

INTRODUCTION

'The TARDIS is outside.'

'So?'

'So, all of time and all of space is sitting out there.

A big blue box. Please, don't even argue.'



$\int^3 \sum x^2$

The Twelfth Doctor and Clara Oswald, *Last Christmas* (2014)

How could anyone resist a chance to explore all of time and space? The Doctor offers his companions – and us, watching at home – a chance to venture out into the universe and discover its extraordinary wonders.

On these journeys, we uncover the most astounding secrets. Somewhere out there are creatures made of pure energy and monsters that exist in only two dimensions. There are worlds made of diamond, and stars which are alive. You can rewrite history, regenerate from injuries and, best of all, you can travel to anywhere or when in a blue police box that is bigger on the inside than the outside...

At least, according to *Doctor Who*.

This *isn't* a book about what bits of science *Doctor Who* might have got right or wrong in the more than fifty years that it has been on TV. Getting the science right isn't necessarily the same thing as telling a good story – although, as we'll see, it's surprising how often bits of real science work their way into the Doctor's adventures. In fact, the series has occasionally been ahead of its time – using the latest scientific theories as the inspiration for stories such as *Earthshock* (1982), or, in stories such as *Planet of the Daleks* (1973), including outlandish-sounding ideas that scientists only later demonstrated to be real phenomena.

This book *won't* detail how you can build your own versions of the technological gadgets that we've seen in the series – robot dogs, sonic screwdrivers or fully working time machines. That said, there is a bit in Chapter 11 about growing your own potatoes.

And this book *isn't* about the intentions of the people who have made *Doctor Who* over the years, and whether or how much they cared about getting the science right. Though that does come up, for example when we discuss the creation of the Cybermen.

Instead, our hope is that the experience of reading this book will be a little like travelling in the TARDIS with the Doctor. Our fifteen thrilling, original *Doctor Who* stories are inspired by the latest and most boggling scientific ideas. Each story is followed by an examination of the real science involved. Using the stories in this book and from the Doctor's TV adventures, we'll explore the strangest, funniest and most astonishing elements of the cosmos.

We hope it's a book to thrill you, make you laugh and think, and ultimately see the world – and the universe – around you differently. *Doctor Who* has been taking us on adventures for more than fifty years, and science is also a great adventure, constantly revealing new things to amaze and astonish us. We hope this book will make you watch *Doctor Who* with new eyes. And we hope it will be just a first step – inspiring you to explore the world of *Doctor Who* and the equally extraordinary world of science still further.

A book, in fact, that's bigger on the inside...

Please note: This book uses examples from all 813 television episodes of *Doctor Who*, from *An Unearthly Child* (1963) to *Last Christmas* (2014). There will be spoilers. Scientific data and *Doctor Who* statistics are correct up to February 2015.