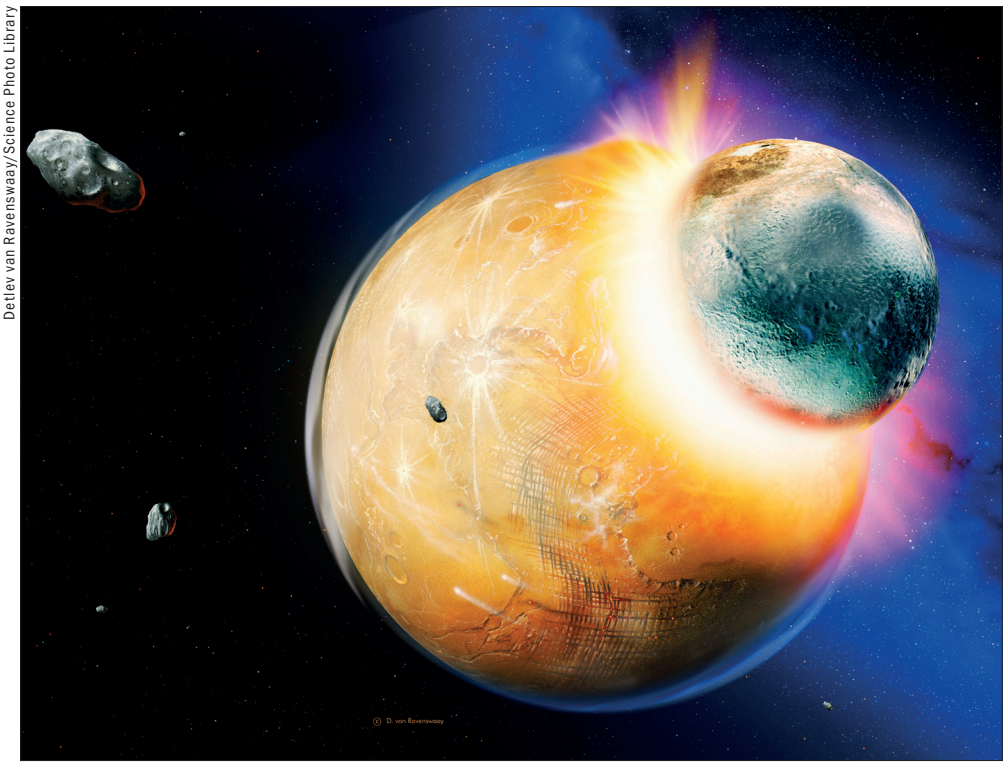
Sabine Hossenfelder

Let's start at the very beginning



Detlev van Ravenswaay/Science Photo Library

Early days
One origin story that is still debated is that of our Moon.

Origins: the Scientific Story of Creation
Jim Baggott
Oxford University Press 432pp £25hb

How did this happen? You, reading this, sitting on a rock that orbits a bright ball of plasma, which itself undergoes nuclear fusion? How all this, and more, materialized is what you will learn from Jim Baggott's book *Origins: the Scientific Story of Creation* – at least to the extent that scientists have the answers. To explain how we came to be, one must draw on knowledge from many different disciplines, which poses quite a challenge to any science writer.

In the beginning, of the universe and of this book, it's all physics. So far, so simple. But to make sense of what happens next, the reader also needs to get to grips with a good deal of chemistry, biology, geology and archaeology, to name a few of the most important research areas involved in the story of creation. And not only must the writer draw on all these disciplines, they also must identify and summarize the key points without getting lost in details, before swiftly moving on to the next phase. It's a challenge indeed, but Baggott takes it on. "I believe all my efforts as a popular science author over more than 20 years have been building up to this," he writes in the preface.

Origins is without doubt an ambitious project, but Baggott executes it masterfully. Whether he covers well-established research or as-yet speculative ideas, he always makes sure to carefully state the scientific case and quote the evidence behind his claims. His writing style is clean and easy to follow, his metaphors and everyday examples are useful and to the point, and he has included many helpful figures and tables that serve well to illustrate his points.

Despite the topic's breadth, this is not a shallow book. *Origins* is packed with illuminating accounts of the science behind creation, starting with the Big Bang and the subsequent period of rapid expansion known as inflation. It follows the cooling of the particle plasma in the early universe, the formation of atomic nuclei and atoms, the emission of the first light, the formation of large-scale structures, galaxies, solar systems, planets in general, and Earth in particular. In the later chapters, Baggott goes through the best current theory for the formation of the solar system, and summarizes the history of planet Earth and its companion, the Moon. He then lays out the currently discussed theories for the formation of self-reproducing large molecules, the first types of cells, bacteria, plants, and finally larger forms of animals. The dinosaurs come and go and, eventually, humans appear on the face of the planet. Baggott doesn't stop with humans. In a refreshing no-nonsense style, he goes on to explore what we do and don't understand about consciousness. He ends his book where the history of civilization would begin, some 10 000 years ago.

But Baggott's is not only a story about our universe coming to be. It is also a story about science and scientists, a story of big questions being answered in little steps, through persistence and a great many trials, with inevitable errors. It is a story about fallible humans with hopes and beliefs, easily confused mammals who nevertheless push onward to unravel the mystery of their existence. The story of our creation is also, as Baggott makes clear, unfinished and will almost certainly have to be revised soon. "Perhaps we can be reasonably certain of one thing," he writes, "Just 10 years from now the story will be different." Certain key pieces of the story are also missing, notably the origin of life, but also smaller ones, such as our incomplete understanding of inflation in the early universe, or the formation of the Moon.

To be honest, I did not expect to find the book interesting. After all, I chose my speciality – theoretical physics – because that's where my interests lie, and I get easily bored by family trees of bacteria, fungi and fern. I also vaguely remember having suffered through all of that in school, and was under the impression that once was enough. But as I learned from Baggott's book, physics isn't the only discipline that has progressed since my school days. Fossils I had never heard of have revealed new insights into the evolution of mankind, advanced computer simulations have made it possible to study the formation of planets, moons and solar systems in novel ways, and new theories about the origin of life have been put forward. And I didn't suffer learning about this.

I would recommend this book to anyone who wants to know the sci-

ence behind the story of our universe. That's opposed to those who prefer inspiration over information, and who will likely find this book heavy to digest. *Origins* is stuffed with knowledge. There isn't a single page in this book you can flip over and not miss something. But the best thing about Baggott's book is that he doesn't preach. He doesn't tell the reader how awed they are supposed to be and doesn't put claim to the greatest story ever told. He doesn't have to – the story speaks for itself.

Physics isn't the only discipline that has progressed since my school days

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Inferior by Angela Saini wins Physics World Book of the Year 2017

The winner of the 2017 Physics World Book of the Year is a bold book that takes a hard look at the bad science that has been used to diminish women.

This year's winner of the Physics World Book of the Year is *Inferior: How Science Got Women Wrong and the New Research That's Rewriting the Story* by Angela Saini. It provides an extremely well-researched and impartial analysis of the science behind the gender stereotypes that hold women back. An accessible entry to the world of gender studies, neuroscience and evolutionary psychology and primatology, Saini travels the world to establish whether it is biology or bias that causes the social imbalance of women. Despite its troubling findings, the book remains upbeat as Saini finds campaigners throughout history who stand up for equality. Inferior serves not only to shed some light on bad science but to provide young women with the scientifically-accurate ammunition to change the world.

We chose our Book of the Year from among the 54 books we reviewed in *Physics World* in 2017, picking the 10 titles on our shortlist and the overall winner using the same three criteria that have been in place since we launched the award in 2009. These are that the books must be well written, novel and scientifically interesting to physicists.

Following on from a tumultuous 2016, 2017 saw much political strife and human-rights crises, along with the rise of the unexpected demon of "fake news". Unsurprisingly, the books we reviewed in *Physics World* last year reflected a lot of these global issues, which means that, along with the usual mix of popular-physics titles, the 2017 shortlist included a few books that at first sight might not seem to have direct links to physics. However, we feel these titles are nevertheless important and relevant to physicists (and of course scientists in general).

Shortlist

The other nine titles in our shortlist are:

Marconi: the Man Who Networked the World by Marc Raboy
Marconi's complicated disposition, which shaped his work as well as his personal life, and the lives of many others, thanks to his embryonic "wireless telegraphy", is described in this "major and long overdue biography".

physicsworld BOOK OF THE YEAR 2017

Mapping the Heavens: the Radical Scientific Ideas That Reveal the Cosmos by Priyamvada Natarajan
This "greatest hits" of cosmological discoveries tackles the science behind concepts such as the accelerating expansion of the universe. It also describes how such "radical" scientific theories gain acceptance and how the line between scientific idealism and scientific realism is blurry, as all scientific endeavours are affected by human bias.

Hidden Figures: the Untold Story of the African American Women Who Helped Win the Space Race by Margot Lee Shetterly
The inspiring tale of the African-American female mathematicians who helped the US to win the space race, through their work at NASA following the labour shortages of the Second World War. The book provides a detailed account of the remarkable impact these intelligent and brave women had on some of NASA's greatest hits.

The Glass Universe: How the Ladies of the Harvard Observatory Took the Measure of the Stars by Dava Sobel
Going further back in time to the early 1900s, this book reveals the revolutionary work done by women were hired as "human calculators" at Harvard Observatory. This talented team went on to make huge contributions to astronomy.

Scale: the Universal Laws of Life and Death in Organisms, Cities and Companies by Geoffrey West
West is a pioneer in the field of complexity science, and this book is the culmination of years of research geared toward answering one fundamental question: could there be just a few simple rules that all complex organisms obey, whether they are animals, corporations or cities?

Not A Scientist: How Politicians Mistake, Misrepresent and Utterly Mangle Science by Dave Levitan
This year, the Collins Dictionary's Word of the Year 2017 is "fake news". While this term has been lobbed at a multitude of media organizations, politicians world over have a long and troubling history of subverting science to suit their own political agendas, which Levitan explores.

We Have No Idea by Jorge Cham and Daniel Whiteson
Frequently hilarious, deeply charming and full of excellent comics, this book does a commendable job of explaining deep ideas with wit and humour. The authors include clever analogies and very clear explanations of the basics of relativity and particle physics, while pondering about things such as the maximum speed of the universe.

The Secret Science of Superheroes edited by Mark Lorch and Andy Miah
This collection of 15 eclectic essays was written by a team of scientists who came together to try to suss out the real-world science behind everything from Wonder Woman's lasso to the Hulk's gigantic transformation. The book makes excellent use of science fiction as a vehicle for science fact and covers a wide scientific territory.

The Death of Expertise: the Campaign Against Established Knowledge and Why it Matters by Tom Nichols
"Buy this book. And read it. Regularly." That's the powerful summary of the book by our reviewer Philip Moriarty. This is an exceptionally timely, carefully reasoned and impassioned analysis of why some people seem proud of not knowing things. At a time when trust in science, scientists and experts is in question, Nichols' book has some suggestions on to fix this cult of ignorance.

You can learn more about the books and why we picked them by tuning in to the December 2017 *Physics World* podcast.

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