signal from another star system provides proof that other life exists in the Galaxy and allows humanity to build a machine that permits wormhole travel. The ending of the novel is far more grand and mysterious than that of the famous film adaptation. Kip Thorne and his graduate students designed a kind of wormhole subway system for the book at Sagan's request.

***Mars Crossing* by Geoffrey Landis (Tor Books, 2000) and *Mars Underground* by William Hartmann (Tor Books, 1997)** This one is a tie — between two books by astronomers about the early exploration of the red planet, both with the authentic feel for what it will be like on Mars, both written long before the current best-seller on the same topic and its blockbuster film, *The Martian*. Landis's book is about an expedition that needs to cross large swaths of Martian terrain to find a rescue ship, whereas Hartmann's is a mystery about a researcher who has disappeared on Mars.

***Star Dragon* by Mike Brotherton (Tor Books, 2003)** University of Wyoming astronomer Brotherton weaves a tale glistening with scientific ideas about a complex binary star system with an active accretion disk in whose extreme plasma environment a new kind of life-form is detected.

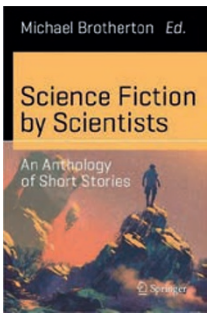
***Illegal Alien* by Robert Sawyer (Ace, 1997)** Sawyer is not a scientist, but an enthusiastic amateur astronomer, with training in anthropology and a fascination with the search for extra-terrestrial intelligence — interests that inform many of his novels. I like to recommend this one because of its sense of humour, and the detective mystery with an astronomical puzzle that is part of the solution.

***The Hard SF Renaissance* edited by David Hartwell and Kathryn Cramer (Tom Doherty, 2002)** Science fiction has a rich culture of short stories focusing on one scientific idea or development, published in magazines and on websites, plus anthologies that regularly collect the best of them. This is a good one to start reading, with stories from many of the best writers of hard SF today. Its 1994 predecessor, *The Ascent of Wonder: The Evolution of Hard SF,* goes back many decades to showcase older stories with a scientific bent. ❐

REVIEWED BY ANDREW FRAKNOI

Andrew Fraknoi is Chair of the Astronomy Department at Foothill College and served for 14 years as the Executive Director of the Astronomical Society of the Pacific. One of his short stories is included in the anthology Science Fiction by Scientists.

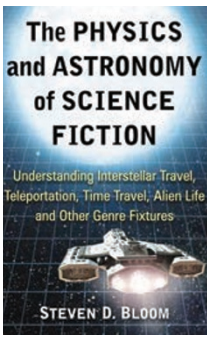
Getting it right



Science Fiction by Scientists: An Anthology of Short Stories

edited by Michael Brotherton

SPRINGER: 2016. 190PP. £15.00



The Physics and Astronomy of Science Fiction

by Steven D. Bloom

MCFARLAND: 2016. 277PP. £32.50

Science fiction is a difficult genre. In its most orthodox hard-SF form the writer has to get both the science and the fiction right, and very often the science bit proves tricky. So when scientists start writing, at least that is taken care of. Many researchers are keen on speculative fiction, with numerous examples in the Futures series published weekly by *Nature*, and intermittently in *Nature Physics*. In the same spirit, the Springer series Science and Fiction explores the boundaries and overlap between the two in different forms ranging from scientific novels to titles such as *Hollyweird Science* or *Using Medicine in Science Fiction*.

The latest addition to this series is an anthology edited by Michael Brotherton, collecting fourteen short stories by fourteen scientists with backgrounds in physics, astronomy, computer science, neuroscience, cell biology or molecular genetics. They blend classic science fiction themes with serious science: the Turing test, type Ia supernovae, hidden variables in quantum mechanics, stem cells, epigenetics, Schrödinger's cat and more. Most of the characters are scientists, reminiscent of 'lab lit' — a lesser-known literary genre that tries to portray scientists realistically, beyond the classic lab coat stereotypes. None of the fourteen authors shies away from detailed and accurate scientific explanations. Here, scientist characters come in handy, as they can naturally lecture about difficult topics. The authors complement their stories with additional explanations, interesting in themselves. Overall, the anthology leans a bit to the hard side of hard-SF, but that is a treat for the scientifically minded reader.

But most of the popular science fiction is not written by scientists, and is not exactly scientifically accurate. Steven Bloom, professor of physics and astronomy, and former researcher at NASA's Goddard Space Flight Center and the Jet Propulsion Laboratory, dissects the physics and astronomy of science fiction. He gives accessible and entertaining explanations of the good and the bad science in beloved series from *Star Trek* and *Doctor Who* to *Battlestar Galactica*. Some of my personal favourite science fiction sins are explosions in vacuum with spectacular flames and sounds, the ability to ignore Newtonian mechanics whenever convenient, and outrageous violations of the second law of thermodynamics.

But is getting the physics right even so important? Ideally, science fiction should at least be scientifically plausible, but after all, this is not the main reason that people love the genre or that scientists are inspired by it. A genuinely good science fiction story is a pleasure to read regardless of whether it was written by a professional writer or by a physicist. As author Neal Asher put it (http://go.nature.com/2bsgyfy): "Science fiction […] is there to entertain and stimulate the imagination. There is absolutely no doubt that many of the imaginations it stimulates belong to scientists. To some extent it drives and directs science." ❐

REVIEWED BY IULIA GEORGESCU