

# Introduction to computational social science

Matthew J. Salganik  
Department of Sociology  
Princeton University

Summer Institute in Computational Social Science  
June 18, 2018



# What is computational social science?

Anything that's cool

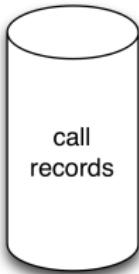
# What is computational social science?

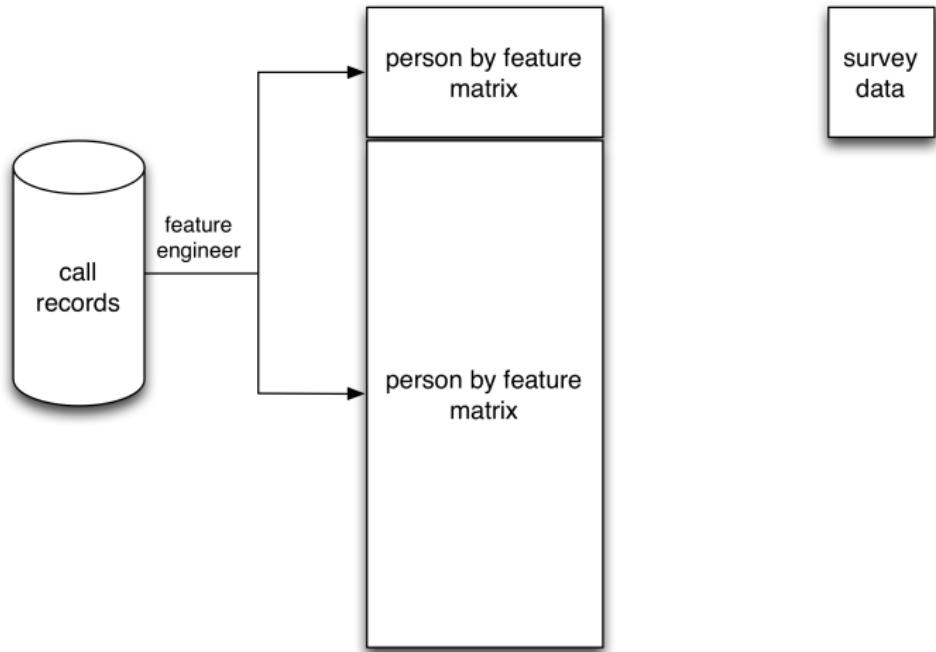
# Predicting poverty and wealth from mobile phone metadata

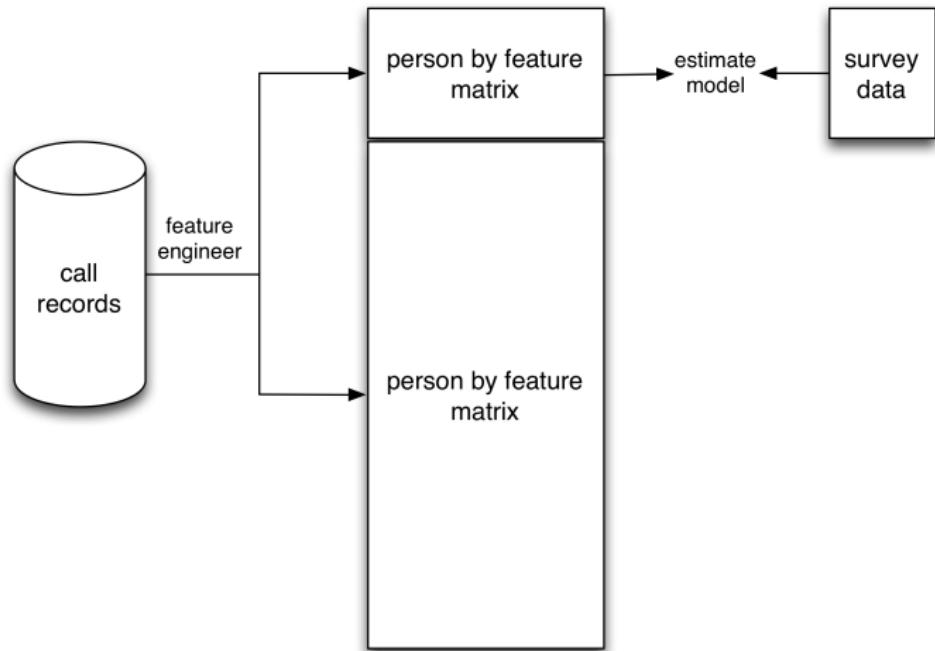
Joshua Blumenstock,<sup>1\*</sup> Gabriel Cadamuro,<sup>2</sup> Robert On<sup>3</sup>

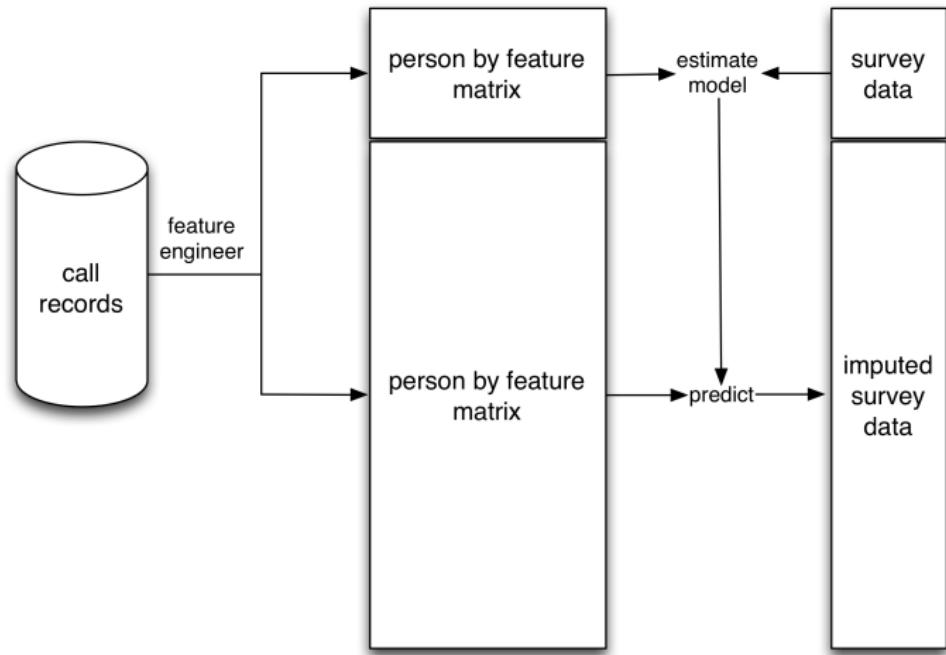
<http://dx.doi.org/10.1126/science.aac4420>

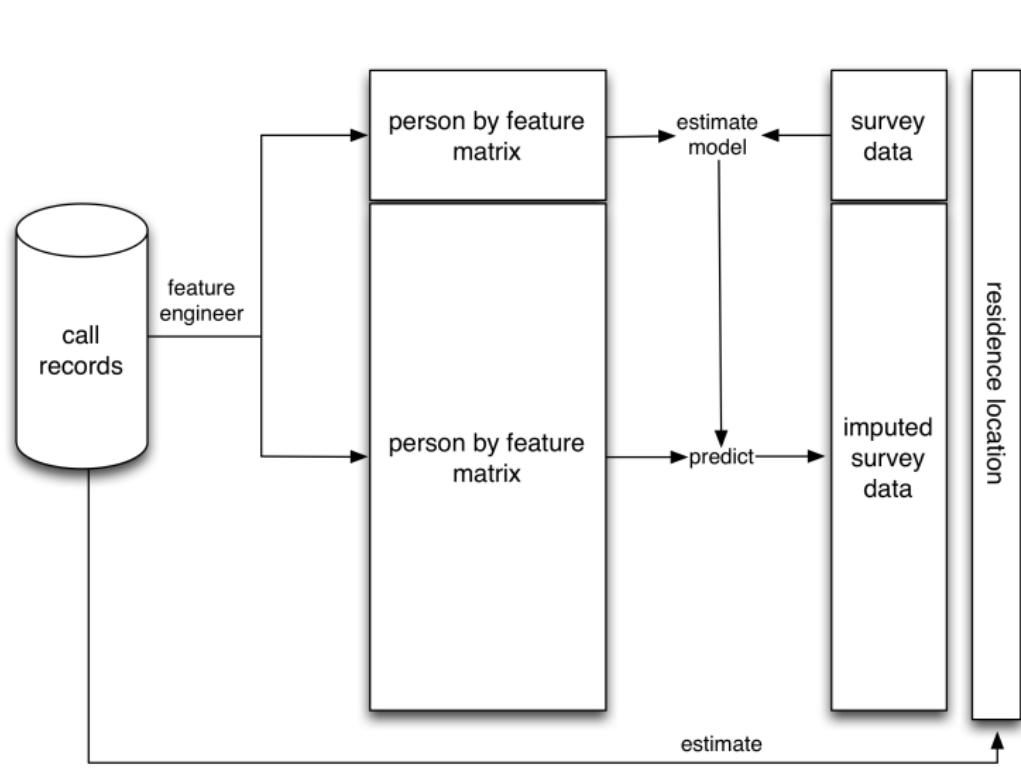


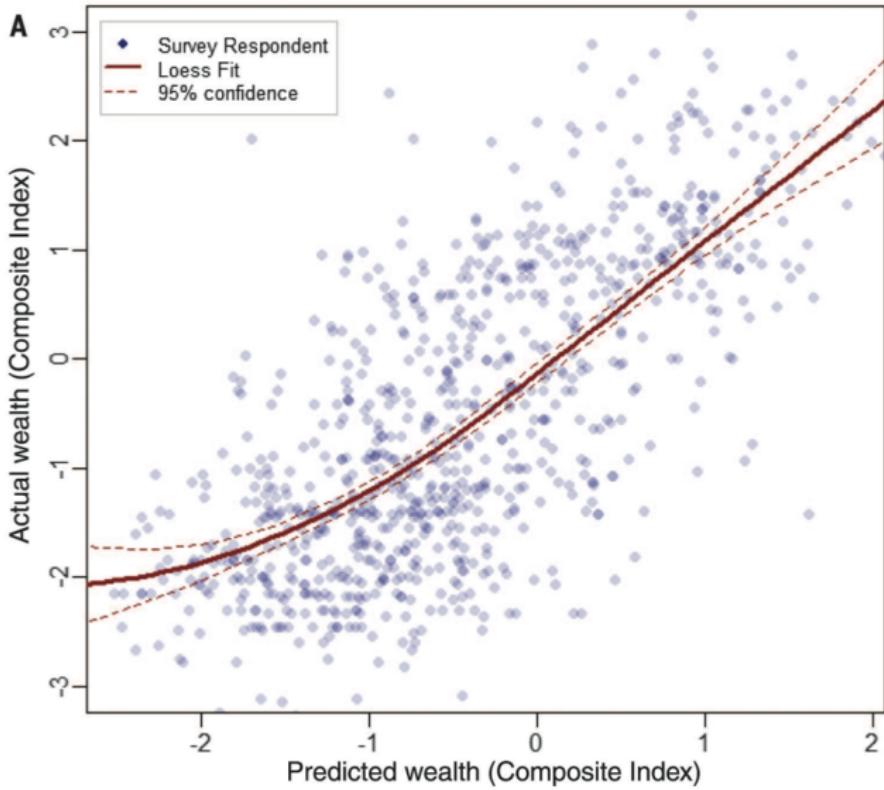


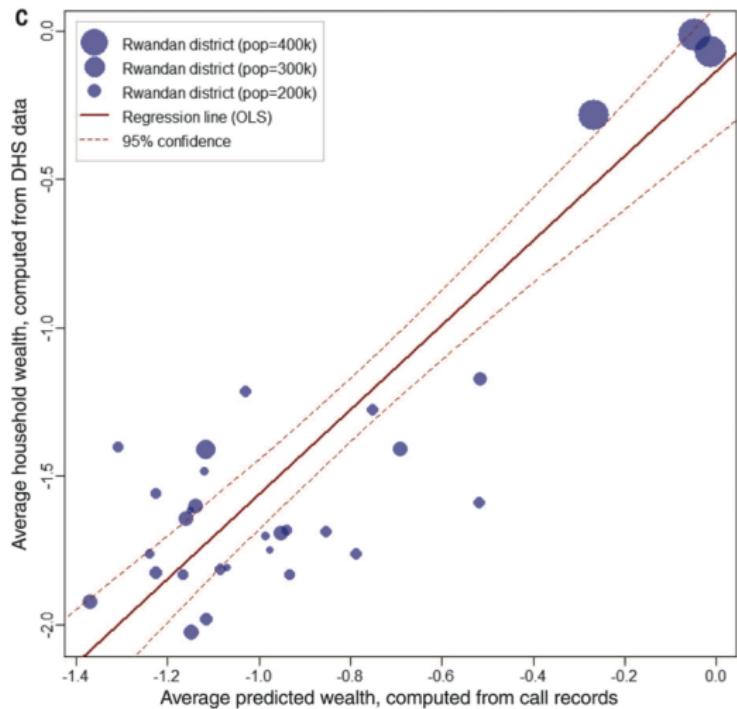


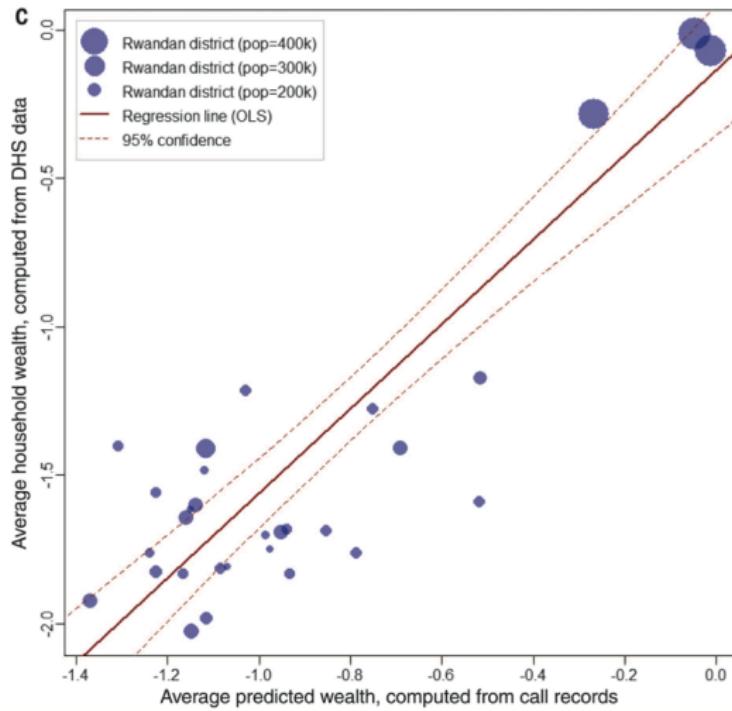












- ▶ 10 times faster
  - ▶ 50 times cheaper

- ▶ *computational and social science*

- ▶ *computational and social science*
- ▶ often involves ethical/privacy questions that are now considered complex

- ▶ *computational and social science*
- ▶ often involves ethical/privacy questions that are now considered complex
- ▶ combines readymades and custommades







readymades



custommades

[https://commons.wikimedia.org/wiki/File:Duchamp\\_Fountainne.jpg](https://commons.wikimedia.org/wiki/File:Duchamp_Fountainne.jpg)

[https://commons.wikimedia.org/wiki/File:%27David%27\\_by\\_Michelangelo\\_JBU0001.JPG](https://commons.wikimedia.org/wiki/File:%27David%27_by_Michelangelo_JBU0001.JPG)

- ▶ *computational* and *social science*
- ▶ often involves ethical/privacy questions that are now considered complex
- ▶ combines readymades and custommades

- ▶ *computational and social science*
- ▶ often involves ethical/privacy questions that are now considered complex
- ▶ combines readymades and custommades
- ▶ involves five key communities: social science, data science, business people, privacy advocates, policy makers

Balance between social science, data science, business people,  
privacy advocates, and policy makers

Health Ecosystem vs Horrific Monoculture

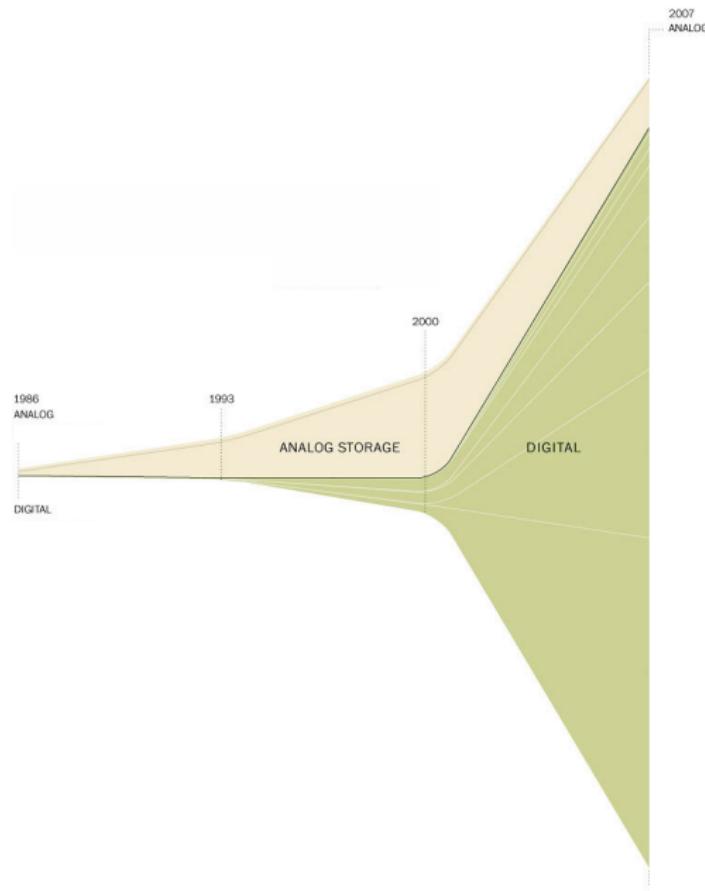
# What is computational social science?

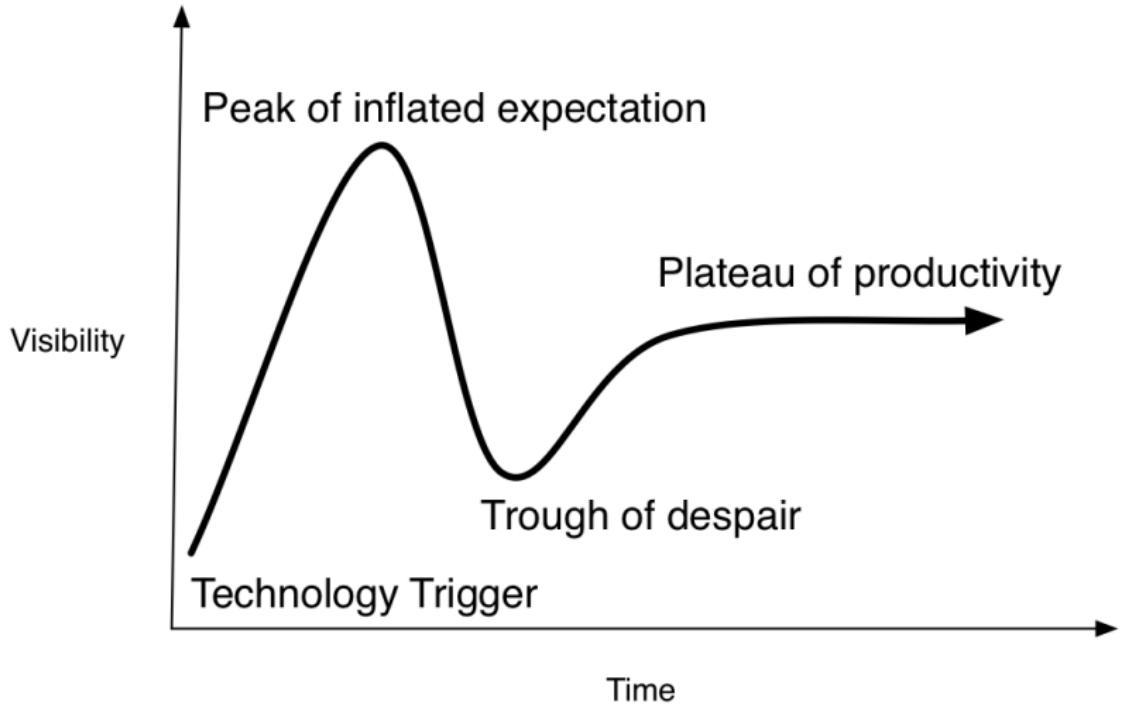
- ▶ *computational and social science*
- ▶ often involves ethical/privacy questions that are now considered complex
- ▶ combines readymades and custommades
- ▶ involves five key communities: social science, data science, business people, privacy advocates, policy makers

Isn't computational social science a fad?

Isn't computational social science a fad?

No





[https://commons.wikimedia.org/wiki/File:Gartner\\_Hype\\_Cycle.svg](https://commons.wikimedia.org/wiki/File:Gartner_Hype_Cycle.svg)

How do we create computational social science, individually and as a community?

Social Scientists ←→ Data Scientists

# What is data science?

Anything that's cool

# What is data science?

# 50 Years of Data Science

David Donoho

Department of Statistics, Stanford University, Standford, CA

<https://doi.org/10.1080/10618600.2017.1384734>

# 50 Years of Data Science

David Donoho

Department of Statistics, Stanford University, Standford, CA

<https://doi.org/10.1080/10618600.2017.1384734>

- ▶ goes back to Tukey (1962)

# 50 Years of Data Science

David Donoho

Department of Statistics, Stanford University, Standford, CA

<https://doi.org/10.1080/10618600.2017.1384734>

- ▶ goes back to Tukey (1962)
- ▶ learning from data

# 50 Years of Data Science

David Donoho

Department of Statistics, Stanford University, Standford, CA

<https://doi.org/10.1080/10618600.2017.1384734>

- ▶ goes back to Tukey (1962)
- ▶ learning from data
- ▶ it includes statistics and much more

- ▶ Data science alone is not enough if we want to study social behavior (e.g., Anderson)

- ▶ Data science alone is not enough if we want to study social behavior (e.g., Anderson)
- ▶ Social science alone is not enough if we want to use new data sources

Hanna Wallach (2015) reports overhearing: "I don't get it. Why is that research?"

Hanna Wallach (2015) reports overhearing: “I don’t get it. Why is that research?”

Computer science	Social science
Study anything	Study social things
Methods driven	Question driven
Large found data	Small designed data
Prediction	Explanation

[http://videolectures.net/icml2015\\_wallach\\_social\\_science/](http://videolectures.net/icml2015_wallach_social_science/)

Another important difference between social science and data science:



Social Scientists ←→ Data Scientists

Let's get started . . .