

# cs199: Thinking Critically About Data

Instructor: Prof. Rebecca Hutchinson

Spring 2018

## Basics

- **Instructor:** Prof. Rebecca Hutchinson (rebecca.hutchinson@oregonstate.edu)  
www.engr.oregonstate.edu/~rah.
- **Class Meetings:** Tuesdays and Thursdays, 2:00-3:20pm in STAG 210.
- **Credits:** 3
- **Office Hours:** Fridays 1:30-2:30pm. In Prof. Hutchinson's office: KEC 2051.
- **Textbook:** None. Readings will be provided.
- **Prerequisites:** MATH 112 recommended.

## Course content

As consumers of information presented by teachers, advertisers, mass media, and especially the internet, we are inundated with data that is presented as evidence for choices ranging from what soap to buy to what energy policies to endorse. In this class, we will critically examine how data analysis can support legitimate conclusions and also how deceptive visualizations, misleading comparisons, and spurious reasoning can lead to false conclusions.

This course is modeled in large part after a course at the University of Washington (<http://callingbullshit.org/index.html>) and uses some of those course materials.

## Student Learning Outcomes

At the completion of the course, students will be able to:

1. Recognize weak and misleading arguments from data in their daily life.
2. Identify aspects of arguments from data that may invalidate their conclusions.
3. Track arguments from data to the source to evaluate claims.
4. Describe - both to a layperson and to a data scientist - how errors and assumptions in arguments from data alter the conclusions that may be drawn.

## Evaluation of student performance

**Participation: 30% of final grade.** Participation will be judged based on contributions to class discussions and in-class exercises.

**Assignments: 30% of final grade.** Assignments will include a mix of in-class and out-of-class exercises and reading summaries.

**Projects: 40% of final grade.** There will be two projects done in small groups - one at midterm and one at end of term.

### Late policy

Late assignments will be accepted up to 24 hours following the due date for 90% credit and up to 48 hours following the due date for 50% credit.

### Learning resources

All learning materials will be made freely available by the instructor.

### Tentative Schedule

Week		
1 Introductions. Cultivating Skepticism.	Apr 3	Apr 5
2 Misleading Visualizations.	Apr 10	Apr 12 Rebecca away - meet with small groups
3 Statistical Traps I.	Apr 17	Apr 19
4 Statistical Traps II.	Apr 24	Apr 26
5 Drawing Scientific/Statistical Conclusions.	May 1	May 3
6 Communicating Scientific Conclusions.	May 8 Midterm Project Presentations	May 10
7 Fake News.	May 15	May 17
8 Is “Big Data” the Answer?	May 22	May 24
9 Refuting Faulty Claims.	May 29	May 31
10 Wrap-up.	Jun 5	Jun 7 Final Project Presentations.

### Classroom Policies and Learning Environment

It is expected that everyone will treat each other with common courtesy in the classroom and behave in a way that facilitates an effective learning environment. Information about the OSU student code of conduct is available at <http://studentlife.oregonstate.edu/studentconduct>. More specific policies will be implemented if the need arises.

### Community Statement

Every student should feel safe and welcome to contribute in this course. As the instructor, I will try to establish this tone whenever possible, but ultimately the responsibility for cultivating a safe and welcoming community belongs to the students-that means you!

Fortunately, being part of a safe and welcoming community is not too hard. A good place to start is to recognize (and continually remind yourself) of the following facts:

- Your classmates come from a variety of cultural, economic, and educational backgrounds. Something that is obvious to you may not be obvious to them.

- Your classmates are human beings with intelligence and emotions. This applies even if you are interacting anonymously on Canvas.
- Your classmates are here to learn. They have the right to pursue their education without being distracted by others' disruptive behavior, or made uncomfortable by inappropriate jokes or unwanted sexual interest.
- If each of us remembers these facts and act with corresponding decency, respect, and professionalism, the course will certainly be better for everyone.

Some students might be inclined to shrug this off and perhaps crack a joke about safe spaces or political correctness. If that's you, please also know that if you make a fellow student uncomfortable by mocking them, making inappropriate jokes, or making unwanted advances, that is harassment and will be taken seriously. (If you are a victim of harassment, please see the brief list of resources below.)

However, I hope that we can all approach this positively. Treat your classmates as respected colleagues, support each other when needed, have fun without spoiling it for anyone else, and everybody wins.

## What to do about harassment

If you are the victim of harassment in this class, there are several resources available to you:

- You may schedule a private meeting to talk to me.
- You may contact the University Ombuds Office (<http://oregonstate.edu/ombuds/>) for confidential guidance and advice.
- You may contact the Office of Equal Opportunity and Access (<http://eoa.oregonstate.edu/>) to file an informal or formal complaint. You may also want to read OSU's policies on bullying (<http://eoa.oregonstate.edu/bullying-policy>) and on sexual harassment and misconduct (<http://eoa.oregonstate.edu/sexual-harassment-and-violence-policy>).

Information about the OSU student code of conduct is available at <http://studentlife.oregonstate.edu/studentconduct>.

## Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

## Academic Misconduct

Academic or Scholarly Misconduct is prohibited and considered a serious violation of the Student Conduct Code. It is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another. For more information, please read the policy via the following link: <http://studentlife.oregonstate.edu/studentconduct/academicmisconduct>

## Disclaimers

The course plan above is subject to change. Students may vary in competency on learning outcomes, and students can only expect to achieve the stated learning outcomes if they honor course policies, attend class, complete assigned work, and meet all other course expectations.