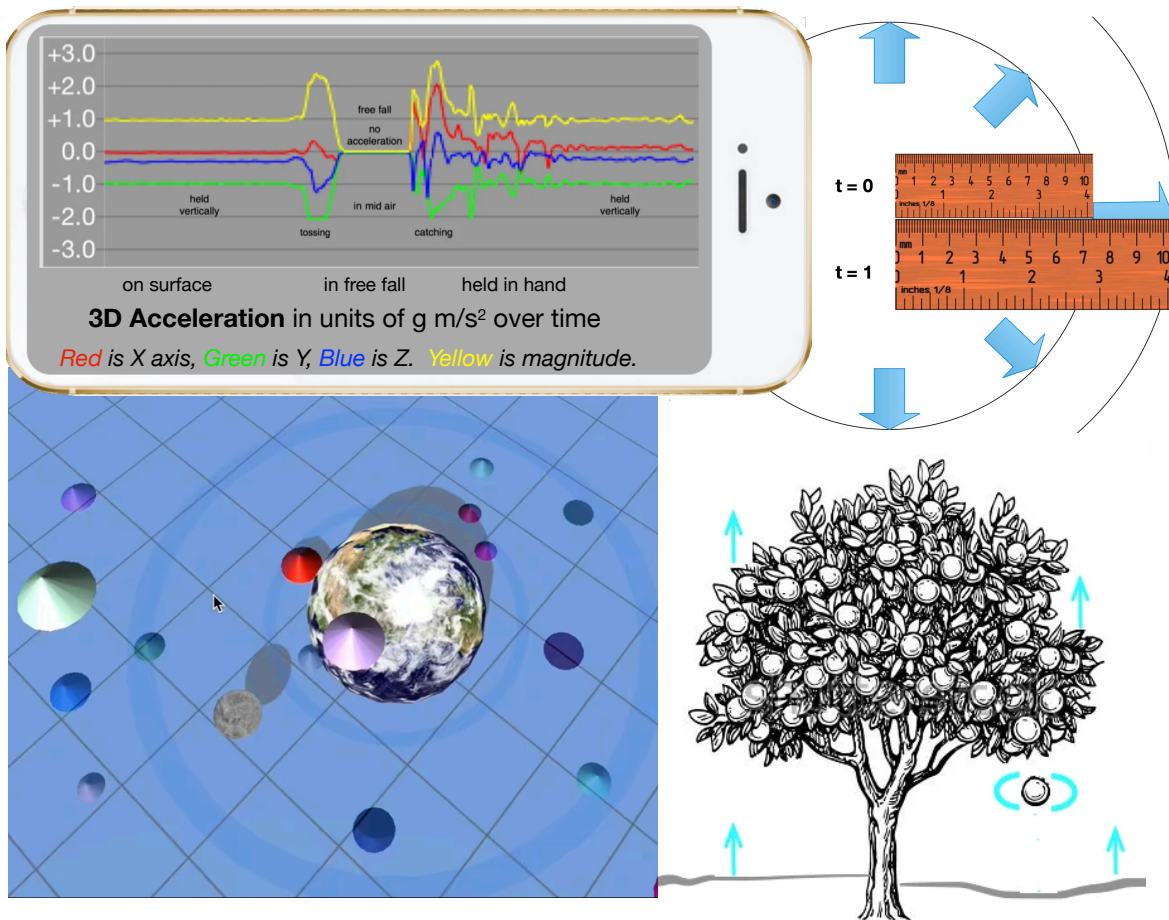


The Secret Truth About Gravity

Dr. David Levitt

This revolutionary book explains Einstein's theory of gravity using an easy new method, enabled by today's mobile devices. Mobile *accelerometers* let anyone experiment, and offer new insight into Einstein's century-old theory. Easy experiments show just what Isaac Newton misunderstood, how Einstein got it right — *and* why what you believe about gravity is probably wrong!



There's no force pulling objects downward towards earth. Absurdly, earth's surface accelerates upward and outward — causing our weight, while creating the *illusion* that nearby objects are falling — what physicists call a *fictitious force*. And somehow,

the earth pushes outward that way *without* getting any bigger. It seems impossible — until we understand that space itself can stretch, and a ruler on earth's surface isn't necessarily the same length it was a moment ago.

It's all part of Einstein's *spacetime curvature* theory, the core of his *general relativity* theory. It's more than a century old, but it's still so *implausible* that many physicists and relativity books avoid it or misunderstand it. They'd rather not mention gravity is a *fictitious force*, or show you how that works. They'd sooner bury you in a hundred pages of 4D symbolic equations — *some of it literally greek!* — than directly ask you to believe such crazy stuff.

So you've found a subversive book.

The Secret Truth About Gravity is the first book to draw a simple, logical line: from Einstein's original insight about gravity while riding an elevator; to how space stretches over time in the vicinity of matter; to how Newton's and Einstein's theories of gravity are kin but also in some ways, opposites; to why an iPhone's sensors will insist it's *not accelerating* when you've dropped it — but it's *actually accelerating skyward at 1 g* when it rests on a table.

It's a short book about a profoundly simple, elegant, easily proven but rather surprising theory. Many scientists consider it the most significant scientific theory ever. But don't worry — whereas intimidating 20th century tomes like Misner-Thorne-Wheeler's classic *Gravitation* took 1200 pages to explain gravity, we'll do it in more like 12 pages, in the first chapter of the book — our sample chapter here.

And that's the wonderful thing about this approach. It makes Einstein's theory of gravity understandable, hands-on, and fun.

Subsequent chapters follow two basic threads:

- offering more and better ways to see how gravity arises from spacetime curvature, including experiments you can do

yourself with heavy objects or with your smart phone; 3D animation; live app experiences; and thought experiments like the ones Einstein loved to do

- explaining how key aspects of the most renowned scientific theory in human history could remain ‘secret’ from so many scientists for over a century!

Why don't more people know the truth about gravity? It's partly that pocket accelerometers haven't existed for very long. But more important, people just *aren't comfortable* thinking that *the pull of gravity is an illusion*, or that *the lengths of rigid objects and inches themselves are stretching*. We deeply reject these ideas, intellectually and emotionally, and in the long run each person processes the facts differently.

Physicists aren't immune. Levitt has taught students of all ages, interviewed dozens of scientists, and reviewed a hundred textbooks and articles on relativity and gravity. He describes many common ways we resist and deny the evidence for how space stretches and how spacetime curvature causes gravity.

So the reader's journey includes more controversy than we find in most science books — seeming contradictions, denial, discarded evidence, innocent half-truths, obfuscation, and even ghosting, gaslighting and bluffing — verging on the feel of investigative reporting or a detective thriller. Throughout, the reader remains firmly grounded in their own experiments and perceptions, and material from renowned Einstein, Richard Feynman and Kip Thorne.

The Secret Truth About Gravity becomes a celebration of how we discover and learn new things by questioning conventional wisdom. In a new era where every smartphone can become a personal physics lab, it's about democratizing science — both the experiments and the ideas — questioning jargon, and making ideas accessible far beyond any academic cloister.

Some readers may even come to understand how gravity works more clearly than Einstein did — since he did not have today's pocket accelerometers and computer graphics to help him experiment and explain. Einstein was, in fact, anguished by how his contemporaries' math obscured his ideas — as outlined in the sample chapter.

Dr. Levitt's unique background — MIT professor, media scientist, mobile and augmented reality innovator, physical simulation engineer, cognitive scientist / AI researcher, app developer and 3D animator — lets him share simple experiments and insights that are missing from many physics books.

About the Author

Dr. David Levitt is a technology innovator, physicist, author, entrepreneur and research scientist. He is president and CEO of Pantomime Corporation, an augmented reality (AR) software company, and a research fellow at Stochastic Labs in Berkeley. He earned his doctorate in Artificial Intelligence and MS in Electrical Engineering and Computer Science from MIT, and a BS in Engineering and Applied Science from Yale.

Levitt co-authored his first physics publication as a research fellow at Bell Laboratories. Dr. Levitt was on the founding team of the MIT Media Lab, where he led a research group that created real-time apps like *HookUp!*, which let artists add gravity and physics to Director animation projects, and *Max*, which is still popular with digital music developers today. When he joined the team that invented virtual reality at VPL Research, Levitt created the first VR worlds with physics, gravity, object collisions and 3D sound.



Levitt's doctoral thesis was the first AI thesis to capture the core common knowledge of melody, harmony and rhythm to generate jazz and classical music. Levitt was co-editor of the book *Machine Models of Music* for MIT Press in 1993, which includes a summary of his thesis and the leading articles on music and AI up to that time.

Levitt has been a research scientist and product developer at Atari, VPL, Viacom and Interval Research, has taught at NYU and MIT, and co-founded three startups, including Pantomime Corporation in 2014. In 2022 Pantomime launched *Reality Construction Kit* app software, which uses the LiDAR depth sensors in iPhone and iPad Pros to create AR with uncannily realistic physics that reflects to the user's unique environment. In 2023 Dr. Levitt joined Stochastic Laboratories in Berkeley, California as a research fellow.

In the fall of 2023 Dr. Levitt presented *Accelerometer Experiments Prove and Clarify Einstein's Gravity Theory* at the *ACP 2023 Conference on Fundamental and Applied Physics*, sharing the core material behind *The Secret Truth About Gravity*.

Target Market and Comparable Work

The Secret Truth About Gravity topic appeals to a wide audience that includes readers of *Scientific American*, *Wired*, *Popular Mechanics*, *Technology Review* and numerous science columns of periodicals — readers curious about the physical world and knowledge itself.

It offers closure to readers of many popular books that discuss relativity but don't quite describe how gravity works. Rovelli's million seller *Seven Brief Lessons on Physics* and many others fit this description.

Our unconventional hands-on approach also fulfills some readers' desire to be part of the discovery process in science. A simple companion app lets readers do experiments themselves, seeing whether Einstein's or Newton's theory is correct, and reviewing data as they rotate or wiggle their phone, flip it over or toss it in the air.

Science fans who read physics bestsellers by Neil deGrasse Tyson and Steven Hawking wind up in literally distant realms of cosmology. Levitt's approach to gravity teaches relativity concepts by *engaging readers with the world directly around us* — how we feel on an elevator or in a vehicle, the pressure against our feet, what happens when we jump, or to an object we've dropped or tossed.

Dr. Levitt's approach has some of the same irreverence as Sabine Hossenfelder's recent bestseller *Existential Physics* and YouTube channel *Science without the gobbledygook*, with similar appeal.

Launch, Promotion and a Long Tail

Launch begins in winter 2023, when the presentations Dr. Levitt gave at the 2023 ACP Conference on Fundamental and Applied Physics begin to appear in published conference proceedings.

Article, Poster and App: This includes a scientific poster and article that explain Einstein's gravity theory in everyday terms, and proves it using data from accelerometers — with app software that lets users demonstrate and prove it themselves.

News: this work is sufficiently different from past summaries of Einstein's gravity that, although the theory itself is a century old, this accessible new format and the technology behind it qualify as science news about Einstein's theory.

Popular Science: We will contact the editors of popular online and print scientific publications: the likes of *Scientific American*, *Wired*, *Technology Review*, *Popular Science*, *Popular Mechanics* and similar periodicals. In concert with editors, Levitt will customize 1200 to 5000 word versions of the article and poster artwork, suited to each audience and context.

Online scientific video publishers like Veritasium, who already have begun addressing this with video like Gravity Is Not A Force.

TED and TEDX talks

Interviews

Ask Me Anything forums

Quora threads — author excels at explaining these ideas to lay audiences

The Secret Truth About Gravity and other Forbidden Ideas

- podcast with physicists, animators, relevant scientific topics

Early reader reaction

I finally get it! This clears a lot of confusion I had. Now it just needs some time and repeating to get used to the facts.

Thank you for such an easy-to-understand introduction and description of these subjects. You have a gift for explaining this stuff .

Now I get it. I heard Professor Brian Cox state that gravity was the earth pushing up at us, and even with a lifelong layman's interest in physics, I couldn't wrap my head around the idea, but now it makes sense.

Now that I know the truth, it's like we've all been gaslighted about physics and gravity for a century.

[Such] popular expositions that have the science right are appreciated widely and inspire kids. They're a good thing. As long as people agree on the equations and predictions, I figure they're allowed to have their own mental pictures. In fact, I bet that the diversity contributes to further scientific progress.

— Nobel laureate physicist Prof H. David Politzer of Cal Tech