



# How It Began: A Time-Traveler's Guide to the Universe

*Chris Impey*

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**How It Began: A Time-Traveler's Guide to the Universe** Chris Impey

**A majestic account of the most fascinating phenomena in our universe-and the science behind them.**

In this vibrant, eye-opening tour of milestones in the history of our universe, Chris Impey guides us through space and time, leading us from the familiar sights of the night sky to the dazzlingly strange aftermath of the Big Bang.

What if we could look into space and see not only our place in the universe but also how we came to be here? As it happens, we can. Because it takes time for light to travel, we see more and more distant regions of the universe as they were in the successively greater past. Impey uses this concept—"look-back time"—to take us on an intergalactic tour that is simultaneously out in space and back in time. Performing a type of cosmic archaeology, Impey brilliantly describes the astronomical clues that scientists have used to solve fascinating mysteries about the origins and development of our universe.

The milestones on this journey range from the nearby to the remote: we travel from the Moon, Jupiter, and the black hole at the heart of our galaxy all the way to the first star, the first ray of light, and even the strange, roiling conditions of the infant universe, an intense and volatile environment in which matter was created from pure energy. Impey gives us breathtaking visual descriptions and also explains what each landmark can reveal about the universe and its history. His lucid, wonderfully engaging scientific discussions bring us to the brink of modern cosmology and physics, illuminating such mind-bending concepts as invisible dimensions, timelessness, and multiple universes.

A dynamic and unforgettable portrait of the cosmos, *How It Began* will reward its readers with a deeper understanding of the universe we inhabit as well as a renewed sense of wonder at its beauty and mystery.

## How It Began: A Time-Traveler's Guide to the Universe Details

Date : Published March 26th 2012 by W. W. Norton Company (first published 2012)

ISBN : 9780393080025

Author : Chris Impey

Format : Hardcover 434 pages

Genre : Science, Nonfiction, Astronomy, Physics, History

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# From Reader Review How It Began: A Time-Traveler's Guide to the Universe for online ebook

## Dkolacinski says

An entertaining introduction to the history of the universe told in a personal entertaining fashion.

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## Natalie says

It's just another pop cosmology book, like so many others that I like to read, but I really like the imaginative way Dr. Impey writes.

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## Tom says

A comprehensive book about the entire universe, structured as a journey both away from Earth in distance, and back in time. Really interesting throughout, but I have to say I was way more interested in the astronomy portion of the book (IE: the chapters about observable phenomena) rather than the later chapters to do with theoretical physics (quarks, quantum stuff, branes, string theory, etc). I guess I need to just seek out more books about the former topic.

This is definitely not a popular science book. Impey doesn't write for the uninitiated. My highschool physics and previous reading was enough to get through the first two thirds of the book but after that a *lot* went over my head. Luckily Impey is really good at analogies and metaphors to illuminate some of the trickiest concepts.

I will be looking into his book about astrobiology now.

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## Mike says

It's a fantastic update on the frontline of cosmology and the scientific journey that's taken us there, as well as frankly showing us the enduring questions & mysteries we still face. All that, and written in a completely compelling storytelling tone that takes you from your own place here and now, to the farthest reaches of time and space.

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## Paperclippe says

Well this was very much not at all what it promised to be. The way the description and even introduction made it sound was that it would be discussing the few minutes immediately following the Big Bang, but what it actually was was just another pop sci book about "the universe" look back from now and into the past. That said, it wasn't bad. It was very thoughtfully told and the author's anecdotes gave it a little

something that made it different enough from, say, Simon Singh's "Big Bang" that it wasn't an absolutely waste of time, and the information was presented really coherently with some new insights that I hadn't thought of before, excepting the fact that it was written in 2012 and thus was still really sceptical about this whole Higgs boson thing.

The one thing that I really didn't like were the author's little vignettes at the beginning and end of each chapter that made to tell a little story about a person travelling backward in time and thus through space. Yeah, author dude? Don't quit your day job. That's some of the worst sci-fi I've ever read. If you do find yourself inclined to pick up a copy of this book, go ahead and just skip those bits. You aren't missing anything.

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## **Brie says**

This is the second book by Impey I have read, and they both left me with a feeling of 'it was ok, nothing special.' I have seen Impey give talks and I have always enjoyed them; he has a way with speaking to an audience. For me, it just doesn't translate into the written word.

There is lots of good information in this book, so perhaps I just don't like his writing style. He explains the beginnings of the Earth, the Solar System, Stars, and the Universe, among other things. There wasn't a lot of new information for me personally, but if you haven't read a lot of science books this book has the potential to teach you a lot. And though Impey has written textbooks, this book definitely doesn't have the feel of one. He has an intro and exit section to each chapter where he is an observer for whatever that chapter is about (for example, what it would be like to view the galaxy from outside it). I found these to be a bit distracting and not all that interesting.

Overall, if you are just getting started reading about astronomy/science, you could pick up this book. If you have been reading these topics for awhile, you can probably skip it.

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## **Tony says**

HOW IT BEGAN: A Time-Traveler's Guide to the Universe. (2012). Chris Impey. \*\*\*.

The author is an Astronomy Professor at the University of Arizona (Tucson), and has written other books on similar subjects. I have to confess that I put it down after getting half-way through it. I didn't find anything new in it, nor were things that I previously didn't understand made any clearer by the author's skill with words. This would be a great book if it was the first you picked up on the topic, but it is lost in the great number of books similar to it published in recent years. It does manage to bring the reader up to date on the latest findings, but forward motion in this field is slow, so that the book you read five years ago on this same topic wouldn't be much different than this one. I don't want to say that this is a bad book; it is simply redundant.

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## **Conrad says**

Impey makes travel through time and the universe in first person type accounts.

## **Kyrie says**

I figure if I read enough of these sort of books, I might actually understand the theories.

I could have done without the sci-fi bits that began and ended each chapter. I'd puzzle through them and then have to reorient my brain to the actual science presented.

The first several chapters were great. So were the last few. The nine in the middle, well, I was ratherlost. Or perhaps I was in an alternate universe? Or maybe it's all part of the alien simulation?

Favorite quotes:

"Ironically deists and atheists are united in having to explain creation out of nothing."

"It's unfortunate that the quest to understand the fundamental nature of matter has led to a formalism that makes the field opaque to all but an elite cadre of theoretical physicists. To them, the theory contains math that's achingly beautiful and elegant. To others, it's inscrutable and the practitioners are high priests from a strange cult who speak in tongues."

Having met a few astrophysicists, and physicists in training recently, I think the latter is an excellent description.

I came away feeling I understood string theory better, and had some understanding of other ideas of the formation of the universe. For a journalism major (who chose it because it required no math), I'd say it was an accomplishment.

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## **Jennifer says**

I love cosmology books. And I enjoyed this one, which spun backwards from the formation of Earth's moon to the earliest beginnings of the universe. I particularly liked Impey's intro and outro to each chapter, where he envisioned what it would be like to see some of these cosmic wonders in person. Some of the stuff at the end was kind of esoteric and over my head (not surprisingly). But I also learned a cool new word, apophenia, which refers to the brain's tendency to perceive patterns where none exist.

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## **John Sheahan says**

Not the sort of book I can read in an extended sitting. Too much information and too many mindbending ideas. The style is colloquial which is most helpful for an amateur in the field.

Impey's strength is that he does a fine job of explaining difficult concepts in reasonably simple terms with numerous analogies to the ordinary and everyday. So, to illustrate the chanciness of any one thing occurring, he tells the story of how he met his wife, that the reason his son – this son – is listening to him is because of the peculiarities of a monkey in South America. He describes the size of the solar system in terms of apricots and peas and football fields, etc etc etc.

It works. The strategy allows me to put a new piece of information up against what I already know. Like measuring the starting height for the Olympic high jump in my living room: I can then stand and look at it ... and wonder!

There is so much to wonder at.

Thanks to Chris Impey, (I think) I now have a decent grasp of event horizons, black holes, why the sky is so dark at night, how little stuff there is in this universe, why the Big Bang stands up as a reputable theory, and so on. The sheer emptiness of the universe is truly astounding.

I am grateful.

The third section bamboozled me more often. I was altogether lost among the fermions and bosons for a while there.

Impey is a scientist. He grapples with the theological theory of the Intelligent Designer with respect and clarity. He presents a position that is straightforward and reasonable. For me, it doesn't really matter. I don't need proofs and arguments anymore; I believe in a divine essence/deity/God/etc because of my experience. Why am I reading this book? What has it got to do with the next book I want to write? To quote Carl Sagan: 'In order to make an apple pie from scratch, you must first create the universe.' (1980)

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## **Noah Goats says**

How it Began feels disorganized. It also contains large chunks of text in italics where I think the author is trying to wax poetic about the universe and pump some excitement into the proceedings, but instead these chunks just add another layer of boredom. I learned some things from this book, but I didn't have much fun in the process and every time I dipped into it I soon found myself wishing I was reading something else.

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## **Silvio Curtis says**

Popular cosmology oriented more towards the astronomical side - what kinds of object are out there - than the physical. It has three parts: first, our solar system and other star systems in the Milky Way; second, other galaxies; last, the Big Bang and the origins of the universe. Really it's only the last part that justifies the book's title, since the other sections are more about the universe's present than its past, though they're all equally interesting. The scientific information is mixed with a lot of whimsical analogies and anecdotes about the history of science that I found more silly than helpful, and the explanations aren't as clear as you would expect in a book that assumes no prior knowledge. Sometimes I suspected that the author had carelessly written the opposite of what he meant to somewhere. On the other hand he goes into a lot of detail without any further obscurity beyond what I already mentioned, and since the book is extremely up-to-date (copyright 2012) that makes it unexpectedly informative on some topics, for example exoplanets.

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## **Nilesh says**

How it began is a good summary of where cosmology is as of now. It does not try to provide new information or perspective. Rather, the biggest utility of the book is in its structure, coherence and simplicity.

The book starts somewhat weak by spending time on earth and solar systems, The real science (howsoever speculative or deductive) comes in as the book moves to stars and galaxies. For any avid reader of

cosmology, there is little that will be new. However, the way the book navigates through pulsars, supernovae, background radiation, black holes etc is impressive.

Author's attempts at flowery, personalistic descriptions at the end and the beginning of each chapter reads quite artificial and not just distracting but almost wrong or at least needless at least to this reader. I am sure there would be many who will love such tales in books of this kind.

Overall, a neat summary for someone who has read on the subject before and possibly more useful introduction to the first timers.

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## **Chad says**

I can't really comment on how this book compares to other books about astronomy and what we know about the early universe. I don't know if this is better or worse than other similar books. All I know is that I loved reading this book, and I loved learning about our solar system, our galaxy, and our universe.

Mr. Impey starts the book on Earth, and progressively moves out from our world to the solar system, to nearby galaxies, and then to more distant galaxies, all the while explaining how discoveries from different areas of the universe shape our understanding of the shape and fabric of the universe. As we examine galaxies more and more distant from Earth, we are in effect traveling back in time, peering into the universe in its earliest stages, and helping us see details of how it formed and what it looked like throughout its history.

Mr. Impey begins and ends each chapter with an imagined out of body experience as if floating in space near the location of something he describes during that chapter, and often looking back toward earth, seeing it as if the light from it was just arriving at the location in space where he is floating, but in perfect detail in spite of the fact that we can't see anything like that of other worlds. In essence, the farther he "traveled" from Earth, the earlier in Earth's history he could "see" and he eventually traveled far before human history and even the formation of the earth itself. This approach struck me as uncomfortably odd for the first half-dozen or so chapters, but I began to appreciate it more toward the end as I could more easily visualize the remote areas of space in a more personal way than I would otherwise. But it's not a terribly standard approach to cosmology.

I would recommend this book to anybody even remotely interested in astronomy or in understanding what we currently know or theorize about the creation of the universe. Mr. Impey is a great writer; he is well read and includes allusions from many different disciplines in his writing. He often includes a few paragraphs of biography of interesting astronomers that he mixes into the narrative, and I appreciated the humanism of that approach. He never gets too mathy, and explains difficult concepts with recognizable metaphors to help those of us unversed in scientific rigor to understand more readily. He also is clear about how much evidence is behind what we know, what we think we know, and what we wish we knew, providing a framework for us to understand where the edge of science is still trying to answer questions, and where our knowledge is much more solid.

When I finished reading the book, I have to admit I was a little sad. I wanted the story to keep going. I wanted to know the next chapter in our discovery and understanding of the wonders of the way the universe works.

