Easy Interactive Charts and Maps with Tableau

Eric Monson
Data Visualization Analyst
Data and Visualization Services

Fall 2017

Data, handouts & slides: http://bit.ly/IntroTableauFall2017

Today

Using Tableau Public to create visualizations to explore a dataset:

- Overview of the program structure
- Terminology used
- Walk-through of a data visualization project
- Exercises on your own with new data

Conceptual introduction

We add things up and split them
to get an overview and see patterns

Order Date	Sales	Product Category
10/13/10	$261.54	Office Supplies
10/1/12	$10,123.02	Office Supplies
10/1/12	$244.57	Office Supplies
7/10/11	$4,965.76	Technology
8/28/10	$394.27	Office Supplies
8/28/10	$146.69	Furniture
6/17/11	$93.54	Office Supplies
6/17/11	$905.08	Office Supplies
3/24/11	$2,781.82	Office Supplies
2/26/10	$228.41	Office Supplies
11/23/10	$196.85	Office Supplies
11/23/10	$124.56	Office Supplies
6/8/12	$716.84	Office Supplies
6/8/12	$1,474.33	Technology
8/4/12	$80.61	Office Supplies
5/30/11	$1,815.49	Furniture

Conceptual introduction

We add things up and split them
to get an overview or see patterns

Sum of Sales
$14,915,600.82

Conceptual introduction

We add things up and split them
to get an overview or see patterns

Product Categories	Sum of Sales
Technology	$5,984,248.18
Furniture	$5,178,590.54
Office Supplies	$3,752,762.10
Grand Total	**$14,915,600.82**

Conceptual introduction

We add things up and split them
to get an overview or see patterns

Sum of Sales	2009	2010	2011	2012	Grand Total
Technology	$1,701,825.48	$1,397,142.14	$1,366,806.58	$1,518,473.98	$5,984,248.18
Furniture	$1,472,671.72	$1,252,665.11	$1,269,661.09	$1,183,592.62	$5,178,590.54
Office Supplies	$1,034,642.25	$899,873.56	$800,349.03	$1,017,897.26	$3,752,762.10
Grand Total	**$4,209,139.46**	**$3,549,680.80**	**$3,436,816.70**	**$3,719,963.86**	**$14,915,600.82**

Conceptual introduction

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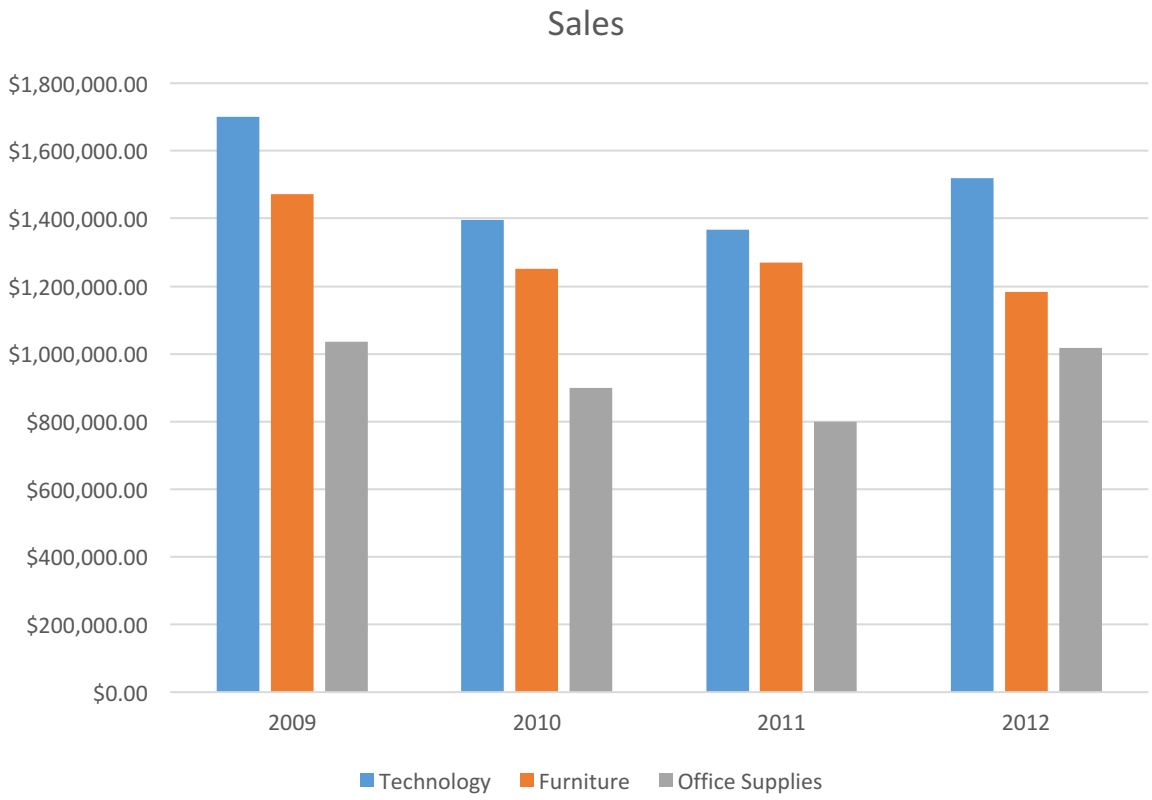
And then visualize to make those patterns and comparisons more clear



Conceptual introduction

But how do we start from this individual event data and explore and communicate patterns?

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4/15/12	$834.90	Technology
4/15/12	$2,480.92	Technology

Tableau will visualize by…

- ***Categorical data***
  (text [string], date or boolean [True/False] values)
  Split up the numbers – set the granularity, or the level of detail
- ***Numerical values***
  Aggregated (sum, mean, etc)
  broken up according to the categories

What can Tableau make?

- Text tables
- Heat maps
  a grid representing variables by size and color
- Highlight tables
  a grid representing variables by text and color
- Maps (symbol, filled)
- Pie charts
- Horizontal bars
- Stacked bars
- Side-by-side bars
- Treemaps
  a grid representing variables by size
- Circle views
- Side-by-side circles
- Lines/Area charts
- Lines/Area charts (discrete)
- Dual lines
- Dual combination
- Scatter plots
- Histograms
- Box-and-whisker plots
- Gantt charts
- Bullet graphs
- Packed bubbles/ Word cloud

Tableau Public

- Free program
- Data limits
  - 15,000,000 rows of data
  - Excel, Google Sheets (live every 24 hrs), CSV, MS Access
- Publishing limits
  - Can only save work to the **web** (10GB storage space per account)
  - Can now disable data download, though

Tableau Desktop

- Allows you to save files privately
- Additional data connection options (databases, etc.)
- No data size limits

Free for:

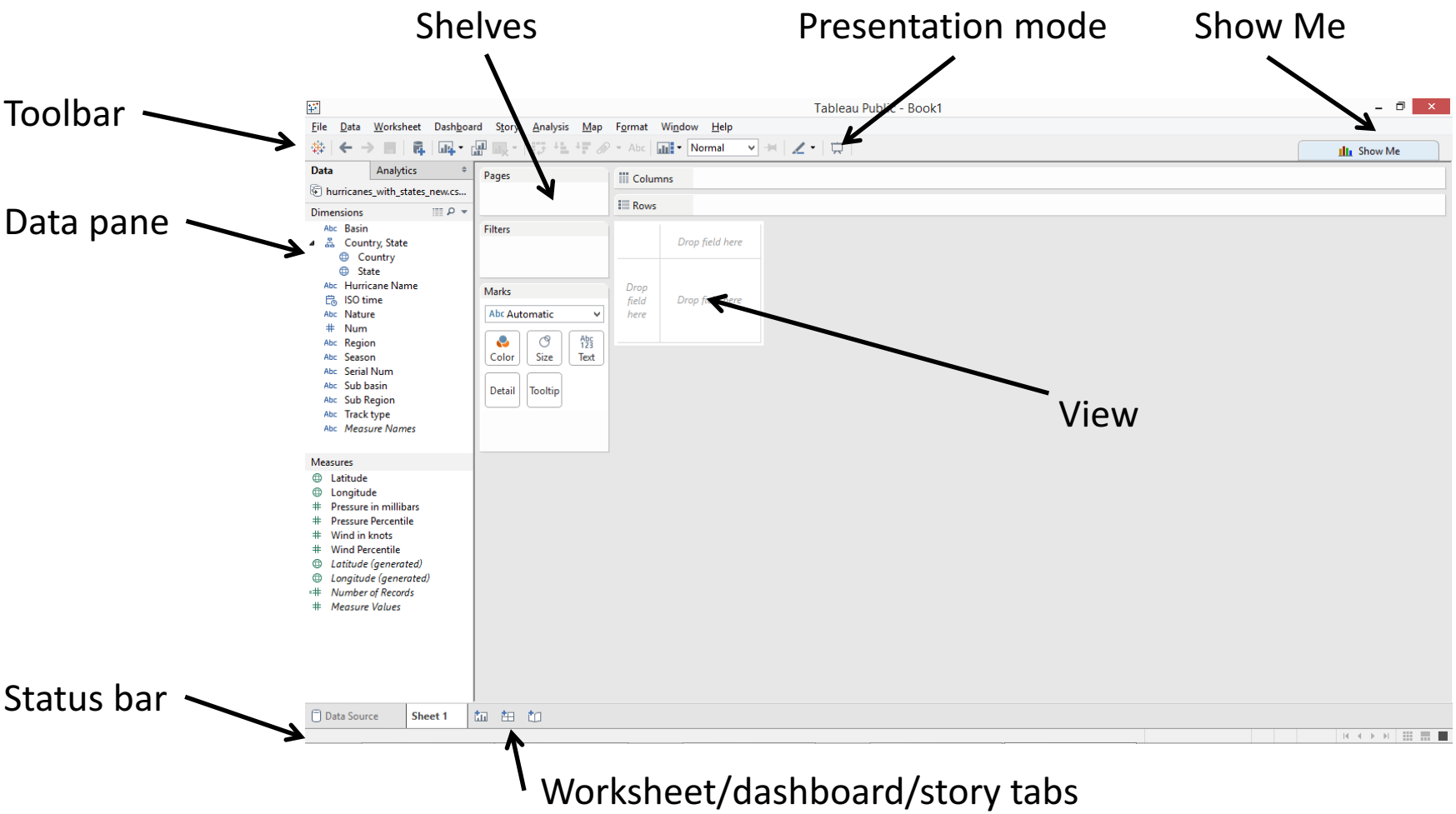
- 2 week trial
  http://www.tableau.com/products/trial
- students (year license – renewable)
  http://www.tableau.com/academic/students
- teachers using it in a class, semester license
  http://www.tableau.com/academic/teaching

Workbooks (Tableau .twbx files)

Contain one or more:

- Worksheets
  - Like a spreadsheet (a working space where data are organized/analyzed), but for creating visualizations (or “views”)
  - one (possibly complex) view per worksheet
- Dashboards
  - A presentation space where the views created in worksheets can be arranged and linked to produce a more complete visualization environment

The Tableau Workspace

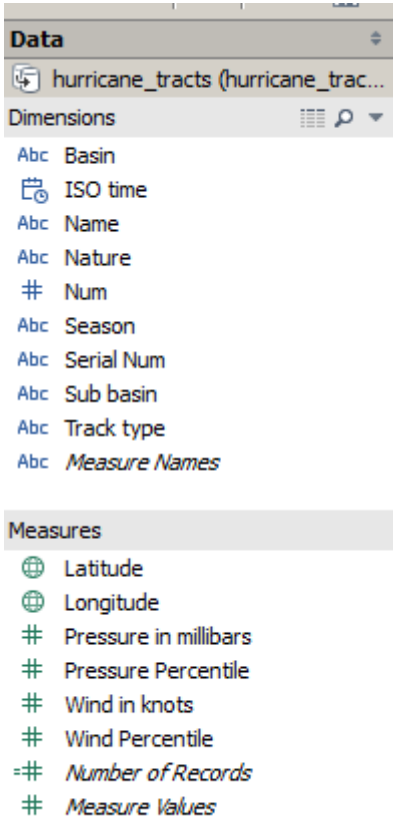


Online help:

http://onlinehelp.tableau.com/current/pro/online/windows/en-us/help.htm

Data Types

- **Dimensions** (categorical – text, date or boolean values)
  Set the level of detail (LOD)
- **Measures** (numerical values)
  Aggregated (sum, mean, etc) to the LOD of the Dimensions in the view



http://www.tableausoftware.com/public/knowledgebase/understanding-data-types-and-roles

EXAMPLE DATA SET: HURRICANE TRACTS

Source:
http://www.ncdc.noaa.gov/ibtracs/index.php?name=wmo-data
(downloaded July 2014)

Discrete versus continuous dates

Arrow pop-up menu on the date pill

- Options on the top are **Discrete date parts**
- Options on the bottom are **Continuous date truncations**

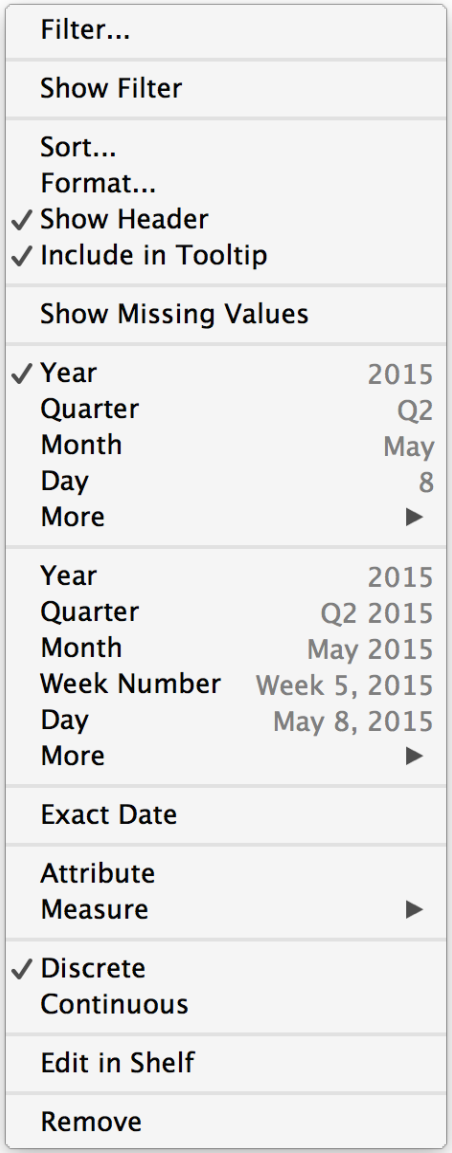


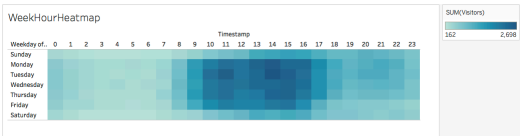
Tableau has a really good tutorial
http://www.tableau.com/learn/tutorials/on-demand/understanding-pill-types

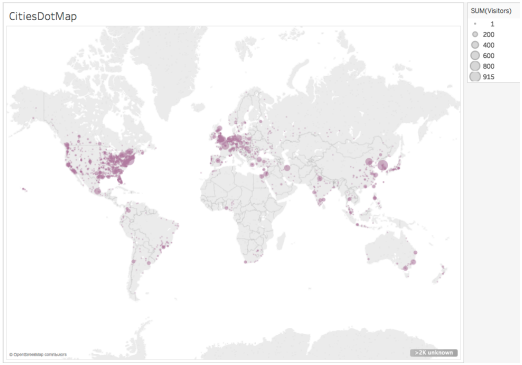
Library web site page views exercises

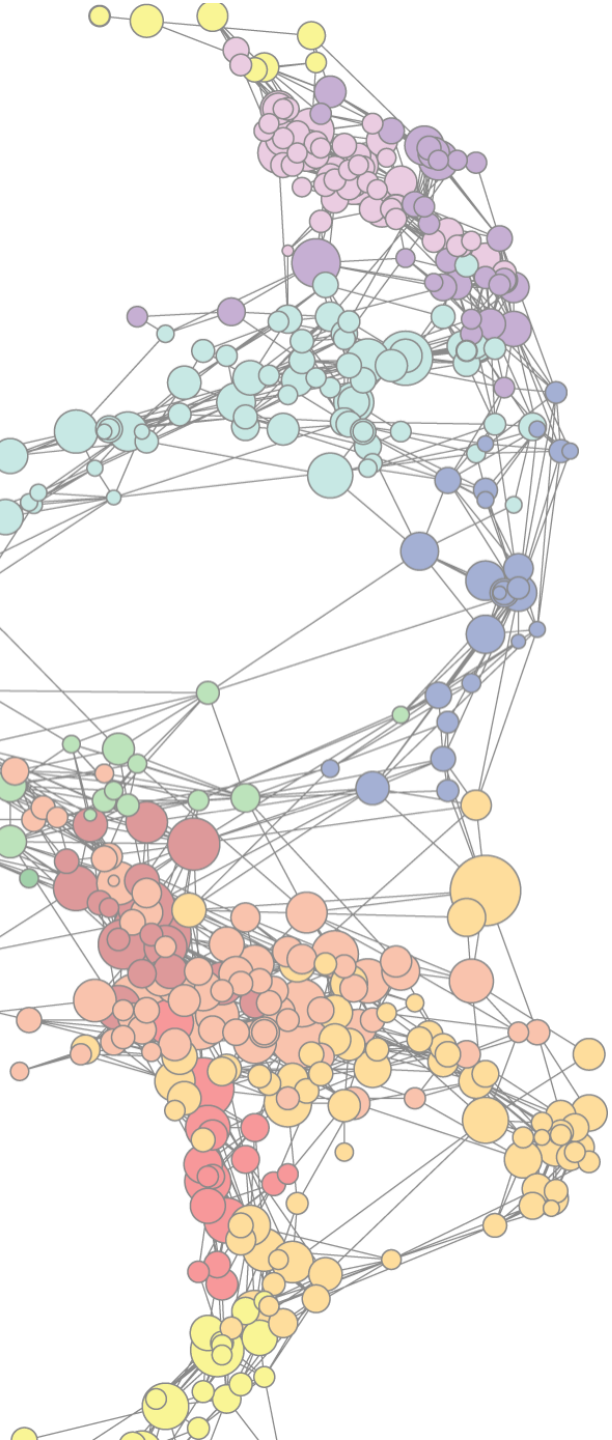
pageviews_2012_subset.xlsx

- Identify winter, summer and spring break from a continuous line plot of the sum of visitors per day.
- Summed over all the data, what hour of the day has peak site viewing?
- Create a heatmap of sum of visitors with weekday vs hour of day as the axes.
- Show the hour of day time shift in the sum of visitors peak between Canada and the UK.
- Make a proportional symbol map of sum of visitors for each city, but exclude all North Carolina cities.

Timestamp	Lcc First Letter	Visitors	City	State	Country
8/28/2011 12:00:00 ...	B	1	Manila	Manila	Philippines
8/28/2011 12:00:00 ...	B	1	Durham	North Carolina	United States
8/28/2011 12:00:00 ...	G	1	Durham	North Carolina	United States
8/28/2011 12:00:00 ...	H	1	Durham	North Carolina	United States
8/28/2011 12:00:00 ...	J	1	Durham	North Carolina	United States
8/28/2011 12:00:00 ...	J	1	Durham	North Carolina	United States
8/28/2011 12:00:00 ...	P	1	Durham	North Carolina	United States
8/28/2011 12:00:00 ...	P	1	Durham	North Carolina	United States
8/28/2011 12:00:00 ...	Z	1	Durham	North Carolina	United States
8/28/2011 1:00:00 AM	B	1	Kitchener	Ontario	Canada
8/28/2011 1:00:00 AM	J	1	Durham	North Carolina	United States
8/28/2011 1:00:00 AM	T	1	Durham	North Carolina	United States

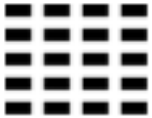






Duke Data and Visualization Services

Support Areas



Data Sources

Data Analysis

Data Management

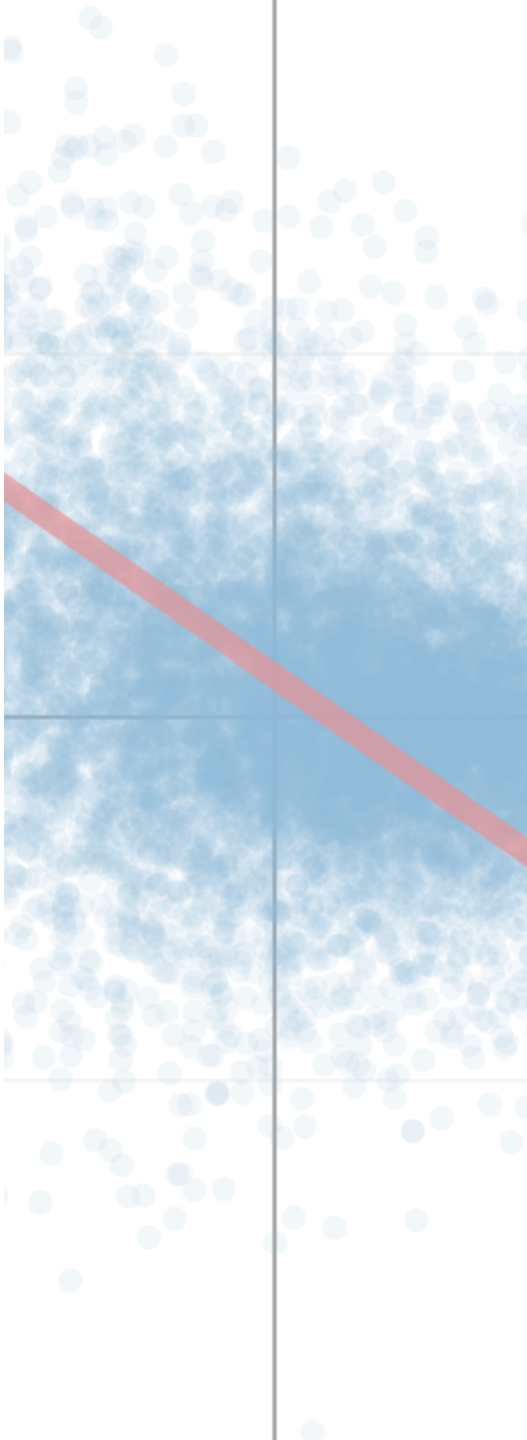
Mapping and GIS

Data Cleaning

Data Visualization

Basic services

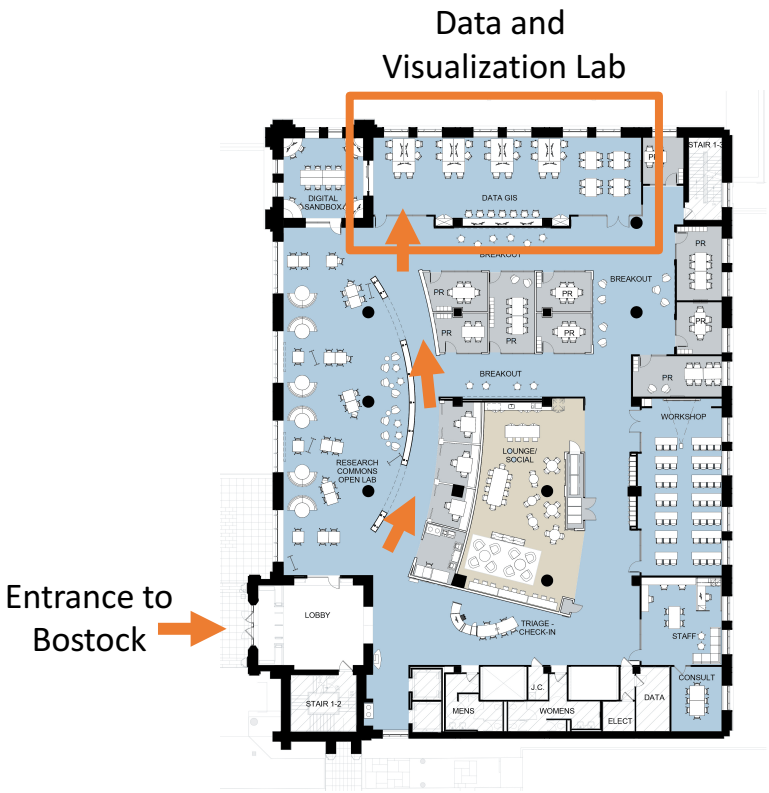
- Computer lab *(The Edge)*
- Consultations *(walk-in or scheduled)*
- Data collections
- Workshops
- Online instructional materials



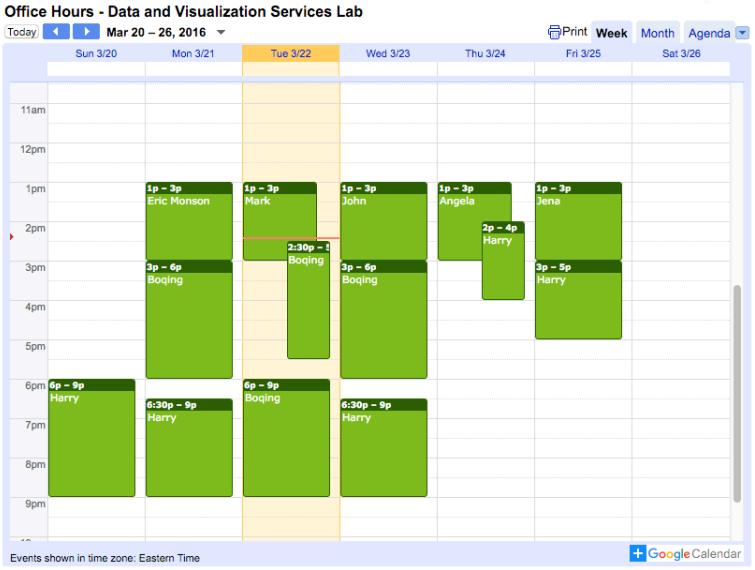
Brandaleone Family Lab for Data and Visualization Services

- **The Edge** *(1st floor of Bostock)*
- Open whenever the library is open
- 12 high-powered Dell workstations
- 3 Bloomberg financial workstations
- Software for data analysis, GIS, and visualization

http://library.duke.edu/data/about/lab



Consulting



http://library.duke.edu/data/about/schedule

…or email
askdata@duke.edu
for an appointment

Types of visualization consulting

- Look at data and brainstorm about the best visualization
- Recommend appropriate tools
- Troubleshoot software problems
- Help with cleaning and structuring data
- Offer graphic design advice for graphics and posters

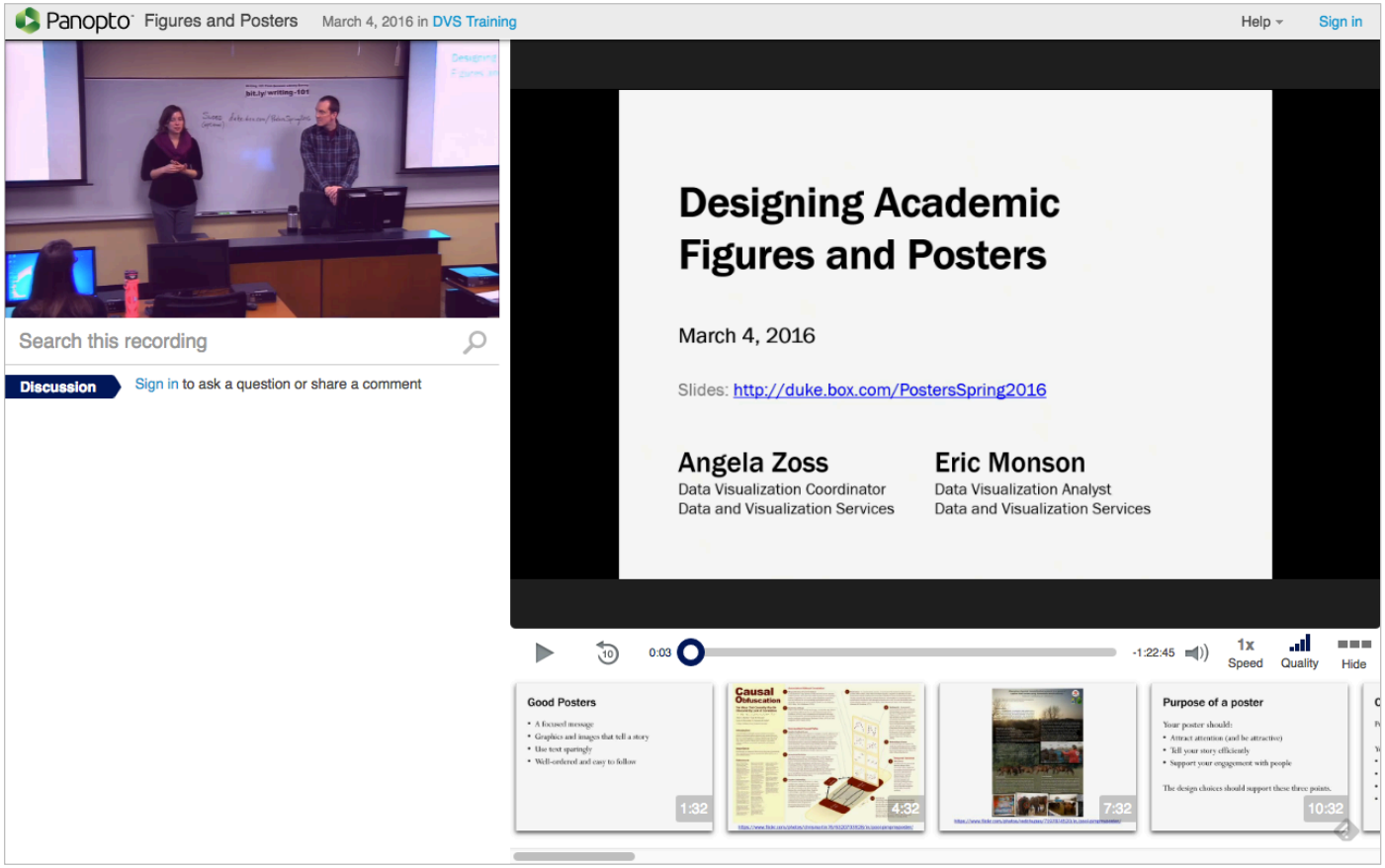
Fall 2017 visualization workshops

- Introduction to Effective Data Visualization · *Sept 12*
- Easy Interactive Charts and Maps with Tableau · *Sept 14*
- Data Visualization with Excel · *Sept 20*
- Visualization in R using ggplot2 · *Sept 25*
- Adobe Illustrator to Enhance Charts and Graphs · *Sept 29*
- Visualizing Qualitative Data · *Oct 13*
- Tidy Data Visualization with Python · *Nov 9*

Stay tuned at:
http://library.duke.edu/data/news

Videos of past workshops

http://bit.ly/DVSvideos



Visualization Friday Forum

- Every Friday during the semester
- Noon in LSRC D106
- Free lunch (sssh!)
- Live streamed and recorded
- email me to get on the mailing list

QUESTIONS

askdata@duke.edu