# SML201
# Introduction to Data Science

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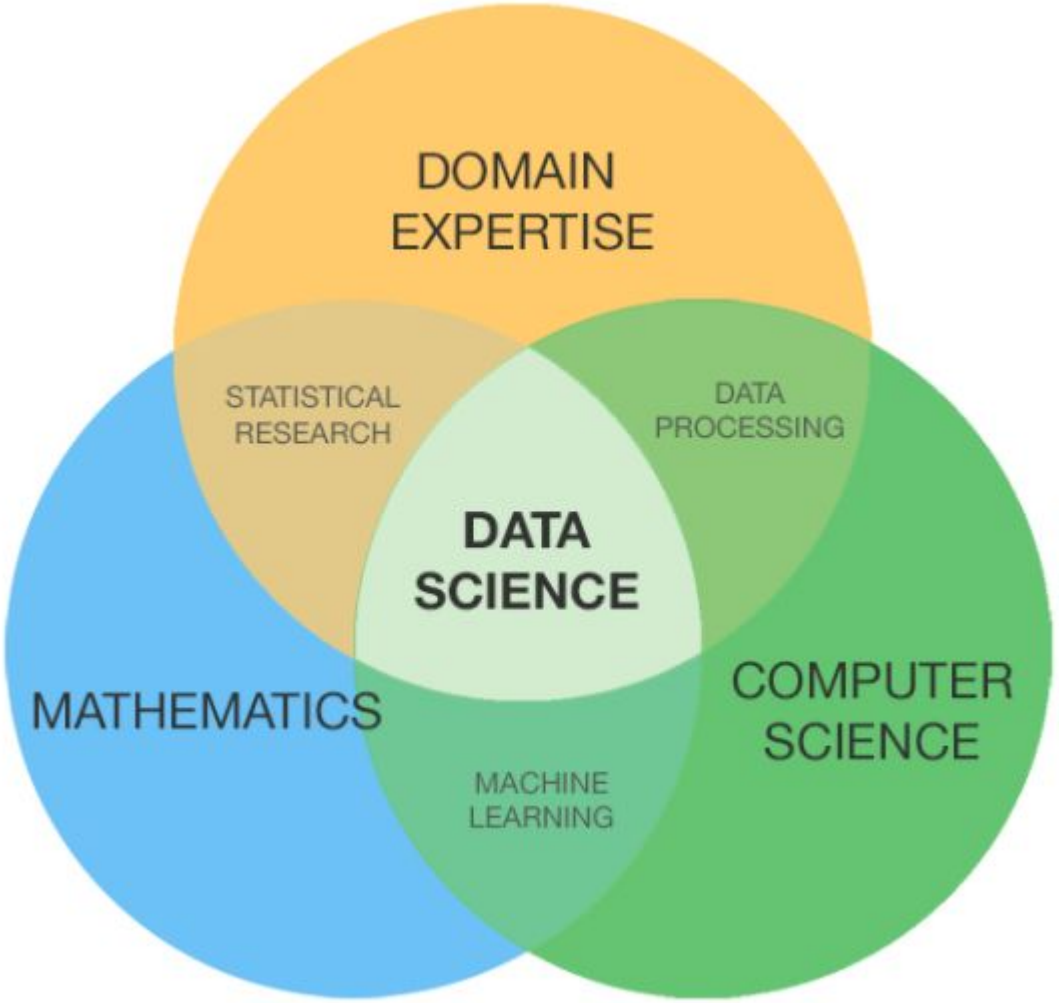
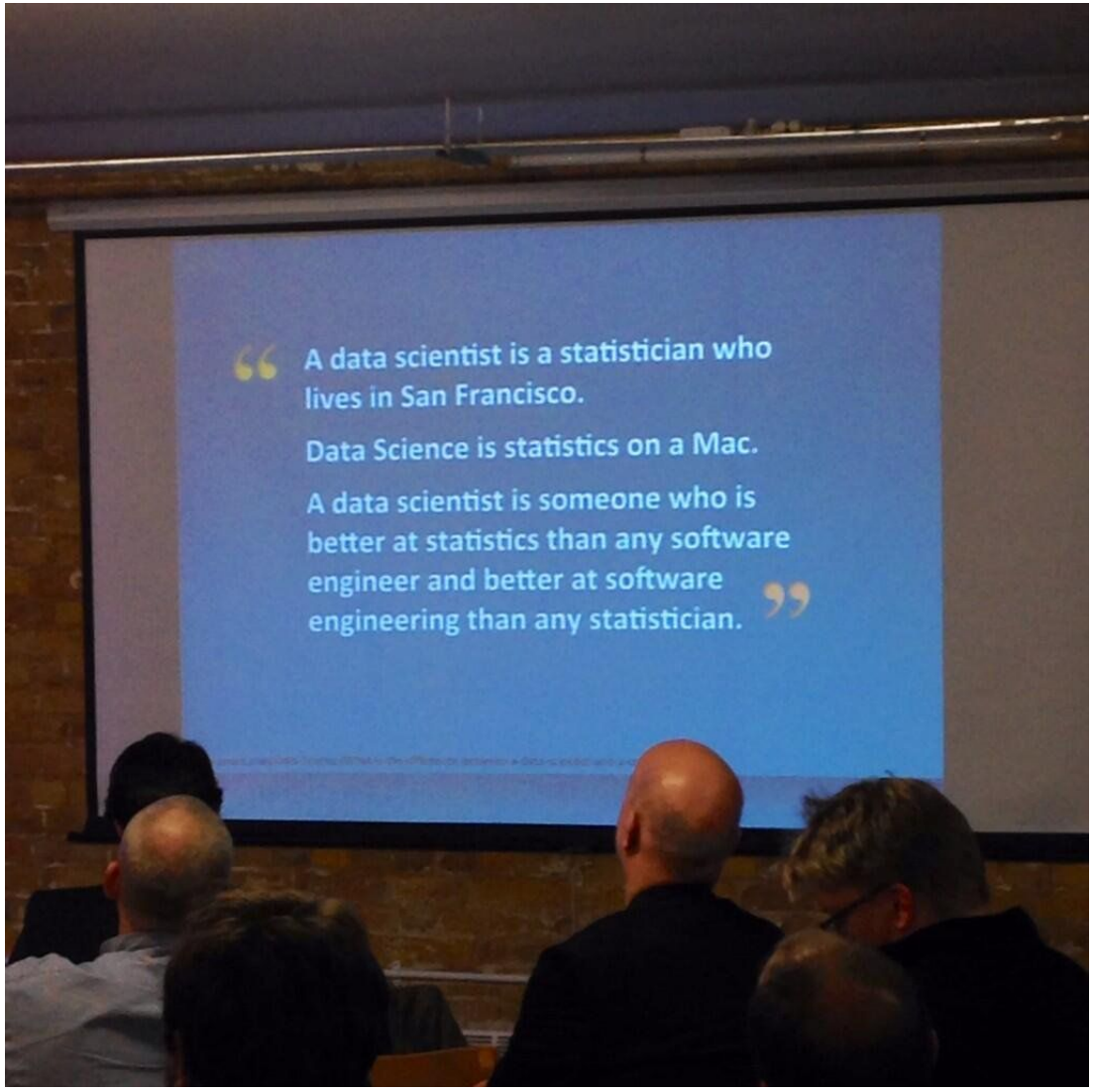
# Data Science



# Data Science



# Data Science

**Dan Ariely**

January 6, 2013 at 6:17pm ·

Big data is like teenage sex: everyone talks about it, nobody really knows how to do it, everyone thinks everyone else is doing it, so everyone claims they are doing it...

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# Data Science and SML201

- Read in and process data for analysis
- Visualize the data to analyze and communicate it
- Use knowledge about where the data came from and how it was collected, as well as data visualization, to formulate mathematical models of the data
- Use the models of the data to make predictions about new data
- Use the models of the data to make inferences about the data
    - Are the patterns we are seeing in the data indicative of real trends, or are they merely noise?

# R and SML201

- Reading in and processing data is more efficient if a computer does it
  - We will do it with R
- Processes/recipes for visualizing and analyzing data can be thought of as algorithms
  - Step-by-step instructions (to a human or a computer) about what to do with the data
  - Will code (some) algorithms in R to
    - Better understand them
    - Be able to code up algorithms that have not yet been implemented

# R and SML201

- About half of the class doesn’t have any programming background
  - We will not assume you have any programming background
  - We will teach R using a functional approach, which nearly no one in the class has seen
    - (The style of Python, Java, etc. programs is usually much more imperative than functional)

# Plan for this semester

- Intro to R
- Data visualization
- Predictive modelling: predicting new data by looking at existing data
  - Using domain knowledge to build models
- Testing statistical hypotheses and confidence intervals: mathematical procedures for determining whether the patterns you see in data are just noise
- Introduction to machine learning
- Case studies

# Course organization

- Revised syllabus to be posted by the end of the week
- (Mandatory) precepts start next week
  - Mandatory because part of the mark for the problem sets will be assigned for making a reasonable effort during precept
  - You should work in pairs on problem sets
- 2-3 data analysis projects
  - You may work in pairs
- 2 in-class tests (30%)
  - One test during midterm week, one test during class at the end of the semester

# About me

- My last name is spelled “Guerzhoy” and pronounced “ger-ZHOY”
- Started as a lecturer in CSML at Princeton last semester
- Also an affiliate scientist at St. Michael’s Hospital in Toronto
  - Using patient data to predict adverse outcomes (death, transfer to ICU) in real time
  - Analyzing CT images of the cervical spine to diagnose fractures
  - Automatically extracting information from dictated clinical notes
- Love data

# About you

- Fill out the survey if you haven't yet! https://goo.gl/forms/lWcnBmjGK8cHt7Ee2

What's the best thing about elevator jokes? They work on so many levels.

Three tomatoes are walkin' down the street. Papa Tomato, Mama Tomato and Baby Tomato. Baby Tomato starts lagging behind, and Papa Tomato gets really angry. Goes back and squishes him and says: "Ketchup".

q) what's the best thing about elevator jokes?
a) they work on SO many levels