

The Elegant Universe by Brian Greene

Review by Richard Rusczyk,

If you've ever wondered what's the fuss with string theory or what the theory's all about and you're not willing to go through six years of postgraduate education to get the details, this is the book for you. In [The Elegant Universe](#) Brian Greene conveys the basics of the theory without delving into high level mathematics or physics, as well as describing the state of research today and the possible impact of string theory on cosmology (particularly black holes and the 'beginning' of the universe).

Greene starts with brief descriptions of relativity and quantum mechanics. Don't be daunted by the words 'quantum mechanics' and 'relativity' - Greene's presentation of these topics is understandable without anything more than basic high school math and physical science. His book is fine for these topics, though if you're really interested in them, look elsewhere (for quantum mechanics, particularly [In Search of Schrodinger's Cat](#) and its sequel, [Schrodinger's Kittens](#), by John Gribbin). Greene's quarry is string theory, not quantum mechanics or relativity.

Greene then describes how quantum mechanics and relativity don't work and play well together - we don't yet have a neat theory to unify them. String theory is many physicists' current effort to come up with so-called Theory of Everything Einstein sought in vain during the final thirty years of his life.

Greene presents the rudiments of string theory, doing a pretty good job introducing concepts such as rolled-up dimensions to the lay reader. I feel like I have a basic understanding of what they're shooting for (though certainly not an in-depth one) as well as an appreciation of the historical steps the research has taken in the last twenty or thirty years. He also effectively delivers the elegance of the theory, though this may be less obvious to the less mathematically inclined, and is also subject to the objections I'll get into below.

This book, like a few other science books I've read in the last couple months, made me feel a little like I blew it studying chemical engineering, and spending years trading bonds... I think I would have loved being a scientist. Even Greene's somewhat silly brief breathless recounts of his own little contributions remind me of the thrill of discovery in math and science (for a very good recount of the role of human nature in science, check out James Watson's excellent [The Double Helix](#)).

As for string theory in specific, the book did get me excited, but not yet sold. Greene is very honest about the theory not yet producing any experimentally testable results. Indeed, this is the primary objection of many prominent physicists today. Greene does point in directions that string theory might be vindicated, but concedes that these may

well be far off. Throughout the string theory section of the book, I couldn't shake the feeling I often had while working in the wrong direction on complex math problems back in high school. You advanced problem solvers know what I'm getting at - you make a grand hypothesis, plug at it for an hour, then discover it reduces to the stirring observation that $0 = 0$. Even if string theory doesn't get quite that redundant, there's a nontrivial possibility that it just gives us another description of the universe with no greater predictive power than particle physics - e.g. the fundamental constants which are the 'axioms' of particle physics will be replaced by the geometry of a highly specific ten (or eleven or whatever they decide)-dimensional space, yet these theorists will no more be able to say why this geometry is the geometry of the universe as opposed to another than particle theorists can say the mass of an electron is one value rather than another.

Greene is an advocate; he doesn't hint at these doubts (he does mention a few times that string theorists may be completely wrong, but he obviously thinks it's very unlikely). Maybe I'm just silly to have them - but I'm probably a solid six years of study that I'll never do from having the background to make a more sane judgement than I have from reading this book.

Despite this skepticism, I can't recommend this book highly enough for students considering physics in their future or for anyone who is pestered by the question of why the universe is the way it is. Had I read this book when I was in high school, I might well have become a physicist - I don't think I could praise the book more highly than that.

Additional books by Dr. Greene: *The Hidden Reality*, *Icarus at the Edge of Time*, and *The Fabric of the Cosmos*.