*WEAPONS OF **MATH** DESTRUCTION*

How Big Data Increases Inequality and Threatens Democracy

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DISCUSSION

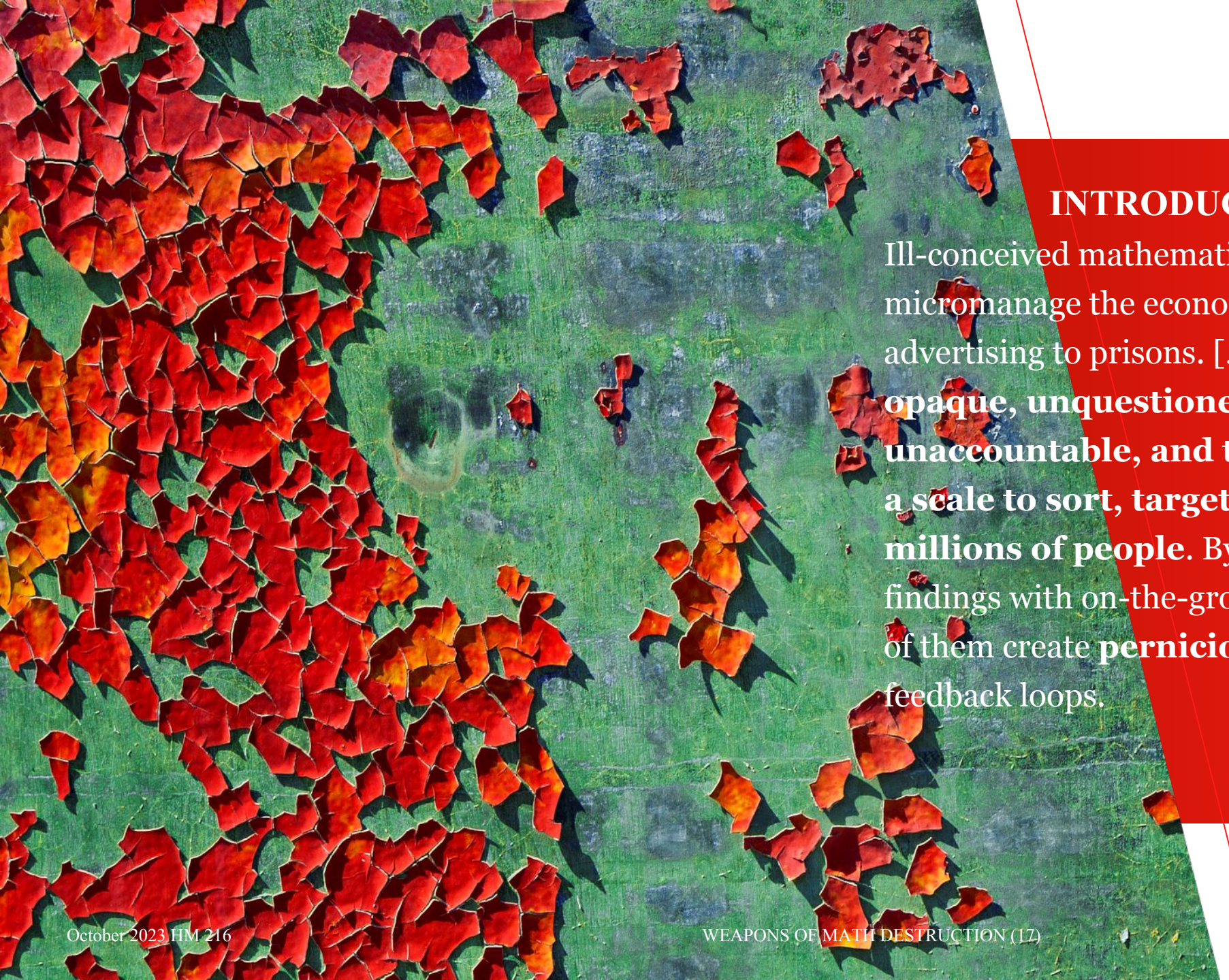
- **INTRODUCTION: How Models Work and Why We Should Worry About Them.**
- **‘BOMB PARTS: WHAT IS A MODEL?’ (Chapter 1)**

THE STORY OF A BAD GOOD TEACHER

- **Washington D.C (USA), 2010-11.**
- **Sarah Wysocki, a school-teacher in a school in a low-income area, has excellent feedback from students and administrators. But she is fired from her job following bad scores from an evaluation algorithm.**
- **This measures teacher-performance on the basis of students' performance.**
- **Nobody can give her an exact explanation about her scores.**
- **Happy ending?: She finds another job quickly, in a school in a rich area, where they didn't use 'students' scores' to evaluate teachers. The poor students lose a good teacher, the rich gain one.**

> …**teacher evaluation algorithms are a powerful tool for behavioral modification**. That's their purpose, and in the Washington schools they featured both a stick and a carrot. Teachers knew that if their students stumbled on the test their own jobs were at risk. This gave teachers a strong motivation to ensure their students passed, especially as the Great Recession battered the labor market. At the same time, if their students outperformed their peers, teachers and administrators could receive bonuses of up to $8,000. If you add those powerful incentives to the evidence in the case—the high number of erasures and the abnormally high test scores—there were grounds for suspicion that fourth-grade teachers, bowing either to fear or to greed, had corrected their students' exams.

Weapons of Math Destruction (15)



INTRODUCTION

Ill-conceived mathematical models now micromanage the economy, from advertising to prisons. [...] They're **opaque, unquestioned, and unaccountable, and they operate at a scale to sort, target, or "optimize" millions of people**. By confusing their findings with on-the-ground reality, most of them create **pernicious** WMD feedback loops.

CHAPTER 1

‘Bomb Parts: What is a Model?’

> The model…evaluates teachers largely on the basis of students' test scores, while ignoring how much the teachers engage the students, work on specific skills, deal with classroom management, or help students with personal and family problems. It's **overly simple, sacrificing accuracy and insight for efficiency**. Yet from the administrators' perspective it provides an effective tool to ferret out hundreds of apparently underperforming teachers, even at the risk of misreading some of them.

Weapons of Math Destruction (23-24)

“Models are opinions embedded in mathematics.”

Weapons of Math Destruction (24)

TWO TAKES ON 'PRE-CRIME'

Film: 'Minority Report' (2002)

Based on a short story by Philip K.Dick (1956).

A Steven Spielberg film.

https://www.youtube.com/watch?v=aGWQYgZZEEQ

TWO TAKES ON ‘PRE-CRIME’

- **Series: ‘Person of Interest’ (2011)**

- **https://www.youtube.com/watch?v=WYDWSNMTauQ**

THE STORY OF RECIDIVISM

- **Q: Who is more likely to commit a crime in future, after having committed one already?**
- **A: Nobody can tell. Too many variables.**
- **WMD Answer: Let's take surveys, assign points, develop a model, and let the model decide. Mark them on previous crime, crime committed by friends and family, Neighbourhood profile, job profile etc. Don't tell them exactly how the model works– or they can game the system.**
- **Result: Black people comprise 40% of the prison population in the USA.**

WHAT MAKES A MODEL A WMD?

- Even if the participant is aware of being modeled, or what the model is used for, is the model **opaque**, or even **invisible?**
- Does the model work against the subject's interest? In short, **is it unfair?** Does it damage or destroy lives?
- As a statistician would put it, **can it scale?** …scale is what turns WMDs from local nuisances into tsunami forces, ones that define and delimit our lives.

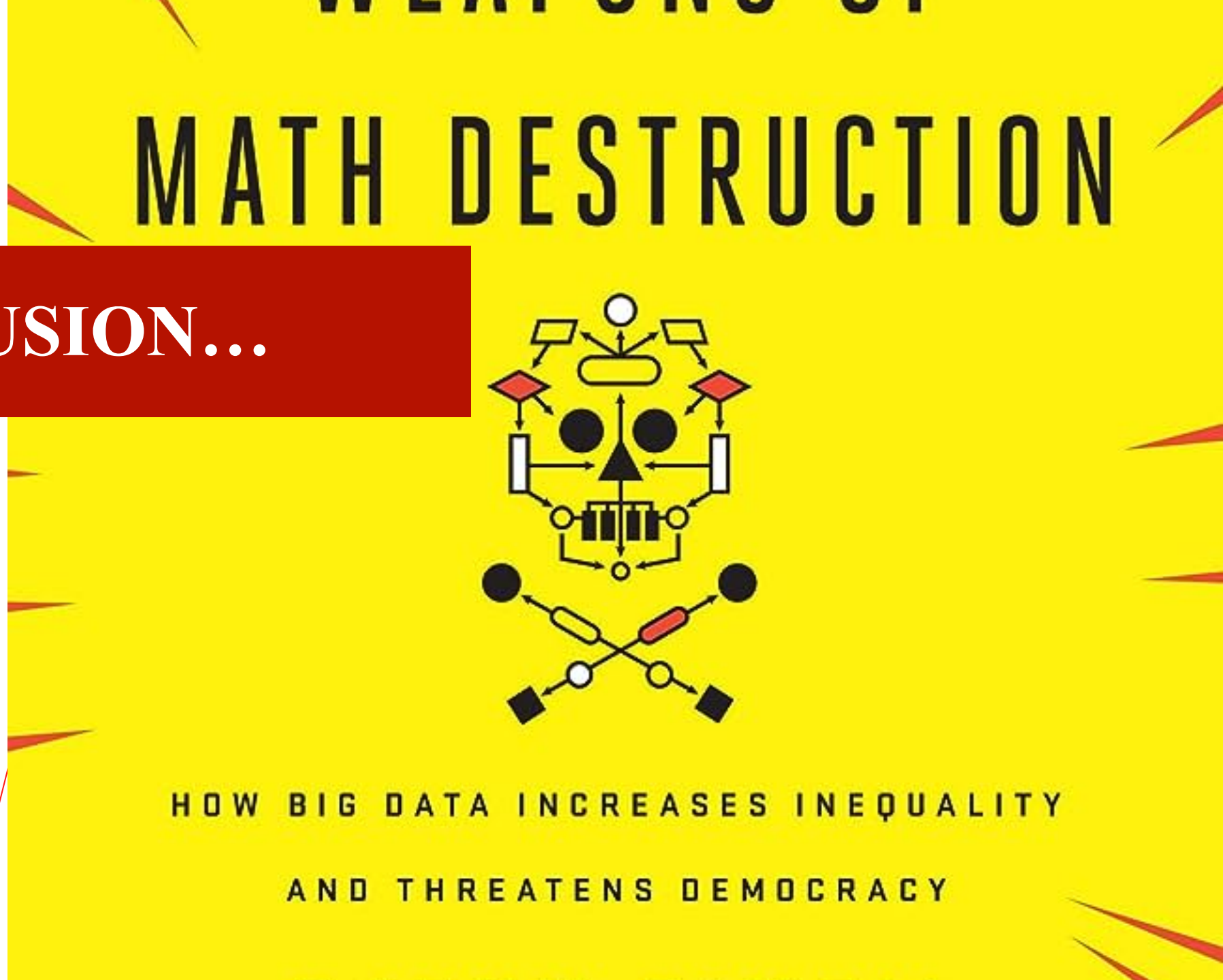
CAUTION

‘And here’s one more thing about algorithms: they can leap from one field to the next, and they often do…

So if mathematical models in prisons appear to succeed at their job—which really boils down to efficient management of people—they could spread into the rest of the economy along with the other WMDs, leaving us as collateral damage.’

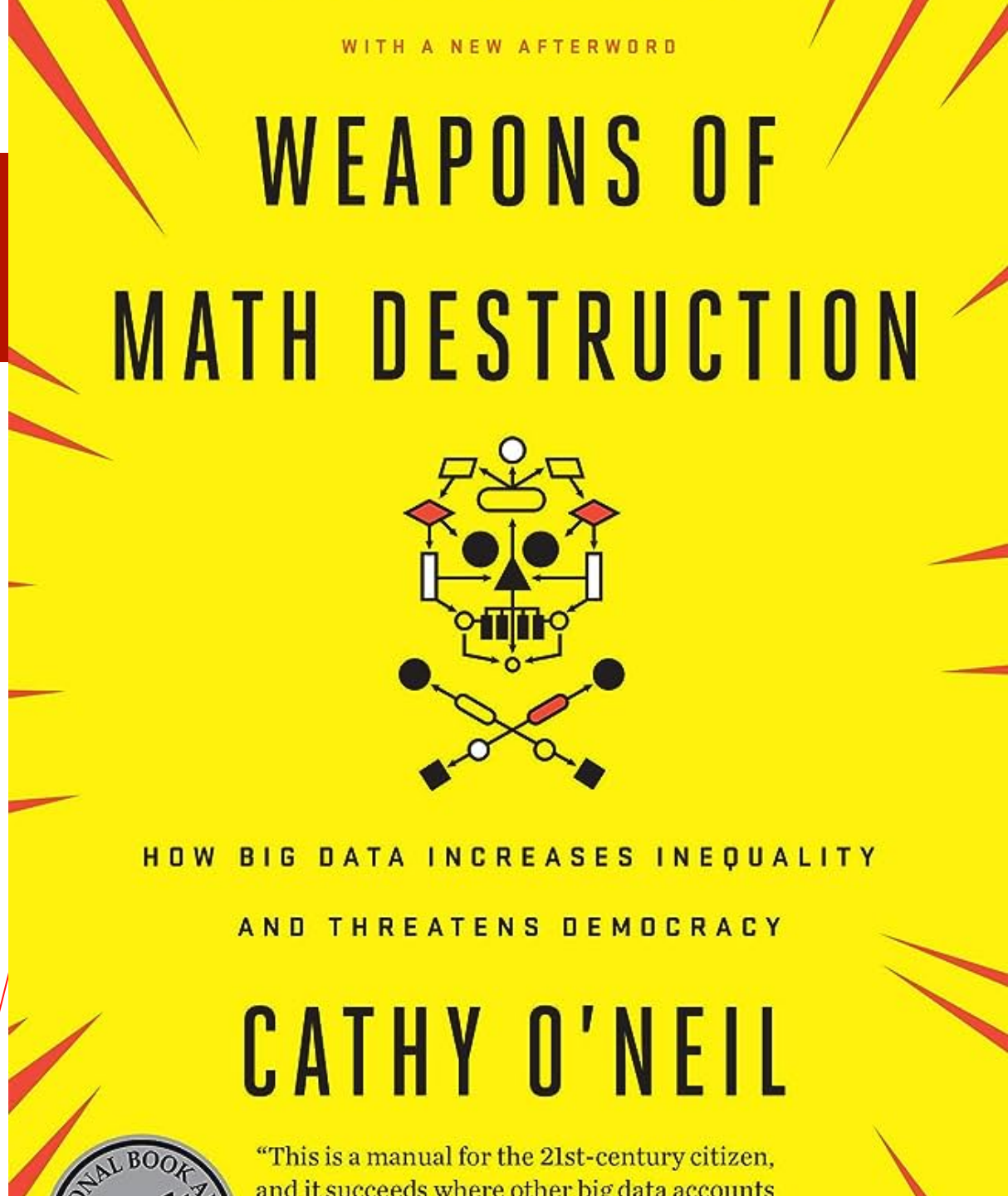
IN CONCLUSION…

What Can We Do?



WHAT CAN WE DO?

To disarm WMDs, we also need to measure their impact and conduct algorithmic audits. The first step, before digging into the software code, is to carry out research. We'd begin by treating the WMD as a black box that takes in data and spits out conclusions.

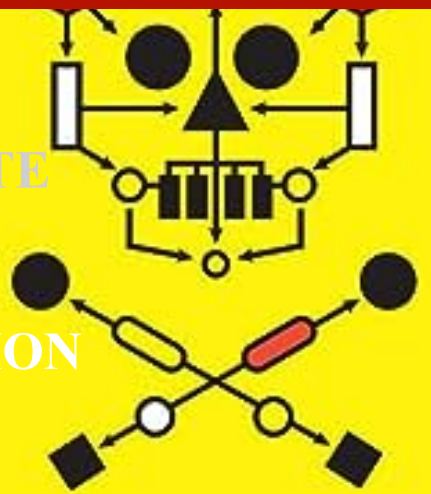


“Big Data processes codify the past. They do not **invent the future**. Doing that requires **moral imagination**, and that’s something **only humans** can provide.”

Weapons of Math Destruction, 169

MATH DESTRUCTION

WHO CAN DO WHAT?



THE STATE — ACADEMIA — MARKET

REGULATION — RESEARCH — INCENTIVIZE FAIRNESS

LAWS — TECH SKILLS — FOLLOW THE LAW

HOW BIG DATA INCREASES INEQUALITY AND THREATENS DEMOCRACY

MATH DESTRUCTION

Helpful big data

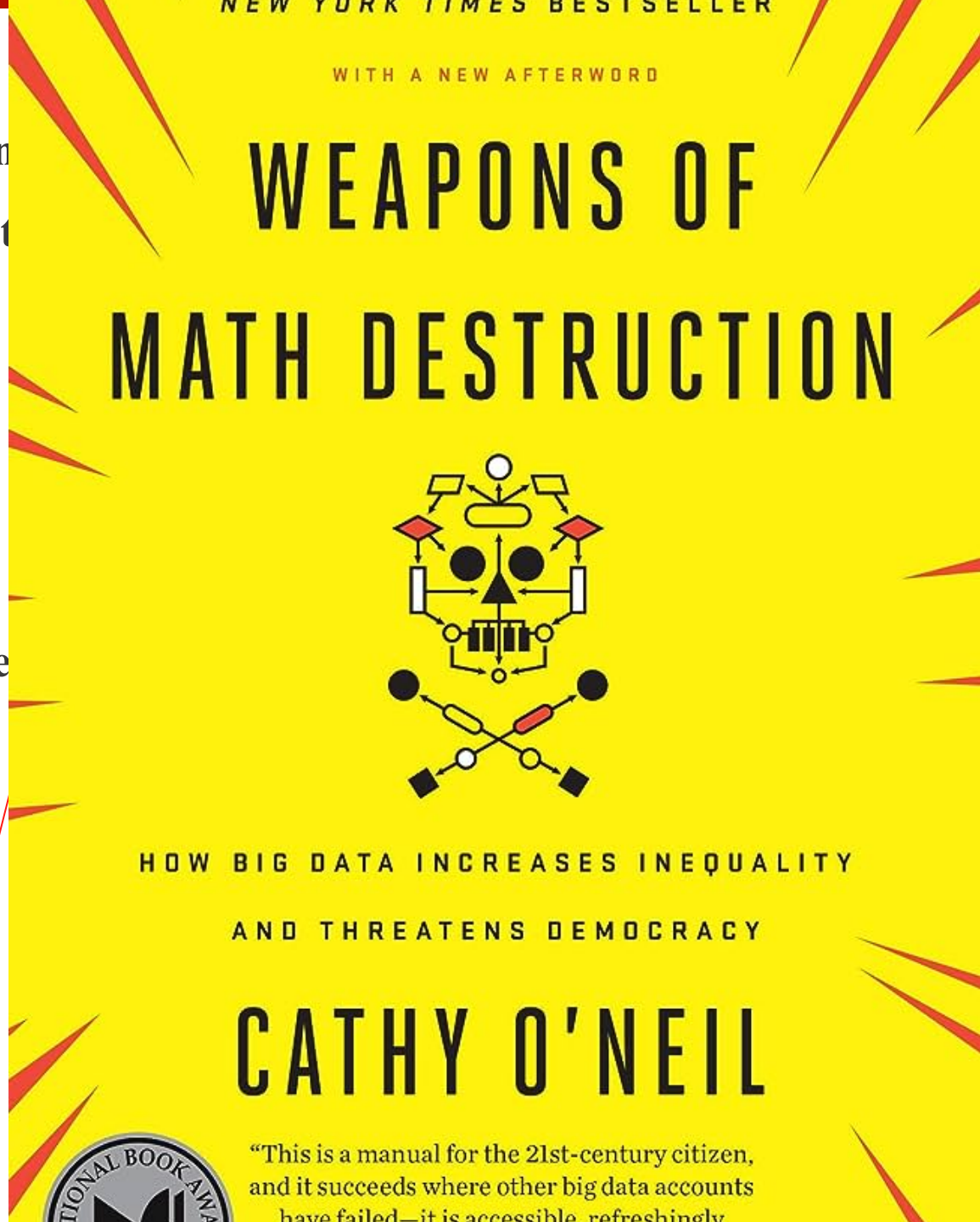
Slavery Footprint

https://youtu.be/x8K-tMog1f4

HOW BIG DATA INCREASES INEQUALITY

Predictive models are…constructed not just from data but from the choices we make about which data to pay attention to—and which to leave out. Those choices are not just about logistics, profits, and efficiency. They are fundamentally moral.

If we back away from them and treat mathematical models a neutral and inevitable force, like the weather or the tides, we abdicate our responsibility. …Math deserves much bette than WMDs, and democracy does too.



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HOW DO YOU KNOW YOUR AI IS WORKING WELL FOR EVERYONE?