

# Elementary Statistics – Welcome!

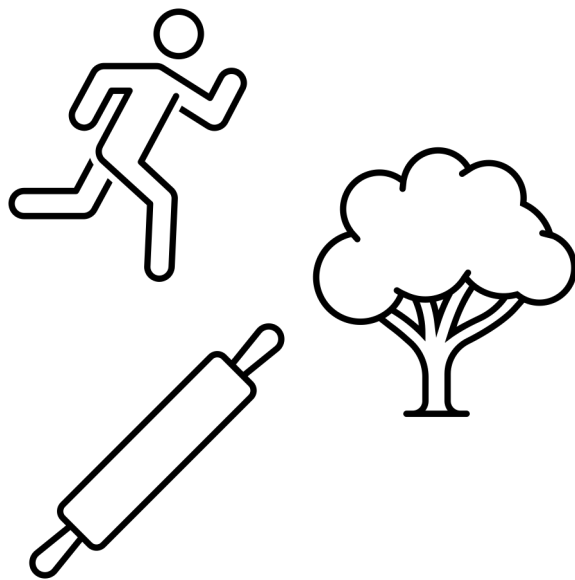
Dr. Ab Mosca (they/them)

*Slides based off slides courtesy of OpenIntro and John McGreevy of Johns Hopkins University*

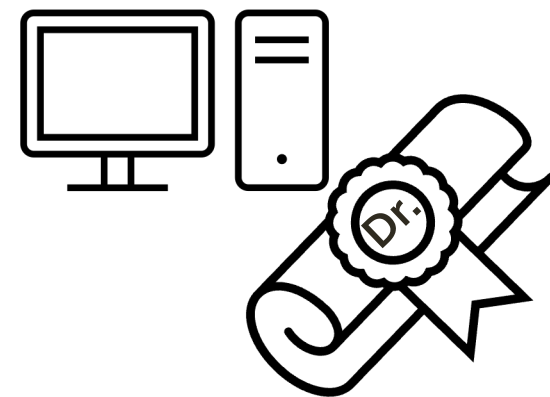
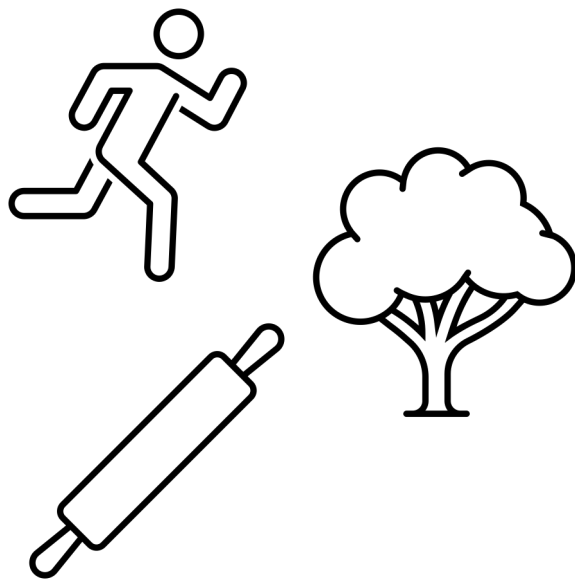
# Plan for Today

- Who am I?
- Who are you?
- What will we do in this class?
- What is statistics?
- Research questions

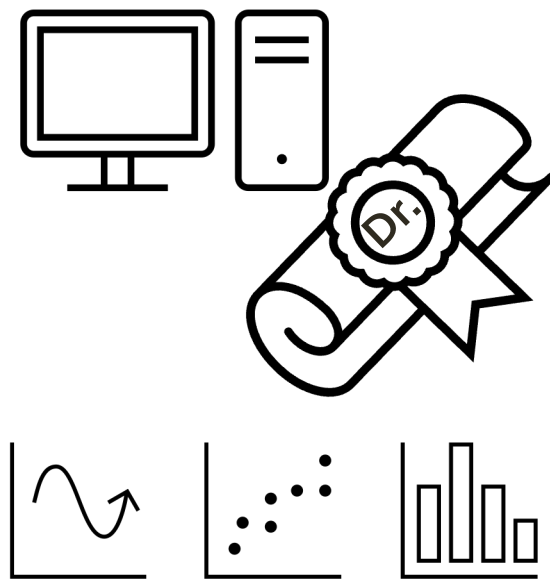
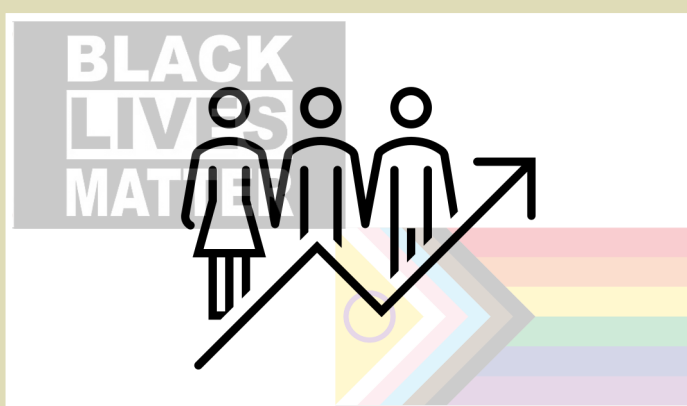
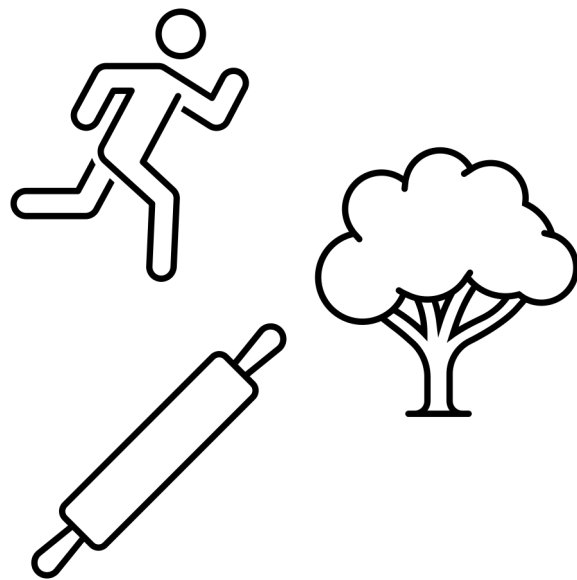
# Who Am I?



# Who Am I?



# Who Am I?



## Who Are You?

- Form groups of 3
- Introduce yourselves (name, pronouns)
- Share:
  - A highlight of your hometown
- Find 1 thing that your entire group has in common (favorite color? hometown? left-handed? Be creative!)
- After about 5 minutes we will go around, introduce ourselves, and share what each group has in common

## Who Are You?

- Form **new groups** of 3 (move around!)
- Introduce yourselves (name, pronouns)
- Share:
  - Would you rather have a cat or a dog?
- Find 1 thing that your entire group has in common (favorite color? hometown? left-handed? Be creative!)
- After about 5 minutes we will go around, introduce ourselves, and share what each group has in common

## Who Are You?

- Form **new new groups** of 3 (move around!)
- Introduce yourselves (name, pronouns)
- Share:
  - Would you rather have a self-driving car but always hit red lights OR drive yourself and never hit red lights?
- Find 1 thing that your entire group has in common (favorite color? hometown? left-handed? Be creative!)
- After about 5 minutes we will go around, introduce ourselves, and share what each group has in common





# What You Will Learn & Logistics

# What Is This Class?

- An introduction to statistics
- You will learn...
  - How to collect sample data from a population
  - How to appropriately summarize data
  - How to make inferences from data
  - How to communicate the outcome of a statistical analysis

## **\*\*Important Info\*\***

- Course website (**write this down!**):  
<https://amoscao1.github.io/MATH108-F23/>
- PLATO: please use for all course related communication
- OH's: T/R 11:30 – 13:30 (stop by and say hi!)

## **\*\*Important Info\*\***

- Textbook: *OpenIntro Statistics*, Fourth Edition
  - Available for free here: <https://www.openintro.org/>
- Assignments:
  - Turn in on PLATO
  - Homeworks – largely effort based
  - Mini-Projects – review and application of skills
  - Final Project – group based, application of skills
- Due Dates: As listed on course schedule.
  - 24hr grace period; no late submissions
  - Lowest homework dropped
  - No regrades; see syllabus for revise and resubmit instructions

**\*\*Important  
Info\*\***

- I'm here to help you succeed
- Please come to office hours or reach out on PLATO if you need any additional support



Now the good stuff

# What is Statistics?

- Work with whoever is sitting next to you to brainstorm what you think statistics is
- Add your definition to the board

What is  
Statistics?

***Definition:*** Statistics is the study of how best to collect, analyze, and draw conclusions from data



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# Data

## data noun

da·ta 'dā-tə 'da- also 'dä-

plural in form but singular or plural in construction

often attributive

[Synonyms of data >](#)

- 1 : factual information (such as measurements or statistics) used as a basis for reasoning, discussion, or calculation
  - the *data* is plentiful and easily available
  - H. A. Gleason, Jr.
  - comprehensive *data* on economic growth have been published
  - N. H. Jacoby
- 2 : information in digital form that can be transmitted or processed
- 3 : information output by a sensing device or organ that includes both useful and irrelevant or [redundant](#) information and must be processed to be meaningful

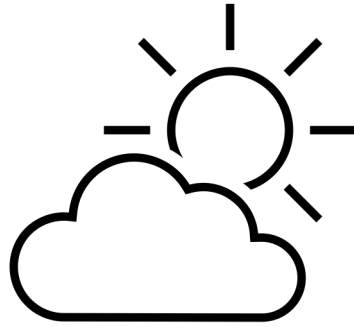
# Data

- What examples of data can you come up with?
- Brainstorm with whoever is next to you

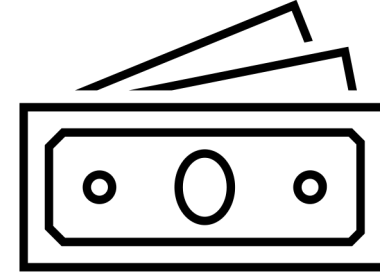
## Data + Analysis

- What if we add analysis to the mix?  
What can we learn or do from analyzing data?
- Brainstorm with whoever is next to you

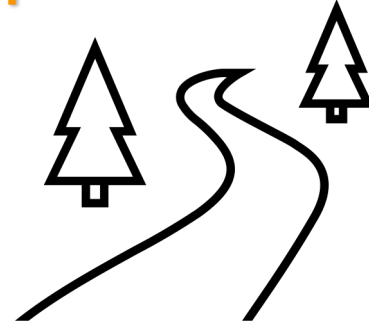
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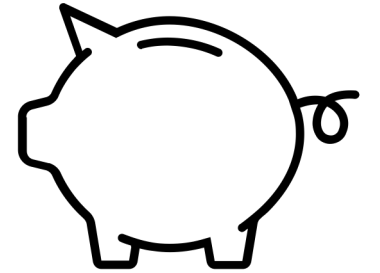
weather



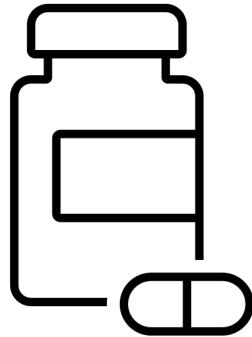
sales



roadways



investing



medicine



urban planning

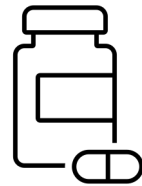
# Analysis

- Different techniques for different needs

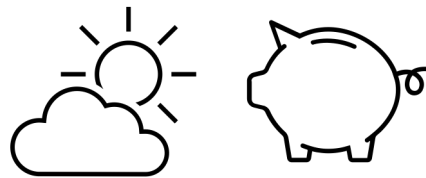
- Summarizing



- Inference



- Prediction



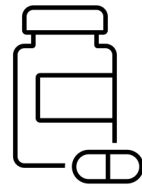
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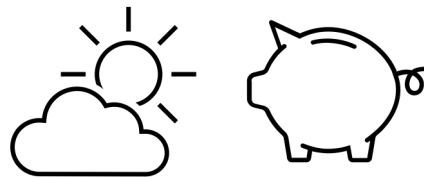
- Summarizing



- Inference



- Prediction



- Regression
- AI / ML



What is  
Statistics?

***Definition:*** Statistics is the study of how best to collect, analyze, and draw conclusions from data

Why?





# Research Questions

# What is a research question?

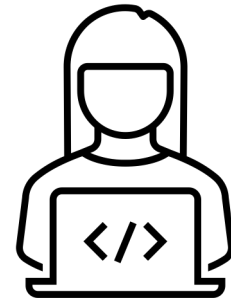
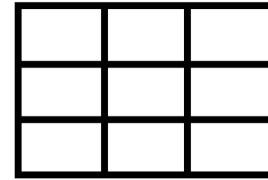
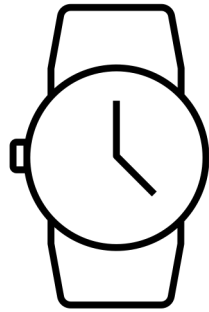
- A **research question (RQ)** is a question that a research project sets out to answer

# What is a research question?

- A **research question (RQ)** is a question that a research project sets out to answer
- Good RQs are FINER:
  - Feasible
  - Interesting
  - Novel
  - Ethical
  - Relevant

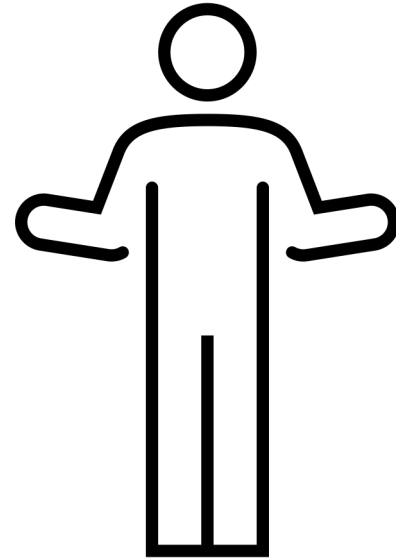
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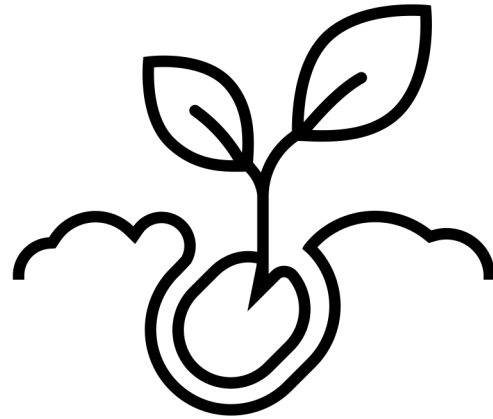
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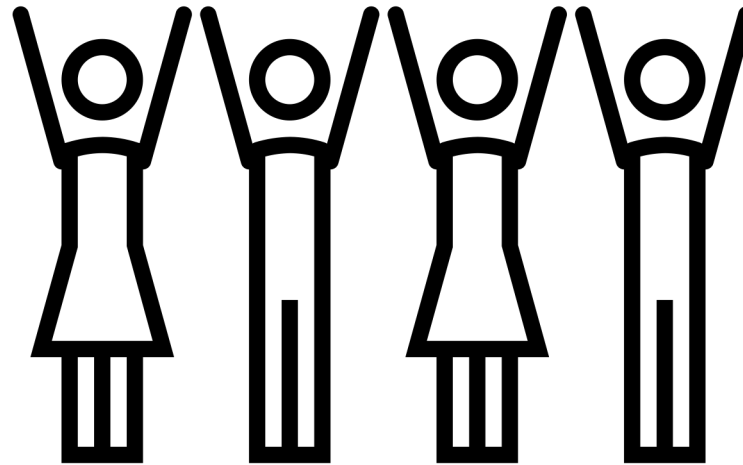
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# Research Questions

- Developing a RQ
  1. Identify an area of interest
  2. Research the area
    - I. What is known?
    - II. What do you (we) still need to know?
    - III. What question(s) does II imply?
  3. Narrow and refine

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Interactive graphs

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## Interactive graphs

- Interaction improves exploration, interaction makes apps harder to build and use

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- How interaction affects reasoning with graphs

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- How interaction affects reasoning with graphs
- How does interaction affect reasoning with graphs?

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How does interaction affect reasoning with graphs?

Very broad

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How does an interactive icon array affect accuracy on a reasoning task?



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Your turn! Find two people to work with and develop a research question. Be ready to share with the class