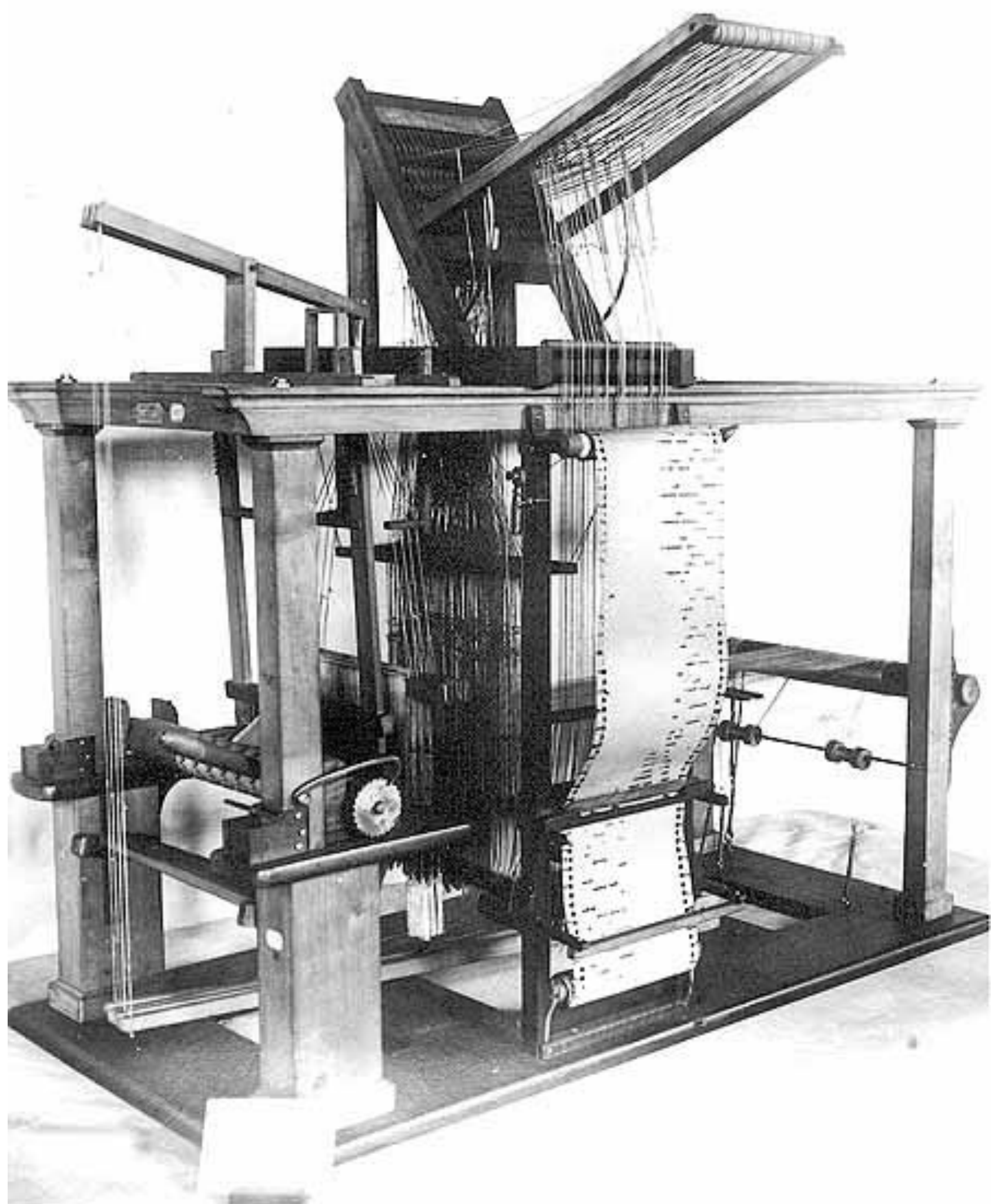


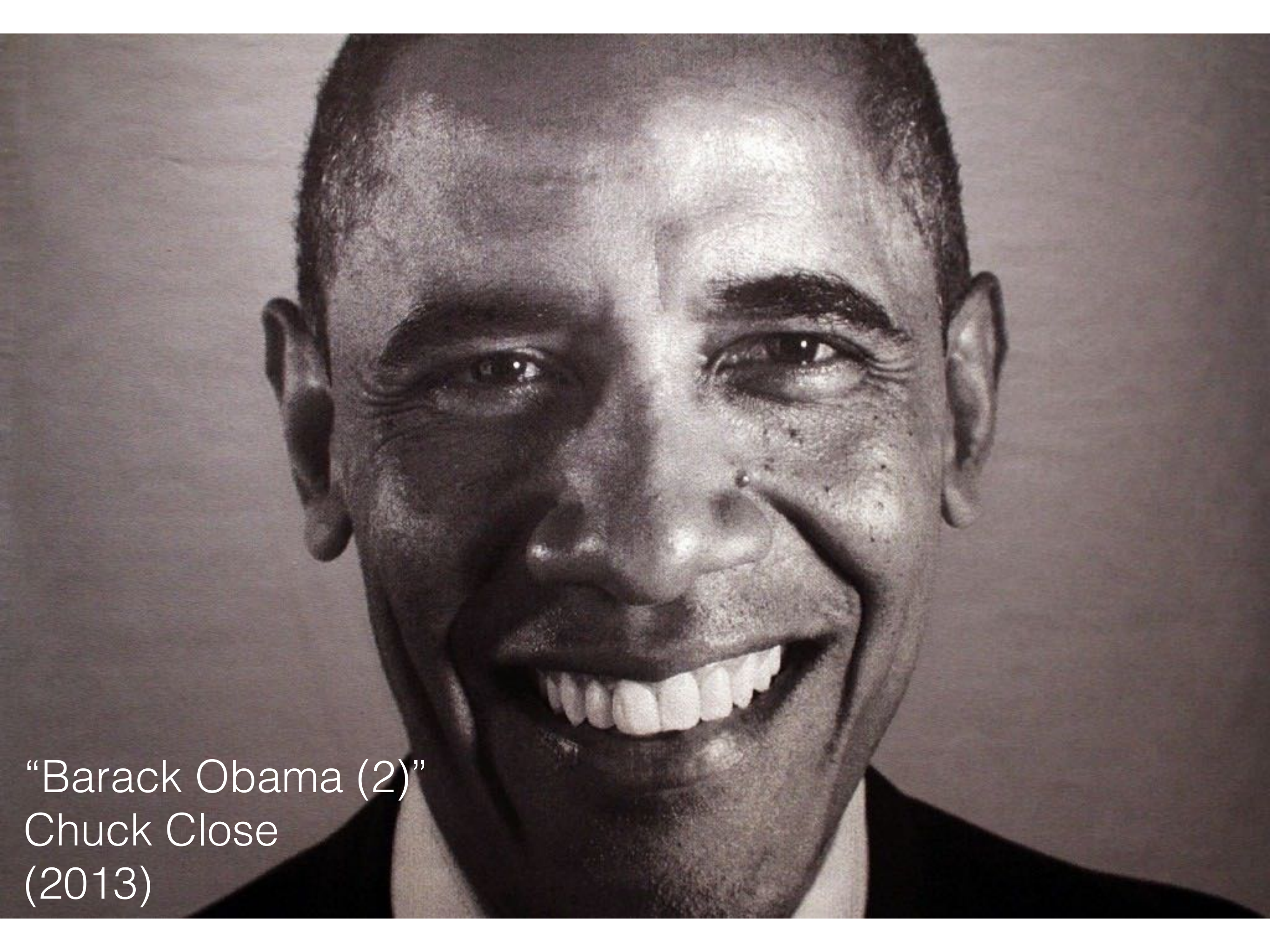
# HUDK 4050: CORE METHODS IN EDM

9/7/17 8:53 AM

Jacquard Loom  
(1801)



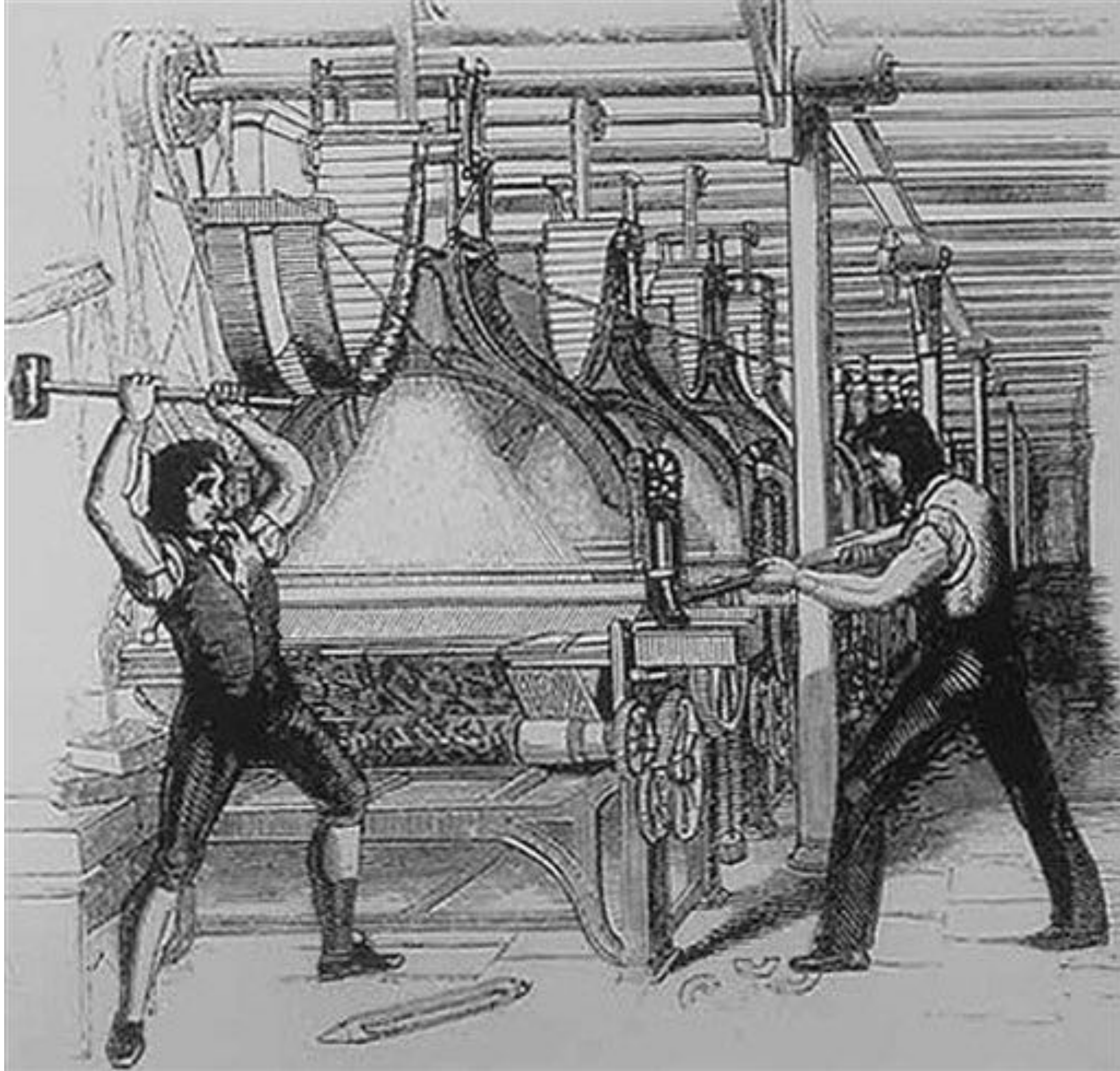




“Barack Obama (2)”  
Chuck Close  
(2013)



Luddites  
(1811-17)





Tweets

Media

Likes



leonie haimson @leoniehaimson 2d

Treating kids like cattle

@Parents4Privacy

Lori Lalama @TechEducator1

#DataMining #PrivacyAware

@leoniehaimson @DianeRavitch

wired.com/2012/09/rfid-c...



leonie haimson Retweeted



Sheila Resseger @sheilaresseger 2d

@leoniehaimson I had no illusions 2  
the contrary! We r up against a  
relentless & callous assault on  
human dignity, preventing self-  
mpowrment



Mark Zuckerberg

December 3, 2015 at 5:24pm · Palo Alto, CA · 🌐

I want to thank you all for your heartwarming congratulations on Max's birth and on starting the [Chan Zuckerberg Initiative](#). This whole community has been so loving and supportive.

If you're interested in following the philanthropy work we're doing with the Chan Zuckerberg Initiative, I encourage you to like the page here:

<https://www.facebook.com/chanzuckerberginitiative>

Since we announced this a couple days ago, many people have asked about what we're planning to focus on and how we're structuring our work.

Our initial focus areas are **personalized learning**, curing disease, connecting people and building strong communities. We've already made many investments over the past five



# 1 THE RAPID GROWTH OF GLOBAL DATA



The production of data is expanding at an astonishing pace. Experts now point to a 4300% increase in annual data generation by 2020. Drivers include the switch from analog to digital technologies and the rapid increase in data generation by individuals and corporations alike.



2020: MORE THAN 1/3 OF THE DATA PRODUCED WILL LIVE IN OR PASS THROUGH THE CLOUD.

2012: CUSTOMERS WILL START STORING 1 EB OF INFORMATION.






# What's new?



Number of  
data points



Number of  
variables



Number of  
time points



Feed-  
back

# MR. MESSY

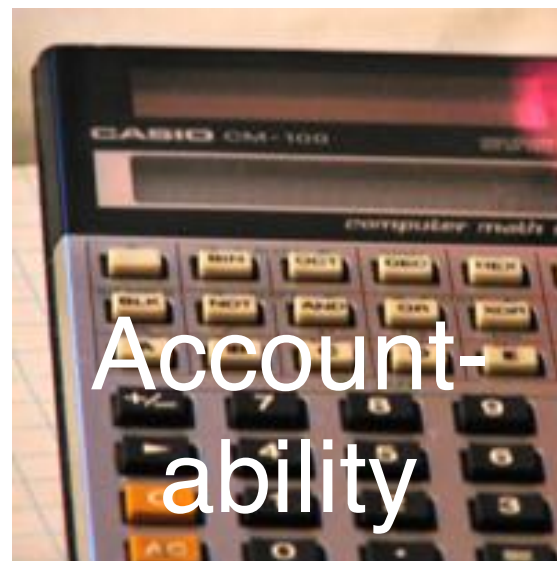
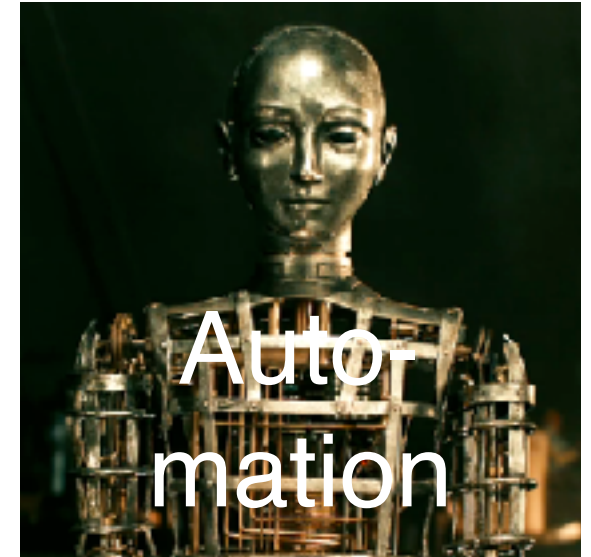
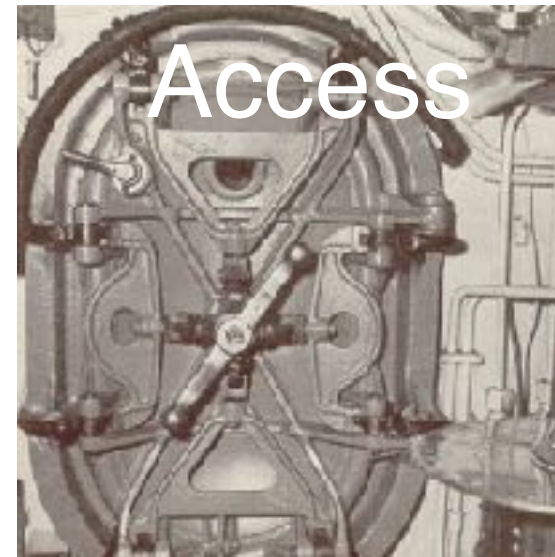
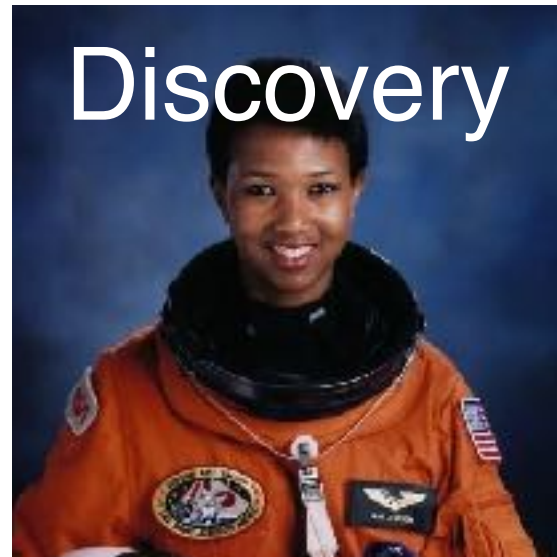
by Roger Hargreaves





- Volume
- Velocity
- Variety
- Veracity

# Possibilities





Computer Science

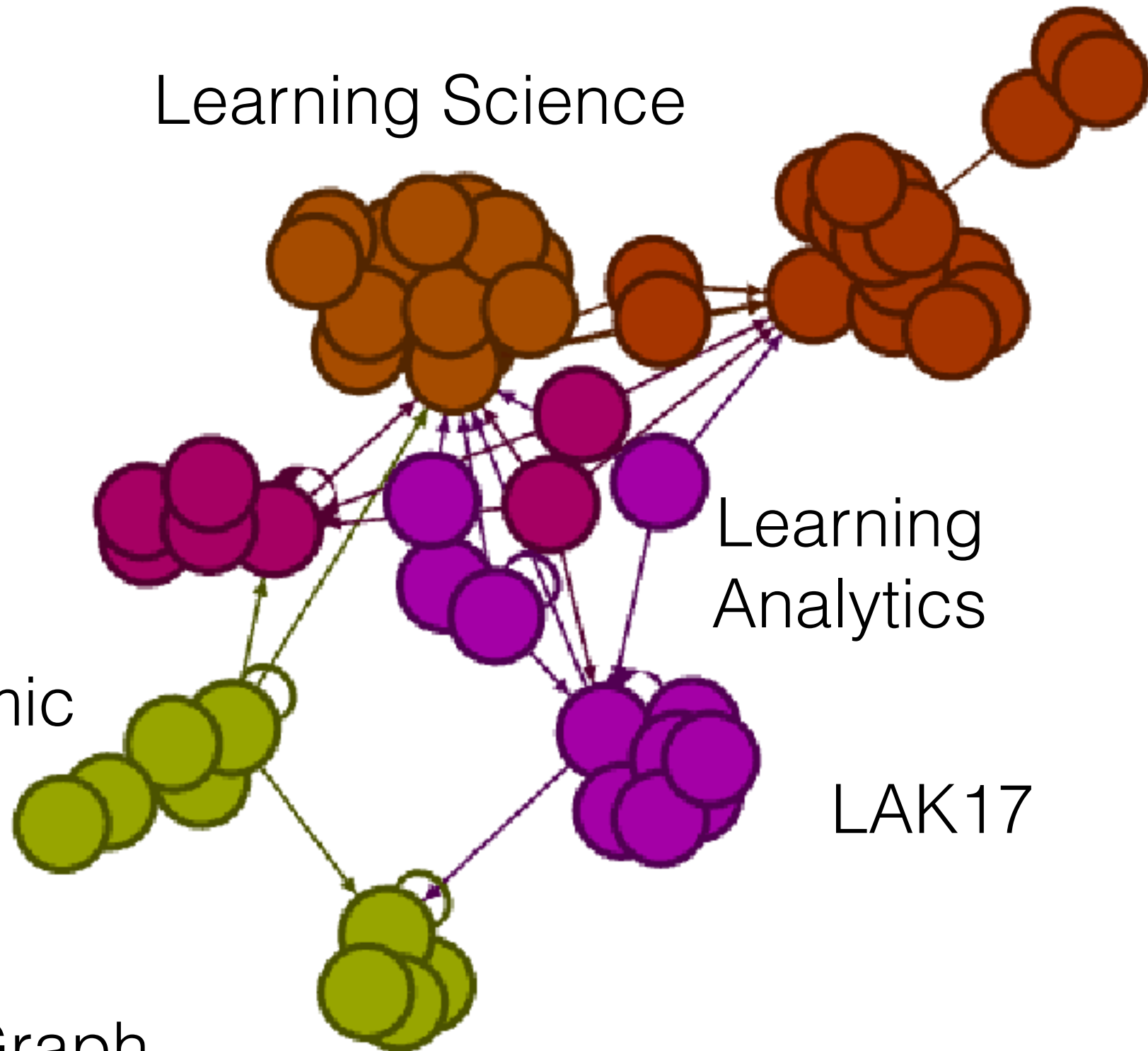
Learning Science

Learning Analytics

EDM/Academic Analytics

LAK17

Twitter Social Graph  
#learninganalytics  
2 weeks worth of tweets



## Learning Analytics

- Grew from BI
- Early-mid 2000s in Canada
- Large domain umbrella - EDM, MOOCs, learning sciences, game design
- Systems oriented
- Methodologically broad (qual, quant, CS, stat)
- Journal: JAL
- Society: SOLAR

## Ed. Data Mining

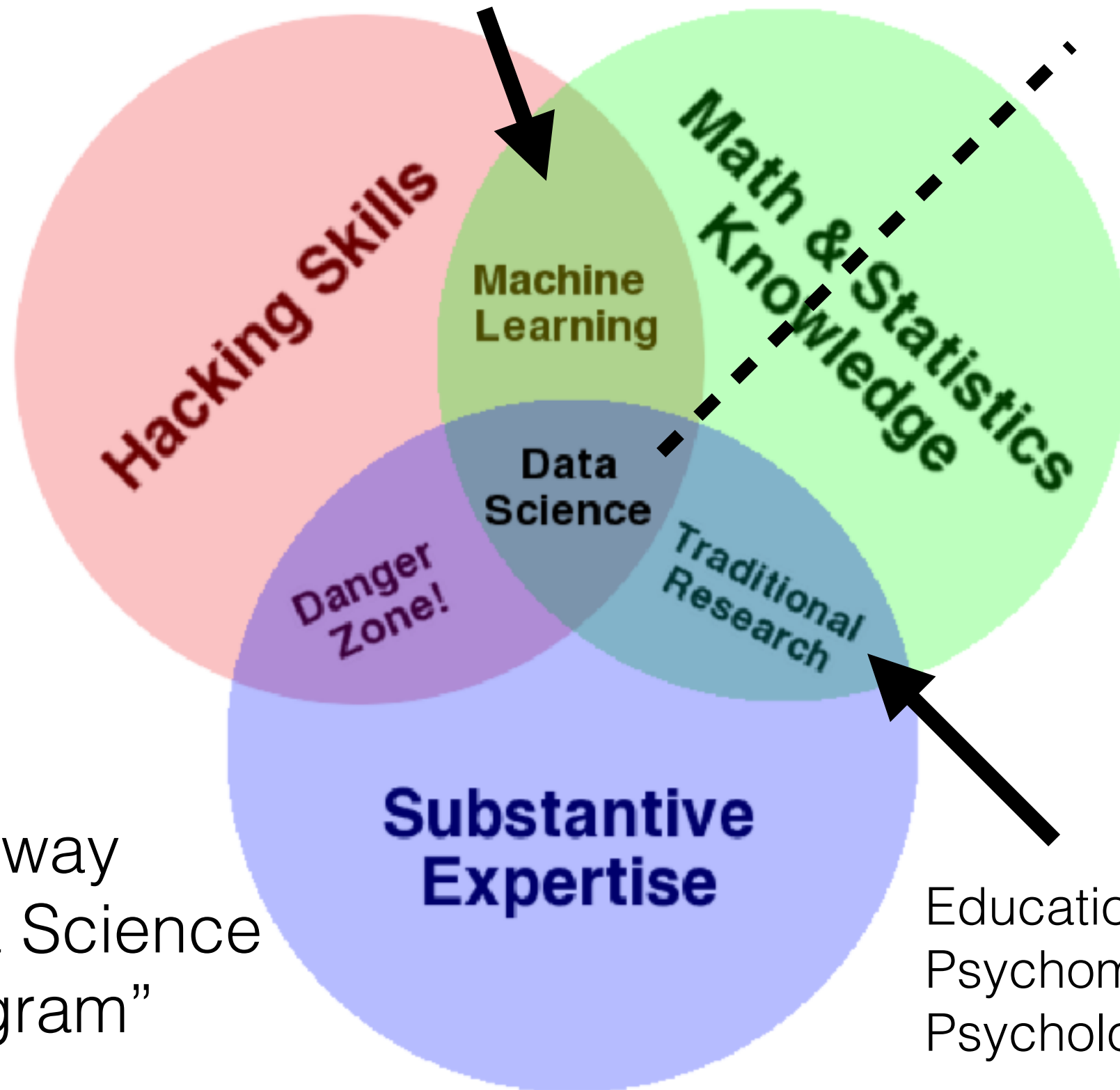
- Grew from Knowledge Mining or KDD
- Late 90s at CMU
- Intelligent tutoring, log-file
- Software oriented
- CS methods
- Journal: JEDM
- Society: IEDMS



A Data Scientist is a statistician who lives in San Francisco

–Sean Owen (Cloudera), 2014

EDM  
Academic Analytics

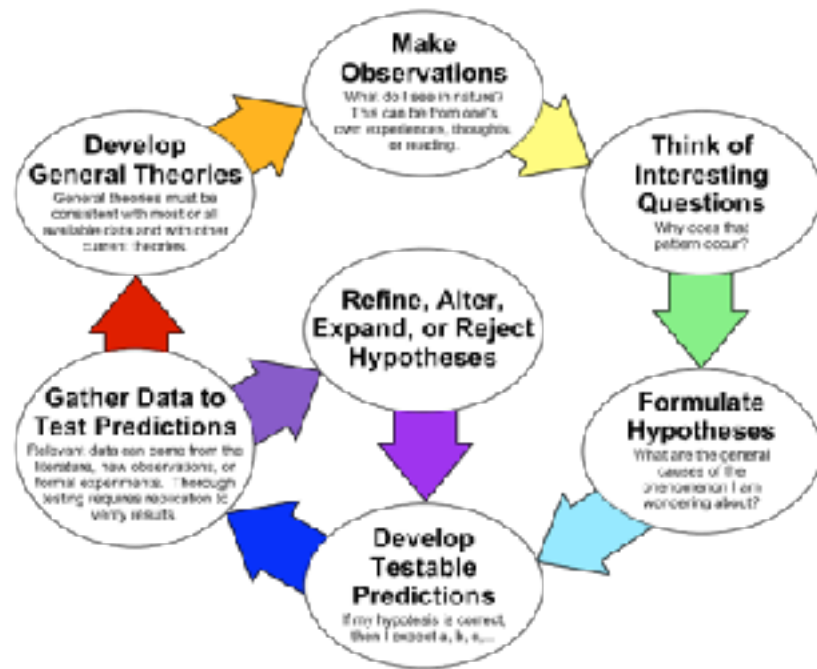


Educational Statistics  
Psychometrics  
Psychology

Drew Conway  
"The Data Science  
Venn Diagram"  
(2010)



# Philosophy of Science Spectrum



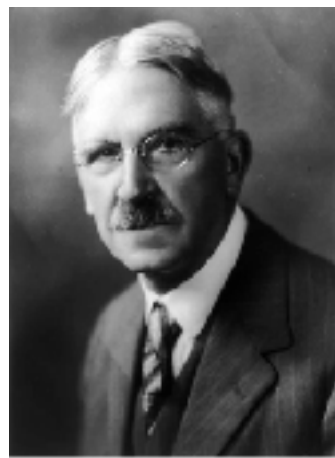
HUDK  
4050



Mr Vargas



Delores  
Etter



John  
Dewey



William  
James



Paul  
Feyerabend



Rick

# Today

- Course logic & structure
- What a lesson will look like
- Assessment





# Instructor

- email: [charles.lang@tc.columbia.edu](mailto:charles.lang@tc.columbia.edu)
- appointment: sign up suing link on syllabus

# Syllabus

[https://github.com/core-  
methods-in-edm/syllabus](https://github.com/core-methods-in-edm/syllabus)

# Course Goals

- Foundation in methods
- Provide a solid workflow for doing LA moving forward
- Not scare you away!



# Course Goals

Short Term		Long Term	
<b><i>Content</i></b>	<b><i>Skills</i></b>	<b><i>Abstractions</i></b>	<b><i>Habits</i></b>
remember..., understand...	demonstrate...	synthesize..., argue...	organize..., implement...
Conceptual basis of methods, use cases	R, git, application of methods	Evaluate broader implications, have opinions, methods schema	Workflow, documentation, JIT learning

# Assessment

## Weekly:

- Attend class
- Weekly readings
- Automated R course
- Maintain documentation of work
  - ★ Github, R Markdown, Zotero

# Assessment

One time only:

- Ask one question on Stack Overflow
- In person meeting with instructor
- 7 x short individual assignments
- 1 x group assignment (3-5 students)
- Submit Zotero file with semester's notes



# Assessment

***How to assess a course that is all about how difficult it is to measure learning?***

- Assess your preparedness to do the work after the course has ended
- Two measures:
  - ◉ Contribution: assignments, comments, quizzes
  - ◉ Organization: keep a record of what you have done (Zotero, Git, Markdown)

# Assessment

## Purpose of grades

- Not performance based
- Entirely a tool to overcome **immunity to change**









# Assessment

## Purpose of grades

- You will be assessed based on:
- Timeliness (5pm)
- Comprehensiveness
- Organization



# Tools

- Git/Github  
  - R/RStudio  
  - Twitter 
  - Zotero 
- Tools that are worth learning in & of themselves
  - Tools that we can easily extract data from
  - Tools that you can use unrestricted in the future

# Git/Github



- Git is a common version control system
- Github is an online hosting service for Git files

We will be using Git/Github to:

- Keep track of work
- Document problems
- As an LMS (assignment submission, etc)

# R/RStudio



- R is a scientific programming language
- RStudio is an Integrated Development Environment



# Why use R?

## Pros

- Free
- Platform independent
- Actively developed by a large community of users
- Functionality is VAST
- Help resources are VAST
- Best graphics (At the moment)
- All the cool kids use it
- Dominant language in Dept.

# Why use R?

## Cons

- Slow (for some tasks)
- Not designed to build tools
- Relies on vectorization
- Non-intuitive structures & syntax with respect to other programming languages

# Why use R?

It is designed for people who are *learning*  
a method *as they apply it*.

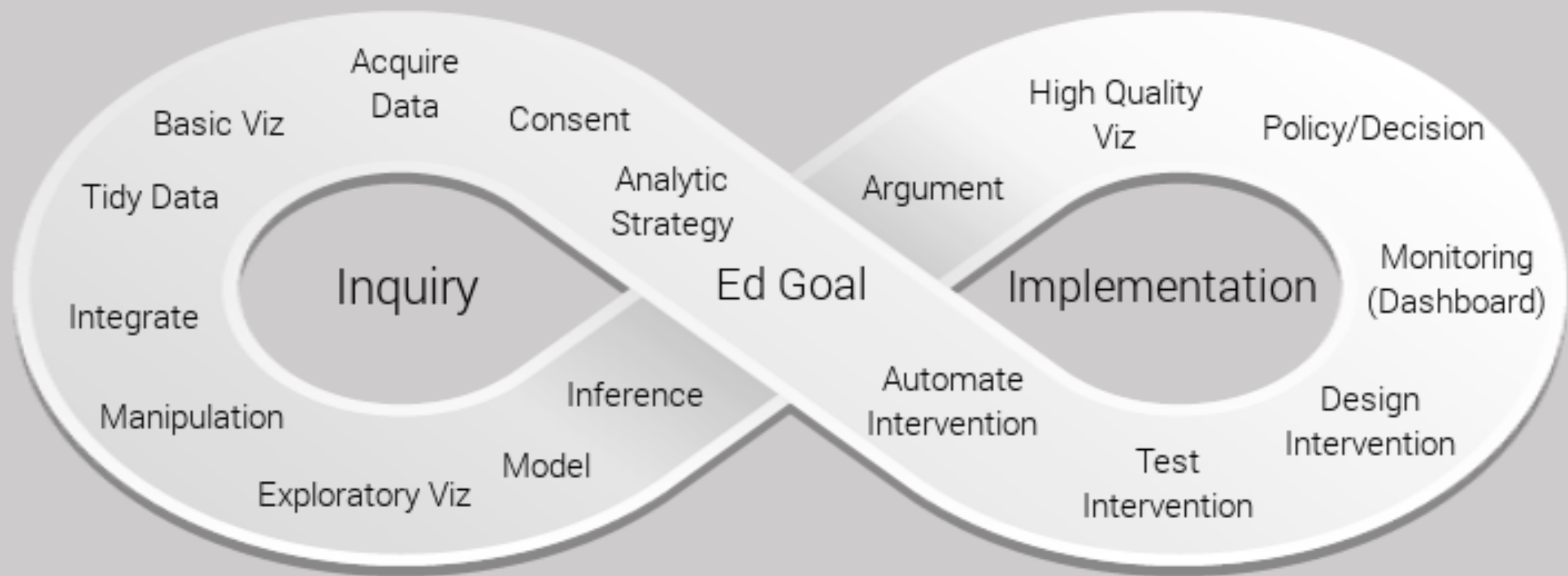
# Zotero



- Bibliographic software
- Lives in browser (where you do research)
- Open source



# Ed Data Science Cycle



Questions?

# Assignment 1

<https://github.com/core-methods-in-edm/assignment1>