

## Weapons Of Math Destruction How Big Data Increases Inequality And Threatens Democracy

**"Roth [examines] the deep historical roots of [what he sees as conservatives'] anti-egalitarian worldview, and introduces us to its modern-day proponents: the GOP officials pushing to make it harder to cast a ballot; the lawyers looking to scrap all limits on money in politics; the libertarian scholars reclaiming judicial activism to roll back the New Deal; and the corporate lobbyists working to ban local action on everything from the minimum wage to the environment"--**

**A guide to understanding the inner workings and outer limits of technology and why we should never assume that computers always get it right. In *Artificial Unintelligence*, Meredith Broussard argues that our collective enthusiasm for applying computer technology to every aspect of life has resulted in a tremendous amount of poorly designed systems. We are so eager to do everything digitally—hiring, driving, paying bills, even choosing romantic partners—that we have stopped demanding that our technology actually work. Broussard, a software developer and journalist, reminds us that there are fundamental limits to what we can (and should) do with technology. With this book, she offers a guide to understanding the inner workings and outer limits of technology—and issues a warning that we should never assume that computers always get things right. Making a case against technochauvinism—the belief that technology is always the solution—Broussard argues that it's just not true that social problems would inevitably retreat before a digitally enabled Utopia. To prove her point, she undertakes a series of adventures in computer programming. She goes for an alarming ride in a driverless car, concluding "the cyborg future is not coming any time soon"; uses artificial intelligence to investigate why students can't pass standardized tests; deploys machine learning to predict which passengers survived the Titanic disaster; and attempts to repair the U.S. campaign finance system by building AI software. If we understand the limits of what we can do with technology, Broussard tells us, we can make better choices about what we should do with it to make the world better for everyone.**

**An I Weigh Book Club Pick "I have been a fan of Henry's work for a long time and I'm excited for more people to see it." —Jameela Jamil From the creator of *Drawings of Dogs*, a warmly illustrated and thoughtful examination of empathy and the necessity of being kinder The kindness we owe one another goes far beyond the everyday gestures of feeding someone else's parking meter--although it's important not to downplay those small acts. Kindness can also mean much more. In this timely, insightful guide, Henry James Garrett lays out the case for developing a strong, courageous, moral kindness, one that will help you fight cruelty and make the world a more empathetic place. So, how could a book possibly make you kinder? It would need to answer two questions: • Why are you kind at all? and, • Why aren't you kinder? In these pages, building on his**

***academic studies in metaethics and using his signature-sweet animal cartoons, Henry James Garrett sets out to do just that, exploring the sources and the limitations of human empathy and the many ways, big and small, that we can work toward being our best and kindest selves for the people around us and the society we need to build.***

***This interdisciplinary and international handbook captures and shapes much needed reflection on normative frameworks for the production, application, and use of artificial intelligence in all spheres of individual, commercial, social, and public life.***

***The Secret Algorithms That Control Money and Information***

***What Algorithms Want***

***How to Be Human in the Age of the Machine***

***The Hidden Geometry of Information, Biology, Strategy, Democracy, and Everything Else***

***How Not to Be Wrong***

***Conditional Citizens***

***An Introduction***

Buy now to get the main key ideas from Cathy O'Neil's Weapons of Math Destruction Technological advances are often lauded as unbiased and fair. But in Weapons of Math Destruction (2016), data scientist Cathy O'Neil posits that the opposite is true. Today's world is largely ruled by mathematical algorithms that decide most aspects of life, from education to work, insurance to elections. Existing models have proven to be harmful. They promote inequalities by favoring the wealthy and the privileged and pushing minorities and poor people further down. These models, by being invisible, unregulated, and indisputable, form Weapons of Math Destruction fueled by the Big Data that could divide the world even more if left unchecked.

Winner, 2018 Law & Legal Studies PROSE Award The consequences of big data and algorithm-driven policing and its impact on law enforcement In a high-tech command center in downtown Los Angeles, a digital map lights up with 911 calls, television monitors track breaking news stories, surveillance cameras sweep the streets, and rows of networked computers link analysts and police officers to a wealth of law enforcement intelligence. This is just a glimpse into a future where software predicts future crimes, algorithms generate virtual "most-wanted" lists, and databanks collect personal and biometric information. The Rise of Big Data Policing introduces the cutting-edge technology that is changing how the police do their jobs and shows why it is more important than ever that citizens understand the far-reaching consequences of big data surveillance as a law enforcement tool. Andrew Guthrie Ferguson reveals how these new technologies—viewed as race-neutral and objective—have been eagerly adopted by police departments hoping to distance themselves from claims of racial bias and unconstitutional practices. After a series of high-profile police shootings and federal investigations into systemic police misconduct, and in an era of law enforcement budget cutbacks, data-driven policing has been billed as a way to "turn the page" on racial bias. But behind the data are real people, and difficult questions

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remain about racial discrimination and the potential to distort constitutional protections. In this first book on big data policing, Ferguson offers an examination of how new technologies will alter the who, where, when and how we police. These new technologies also offer data-driven methods to improve police accountability and to remedy the underlying socio-economic risk factors that encourage crime. The Rise of Big Data Policing is a must read for anyone concerned with how technology will revolutionize law enforcement and its potential threat to the security, privacy, and constitutional rights of citizens. Read an excerpt and interview with Andrew Guthrie Ferguson in The Economist.

Over the course of a generation, algorithms have gone from mathematical abstractions to powerful mediators of daily life. Algorithms have made our lives more efficient, more entertaining, and, sometimes, better informed. At the same time, complex algorithms are increasingly violating the basic rights of individual citizens. Allegedly anonymized datasets routinely leak our most sensitive personal information; statistical models for everything from mortgages to college admissions reflect racial and gender bias. Meanwhile, users manipulate algorithms to "game" search engines, spam filters, online reviewing services, and navigation apps. Understanding and improving the science behind the algorithms that run our lives is rapidly becoming one of the most pressing issues of this century. Traditional fixes, such as laws, regulations and watchdog groups, have proven woefully inadequate. Reporting from the cutting edge of scientific research, *The Ethical Algorithm* offers a new approach: a set of principled solutions based on the emerging and exciting science of socially aware algorithm design. Michael Kearns and Aaron Roth explain how we can better embed human principles into machine code - without halting the advance of data-driven scientific exploration. Weaving together innovative research with stories of citizens, scientists, and activists on the front lines, *The Ethical Algorithm* offers a compelling vision for a future, one in which we can better protect humans from the unintended impacts of algorithms while continuing to inspire wondrous advances in technology.

Amity Shlaes, author of *The Forgotten Man*, delivers a brilliant and provocative reexamination of America's thirtieth president, Calvin Coolidge, and the decade of unparalleled growth that the nation enjoyed under his leadership. In this riveting biography, Shlaes traces Coolidge's improbable rise from a tiny town in New England to a youth so unpopular he was shut out of college fraternities at Amherst College up through Massachusetts politics. After a divisive period of government excess and corruption, Coolidge restored national trust in Washington and achieved what few other peacetime presidents have: He left office with a federal budget smaller than the one he inherited. A man of calm discipline, he lived by example, renting half of a two-family house for his entire political career rather than compromise his political work by taking on debt. Renowned as a throwback, Coolidge was in fact strikingly modern—an advocate of women's suffrage and a radio pioneer. At once a revision of man and economics, Coolidge

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gestures to the country we once were and reminds us of qualities we had forgotten and can use today.

The Black Box Society

Power, Illusion and Control of Predictive Algorithms

On Being a Data Skeptic

Hello World

Summary of Cathy O'Neil's Weapons of Math Destruction

An Unfinished Story

The Internet of Us: Knowing More and Understanding Less in the Age of Big Data

*The author uses her journey from Moroccan immigrant to U.S. citizen as a starting point for an exploration of the rights, liberties, and protections that are traditionally associated with American citizenship. Tapping into history, politics, and literature, she elucidates how accidents of birth - such as national origin, race, or gender - that once determined the boundaries of Americanness still cast their shadows today. As the Nazi advance across Europe stalled, Adolf Hitler repeatedly told his military advisers and inner circle that Germany possessed Wunderwaffen - miracle weapons - that would turn the tide and bring the Germans ultimate victory. But was he simply boasting out of desperation, or were the 'miracle weapons' real? Ideas that other governments considered too outrageous were funded by the Third Reich. At this time, German scientists and engineers led the world in the fields of aviation research, rocketry, and the quest for alternative sources of energy. They even came perilously close to beating the British and Americans in the search to build the first atomic bomb. This book describes the Nazis' secret plans to produce weapons of mass destruction, and shows how they almost succeeded in defeating the Allies in World War II.*

*Longlisted for the National Book Award New York Times Bestseller A former Wall Street quant sounds an alarm on the mathematical models that pervade modern life -- and threaten to rip apart our social fabric We live in the age of the algorithm. Increasingly, the decisions that affect our lives--where we go to school, whether we get a car loan, how much we pay for health insurance--are being made not by humans, but by mathematical models. In theory, this should lead to greater fairness: Everyone is judged according to the same rules, and bias is eliminated. But as Cathy O'Neil reveals in this urgent and necessary book, the opposite is true. The models being used today are opaque, unregulated, and uncontestable, even when they're wrong. Most troubling, they reinforce discrimination: If a poor student can't get a loan because a lending model deems him too risky (by virtue of his zip code), he's then cut off from the kind of education that could pull him out of poverty,*

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and a vicious spiral ensues. Models are propping up the lucky and punishing the downtrodden, creating a "toxic cocktail for democracy." Welcome to the dark side of Big Data. Tracing the arc of a person's life, O'Neil exposes the black box models that shape our future, both as individuals and as a society. These "weapons of math destruction" score teachers and students, sort resumes, grant (or deny) loans, evaluate workers, target voters, set parole, and monitor our health. O'Neil calls on modelers to take more responsibility for their algorithms and on policy makers to regulate their use. But in the end, it's up to us to become more savvy about the models that govern our lives. This important book empowers us to ask the tough questions, uncover the truth, and demand change. -- Longlist for National Book Award (Non-Fiction) -- Goodreads, semi-finalist for the 2016 Goodreads Choice Awards (Science and Technology) -- Kirkus, Best Books of 2016 -- New York Times, 100 Notable Books of 2016 (Non-Fiction) -- The Guardian, Best Books of 2016 -- WBUR's "On Point," Best Books of 2016: Staff Picks -- Boston Globe, Best Books of 2016, Non-Fiction

From "one of the great (greatest?) contemporary popular writers on economics" (Tyler Cowen) comes a smart, lively, and encouraging rethinking of how to use statistics. Today we think statistics are the enemy, numbers used to mislead and confuse us. That's a mistake, Tim Harford says in *The Data Detective*. We shouldn't be suspicious of statistics—we need to understand what they mean and how they can improve our lives: they are, at heart, human behavior seen through the prism of numbers and are often "the only way of grasping much of what is going on around us." If we can toss aside our fears and learn to approach them clearly—understanding how our own preconceptions lead us astray—statistics can point to ways we can live better and work smarter. As "perhaps the best popular economics writer in the world" (*New Statesman*), Tim Harford is an expert at taking complicated ideas and untangling them for millions of readers. In *The Data Detective*, he uses new research in science and psychology to set out ten strategies for using statistics to erase our biases and replace them with new ideas that use virtues like patience, curiosity, and good sense to better understand ourselves and the world. As a result, *The Data Detective* is a big-idea book about statistics and human behavior that is fresh, unexpected, and insightful.

*How Computers Misunderstand the World*

*The Mathematical Corporation*

SUMMARY - *Weapons Of Math Destruction: How Big Data Increases Inequality And Threatens Democracy* By Cathy O'Neil

*How Big Data Increases Inequality and Threatens Democracy*

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*How High-Tech Tools Profile, Police, and Punish the Poor*

*Hitler's Secret Weapons of Mass Destruction*

*The Data Detective*

Every day, corporations are connecting the dots about our personal behavior—silently scrutinizing clues left behind by our work habits and Internet use. But who connects the dots about what firms are doing with all this information? Frank Pasquale exposes how powerful interests abuse secrecy for profit and explains ways to rein them in.

'One of the best books yet written on data and algorithms. . .deserves a place on the bestseller charts.' (The Times) You are accused of a crime. Who would you rather determined your fate - a human or an algorithm? An algorithm is more consistent and less prone to error of judgement. Yet a human can look you in the eye before passing sentence. Welcome to the age of the algorithm, the story of a not-too-distant future where machines rule supreme, making important decisions - in healthcare, transport, finance, security, what we watch, where we go even who we send to prison. So how much should we rely on them? What kind of future do we want? Hannah Fry takes us on a tour of the good, the bad and the downright ugly of the algorithms that surround us. In Hello World she lifts the lid on their inner workings, demonstrates their power, exposes their limitations, and examines whether they really are an improvement on the humans they are replacing. A BBC RADIO 4- BOOK OF THE WEEK SHORTLISTED FOR THE 2018 BAILLIE GIFFORD PRIZE AND 2018 ROYAL SOCIETY SCIENCE BOOK PRIZE

Weapons of Math Destruction How Big Data Increases Inequality and Threatens Democracy Broadway Books

"An intelligent book that struggles honestly with important questions: Is the net turning us into passive knowers? Is it degrading our ability to reason? What can we do about this?" —David Weinberger, Los Angeles Review of Books We used to say "seeing is believing"; now, googling is believing. With 24/7 access to nearly all of the world's information at our fingertips, we no longer trek to the library or the encyclopedia shelf in search of answers. We just open our browsers, type in a few keywords and wait for the information to come to us. Now firmly established as a pioneering work of modern philosophy, *The Internet of Us* has helped revolutionize our understanding of what it means to be human in the digital age. Indeed, demonstrating that knowledge based on reason plays an essential role in society and that there is more to "knowing" than just acquiring information, leading philosopher Michael P. Lynch shows how our digital way of life makes us value some ways of processing information over others, and thus risks distorting the greatest traits of mankind. Charting a path from Plato's cave to Google Glass, the result is a necessary guide on how to navigate the philosophical quagmire that is the "Internet of Things."

Hand to Mouth

Quantum Theory, Groups and Representations

Artificial Unintelligence

Why Things Spread - and Why They Stop

The Alignment Problem: Machine Learning and Human Values

The Nazis' Plan for Final Victory

The Power of Mathematical Thinking

"Data is here, it's growing, and it's powerful." Author Cathy O'Neil argues that th

right approach to data is skeptical, not cynical—it understands that, while powerful data science tools often fail. Data is nuanced, and "a really excellent skeptic put the term 'science' into 'data science.'" The big data revolution shouldn't be dismissed as hype, but current data science tools and models shouldn't be hailed as the end-all, either.

The complete story of the universe and absolutely everything in it (minus the boring parts). Despite our clever linguistic abilities, humans are spectacularly ill-equipped to comprehend what's happening in the universe. Our senses and intuition routinely mislead us. *The Complete Guide to Absolutely Everything (Abridged)* tells the story of how we came to suppress our monkey minds and perceive the true nature of reality. Written with wit and humor, this brief book tells the story of science—the fumbles and missteps, errors and egos, hard work, accidents, and some really bad decisions—all of which have created the sum total of human knowledge. Geneticist Adam Rutherford and mathematician Hannah Fry guide readers through time and space, through our bodies and brains, showing how emotions shape our view of reality, how our minds tell us lies, and why a mostly bald and curious ape decided to begin poking at the fabric of the universe. Rutherford and Fry shine as science sleuths, wrestling with some truly head-scratching questions: Where did time come from? Do we have free will? Does my dog love me? Hilarious sidebars present memorable scientific oddities: for example, hypnotized snails, human-sized ants, and the average time it takes most animals to evacuate their bladders. (A surprisingly consistent twenty-one seconds, if you must know.) Both rigorous and playful, *The Complete Guide to Absolutely Everything (Abridged)* is a celebration of the weirdness of the cosmos, the strangeness of humans, and the joys and frustrations of scientific discovery.

A new way of thinking about data science and data ethics that is informed by the ideas of intersectional feminism. Today, data science is a form of power. It has been used to expose injustice, improve health outcomes, and topple governments. But it has also been used to discriminate, police, and surveil. This potential for good, on the one hand, and harm, on the other, makes it essential to ask: Data science by whom? Data science for whom? Data science with whose interests in mind? The narratives around big data and data science are overwhelmingly white, male, and techno-heroic. In *Data Feminism*, Catherine D'Ignazio and Lauren Klein present a new way of thinking about data science and data ethics—one that is informed by intersectional feminist thought. Illustrating data feminism in action, D'Ignazio and Klein show how challenges to the male/female binary can help challenge other hierarchical (and empirically wrong) classification systems. They explain how, for example, an understanding of emotion can expand our ideas about effective data visualization, and how the concept of invisible labor can expose the significant human efforts required by our automated systems. And they show why the data never, ever "speak for themselves." *Data Feminism* offers strategies for data scientists seeking to learn how feminism can help them work toward justice, and for feminists who want to focus their efforts on the growing field of data science.

Data Feminism is about much more than gender. It is about power, about who has it and who doesn't, and about how those differentials of power can be challenged and changed.

\* Our summary is short, simple and pragmatic. It allows you to have the essential ideas of a big book in less than 30 minutes. By reading this summary, you will discover that mathematical models, and more particularly algorithms coupled with information systems, may increase inequalities and threaten democracies. You will also discover that : mathematical models are not neutral, but hide ideologies and personal interests; algorithms promise efficiency and lowest cost, but increase inequalities and injustices; mathematical formulas affect your life choices; your personal data are weapons used by the giants of Tech. At a time when algorithms are king, the decisions that affect your life - which school to go to, which loan to take out - are no longer made by humans, but by mathematical models. In theory, this should promote fairness: everyone is judged by the same level of value.

Mathematician Cathy O'Neil argues the opposite. These opaque, unregulated models can cause irreparable damage, like the mortgage payments of American households during the subprime crisis in 2007. Worse: they accentuate discrimination. For example, a student from a modest background who cannot obtain a loan - too risky - will never have access to quality education. These mathematical models support the lucky ones and disadvantage the oppressed: welcome to the dark side of big data, the exponential growth of digital data! \* Buy now the summary of this book for the modest price of a cup of coffee!

The Science of Socially Aware Algorithm Design

Finance in America

Becoming a Data Head

Shape

The Ethical Algorithm

The Rules of Contagion

Build Siege Weapons of the Dark Ages

*Marketers are harnessing the enormous power of AI to drive unprecedented results. The world of marketing is undergoing major change. Sophisticated algorithms can test billions of marketing messages and measure results, and shift the weight of campaigns—all in real time. What's next? A complete transformation of marketing as we know it, where machines themselves design and implement customized advertising tactics at virtually every point of digital contact. The Invisible Brand provides an in-depth exploration of the risks and rewards of this epochal shift—while delivering the information and insight you need to stay ahead of the game. Renowned technologist William Ammerman draws from his decades of experience at the forefront of digital marketing to provide a roadmap to our data-driven future. You'll learn how data and AI will forge a new level of persuasiveness and influence for reshaping consumers' buying decisions. You'll understand the technology behind these changes and see how it is already at work in digital assistants, recommendation engines and digital advertising. And you'll find unmatched insight into how to harness the power of artificial intelligence for maximum results. As we enter the age of mass customization of messaging, power*



*and influence will go to those who know the consumer best. Whether you are a marketing executive or concerned citizen, The Invisible Brand provides everything you need to understand how brands are harnessing the extraordinary amounts of data at their disposal—and capitalizing on it with AI.*

*"A deeply reported look at the Chinese immigrant community in the United States, casting a new light on what it means to seek the American dream" --*

*An Observer Book of the Year A Times Science Book of the Year A New Statesman Book of the Year A Financial Times Science Book of the Year 'Astonishingly bold' Daily Mail 'It is hard to imagine a more timely book ... much of the modern world will make more sense having read it.' The Times We live in a world that's more interconnected than ever before. Our lives are shaped by outbreaks - of disease, of misinformation, even of violence - that appear, spread and fade away with bewildering speed. To understand them, we need to learn the hidden laws that govern them. From 'superspreaders' who might spark a pandemic or bring down a financial system to the social dynamics that make loneliness catch on, The Rules of Contagion offers compelling insights into human behaviour and explains how we can get better at predicting what happens next. Along the way, Adam Kucharski explores how innovations spread through friendship networks, what links computer viruses with folk stories - and why the most useful predictions aren't necessarily the ones that come true. Now revised and updated with content on Covid-19.*

*The gap between theoretical ideas and messy reality, as seen in Neal Stephenson, Adam Smith, and Star Trek. We depend on—we believe in—algorithms to help us get a ride, choose which book to buy, execute a mathematical proof. It's as if we think of code as a magic spell, an incantation to reveal what we need to know and even what we want. Humans have always believed that certain invocations—the marriage vow, the shaman's curse—do not merely describe the world but make it. Computation casts a cultural shadow that is shaped by this long tradition of magical thinking. In this book, Ed Finn considers how the algorithm—in practical terms, “a method for solving a problem”—has its roots not only in mathematical logic but also in cybernetics, philosophy, and magical thinking. Finn argues that the algorithm deploys concepts from the idealized space of computation in a messy reality, with unpredictable and sometimes fascinating results. Drawing on sources that range from Neal Stephenson's Snow Crash to Diderot's Encyclopédie, from Adam Smith to the Star Trek computer, Finn explores the gap between theoretical ideas and pragmatic instructions. He examines the development of intelligent assistants like Siri, the rise of algorithmic aesthetics at Netflix, Ian Bogost's satiric Facebook game Cow Clicker, and the revolutionary economics of Bitcoin. He describes Google's goal of anticipating our questions, Uber's cartoon maps and black box accounting, and what Facebook tells us about programmable value, among other things. If we want to understand the gap between abstraction and messy reality, Finn argues, we need to build a model of “algorithmic reading” and scholarship that attends to process, spearheading a new experimental humanities.*

*Technically Wrong: Sexist Apps, Biased Algorithms, and Other Threats of Toxic Tech Automating Inequality*

*American Dreams in Chinatown*

*The Great Suppression*

*Imagination in the Age of Computing*

*Voting Rights, Corporate Cash, and the Conservative Assault on Democracy*

**WINNER: The 2018 McGannon Center Book Prize and shortlisted for the Goddard Riverside Stephan Russo Book Prize for Social Justice The New York Times Book Review: "Riveting." Naomi Klein: "This book is downright scary." Ethan Zuckerman, MIT: "Should be required reading." Dorothy Roberts, author of Killing the Black Body: "A must-read." Astra Taylor, author of The People's Platform: "The single most important book about technology you will read this year." Cory Doctorow: "Indispensable." A powerful investigative look at data-based discrimination—and how technology affects civil and human rights and economic equity The State of Indiana denies one million applications for healthcare, foodstamps and cash benefits in three years—because a new computer system interprets any mistake as “failure to cooperate.” In Los Angeles, an algorithm calculates the comparative vulnerability of tens of thousands of homeless people in order to prioritize them for an inadequate pool of housing resources. In Pittsburgh, a child welfare agency uses a statistical model to try to predict which children might be future victims of abuse or neglect. Since the dawn of the digital age, decision-making in finance, employment, politics, health and human services has undergone revolutionary change. Today, automated systems—rather than humans—control which neighborhoods get policed, which families attain needed resources, and who is investigated for fraud. While we all live under this new regime of data, the most invasive and punitive systems are aimed at the poor. In Automating Inequality, Virginia Eubanks systematically investigates the impacts of data mining, policy algorithms, and predictive risk models on poor and working-class people in America. The book is full of heart-wrenching and eye-opening stories, from a woman in Indiana whose benefits are literally cut off as she lays dying to a family in Pennsylvania in daily fear of losing their daughter because they fit a certain statistical profile. The U.S. has always used its most cutting-edge science and technology to contain, investigate, discipline and punish the destitute. Like the county poorhouse and scientific charity before them, digital tracking and automated decision-making hide poverty from the middle-class public and give the nation the ethical distance it needs to make inhumane choices: which families get food and which starve, who has housing and who remains homeless, and which families are broken up by the state. In the process, they weaken democracy and betray our most cherished national values. This deeply researched and passionate book could not be more timely.**

**“Witty, compelling, and just plain fun to read . . .” —Evelyn Lamb, Scientific American** The Freakonomics of math—a math-world superstar unveils the hidden beauty and logic of the world and puts its power in our hands The math we learn in school can seem like a dull set of rules, laid down by the ancients and not to be questioned. In How Not to Be Wrong, Jordan Ellenberg shows us how terribly limiting this view is: Math isn’t confined to abstract incidents that never occur in real life, but rather touches everything we do—the whole world is shot through with it. Math allows us to see the hidden structures underneath the messy and chaotic surface of our world. It’s a science of not being wrong, hammered out by centuries of hard work and argument. Armed with the tools of mathematics, we can see through to the true meaning of information we take for granted: How early should you get to the airport? What does “public opinion” really represent? Why do tall parents have shorter children? Who really won Florida in 2000? And how likely are you, really, to develop cancer? How Not to Be Wrong presents the surprising revelations behind all of these questions and many more, using the mathematician’s method of analyzing life and exposing the hard-won insights of the academic community to the layman—minus the jargon. Ellenberg chases mathematical

threads through a vast range of time and space, from the everyday to the cosmic, encountering, among other things, baseball, Reaganomics, daring lottery schemes, Voltaire, the replicability crisis in psychology, Italian Renaissance painting, artificial languages, the development of non-Euclidean geometry, the coming obesity apocalypse, Antonin Scalia's views on crime and punishment, the psychology of slime molds, what Facebook can and can't figure out about you, and the existence of God. Ellenberg pulls from history as well as from the latest theoretical developments to provide those not trained in math with the knowledge they need. Math, as Ellenberg says, is "an atomic-powered prosthesis that you attach to your common sense, vastly multiplying its reach and strength." With the tools of mathematics in hand, you can understand the world in a deeper, more meaningful way. How Not to Be Wrong will show you how.

**NEW YORK TIMES BESTSELLER • A former Wall Street quant sounds the alarm on Big Data and the mathematical models that threaten to rip apart our social fabric—with a new afterword "A manual for the twenty-first-century citizen . . . relevant and urgent."**—Financial Times **NATIONAL BOOK AWARD LONGLIST • NAMED ONE OF THE BEST BOOKS OF THE YEAR BY The New York Times Book Review • The Boston Globe • Wired • Fortune • Kirkus Reviews • The Guardian • Nature • On Point** We live in the age of the algorithm. Increasingly, the decisions that affect our lives—where we go to school, whether we can get a job or a loan, how much we pay for health insurance—are being made not by humans, but by machines. In theory, this should lead to greater fairness: Everyone is judged according to the same rules. But as mathematician and data scientist Cathy O'Neil reveals, the mathematical models being used today are unregulated and uncontestable, even when they're wrong. Most troubling, they reinforce discrimination—propping up the lucky, punishing the downtrodden, and undermining our democracy in the process. Welcome to the dark side of Big Data. "Turn yourself into a Data Head. You'll become a more valuable employee and make your organization more successful." Thomas H. Davenport, Research Fellow, Author of *Competing on Analytics*, *Big Data @ Work*, and *The AI Advantage* You've heard the hype around data—now get the facts. In *Becoming a Data Head: How to Think, Speak, and Understand Data Science, Statistics, and Machine Learning*, award-winning data scientists Alex Gutman and Jordan Goldmeier pull back the curtain on data science and give you the language and tools necessary to talk and think critically about it. You'll learn how to: Think statistically and understand the role variation plays in your life and decision making Speak intelligently and ask the right questions about the statistics and results you encounter in the workplace Understand what's really going on with machine learning, text analytics, deep learning, and artificial intelligence Avoid common pitfalls when working with and interpreting data *Becoming a Data Head* is a complete guide for data science in the workplace: covering everything from the personalities you'll work with to the math behind the algorithms. The authors have spent years in data trenches and sought to create a fun, approachable, and eminently readable book. Anyone can become a Data Head—an active participant in data science, statistics, and machine learning. Whether you're a business professional, engineer, executive, or aspiring data scientist, this book is for you.

**The Invisible Brand: Marketing in the Age of Automation, Big Data, and Machine Learning**

**Patriot Number One**

**An Empathy Handbook**

**The Rise of Big Data Policing**

**Data Feminism**

## Who Profits in the New Age of Humiliation

### The Shame Machine

**A jaw-dropping exploration of everything that goes wrong when we build AI systems and the movement to fix them. Today's "machine-learning" systems, trained by data, are so effective that we've invited them to see and hear for us—and to make decisions on our behalf. But alarm bells are ringing. Recent years have seen an eruption of concern as the field of machine learning advances. When the systems we attempt to teach will not, in the end, do what we want or what we expect, ethical and potentially existential risks emerge. Researchers call this the alignment problem. Systems cull résumés until, years later, we discover that they have inherent gender biases. Algorithms decide bail and parole—and appear to assess Black and White defendants differently. We can no longer assume that our mortgage application, or even our medical tests, will be seen by human eyes. And as autonomous vehicles share our streets, we are increasingly putting our lives in their hands. The mathematical and computational models driving these changes range in complexity from something that can fit on a spreadsheet to a complex system that might credibly be called "artificial intelligence." They are steadily replacing both human judgment and explicitly programmed software. In best-selling author Brian Christian's riveting account, we meet the alignment problem's "first-responders," and learn their ambitious plan to solve it before our hands are completely off the wheel. In a masterful blend of history and on-the-ground reporting, Christian traces the explosive growth in the field of machine learning and surveys its current, sprawling frontier. Readers encounter a discipline finding its legs amid exhilarating and sometimes terrifying progress. Whether they—and we—succeed or fail in solving the alignment problem will be a defining human story. The Alignment Problem offers an unflinching reckoning with humanity's biases and blind spots, our own unstated assumptions and often contradictory goals. A dazzlingly interdisciplinary work, it takes a hard look not only at our technology but at our culture—and finds a story by turns harrowing and hopeful.**

**"An entertaining romp that tells us where and why the tech industry, once America's darling, went wrong, and what it might do to recover its good graces." —Tim Wu, author of The Master Switch** Buying groceries, tracking our health, finding a date: whatever we want to do, odds are that we can now do it online. But few of us realize just how many oversights, biases, and downright ethical nightmares are baked inside the tech products we use every day. It's time we change that. In **Technically Wrong**, Sara Wachter-Boettcher demystifies the tech industry, leaving those of us on the other side of the screen better prepared to make informed choices about the services we use—and to demand more from the companies behind them. **A Wired Top Tech Book of the Year** **A Fast Company Best Business and Leadership Book of the Year**

**This text systematically presents the basics of quantum mechanics, emphasizing the role of Lie groups, Lie algebras, and their unitary representations. The mathematical structure of the subject is brought to the fore, intentionally avoiding significant overlap with material from**

standard physics courses in quantum mechanics and quantum field theory. The level of presentation is attractive to mathematics students looking to learn about both quantum mechanics and representation theory, while also appealing to physics students who would like to know more about the mathematics underlying the subject. This text showcases the numerous differences between typical mathematical and physical treatments of the subject. The latter portions of the book focus on central mathematical objects that occur in the Standard Model of particle physics, underlining the deep and intimate connections between mathematics and the physical world. While an elementary physics course of some kind would be helpful to the reader, no specific background in physics is assumed, making this book accessible to students with a grounding in multivariable calculus and linear algebra. Many exercises are provided to develop the reader's understanding of and facility in quantum-theoretical concepts and calculations.

The economic crisis of 2008 led to an unprecedented focus on the world of high finance—and revealed it to be far more arcane and influential than most people could ever have imagined. Any hope of avoiding future crises, it's clear, rest on understanding finance itself. To understand finance, however, we have to learn its history, and this book fills that need. Kevin R. Brine, an industry veteran, and Mary Poovey, an acclaimed historian, show that finance as we know it today emerged gradually in the late nineteenth century and only coalesced after World War II, becoming ever more complicated—and ever more central to the American economy. The authors explain the models, regulations, and institutions at the heart of modern finance and uncover the complex and sometimes surprising origins of its critical features, such as corporate accounting standards, the Federal Reserve System, risk management practices, and American Keynesian and New Classic monetary economics. This book sees finance through its highs and lows, from pre-Depression to post-Recession, exploring the myriad ways in which the practices of finance and the realities of the economy influenced one another through the years. A masterwork of collaboration, *Finance in America* lays bare the theories and practices that constitute finance, opening up the discussion of its role and risks to a broad range of scholars and citizens.

**The Oxford Handbook of Ethics of AI**

**This Book Will Make You Kinder**

**The Complete Guide to Absolutely Everything (Abridged): Adventures in Math and Science**

**Straight Talk from the Frontline**

**How to Think, Speak, and Understand Data Science, Statistics, and Machine Learning**

**Coolidge**

**Doing Data Science**

*A former Wall Street quant sounds an alarm on the mathematical models that pervade modern life - and threaten to rip apart our social fabric We live in the age of the algorithm. Increasingly, the decisions that affect our lives - where we go to school, whether we get a loan, how much we pay for insurance - are being made not by humans, but by mathematical models. In theory, this should lead to greater fairness: everyone is judged according to the same rules, and bias is eliminated. And yet, as Cathy O'Neil reveals in this urgent and necessary book, the opposite is true. The models being used today are opaque, unregulated, and*

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*incontestable, even when they're wrong. Most troubling, they reinforce discrimination. Tracing the arc of a person's life, O'Neil exposes the black box models that shape our future, both as individuals and as a society. These "weapons of math destruction" score teachers and students, sort CVs, grant or deny loans, evaluate workers, target voters, and monitor our health. O'Neil calls on modellers to take more responsibility for their algorithms and on policy makers to regulate their use. But in the end, it's up to us to become more savvy about the models that govern our lives. This important book empowers us to ask the tough questions, uncover the truth, and demand change.*

*'With moral clarity and powerful storytelling, Cathy O'Neil reverse engineers the 'shame machine,' revealing its inner workings and inciting nothing short of a cultural reckoning that has the potential to blow this machine to bits' - Ruha Benjamin Shame is being weaponized by governments and corporations to attack the most vulnerable. It's time to fight back Shame is a powerful and sometimes useful tool. When we publicly shame corrupt politicians, abusive celebrities, or predatory corporations, we reinforce values of fairness and justice. But as best-selling author Cathy O'Neil argues in this revelatory book, shaming has taken a new and dangerous turn. It is increasingly being weaponized -- used as a way to shift responsibility for social problems from institutions to individuals. Shaming children for not being able to afford school lunches or adults for not being able to find work lets us off the hook as a society. After all, why pay higher taxes to fund programmes for people who are fundamentally unworthy? O'Neil explores the machinery behind all this shame, showing how governments, corporations and the healthcare system capitalize on it. There are damning stories of rehab clinics, reentry programs, drug and diet companies, and social media platforms -- all of which profit from 'punching down' on the vulnerable. Woven throughout The Shame Machine is the story of O'Neil's own struggle with body image and her recent weight-loss surgery, which awakened her to the systematic shaming of fat people seeking medical care. With clarity and nuance, O'Neil dissects the relationship between shame and power. Whom does the system serve? How do current incentive structures perpetuate the shaming cycle? And, most important, how can we all fight back?*

*The most powerful weapon in business today is the alliance between the mathematical smarts of machines and the imaginative human intellect of great leaders. Together they make the mathematical corporation, the business model of the future. We are at a once-in-a-decade breaking point similar to the quality revolution of the 1980s and the dawn of the internet age in the 1990s: leaders must transform how they run their organizations, or competitors will bring them crashing to earth--often overnight. Mathematical corporations--the organizations that will master the future--will outcompete high-flying rivals by merging the best of human ingenuity with machine intelligence. While smart machines are weapon number one for organizations, leaders are still the drivers of breakthroughs. Only they can ask crucial questions to capitalize on business opportunities newly discovered in oceans of data. This dynamic combination will make possible the fulfillment of missions that once seemed out of reach, even impossible to attain. Josh Sullivan and Angela Zutavern's extraordinary examples include the entrepreneur who upended preventive health care, the oceanographer who transformed fisheries management, and the pharmaceutical company that used algorithm-driven optimization to boost vaccine yields. Together they offer a profoundly optimistic vision for a dazzling new phase in business, and a playbook for how smart companies can manage the essential combination of human and machine.*

*Utilizing easy-to-find and inexpensive materials, this handy resource teaches desktop warriors how to build a multitude of medieval siege weapons for the modern era. Novice combatants will learn to build 35 defense weapons, including a marshmallow catapult, a chopstick bow, a bottle cap crossbow, and a clothespin ballista. In addition to beefing up their Dark Age arsenal, would-be warriors are provided with a number of targets on which to practice their shooting skills. Clear diagrams, instructions, and safety tips for each project are included, making construction of each of these weapons simple, safe, and fun.*

*Where Machine Intelligence and Human Ingenuity Achieve the Impossible*

*On Belonging in America*

*Living in Bootstrap America*

*In AI We Trust*

*Ten Easy Rules to Make Sense of Statistics*

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*Surveillance, Race, and the Future of Law Enforcement*

*Mini Weapons of Mass Destruction 3*

One of the most persistent concerns about the future is whether it will be dominated by the predictive algorithms of AI — and, if so, what this will mean for our behaviour, for our institutions and for what it means to be human. AI changes our experience of time and the future and challenges our identities, yet we are blinded by its efficiency and fail to understand how it affects us. At the heart of our trust in AI lies a paradox: we leverage AI to increase our control over the future and uncertainty, while at the same time the performativity of AI, the power it has to make us act in the ways it predicts, reduces our agency over the future. This happens when we forget that that we humans have created the digital technologies to which we attribute agency. These developments also challenge the narrative of progress, which played such a central role in modernity and is based on the hubris of total control. We are now moving into an era where this control is limited as AI monitors our actions, posing the threat of surveillance, but also offering the opportunity to reappropriate control and transform it into care. As we try to adjust to a world in which algorithms, robots and avatars play an ever-increasing role, we need to understand better the limitations of AI and how their predictions affect our agency, while at the same time having the courage to embrace the uncertainty of the future.

Now that people are aware that data can make the difference in an election or a business model, data science as an occupation is gaining ground. But how can you get started working in a wide-ranging, interdisciplinary field that's so clouded in hype? This insightful book, based on Columbia University's Introduction to Data Science class, tells you what you need to know. In many of these chapter-long lectures, data scientists from companies such as Google, Microsoft, and eBay share new algorithms, methods, and models by presenting case studies and the code they use. If you're familiar with linear algebra, probability, and statistics, and have programming experience, this book is an ideal introduction to data science. Topics include: Statistical inference, exploratory data analysis, and the data science process Algorithms Spam filters, Naive Bayes, and data wrangling Logistic regression Financial modeling Recommendation engines and causality Data visualization Social networks and data journalism Data engineering, MapReduce, Pregel, and Hadoop Doing Data Science is collaboration between course instructor Rachel Schutt, Senior VP of Data Science at News Corp, and data science consultant Cathy O'Neil, a senior data scientist at Johnson Research Labs, who attended and blogged about the course.

An instant New York Times Bestseller! "Unreasonably entertaining . . . reveals how geometric thinking can allow for everything from fairer American elections to better pandemic planning." "The New York Times From the New York Times-bestselling author of *How Not to Be Wrong*—himself a world-class geometer—a far-ranging exploration of the power of geometry, which turns out to help us think better about practically everything. How should a democracy choose its representatives? How can you stop a pandemic from sweeping the world? How do computers learn to play Go, and why is learning Go so much easier for them than learning to read a sentence? Can ancient Greek proportions predict the stock market? (Sorry, no.) What should your kids learn in school if they really want to learn to think? All these are questions about geometry. For real. If you're like most people, geometry is a sterile and dimly

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remembered exercise you gladly left behind in the dust of ninth grade, along with your braces and active romantic interest in pop singers. If you recall any of it, it's plodding through a series of miniscule steps only to prove some fact about triangles that was obvious to you in the first place. That's not geometry. Okay, it is geometry, but only a tiny part, which has as much to do with geometry in all its flush modern richness as conjugating a verb has to do with a great novel. Shape reveals the geometry underneath some of the most important scientific, political, and philosophical problems we face. Geometry asks: Where are things? Which things are near each other? How can you get from one thing to another thing? Those are important questions. The word "geometry" comes from the Greek for "measuring the world." If anything, that's an undersell. Geometry doesn't just measure the world—it explains it. Shape shows us how. Originally published in hardcover in 2014 by G.P. Putnam's Sons.

Weapons of Math Destruction