



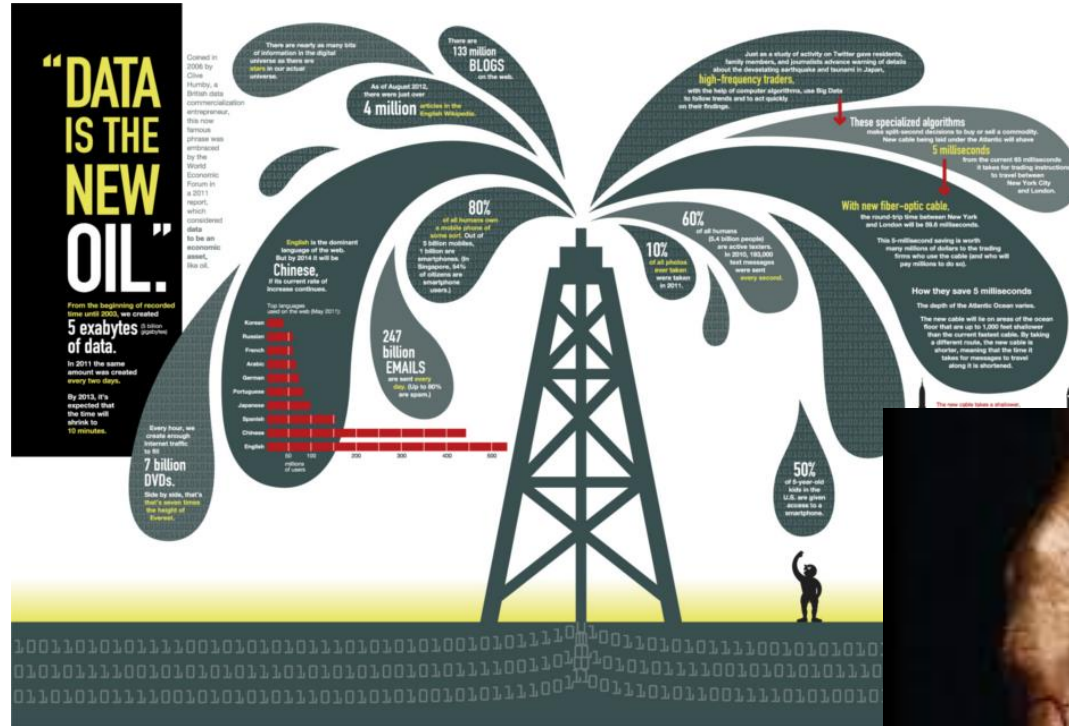
Data to Advance Sustainability

Philip E. Bourne

Dean & Prof of Data Science and Biomedical Engineering

NASEM Workshop Sept. 9, 2021

Data – A Sustainability Enabler



<https://digitalblog.ons.gov.uk/2016/01/25/open-data-new-oil-fuels-society/>



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Causal – Why we should act

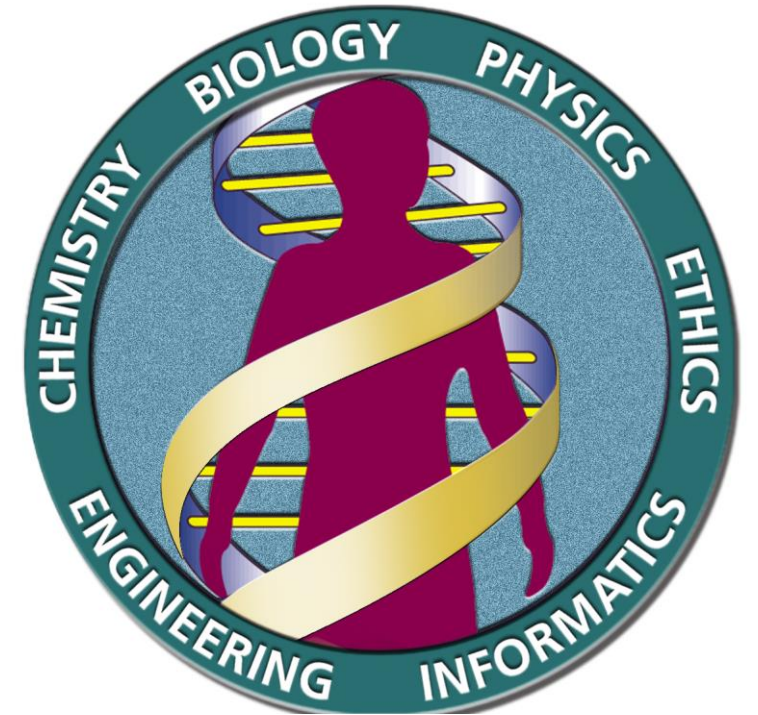
Predictive – How we should act

TOWARDS SUSTAINABILITY - TOWARDS SUSTAINABILITY

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In 40 Years in Academia I Have Never Seen Anything Like it... There is a Precedent

- High throughput DNA digital data changed how we think about biomedicine
- Spawned a new field – bioinformatics / computational biology/ systems biology / biomedical data science



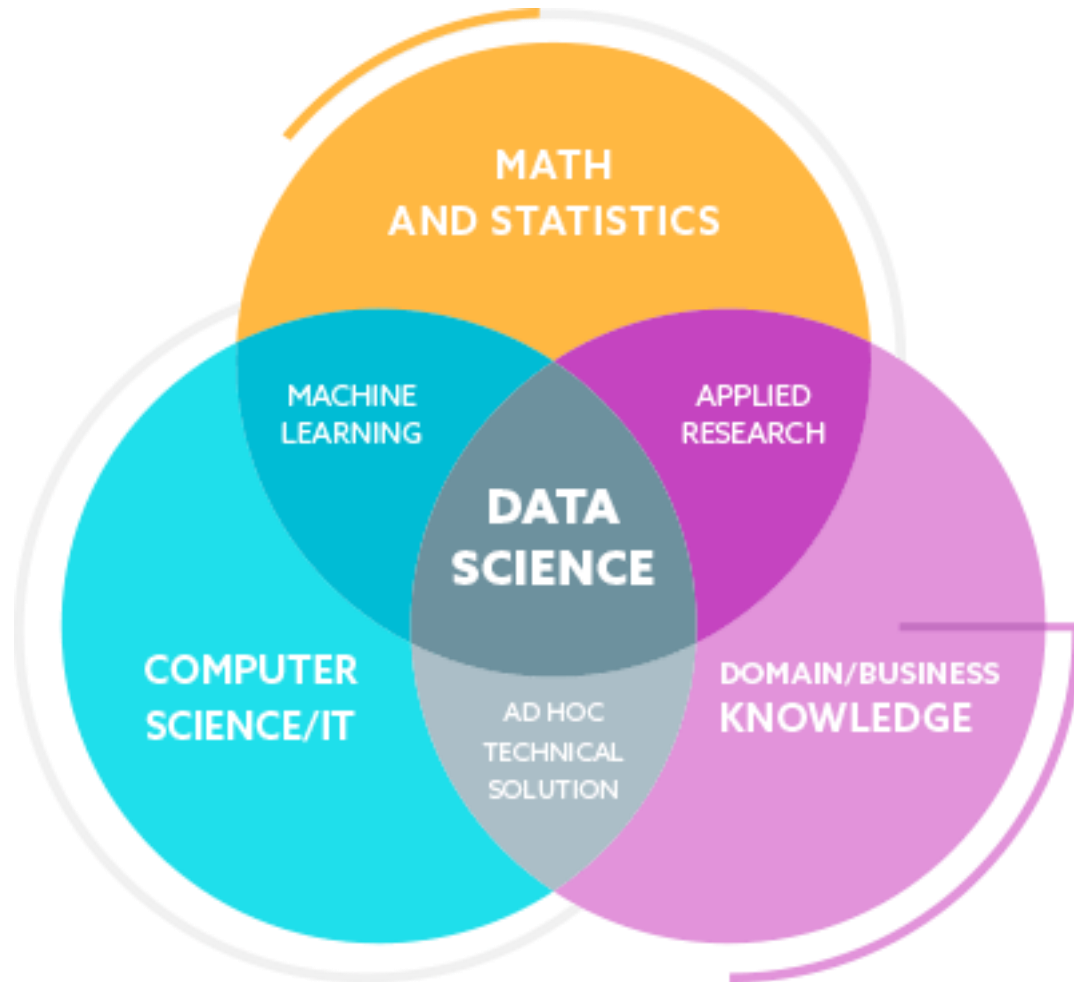
Article [Talk](#)

Human Genome Project

From Wikipedia, the free encyclopedia

<http://www.ornl.gov/hgmis>

Today that New Field is Data Science



Touching all domains

Example – UN Goal 10 Reduce Inequalities

UVA DATA SCIENCE

NEWS

PRESIDENTIAL FELLOWS

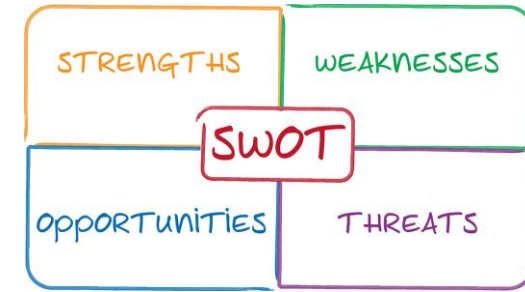
Using Data Science to Uncover Native Kinship

By Meg Evett •



- Historian meets data scientist to exploit parish records to understand social networks of native Americans and how and why they were displaced
- Takeaways –
 - To study history is not to repeat it (maybe)
 - Its not all about STEM
 - History like every other field is awash in digital data – in this case text that can be mined – it changes the academy in profound ways

It's Not a Magic Bullet



- Strengths

- Endless possibilities
- Data catalyzes interdisciplinarity
- Predictive modeling

- Opportunities

- Barrier to entry is relatively low – can level the playing field
- Build trust based on solid evidence
- Create an open environment
- Threats – COVID, global warming etc. are drivers of change

- Weaknesses

- AI is over-hyped
- Only meaningful when translated into action
- Data are usually messy, noisy and non-conclusive

- Threats

- Bias, disparities, lack of training
- Its more a social than a technical issue – social change is hard
- Data = money = proprietary
- Sustaining an open data ecosystem
- Security



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Thank you