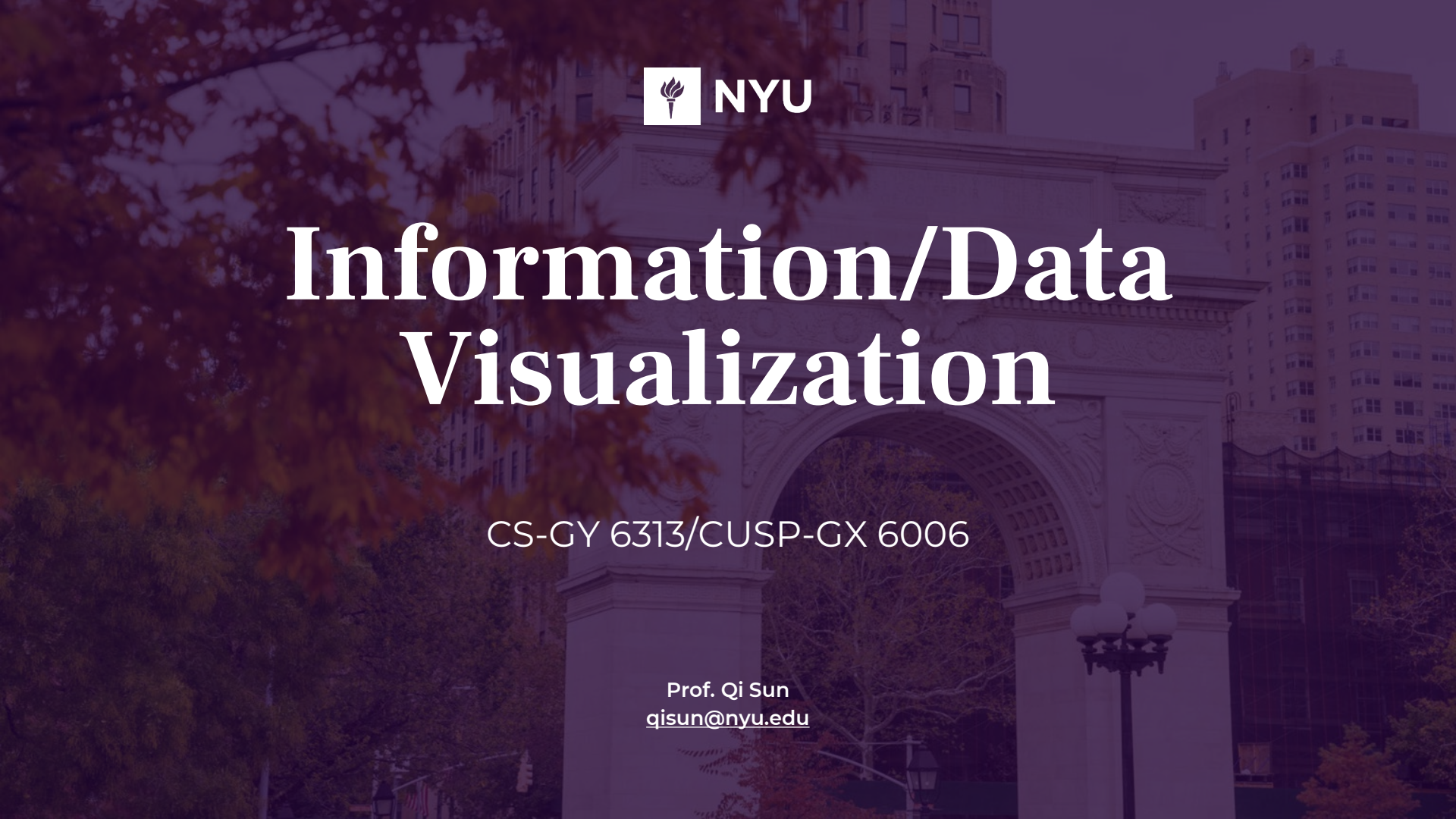

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Information/Data Visualization

CS-GY 6313/CUSP-GX 6006

Prof. Qi Sun
qisun@nyu.edu

Introduction
&
Syllabus

The Instructors

Qi Sun
Virtual/Augmented Reality
Computer Graphics
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Microsoft Research

Ryan Kim
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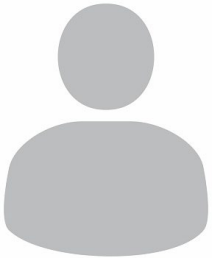
Stony Brook University



TBD
Guest Lecturers

NVIDIA

NYU
TANDON SCHOOL OF ENGINEERING

Adobe

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This Course is about:

A *bottom-up* tutorial on how a human-computer system performs: visual information *generation/consumption/perception/application*,

and your own hands-on creation!

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This Course is NOT about:

- Data science/mining/…
- High-level “seminar” or “overview” – you will need to program
- How to draw “charts”
- Web development
- Data processing/statistics (excel, R, etc.)

You Can/Should:

- Interrupt me anytime
- Ask technical/engineering questions to me/TA
- Discuss with peers
- Version control your code (we'll cover this today)
- Request extension/absence with a reason

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You CANNOT:

- do teamwork – independent work in the whole course
- copy code/text from online/others/any resource – we will perform plagiarism check: you **can** acknowledge
- **F** if you do any of these

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Syllabus

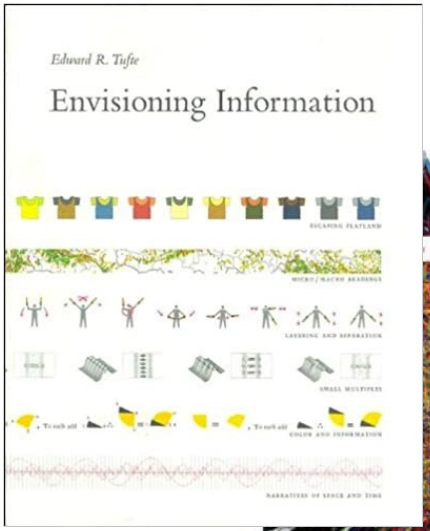
Lecture Overview – What You Will Gain

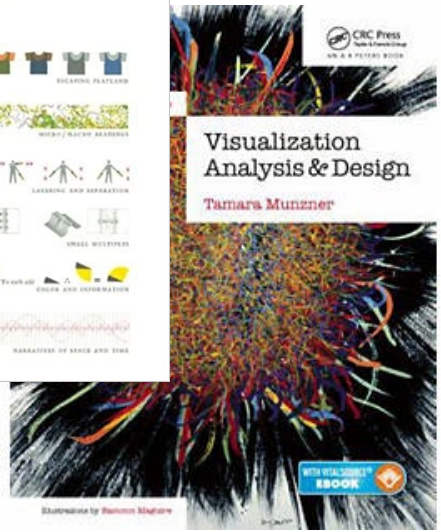
- Mathematical and programming foundations
- Color theories and visual perception
- 2D visualization: spatial/temporal/network data
- 3D visualization: projections and case studies
- Modern topics: machine learning, etc.
- Guest lectures

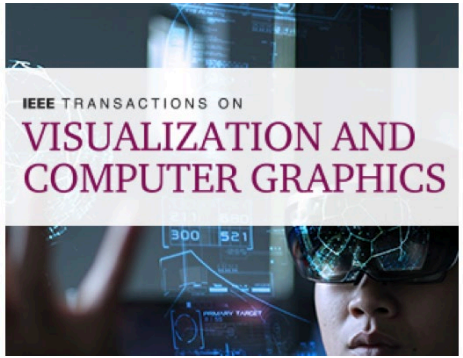
Prerequisites

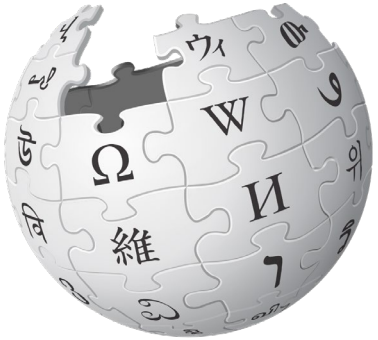
- Mathematics
  - Basic Linear algebra (we will cover today)
- Programming
  - **Python** (highlypreferred with Matplotlib) OR Javascript (if you have to)
- Academic Writing
  - Latex

Materials









WIKIPEDIA
The Free Encyclopedia

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Grading Overview

- 15% x 4 Assignments (mini-projects)
- 10% Survey Article + Project Proposal
- 30% Final Project

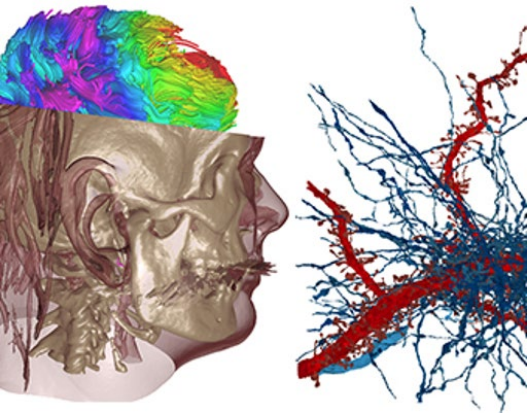
Breakdown & Assignments

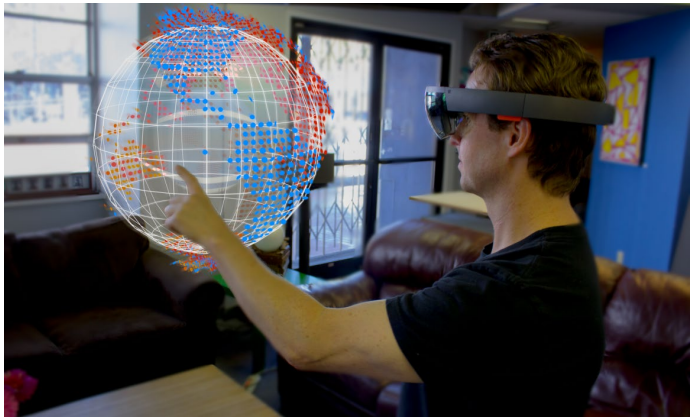
- Assignment 1-3: 2D visualization
- Assignment 4: 3D visualization
- Survey and final project – your choice! But do it throughout the course

Course Content

Visualization

Any technique
for creating **images/diagrams/animation**
to communicate a message

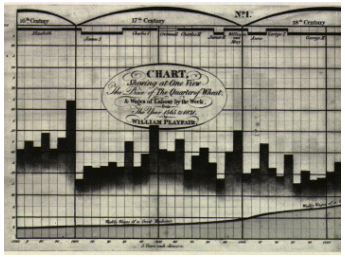




Visualization

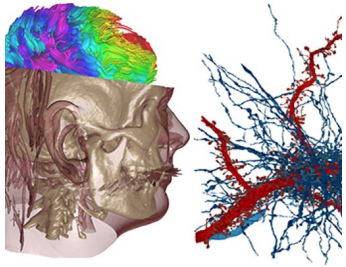
- Basic color and graphics theories
- Scientific visualization
- Information visualization
- Interfaces

History/Fields of Visualization



Charts

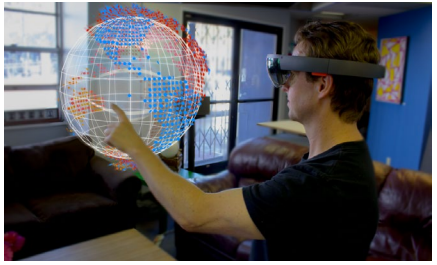
Computer Graphics



Scientific Visualization

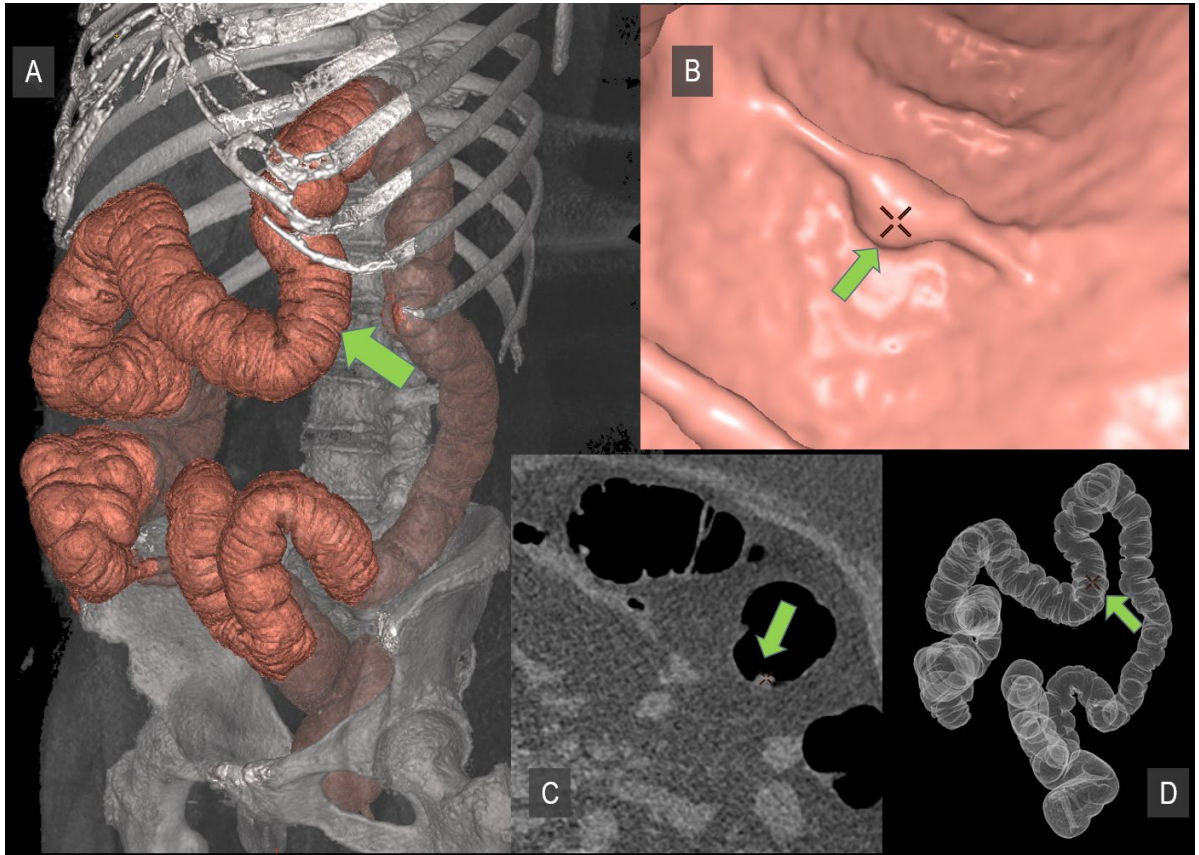
Information Visualization

Interfaces



Modern Medium/Data

Applications – Medicine



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Applications – Finance

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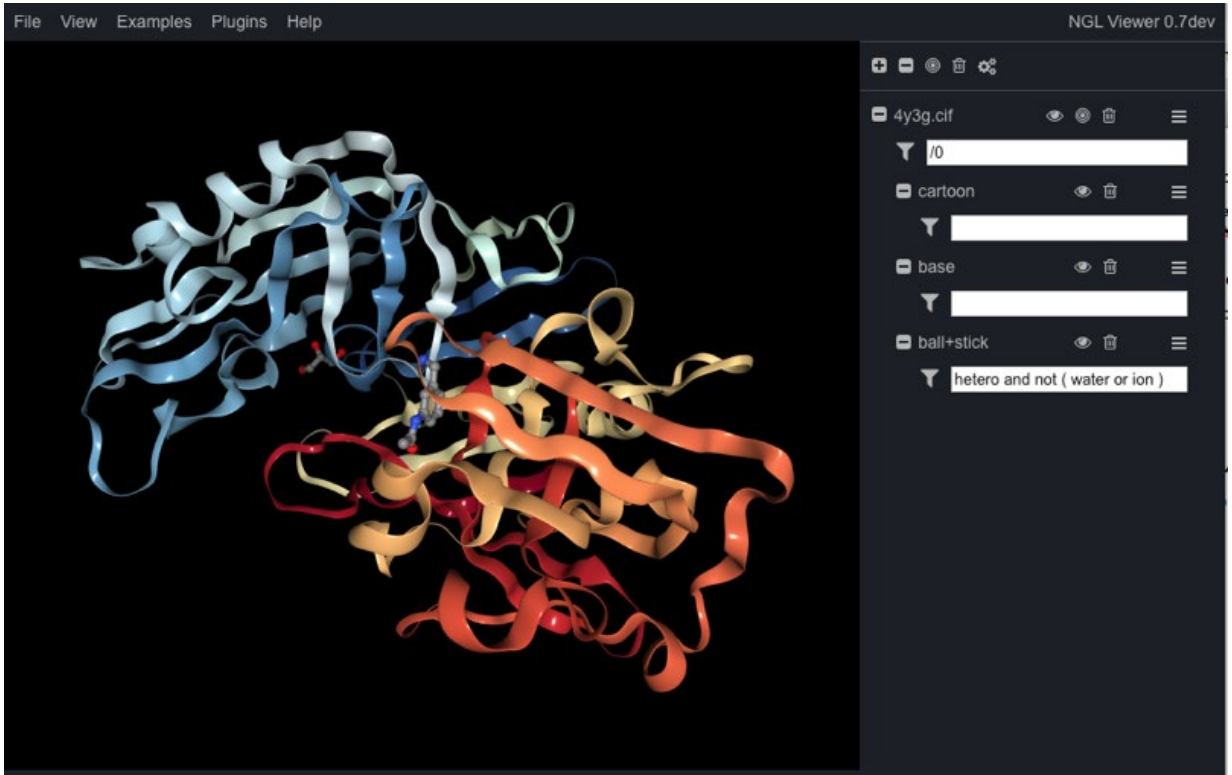
Applications – Scientific Discovery



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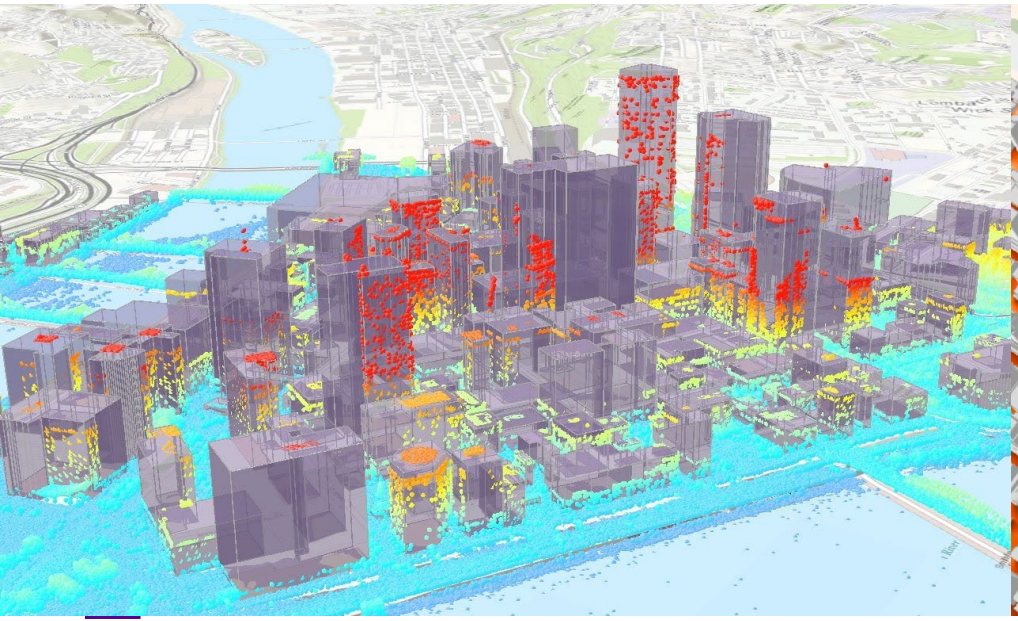
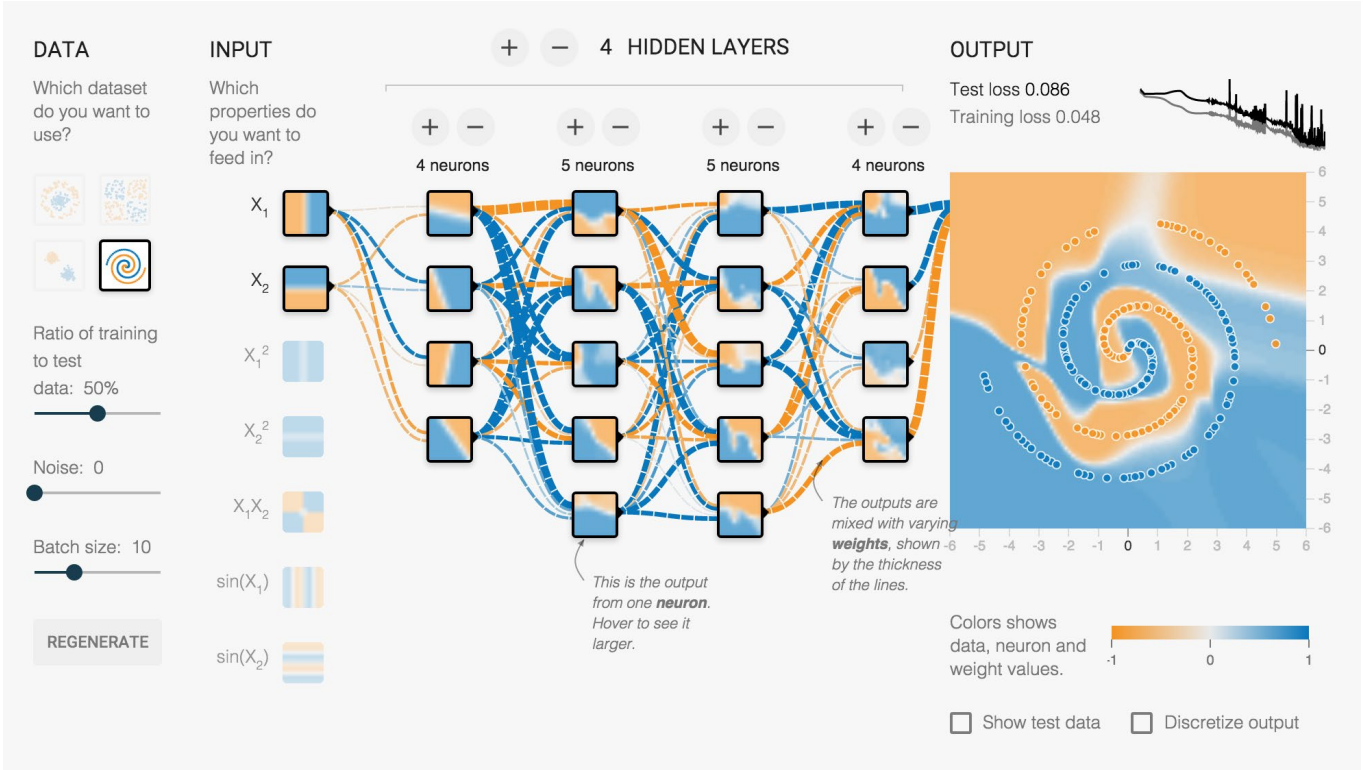
Applications – Urban Science



Applications – Machine Intelligence



Components

data

medium

human

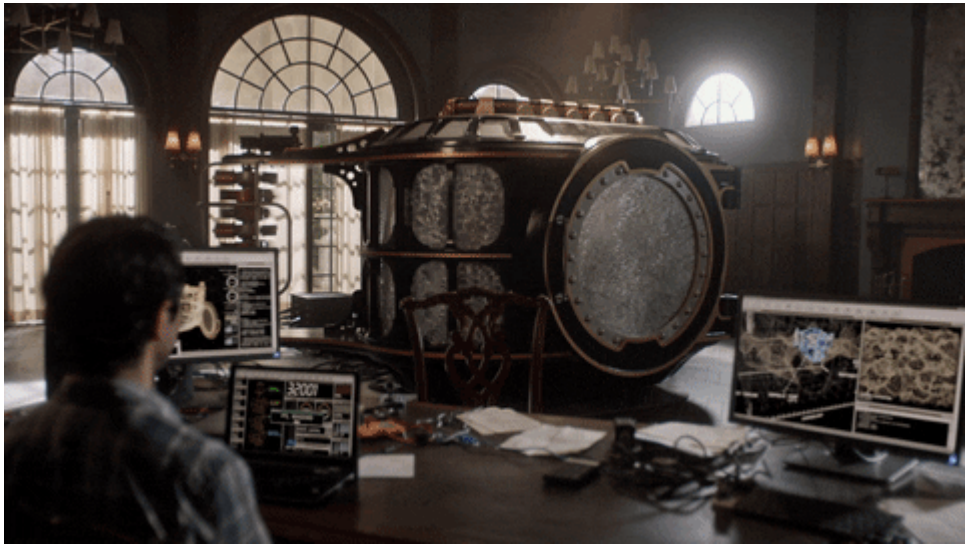
Academic Skills to Develop

- Maths & engineering (proficient Python)
- Reading
- Literature survey and academic writing
- Presentation

Version Control 101

What is version control?

- managing multiple versions of documents, programs, web sites, etc



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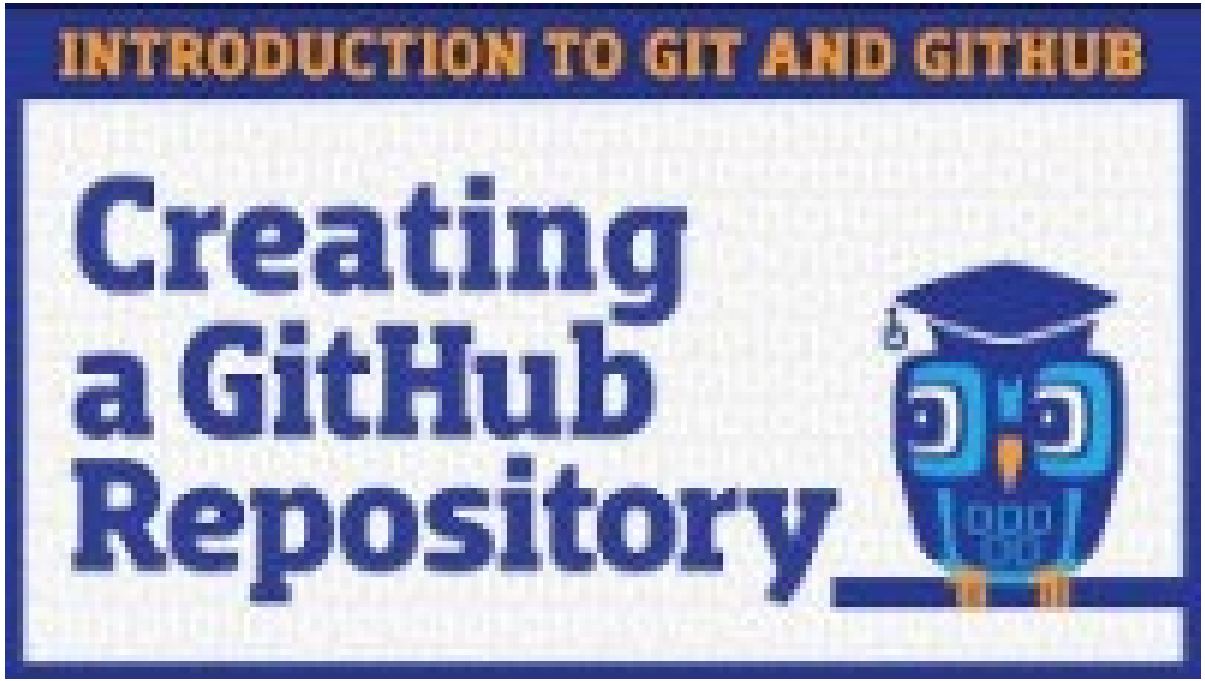
source: David Matuszek

Version control is your friend – Why?

- For working by yourself:
  - Gives you a “time machine” for going back to earlier versions
  - Gives you great support for different versions (standalone, web app, etc.) of the same basic project
- For working with others:
  - Greatly simplifies concurrent work, merging changes
- Basic skill for internships/industrial job

source: David Matuszek

Git and Github are your friends



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video source: data school

How to version control: git and github

1. `cd` to the project directory you want to use
2. Type in `git init`
   - This creates the repository (a directory named `.git`)
   - You seldom (if ever) need to look inside this directory
3. Type in `git add .`
   - This adds all your current files to the repository
   - Period means “this directory”
4. Type in `git commit –m "Initial commit”`
5. `type in git push origin master`

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source: David Matuszek

How to version control: git and github

- `git clone` *`URL`*
- `git clone` *`URL mypath`*
  - These make an exact copy of the repository at the given URL
- `git clone git://github.com/`*`rest_of_path/file.git`*
  - Github is the most popular (free) public repository
- All repositories are equal

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source: David Matuszek