DATA SCIENCE
& ANALYTICS

# Advanced Visualization and Communication 1

## PSDS 3300

# Beginning Thoughts

Visual information is one of the most effective communication modalities for humans!

"Use a picture. It's worth a thousand words."

- 1911

"One Look Is Worth A Thousand Words"

- 1913

We have a physiology that is especially developed for visual information processing.

# Fundamentals from 2300

## Fundamental Concepts from Data Visualization

- Color Perception
- Preattentive Processing
- Elements of Visualization
- Design Principals
- Grammar of Graphics

# Course Overview

## Course Topics

- Review of Data Visualization
- Introduction to Shiny as an Interactive Framework
- Customizing Interactive Visualizations
- Cognition and Perception in Visualizations
- Visualization and Human Centered Design
- Interactive Map Interfaces
- Interactive Visualizations with D3
- Network Visualization

# Class Discussion

What is the goal of data visualization?

# Class Discussion

What is the motivation for interactive data visualization?

# Class Discussion

Data Visualization Dashboard

What comes to mind?

# Beginning Thoughts

- Course exposure is tip of the iceberg into interactive visualizations and dashboards
- You will see concepts from prior courses link and integrate into many of these concepts
- Some challenging programming integrations as we learn events and reactive code execution

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# Course Schedule

| Day | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
|---|---|---|---|---|---|
| **AM** | **Course Overview**<br><br>**Module 1**<br>Intro to Interactive Viz Frameworks (Shiny) | **Module 3**<br>Cognition and Visual Perception | **M1 – 4 Exercise Recap** | **Module 6**<br>Interactive Map Interfaces | **Module 8**<br>Network Visualization |
| **PM** | **Module 2**<br>Customizing Interactive Viz | **Module 4**<br>Visualization & Human-Centered Design | **Module 5**<br>Human-Centered Design & Evaluation | **Module 7**<br>Interactive Viz with D3 | **Final Project** |

**All days are Instructor Led Training**

# Course Philosophy

- Learn by doing!
- Course learning materials are primarily R, but include HTML and JavaScript programming languages
- R background skills (2120, 2300, 3200)
  - Data Carpentry
  - Data Visualization
  - Statistical Modeling

# Learning Activities

- Jupyter Notebook Labs
  - Targeted at specific concepts
  - Follow along examples
- Jupyter Notebook Practices
  - Elements where you copy-paste-edit code
  - Will rely on prior Data Science course work
- End of Module Exercises
  - Combine cumulative concepts from the module practices as well as whole course and prior courses

# Course Evaluation

- Course "Grade" has three components
  - Labs, Practices (70%)
  - End of Module Exercises (15%)
  - Final project (15%)
- Practices are evaluated on effort (completeness)
- End of Module Exercises and Projects evaluated for correctness

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# Goals

- Reinforce Data Science Concepts
- Broaden vocabulary and deepen understanding of
  - Data Visualization
  - Interactive Visualizations & Dashboards
  - Human Cognitive Load
- Broaden exposure to programming tools for data visualization, interactive graphics, and related technologies (HTML, JavaScript)

# Questions?