

# Lies, Damned Lies, and Data Science

## COLQ 1020, Fall 2018

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**Office Hours (Gibson Hall 427)**

Mon 3 pm - 5 pm

Fri 10 am - noon

### Resources

Required Text: *The Signal and the Noise* by Nate Silver.

Supplemental Texts:

*How Not to be Wrong* by Jordan Ellenberg

*The Demon-Haunted World: Science as a Candle in the Dark* by Carl Sagan

When we encounter material from the supplemental texts, the relevant chapter or section will be provided on Canvas. We will also regularly read academic papers and episodes from podcasts, particularly *Radiolab* and *This American Life*.

### Course Overview

No one is quite sure who said it first, but for more than a hundred years people have loved to joke that there are three kinds of falsehoods: lies, damned lies, and statistics. The frustration with statistics stems from their constant misuse, especially in masking weak arguments. When reason and common sense fail, a cherry-picked statistic or a cleverly constructed chart can intimidate and silence an opponent. And this assumes that the cited fact is even true! Recent studies show that 90% of all cited statistics are, in fact, completely made up\*.

This is the Era of Big Data and The Era of Easy Access to Information on the Internet. This should be a golden age of truth in the public sphere, and yet, the buzzword of the 2016 Election was “fake news.” In fact, every major newspaper has felt the need to open up Fact Check sites and Explainer sections. Paradoxically, while modern Data Science has allowed scientists to discover fundamental truths among inconceivably complex interactions, it has also enabled Masters of Obfuscation to profit from casting doubt and investing in confusion. It is no longer enough to publish “all the news that’s fit to print.” You need to have a rapid-response Twitter team and clever animated graphics to stand a fighting chance. And STILL more than 50% of American adults say they are not sure whether vaccines cause autism<sup>†</sup>.

How can this be?

\* In fact, there is no such study. But did you believe me for just a moment?!

† In US, Percentage Saying Vaccines Are Vital Dips Slightly Gallup, March 6, 2015.  
[http://www.gallup.com/file/poll/181970/Americans\\_VIEWS\\_on\\_Vaccines\\_150306.pdf](http://www.gallup.com/file/poll/181970/Americans_VIEWS_on_Vaccines_150306.pdf)

We seek to answer this question through a course that will touch on topics from modern statistical analysis to computational methods in political science and economics to classical philosophy of rhetoric. It will be a course with three parts.

**Weeks 1-5: How to Lie with Statistics**

Even when there are not two sides to a story, there are people who find political and monetary profit in obscuring the truth. Lies are told nakedly and yet the teller stands proud. We will look at the statistical techniques that are used to deliver lies of omission and lies of commission in service to keeping Fake News alive.

**Weeks 6-10: What Exactly Do We Mean by “Truth” Anyway?**

To a mathematician, truth follows from logical proof; but to a statistician, truth is an experimental outcome that has less than a five percent chance of occurring by randomness alone. To a laboratory scientist, truth is that which can be experimentally replicated; but to my skeptical uncle, truth is that which can be seen with his own eyes. Researchers have even shown that members of the two major political parties value very distinct modes of persuasion. When someone says “just stick to the facts,” whose notion(s) of “facts” should we stick to?

**Weeks 11-15: How to Tell the Truth**

It is not enough to sit on the sidelines and watch the national conversation pass by. Rather than being satisfied in our ability to debunk falsehoods, we will consider how best to tell the truth. We will look at effective principles of data visualization and statistical communication. Moreover, we will have a surprising encounter with ethics: What should we do if the most effective way to communicate a truth is to tell a lie about it?!

**In the end, the final project is simple: Pick a truth and tell it.**

All students will be challenged to compose a publicly available argument (a visually compelling article, a website, a video) for some popularly disputed topic of personal interest.

**Evaluation.** This course is not about homework and mid-terms. It is an exploration of a series of ideas that will hopefully culminate in *you* having your own perspective on what honest and compelling presentation of data-based arguments looks like.

You’re honors students. I shouldn’t have to use a carrot and stick to motivate you to engage with this course. Every week you (in a group of 1-4) will be asked to do some reading or some listening and to write a one page *reaction piece*. Do a good job and the grades will take care of themselves.