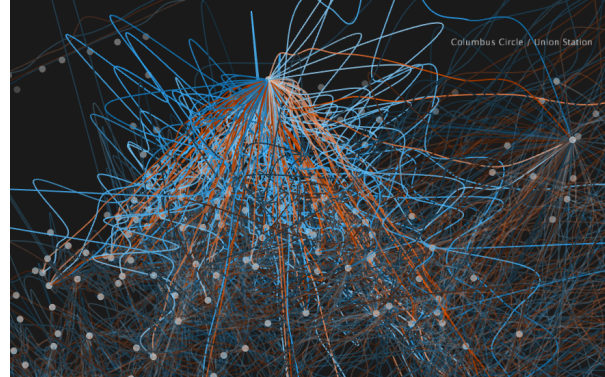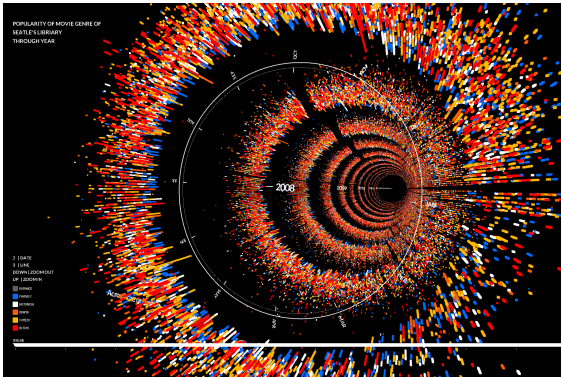# MAT259a DATA VISUALIZATION
Media Arts & Technology

Experimental Visualization Lab, Elings Hall 2611
Tues-Thurs 1:00-2:50pm

Instructor: George Legrady   TA: Jenni Hutson

The focus of the course is to acquire within a 10-week academic quarter, experience in data processing, the design process, computation and visual language to gain experience in visualizing **multi-dimensional data organized within a 3D interactive space**. The goal is to gain experience in the fundamentals of visual language to represent data. Even though the course is based on coding in MySQL and Java-based Processing, we are introducing ChatGPT as a way to assist with code development.

Course prioritizes data analytic techniques for knowledge discovery and pattern recognition - frequency mapping - exploration of algorithms for data clustering - visualizing data - resulting in 3D interactive visualization projects.

Proj 1 (2 weeks): Data Analytics, Knowledge Discovery, Content Analysis with MySQL
Goals: Discover unexpected patterns, anomalies, etc. in a large multivariate dataset

Data Source: over 108 million, 18-year multi-dimensional datasets of library circulation recorded by the hour
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Proj 2 (4 weeks): 3D Interactive Visualization, Frequency Data Mapping - Visual Language Basics
Goals: Acquire visual language basics, visualize data in java-based Processing and p5, design in 3D-interactive space/time, implement associative rule-mining and other algorithms

Data Source: 108 million/18-year multi-dimensional datasets of library circulation recorded by the hour

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Proj 3 (4 weeks): Student Defined Project
Goals: Student defines a project with their own data source, a project that builds on skills acquired through the two previous assignments

Data Source: Each student selects their own datasets

Knowledge acquired through the course:
1) Learn to explore and retrieve significant data from a dataset with MySQL
2) Develop skills in the fundamentals of visual language expressed through programming
3) Visualize abstract data to reveal patterns and relationships, or to explore visualization
4) Normalize data to enhance legibility and coherence
5) Implement interactivity within 3D volumetric visualization
6) Correlate various data sources through JSON and APIs

A fundamental component of the course is that it is research-based, hands-on and involves software applications including MySQL, JSON, java-based Processing and its libraries.

Reference Links:
Most recent Syllabus https://www.mat.ucsb.edu/~g.legrady/academic/courses/23w259/23w259.html
Most recent student projects https://vislab.mat.ucsb.edu/2023.html

Prerequisite: Interest in computer programming (but now assisted by ChatGPT), and/or data analytics skillsets, and/or visualization experience