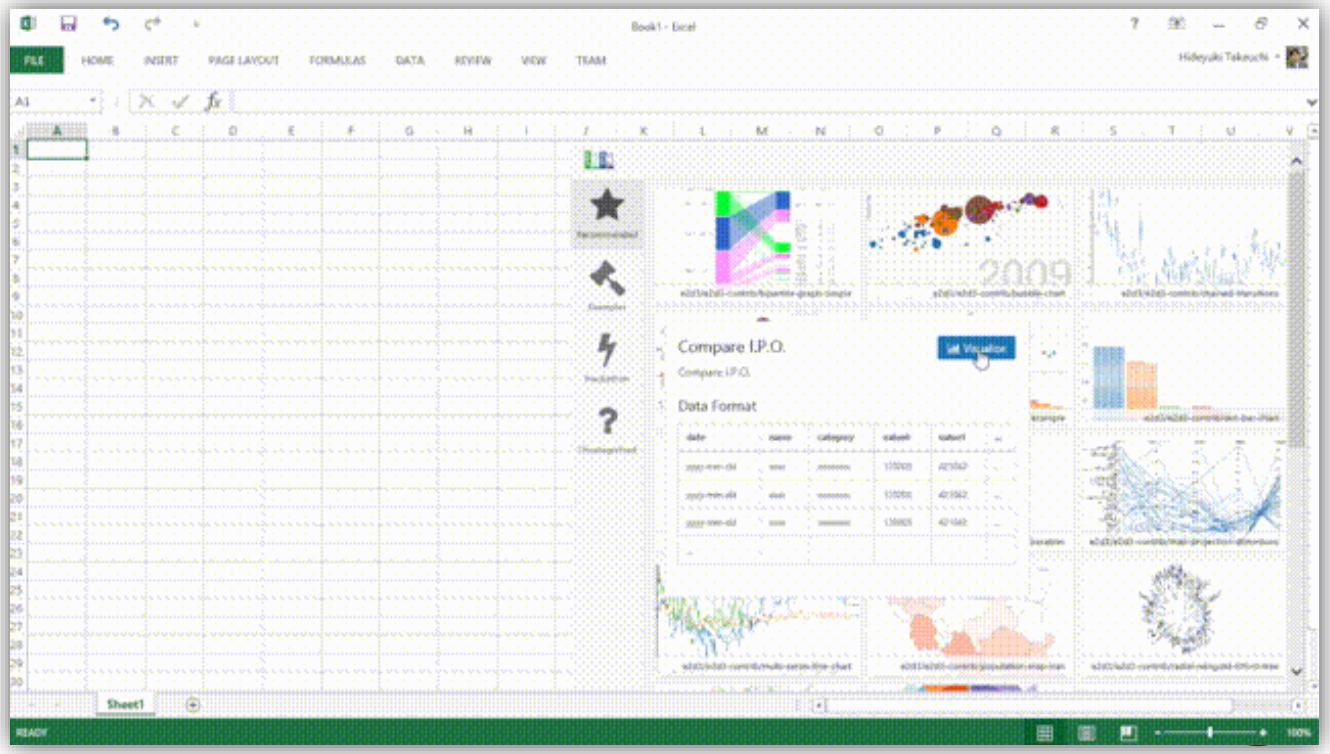
- Very flexible
- Embeds data into the webpage
- Animations
- Many examples to build from
- Need to know html, css, javascript, & SVG
- Used extensively by New York Times
- Many libraries that build on D3

- Poor performance when you reach 10K elements

# D3: E2E3

http://e2d3.org/

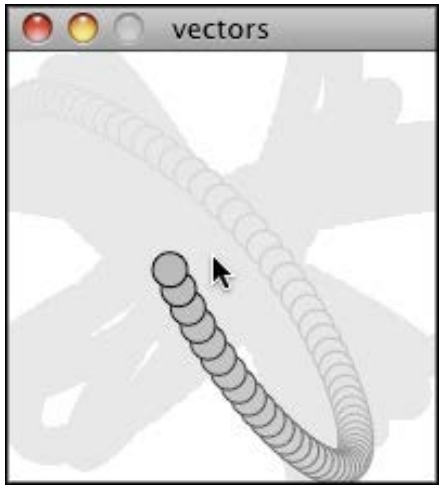

- Connect Excel data to D3.js
- Can work with D3 visualizations (without coding) inside Excel
- Must have Excel 2013 or later



# API: PROCESSING


https://processing.org/

- Programming language & IDE designed for non-programmers
- Used by Artists, Designers, Educators, Researchers
- Can be converted to Android & Java





# COLOUR

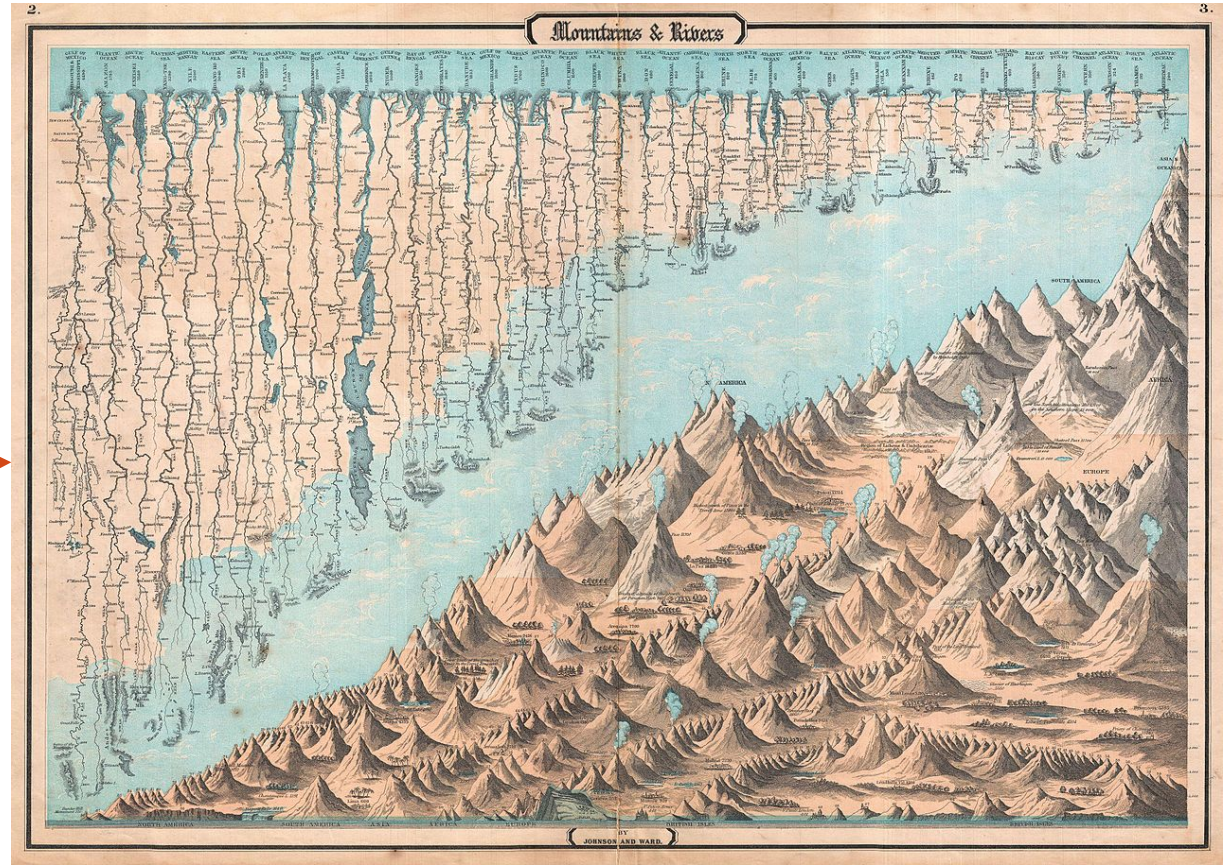
- Adobe Kuler
  - https://kuler.adobe.com/
  - Pick great colour palettes
  - Given this colour pick complementary colours

- ColorBrewer
  - http://colorbrewer2.org/
  - Help in choosing colours for maps
  - Colourblind, printing, etc.

# TRANSMOGRIFICATION

J. Brosz, M. A. Nacenta, R. Pusch, S. Carpendale and C. Hurter

Transmogrifiers.org

# PLAN FOR TODAY

- 9:00 Intro
- 9:30 Visual Variables
- **10:15 Break**
- 10:30 Sketching
- 11:30 Vis Software & Tools
- **12:00 Lunch**
- 1:00 Tableau
- **2:30 Break**
- 3:30 Vis in the Library & Professional Practice
- 4:00 Work with Data

http://bit.ly/tfdlvis