Syllabus

Instructor: Annelie Berner  Instructor e-mail: annelieberner@gmail.com
Office Hours: Tuesday, 6:30pm to 8:00pm

Session A: A4820 – Designing Interactive Narrative Through Data Visualization
Instructor: Annelie Berner
Day/Time: Thursdays 2:00pm-4:00pm
Location: 300 N Buell Hall

Our world is brimming with data, and always has been. Now, more than ever, we have the ability to record and access massive amounts of information as well as free tools to work with those records. In this course, we will delve into why a set of data requires depiction, research to uncover the story within, and strive to integrate our visualization and its narrative.
We will explore both the simplest method to represent a set of data, as well as how to draw out and represent the specific character of that dataset. We will discuss various methods of representing data and learn to design interactive data visualization on the web. We will work with data using the d3/javascript framework and understand its integration with HTML and CSS. Students will also be introduced to physical and audial data representation and encouraged to pursue final projects in these areas of output as well as web-based output.

The course has two main goals: first, to provide grounding in the design of elegant and meaningful data visualizations, and second, to provide a technical introduction to implementing data visualizations using D3 and web technologies.

The output of this workshop for each student/group will be a meaningful, interactive data visualization that incorporates and reflects an informed point of view. Grading will be based on attendance, engagement, and the clarity, design, and narrative focus of final projects and project presentations.

Students should enter the course with a basic understanding of HTML and CSS. (The first two lessons at http://is.gd/DU5rBq provide a good foundation!) Familiarity with Javascript is beneficial, but not necessary. Any software or platforms used in this workshop will be open source, and students are strongly encouraged to use their personal laptops for the work done in the course.

Expectations and Workload

You can expect to have between one and three assigned readings, as well as a small assignment from this course (almost) every week. You must complete all readings prior to class, and come ready to participate in discussion. Results from all assignments must be posted online, and a link to the result (and source code if requested) must be provided to me or posted onto the blog before the start of class. A final project will be produced in this course, and must be finished by the final class of the term.

Class Rules

(i) Everyone shows up to class on time. If you're going to be late, let me know in advance. If you need to miss a class for a real reason, you must also let me know in

advance.
(ii) Everyone does the readings. For the most part, they're short, fun, and useful.
(iii) All assignment work is due at the beginning of class. Everyone gets a free pass for one late assignment. After that, any assignments not ready for the start of class will be counted as incomplete.
(iv) Everyone in the class must attend office hours at least once in first three weeks of class.
(v) We'll have a series of guest speakers coming into class over the course of the term. I will provide resources to learn about their work prior to their visits – everyone in class must do their homework and be prepared to learn from our guests.

Schedule:

**WEEK 1**
Discussion - Introduction: the group, the topic, and the backbone
Technique - Getting set up, a first sketch

*Assignment:*
1. Visit openpaths.cc, sign up for an account, and download & install the openpaths app for your iPhone or Android device.
2. Get going with github. Read this. And read this. Set up a github account and commit your first sketch. Email me a link to your account.
3. Start a blog, if you don't have one already. Please start it on Tumblr so that we can comment on each other's work.
4. Post two links to data representation projects that speak to issues concerning New York City. Write why you liked them.
Readings:
The Philosophy of Data - David Brooks
The Anti-Sublime Ideal in New Media - Lev Manovich

**WEEK 2**
Discussion - The weight of visual choices: form, color, space, and movement
Technique - Using d3 and svg to draw with data

*Assignment:*
**Read an excerpt** from Josef Albers' "Interaction of Color"
**Read Chap 4, 5, 6** on working with d3 + data
**More details** on selections / joining elements with data
**Another tutorial**
**Play with d3+data in your html/js sketches**
Consider how you can show the data through:
- form
- position (x, y, z)
- color
- ?
Extra:

Try to incorporate an idea from the Albers Interaction of Color chapter in your sketch. Write in comments how you feel it worked / didn't work, etc.
**And post 2 sketches to github:**
1. A sketch you're comfortable and confident about
2. A sketch that you are working towards - that may not function properly - comment it up with how you wish it worked! Challenge yourself to figure out something new here. For example, for those of you who want to figure out how to draw text data to a proper position, go for it! For those of you who want to figure out how to have a mouse click on an element change that element's color, go for it! Doesn't have to work.
**Post your dream for your final project to your tumblr page**
Please be as thorough here as possible and be prepared to tell us about what you are going to do.
Questions to answer:
1) What is your data set? 2) What is the medium? (screen, physical, neither, etc.) 3) What is the central question?

**WEEK 3**
Discussion - Audience and perception
Technique - Mapping: scales, axes, and analysis

*Assignment:*
Begin final project prep.
**Form** / **Form+Computers**

Why?
Some of my answers:
Because we are applying the technique we are starting to learn to a particular project.
Through application, obstacles and iterations, we will learn.
Things take time! Iterations are crucial.
It's interesting to try to understand the language etc. on its own, but it's meant to be applied, at the end of the day.

Why now?
Give yourself time to work through your idea, because
It's all about **process. Different angles**. **First stabs**.

Data representation + interactive narrative is based on your question/subject, its underlying research, and your design iterations regarding that subject and question.
If you make something that is deeply thoughtful and yet very simple, you will do something you are proud of.
**https://vimeo.com/45537437**

Therefore please take one hour, put aside the code, and:
1. Think about what you are interested in representing and why. Is it **critical design**? Political? Artistic? **Contextual**?

2. Sketch (by hand) about different options
3. Research the topic (whatever it is - there might be data around it, there might be debate around it, etc.)
4. If you find data, what is its source? How was it made? Who is the expert on it who can help you draw out the important stories? Or how will you make it? What about the data can inform the *form* for the data's representation? Here is **an interview with Jer Thorp** - note the process section.
6. Sketch more
7. Be prepared to show and tell Thursday

Present your above session, along with a possible data set (can also be an ideal idea for a data set, something you haven't found but hope to, or something you want to create), medium (can be screen, physical, physical -> screen, screen -> physical), and question (or provocative theme) - all those will follow from doing the above exercise.

**WEEK 4**
Discussion - Data in public space: physical data representation, forms and intent
Technique - Updates, transitions and movement

*Assignment:*
For this week, I would like you to consider:
- which dimensions of data you are interested in
- which visualizations you will make of these dimensions
- what are your ideal interactions
Idea of "zooming in" - layered experience of the data.
0. Read this short article on **form + content**.
1. Try to hone in on what dimensions of your data you would like to represent. For example - "geographic, recently bought vs. vacant" or "type of print job, $ spent, time of day printed, user id"
2. How will you represent each dimension? Each rectangle's size is according to the number of print jobs that day. Each rectangle's color is according to the type of paper. Etc. Or will you have a "toggle" experience - toggle to see the geographic projection, toggle back to see that data as more of a scatterplot / barchart?
3. Sketch the different visualizations you want to include in your overall data representation. Ideally, per visualization, you are thinking about several iterations - maybe it could be this way, that way, etc. -
4. Get through the **data chapter** in our O'Reilly book. Then, continue on to **scales**. I wasn't able to cover it at the end of class - but here's the chapter - and you'll see use of scales at the end of my sketch on github.
**For those of you making maps, check out Chapter 12. // code on git**
**5. Get going on your project!** Even if it's bringing the data in (or a few lines of data) and "console.log(somethingfromyourdataset)"

**WEEK 5**
Discussion - Ethics of data: security, privacy, ownership, and the lens of representation

Technique - Interaction: the mouse, query, animated introductions, and toggles

*Assignment:*
1. Storyboard the interactions you want to create. Is it just one view? Are there controls? What is your story? How do you want to guide users through it?
2. Define your aesthetic: font, colors, et. Should all make sense for your specific story.
3. Get some aspect of your data visualization working. A bar chart. Circles corresponding to the data. Something. Or get something "not working" and we can figure it out together.

**WEEK 6**
Discussion - Project work
Technique - layouts, maps

*Assignment:*
Work on final projects.

**WEEK 7**
Final project presentations
1.
Project presentation -
What did you make and how did you get there?
2.
Share your process: whether it is tricks you figured out in code, work you did on graphic design, metaphor, conceptual, etc.
3.
Documented process: blog post with the above written up such that anyone could understand and learn from what you have done - the successes and the challenges. Lucky for you - the blog post will help you organize your process and thoughts such that you are ready to present (see #1)
4.
Where do you hope to take it next?
Of note:
This is a presentation - be ready to engage us rather than your code and computer screen - be ready to convince and excite us.

**RESOURCES**

Tutorials on coding:
http://blog.chryswu.com/2014/02/21/nicar14-slides-tutorials-links-tools/
Reviewing / introducing html-css:
**http://learn.shayhowe.com/html-css/terminology-syntax-intro**

Inspirational readings:
http://well-formed-data.net/archives/1027/worlds-not-stories

http://governingalgorithms.org/wp-content/uploads/2013/05/1-response-crawford.pdf
http://en.wikipedia.org/wiki/Progressive_disclosure
**http://artport.whitney.org/commissions/softwarestructures/text.html**

Helpful kits:
1. Bootstrap
**http://getbootstrap.com/**
2. CartoDB
**http://cartodb.com/visualize**
Illustrator-like application translates automagically to html / css:
**http://www.google.com/webdesigner/index.html**
Live coding:
**http://liveweave.com/GoGhKy**
Platform:
**http://bubble.is/**

Examples:
http://christopheviau.com/d3list/gallery.html
http://well.blogs.nytimes.com/2014/01/01/navigating-our-world-like-birds-and-bees/?_php=true&_type=blogs&emc=eta1&_r=1
http://www.evolutionoftheweb.com/

Dataset resources:
**http://datavisualization.ch/datasets/**
**http://datavis.cs.usfca.edu/resources**

Data converters:
http://shancarter.com/data_converter/
http://vis.stanford.edu/wrangler/app/
https://www.kimonolabs.com/sochi/docs
http://www.gpsvisualizer.com/geocoder/

**Software** *Text Editors* **Sublime Text** - OSX and Windows **Notepad++** - Windows **TextWrangler** - OSX **Coda** - OSX; Paid software
*Web Servers* **Through Python** - Pre-installed on most Macs; uses Terminal.app **Mongoose** - Windows; drop into folder you want to turn into a web server and run.
**Reference** **Mozilla Developer Network** - Dense, but extremely in-depth reference for most web technologies **D3 Wiki** **mbostock's blocks** **w3schools CSS Reference**
**Tutorials** *HTML and CSS* **Don't Fear the Internet** - A series of useful and well-produced videos **HTML Dog: HTML beginner tutorial** **HTML Dog: CSS beginner tutorial** **Codeacademy: Web tracks** **"30 CSS selectors you should memorize"** **Designing a HTML5 layout from scratch** - a somewhat technical look at HTML5 **Dive into HTML5** - a more involved look at HTML5 as a technology **CSS**

**Zen Garden** - A relatively old site, but excellent examples of using CSS to change how things look on a page

*D3* **Getting to Hello World with D3** **Alignedleft D3 Tutorials** - Also wrote **O'Reilly Book** **D3 For Beginners Slides** **D3 for mere mortals** **D3 Intro Presentation** - Sparse, but useful in how it builds up code slowly **Mike Bostock: Thinking with Joins** **D3, Conceptually** **Learning Data-Driven Documents (D3)** **Dashing D3.js** - Very detailed set of tutorials **Christophe Viau D3 tutorial** **Mike Bostock: D3 Workshop** - Detailed overview from a workshop by the creator of D3

*Javascript* **Codeacademy: Javascript tracks** **Quirksmode.org: Intro to JS** - Technical intro to the language

**Data** **Data Fundamentals**

**Other stuff** *"Live Coding" Sites* **Scratchpad** **LiveCoding** **Tributary** - HTML only.

*Document Object Model* **Introduction to the Document Object Model** **Another intro to the Document Object Model**

*Miscellaneous* **Choosing a Graph for a presentation** **Understanding Web Design** - Great introduction to the web as a medium, with parallels drawn to architecture