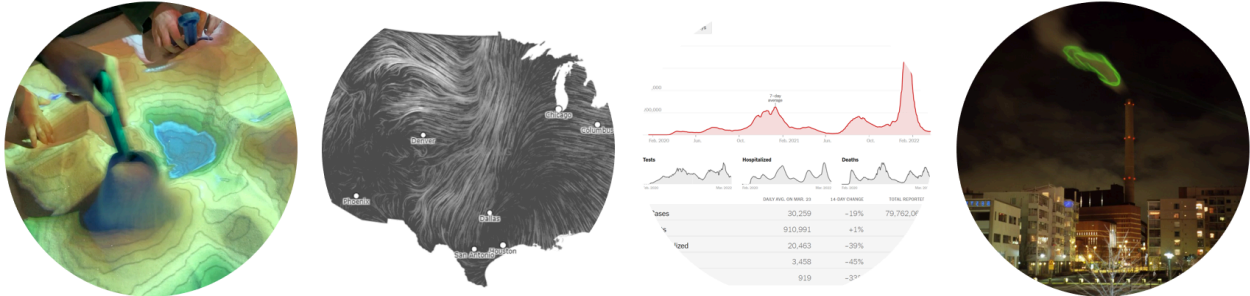# INTRO TO DATA VISUALIZATION

CSE412 provides an introduction to the design and implementation of interactive visualizations for non-majors. You will learn how visual representations can help in the analysis and understanding of complex data, how to design effective visualizations, and how to create your own interactive visualizations using modern tools.

Our pedagogical approach is rooted in Papert's theory of constructionism, which suggests that the best learning experiences occur when learners are actively engaged in designing, creating, and sharing things. In short, you will learn, primarily, by doing—through homeworks, in-class activities, design crits, and TA sections. This experiential learning will be complemented by lectures and readings.

After successful completion, you will be able to:

- Understand the value of visualization
- Critically evaluate visualizations and suggest improvements and refinements
- Use principles of perception and graphic design to create effective visualizations
- Learn how to use visualization as a communication tool
- Conduct exploratory data analysis and transform data
- Use modern tools and toolkits such as Observable, Tableau, p5.js, and Vega-Lite

Course Logistics

Lectures occur MW from 12:30 – 1:50 PM in CSE2 G10 (map) and TA sections on Fridays. Please bring a laptop to every lecture and TA section to participate in in-class coding and visualization activities.

To contact the teaching team, please see Course Communication below.

TA Sections

TA sections complement lectures: they provide an opportunity for additional learning activities, design crits, and in-class discussions. You are required to attend and there will often be activities to turn in at the end of a session. You should attend your assigned section. If you need to attend a different section, please email the TAs ahead of time.

Course Communication

We will use the Ed platform for all course communication and discussion. You can also contact the teaching team via email but Ed is preferred for any questions related to course content.

Assignments and Grading

Following our pedagogical philosophy of *learning by doing*, we will not have exams. Instead, you will demonstrate your learning via assignments (50%), the course project (35%), and active participation in lecture and section (15%)

The Final Project will be completed in pairs. As group work can be both fulfilling and challenging, you will submit a brief survey of your own work and your partners' work. The teaching team will use these assessments, if necessary, to reweight individual grades.

To accommodate travel, sickness, and other unexpected events, you can drop your single (1) lowest section activity as well as your two (2) lowest lecture activities.

Schedule

See the course website for the calendar. The calendar will be regularly updated throughout the quarter to reflect the content covered in lecture and section, the assignments, and the final project. This will also be the place you can find links to the slides. This schedule will be updated as the quarter progresses and is subject to change based on the needs of the class

The course is roughly broken into three parts, which are roughly covered in order (with some inevitable intermixing as the areas overlap): (1) the design of visualizations, (2) implementing visualizations, (3) visualization application spaces.

Course Policies

Late Policy: We will automatically deduct 10% for each day an assignment is late. You can submit an assignment up until 48 hours after the due date. After 48 hours, the assignment

will not be accepted. Please contact the instructor well in advance to request an extension if needed.

Plagiarism Policy: Assignments should consist primarily of original work. Building off of others' work—including 3rd party libraries, public source code examples, and design ideas—is acceptable and in most cases encouraged. However, failure to cite such sources will result in score deductions proportional to the severity of the oversight. The use of generative AI, such as ChatGPT, Copilot, and others, to generate code or assignment responses is strictly prohibited.

Regrades Policy: If you believe a mistake was made while your assignment was being graded, you can submit a regrade request through gradescope with a detailed explanation as to why you believe that the credit should be awarded back to you. Typically, regrades will open 24 hours after grades are released and will be available for 1 week.

Diversity & inclusion: This course welcomes all students of all backgrounds. You should expect and demand to be treated with respect by your classmates and the course staff and, reciprocally, treat your classmates and course staff with respect. Each of us is responsible for creating a safer, more inclusive environment. Unfortunately, incidents of bias or discrimination do occur, whether intentional or unintentional. They contribute to creating an unwelcoming environment for individuals and groups at the university. If any incident occurs that challenges this commitment to a supportive, diverse, inclusive, and equitable environment, please let Tal and the teaching staff know so that the issue can be addressed.

Accommodations: Following from the above, please refer to university policies regarding disability and religious accommodations. Accommodations must be requested within the first two weeks of this course.

Acknowledgements

This course builds on previous CSE412 offerings developed by Jane Hoffswell and Jon Froehlich (see Spring'22 version) but also draws heavily upon:

- MIT 6.859 Interactive Data Visualization, Professor Arvind Satyanaran

- UBC CS 436V Information Visualization, Professor Tamara Munzner

- CSE442 Data Visualization, Professor Jeff Heer

- INFO474 Interactive Information Visualization, Professor Michael Freeman

- HCDE411 Information Visualization, Professor Brock Craft

- CMU 05-899 Data Visualization, Professors Adam Perer and Dominik Moritz

We are grateful to the above professors for sharing their materials and allowing us to integrate them into our course.