

# Introduction to computational social science

Matthew J. Salganik  
Department of Sociology  
Princeton University

Summer Institute in Computational Social Science  
June 17, 2019

The Summer Institute in Computational Social Science is supported by grants from the Russell Sage Foundation and the Alfred P. Sloan Foundation.



# What is computational social science?

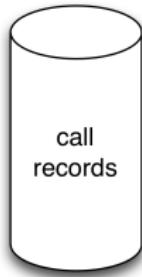
Anything that's cool

# What is computational social science?

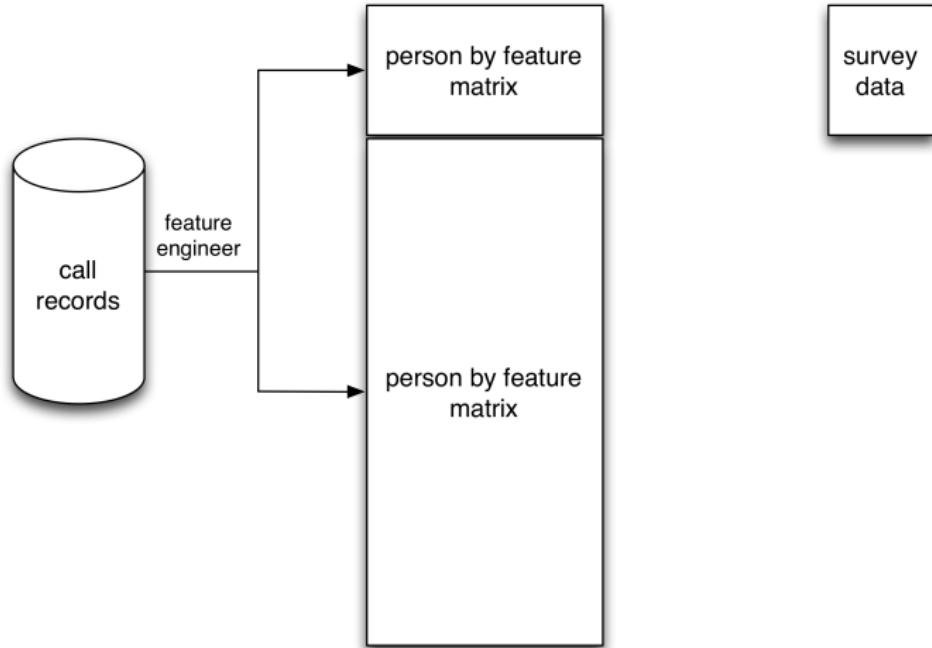
# Predicting poverty and wealth from mobile phone metadata

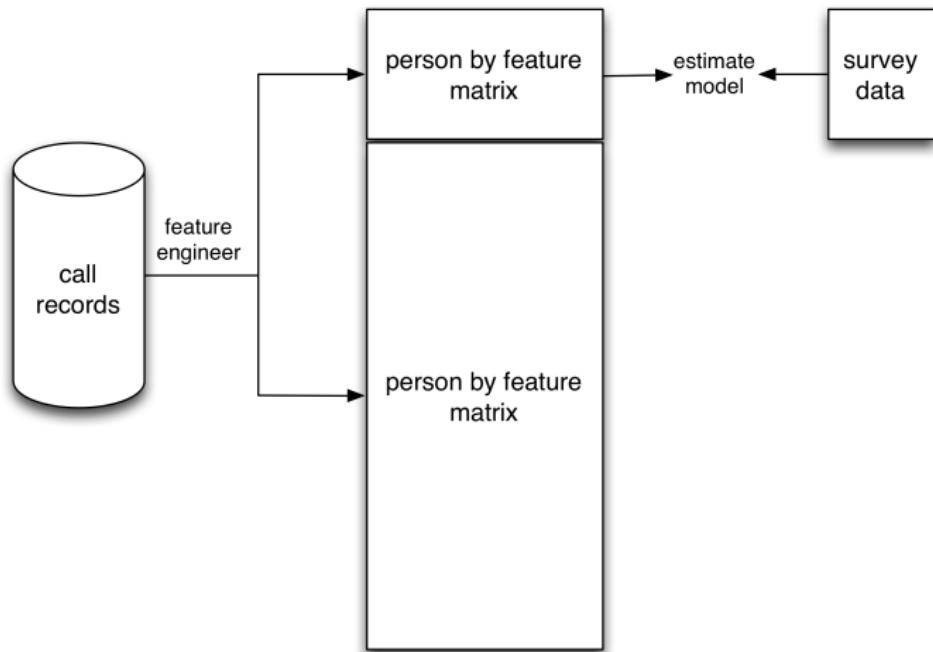
Joshua Blumenstock,<sup>1\*</sup> Gabriel Cadamuro,<sup>2</sup> Robert On<sup>3</sup>

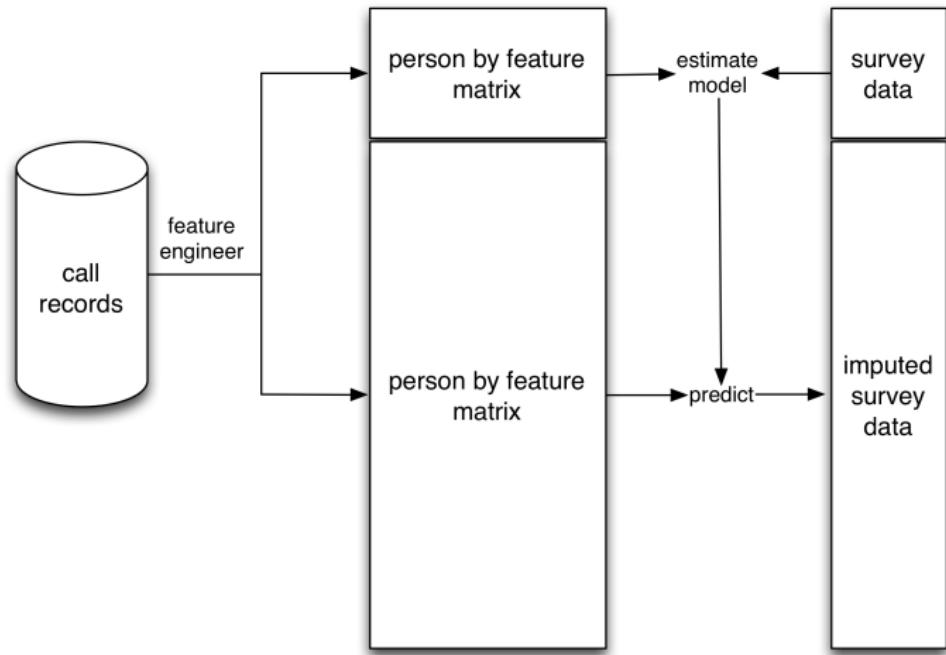
<http://dx.doi.org/10.1126/science.aac4420>

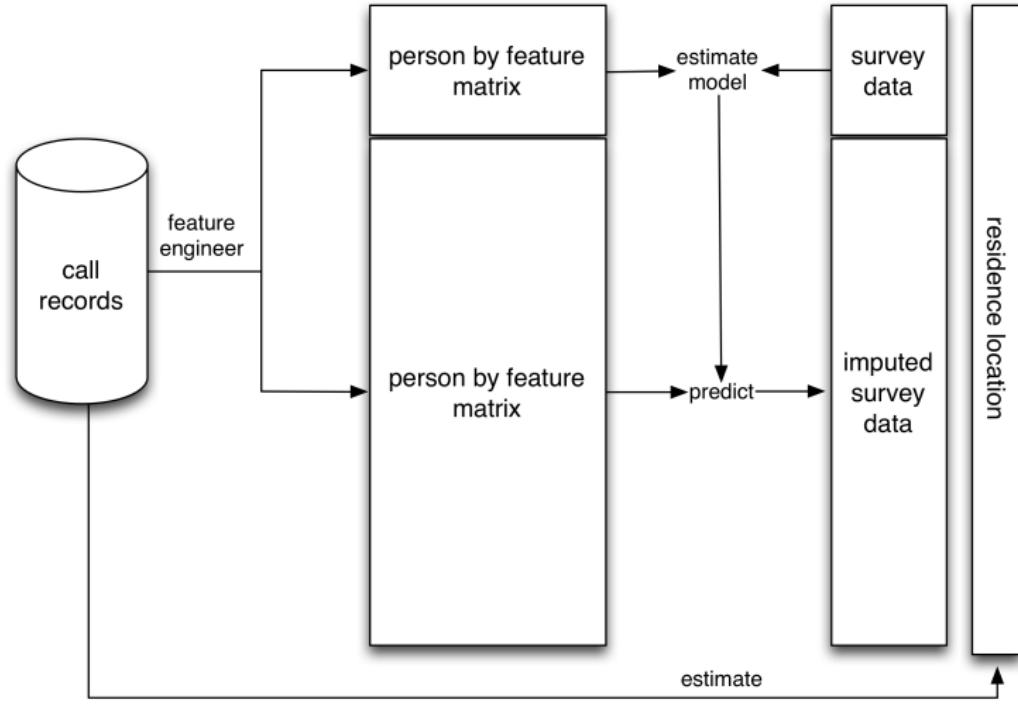


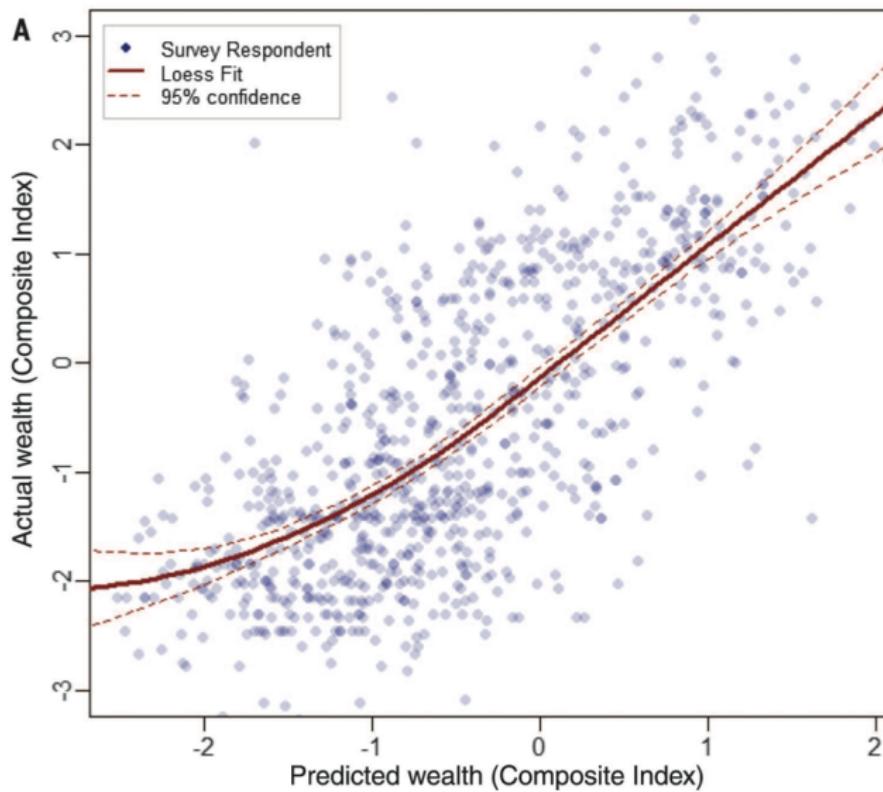


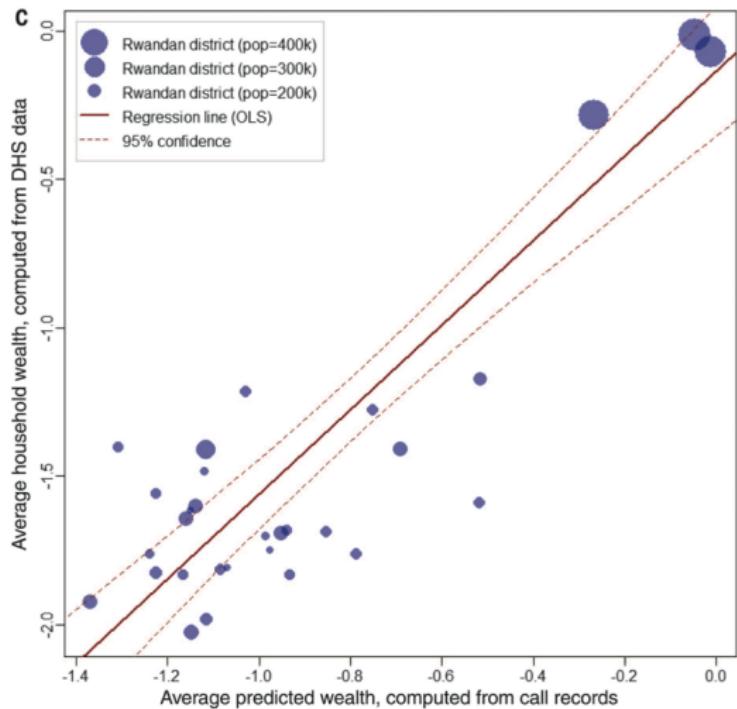


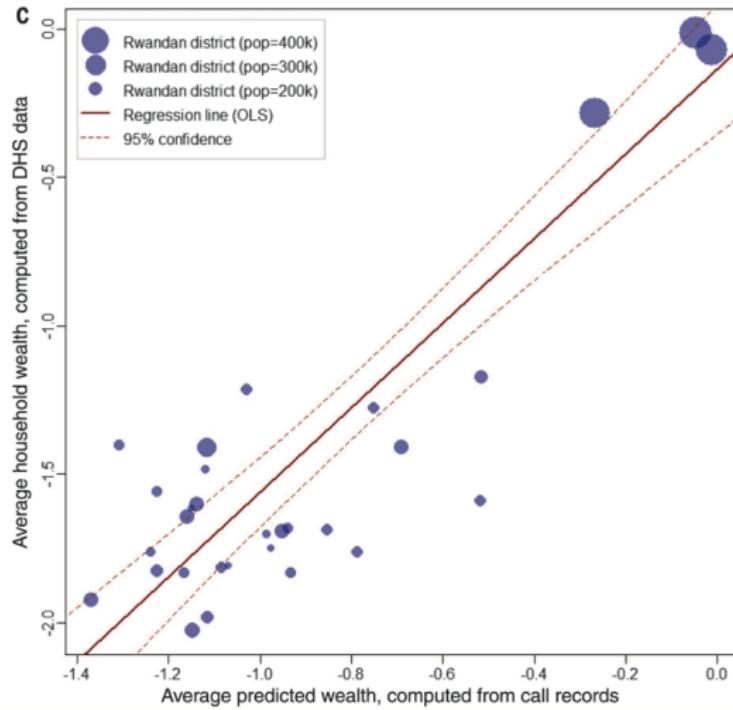












- ▶ 10 times faster
  - ▶ 50 times cheaper

- ▶ *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

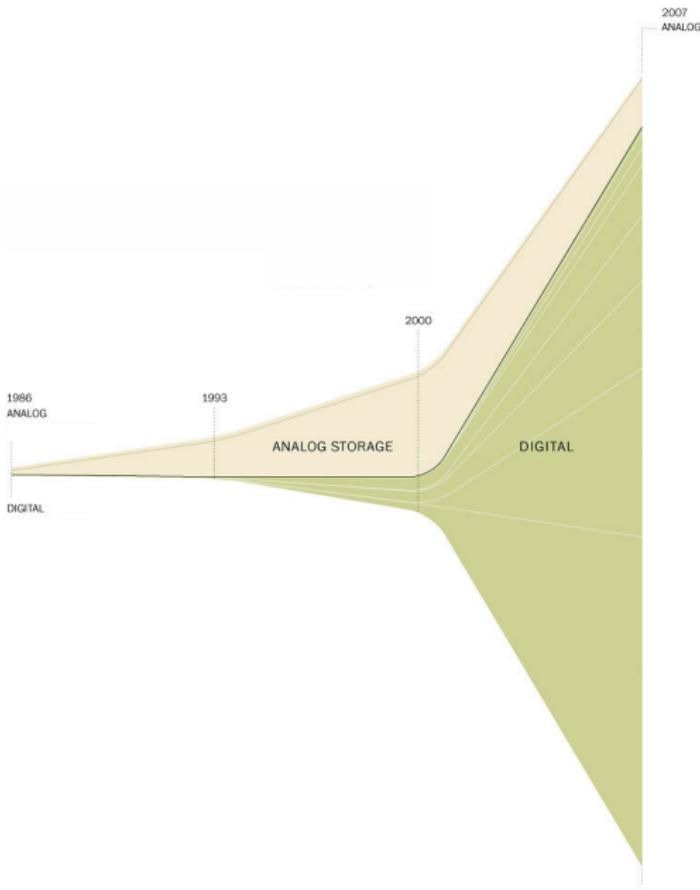
# What is computational social science?

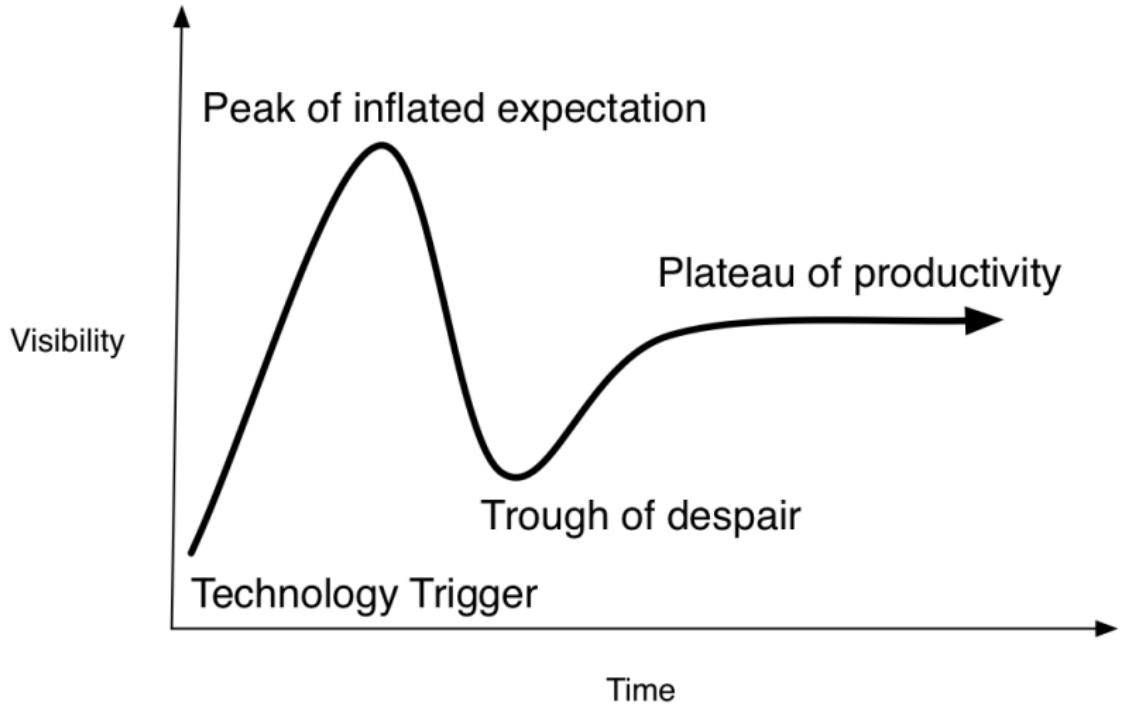
- ▶ *computational and social science*
- ▶ often involves ethical/privacy questions that are now considered complex
- ▶ combines readymades and custommades
- ▶ involves five key communities: social science, data science, business people, privacy advocates, policy makers

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 . . .