

A Physicist Explains
How Science Shattered His Atheism
and Revealed the Necessity of Faith



BELIEVING

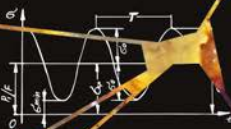
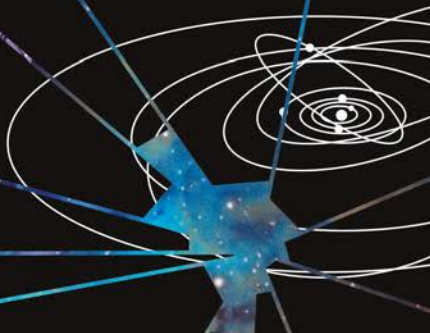
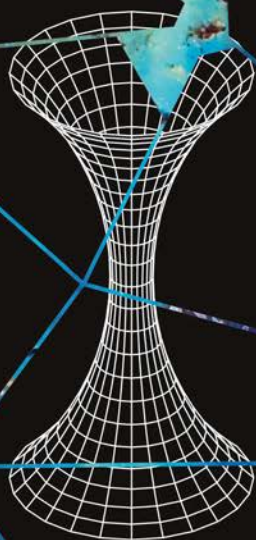
"Dr. Guillen's new book will produce
a seismic shift in the minds of skeptics
and believers alike regarding the
nature and power of faith."

—RICE BROOKS—
bestselling author of *God's Not Dead*

IS

SEEING

MICHAEL GUILLEN, PhD
FORMER ABC NEWS SCIENCE EDITOR



PRAISE FOR *BELIEVING IS SEEING*

I can see many exclaiming, “This is the book I’ve been searching for!” Dr. Michael Guillen has written an exceptionally accessible overview on how science and faith are not only compatible but also infinitely parallel and wholly inseparable. Parents, this is the book to give to your science-minded sons and daughters before they go off to college.

JAMES M. TOUR, Professor of chemistry, materials science and nanoengineering, and computer science, Rice University

Michael Guillen is that rare breed of science journalist who is also an actual scientist. Not surprisingly, then, *Believing is Seeing* is as deep and profound as it is readable.

KARLE. JOHNSON, Founder, Chesterton House, and executive director, Consortium of Christian Study Centers

In *Believing Is Seeing*, Michael Guillen reveals how magnificently and inextricably science and the Christian faith are intertwined. The same pervasive beauty, elegance, logic, and truth permeate both. This awe-inspiring book comes from one of the most colorful and engaging and laugh-out-loud entertaining communicators I have ever met.

HUGH ROSS, President of Reasons To Believe and author of *The Creator and the Cosmos* and *Weathering Climate Change*

This is a fascinating, readable, and compelling book, especially for those who think our wonder-full universe is one grand accident. It isn't.

ROBERT C. FAY, Emeritus professor of chemistry, Cornell University

In this striking account, the author explains why he gave up his atheism to put his faith in God. With great skill, important concepts in contemporary physics are introduced for the nonspecialist, and the author shows how such ideas played a key role in his gradual journey to faith. Science, he explains, used to be his god—but no longer. Yet the author remains a passionate advocate for science, albeit now appreciated within a much broader worldview. The style is fast-paced, and there are plenty of fascinating facts and anecdotes, some quite personal, to keep the reader fully engaged until the last page.

DENIS ALEXANDER, Emeritus founding director of the Faraday Institute for Science and Religion and emeritus fellow of St. Edmund's College, Cambridge, UK

What awaits you in these pages is an exhilarating discovery of a worldview that will enable you to confidently navigate the inevitable storms that lie ahead *and* every challenge, disappointment, and setback you're facing right now. Wherever you are on your journey of faith—deeply steeped or hard-boiled skeptic—*Believing Is Seeing* will jolt you from your comfort zone, propel you toward finding and discovering Truth, and bolster and deepen even your tepid faith. A must-read book for our times.

NANCY STAFFORD, Actress (*First Lady*, *Matlock*), speaker, and author of *The Wonder of His Love* and *Beauty by the Book*

It is unusual to find a world-class scientist who is also gifted at communicating complex ideas. Dr. Michael Guillen is one of those rare gems. In his latest work—destined to be a classic—Dr. Guillen puts these skills to good use as he offers us his insight into the nature of reality. Guillen helps us see that all facets of our lives depend on our faith commitments, on what we believe—even logic, math, and science. This insight means that, despite popular opinion, there isn't a conflict between faith and reason. Instead,

Guillen makes a compelling case that reason rests on a foundation of faith. After reading *Believing Is Seeing*, you will be compelled to examine your own beliefs. Does your faith rest on what is true? Is it a misguided faith—or an enlightened one?

FAZALE “FUZ” RANA, PhD, Biochemist, and author of *The Cell's Design*, *Creating Life in the Lab*, and *Humans 2.0*

I remember a time when my son was embarrassed about asking questions in school, and I told him the smartest people ask the most questions. Dr. Michael Guillen is one of the most brilliant men I've ever met. He is curious about everything and never stops asking questions and helping others find the answers. In his new book, *Believing Is Seeing*, he brings together science and the Bible and shows us how to create a worldview based on absolute truth.

ROBERT MORRIS, Senior pastor, Gateway Church, and author of *The Blessed Life*, *Beyond Blessed*, and *Take the Day Off*

No one discusses the relationship between IQ and SQ (spiritual intelligence) better than Michael Guillen, encouraging a deep reflexive response. This book needs to be read by anyone critically examining the role their individual faith and belief system plays in guiding them toward purpose, service, and leadership.

STEPHEN KIRNON, Program chair social entrepreneurship and change, Pepperdine University and serial life-science entrepreneur

What I particularly appreciate about Michael is his passion for the discoveries of both science and Christian faith and the way he combines these with a truly impressive academic training and a curious and brilliant mind. All this (and more) you'll experience within these pages.

GREG COOTSONA, Author of *Mere Science and Christian Faith*

In *Believing Is Seeing*, physicist and science journalist Michael Guillen tells the story of how he discovered a deep consonance between the scientific world picture and a Christian worldview. He not only shows how the presuppositions that make science possible flow naturally from belief in God, but he also shows that scientific discoveries about the design of life and the universe provide evidence for the reality of God. Guillen's engaging intellectual autobiography will help people from all walks of life wrestle with, and answer, life's deepest questions. Highly readable and highly recommended!

STEPHEN C. MEYER, PhD, Director, Center for Science and Culture
Discovery Institute, and author of *Return of the God Hypothesis*

Many think of faith and science as polar opposites. Yet, in *Believing is Seeing*, Michael Guillen shows how, at its root, science itself stands on a foundation of faith. With the insight of a trained astrophysicist and the easy-to-read clarity of a journalist, Guillen writes about physics, astronomy, mathematics, and the methods of science as a whole, showing how they rest on truths that must be accepted by faith.

As a boy growing up in the barrios of Los Angeles, Guillen dreamed of being a scientist. He made it from the barrio to the halls of Ivy League universities and to an Emmy award-winning career in television. But the most surprising turn in his story happened when his study of nature led him to a surprising encounter with the God of nature. In telling his story, Guillen challenges us to examine our own story—and how that story relates to our view of the world around us.

I recommend this book for those who want to know if it is possible to resolve the conflict between science and faith and for those interested in exploring the deep truths of life to which science points.

EMMANUEL HAQQ, PhD, Senior pastor, Christ Community Church,
Belchertown, MA

Believing Is Seeing



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BELIEVING IS SEEING

MICHAEL GUILLEN, PhD
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and understands that it is
far bigger than proof.*

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INTRODUCTION

Why I Wrote This Book

As a physicist, mathematician, astronomer, and Christian, I have a worldview broad enough to accommodate both the scientific method and the Bible . . . reason and faith . . . the universe and God.

During my long and winding intellectual and spiritual journey, I've learned two enormously helpful lessons. First, logic does not represent the pinnacle of human intelligence, critical thinking, or wisdom, and it's not faith-free. Second, science is not the enemy of God; instead, it is God's *gift* to humanity, a brilliant way to explore his transfinite nature and stunning creation.

For the past several years, I have been touring university campuses far and wide, answering students' questions about science and Christianity—a hot-button issue since at least the days of Darwin. The questions span the full gamut of human curiosity, from “Do you really believe the *entire* Bible?” to “Do you think that science can explain *everything*?”

Wherever I go—be it Reykjavik or Warsaw or New York City or Phoenix—my young audiences include fresh-faced, impassioned Christians, Atheists, New Agers, Muslims, Buddhists, Nones, you name it. Typically, they keep me up past midnight, thirsting after answers about logic and faith, science and religion, exceptionalism

and pluralism—worrying about what the future will look like for them, individually and collectively.

From these wonderful face-to-face meetings, I've made lots of young friends and learned many things about their emerging—and in many ways unparalleled—Gen-Z generation. One lesson is crystal clear: The traditional Christian Church has lost young people by the tens of millions, even those who were brought up by devoutly Christian parents. As many young Christians go off to college and find themselves surrounded by vocal skeptics, they are tempted to believe that God, Jesus, and the Holy Spirit are childish fables and the very idea of faith is somehow lowbrow.

Away from home, feeling set adrift, and beset by uncertainty, many of these young people have turned to science as their go-to authority. And no wonder. They've grown up reading about the miracles wrought by science and technology: connecting the world through handheld devices, creating humanlike robots, curing diseases, sending spacecrafts to far-off worlds, decoding the human genome, inventing new forms of life, even restoring sight to the blind.

But make no mistake: Science, too, has alienated many young people. More than any other generation, Gen-Zers are suffering the unintended consequences of the Age of Social Media. They're watching with dismay as their peers are devastated by unprecedented levels of depression, loneliness, and suicide. In fact, the very night I was speaking at the University of Kentucky, a student in one of the dorms took his own life.

And it's not just young people. I dare say there isn't anyone today who isn't concerned, for example, about the Internet of Things (IOT), that burgeoning network of Web-controlled "smart" gadgets that rule our lives—from voice-activated assistants and TV sets to coffeemakers and vacuum cleaners. Or the double-edged scientific innovations that now threaten our human identity, livelihoods, and privacy—such as genetic engineering, artificial intelligence, and

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facial-recognition technology. Some distraught rebels have tried “cutting the cord”—shunning social media, disconnecting from the IOT, or living off the grid—but the devastating head-on collision between freedom and technology demands deeper, wider, more thoughtful remedies than that.

It might even require a complete overhaul of your current worldview.

What do I mean by *worldview*? It is how you see yourself, others, the cosmos, and God. It is your religion, whether you call it that or not. It is your own personal Svengali, the all-powerful puppeteer deep within your subconscious that pulls your strings, that controls not only how you see everything but how you react to everything—including this book.

You might pride yourself on being a smart, sophisticated, modern-day person with a smart, sophisticated, modern-day worldview, but don't kid yourself. Your worldview is not based on logic. It is based on faith. That's right: *faith*. Like everyone else's worldview—including mine—yours is ultimately based on what you *believe* to be true, on ideas and feelings that cannot ever be proved.

That is why faith, far from being a weakness, is far stronger than logic, stronger than empirical evidence, and certainly stronger than feelings. Faith is the mysterious, widely misunderstood agent that powers every one of your worldview's unprovable beliefs. It's the granite foundation that supports the entire weight of your worldview.

Faith dictates how you see, think about, and relate to everything within and beyond the universe. Everything. In other words, *believing is seeing*.

Atheists boast about being “free thinkers,” but they rely on faith every bit as much as a fundamentalist Christian does. Every one of an Atheist's so-called free thoughts is based on assumptions that cannot be proved. We'll get into that in a later chapter.

Likewise, people calling themselves “true believers” boast about going through life relying purely on faith. Yet, when pressed, they

cannot explain the actual phenomenon of faith. In this book, you'll discover what it is, exactly.

On top of all that, many individuals—and you might be one of them—see logic and faith as implacable adversaries and, therefore, believe they must choose between the two. Worst of all, they talk up the importance of *evidence-based thinking* but have a woefully fractured view of what it is.

A recent global survey gave high school students a reading assignment and tested their comprehension. On average, fewer than 9 percent of 15-year-olds surveyed were able to tell the difference between fact and opinion.¹ *Nine percent!* Worse, this appalling derangement doesn't afflict only teenagers; we see it in full display in today's professional media, where editorializing and propagandizing are routinely presented as factual reporting.

The results of this poll and others affirm what I've learned firsthand from my speaking tours: Not only do many of today's young people equate opinion with fact, but they also believe that opinions and feelings are *more important* than facts and that *faith* is like an ugly four-letter word.

This pervasive malady is bad news for both science and religion. The worst of all worlds.

The personal and social fallout from such a severely misguided worldview portends a grim future for you, me, and our loved ones. For the United States. For the planet.

Indeed, if things don't improve, today's unprecedented levels of loneliness, depression, and suicide will prove to be only a preview of greater tragedies to come. When life hits the fan, people young and old will discover too late that their unexamined worldviews are empty, toxic, and even deadly.

So then: *What is your worldview?* Have you ever thought about it? Most people haven't.

If you're like most people, your worldview is like your car. You

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give it just enough attention to keep it running. You take it into the shop when something's amiss, but you have never once crawled underneath the chassis or looked under the hood to see how it works.

Even now, despite what I've already told you, you might be wondering: *Honestly, does my worldview really matter that much?*

Yes, it does.

It's why I've written this book.

This book teaches you how to become your own worldview mechanic. Using real-life stories, I show you how to hoist your worldview onto a hydraulic lift and inspect it from the bottom up. I show you how to give it a tune-up—or if necessary, a complete overhaul. So when you're done, you'll drive away with a big, beautiful, new, truth-based worldview that will serve you well in life—especially in times of trouble.

In these pages, you'll read about what happens to people who fail to inspect their worldview. People in crisis whose dysfunctional worldview actually ended up killing them. People whose misguided Svengali shone their problems in the worst possible light—causing them to lose hope, to believe there was no conceivable way their lives could get any better.

What about you? What personal setbacks are you facing right now? Is it your health? Your job? A relationship with someone near and dear to you: friend, relative, spouse, lover, child?

Whether you realize it or not, in times of trouble, your worldview is your most treasured possession—arguably your *only* treasured possession. Why? Because it's pulling your strings. It's controlling how you see and react to whatever is vexing you.

Is your worldview big enough to include God? Is it based on enlightened faith? On misguided faith? Depending on the answers, your worldview will either rescue you from your troubles or send you over the edge. It will ultimately spell joy or continued sorrow. Life or death.

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That's what's at stake for you. *That's* why your worldview matters so much. And *that's* why your very next decision will determine which fork in the road you'll take on the journey of life.

Will you stop reading here, put down the book, and drive away in your old, beat-up worldview? Or will you forge ahead and learn how to claim a brand-new, well-informed, powerful worldview? One that will see you safely and serenely through the inevitable tempests of life—and more than that, fly you to the highest possible, most breathtaking mountaintops of human experience.

The choice is now upon you.

The very next instant is the beginning of your future.



MY JOURNEY

What mind can penetrate your nature?

What language can express this marvel? None, to be sure.

*This is where human discourse turns toward
the contemplation of the divine.*

LEONARDO DA VINCI

CALIFORNIA DREAMIN' . . . AND BEYOND

*Ah, but a man's reach should exceed his grasp,
Or what's a heaven for?*

ROBERT BROWNING, "ANDREA DEL SARTO"

Three things you should know about me: First, I was born in the heart of East Los Angeles—I'm five-eighths Mexican, one-quarter Cuban/Spanish, and one-eighth Austrian (go figure)—and I *love* Mexican food. Second, I'm a bit of a rebel. Ever since I was young, I've gone my own way, even to the point of being deliberately contrary at times. Third, I'm curious about *everything*. I drove my teachers crazy with all my questions. In junior high, my math teacher hated me because I constantly interrupted his class. Finally, he got so fed up that he started calling me Michael *Jillion*—because I asked a jillion questions. But I didn't care. I kept asking.

In some ways, I relate strongly to Dr. Frankenstein—though not in the sense of piecing together dead body parts and making them come to life! What I resonate with most is his passion for wanting to know how the universe works.

In Carl Laemmle Jr.'s 1931 film adaptation of the Frankenstein

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story—my absolute favorite version—the role of the rebel scientist is played by Colin Clive, a suave-looking British actor. Just after creating the monster, he is scolded by the elderly, straitlaced Dr. Waldman, played by Edward Van Sloan. In my opinion, this iconic scene captures perfectly the heart and soul of a scientist:

DR. WALDMAN: “This creature of yours should be kept under guard! Mark my words: He will prove dangerous.”

DR. FRANKENSTEIN: “Dangerous? Poor old Waldman. Have you never wanted to do anything that was dangerous? Where should we be if nobody tried to find out what lies beyond? You never wanted to look beyond the clouds and the stars, or to know what causes the trees to bud? And what changes the darkness into light? But if you talk like that, people call you crazy. Well, if I could discover just one of these things—what eternity is, for example—I wouldn’t care if they did think I was crazy.”¹

In second grade, I began to dream—*literally*—of becoming a scientist. In my sleep at night, I saw myself wearing a white coat, working in a lab filled with equipment, and being awarded the Nobel Prize—for what, I can’t remember. All I know is I was happy as a pig in slop.

Chasing that blissful dream got me out of the barrio and into UCLA, where I earned a BS in physics and mathematics. Afterward, I applied to and was accepted by the graduate physics department in several famous universities. Cornell was one of them.

Before I made my decision, my dad and I started out by flying to Upstate New York to visit the Cornell campus. It was late March, and the trees had no leaves. We both thought there had been a fire. Growing up in Southern California, we’d never seen anything like it.

I met the physics faculty and toured the Wilson Synchrotron Laboratory, a world-class atom smasher right there on campus. I was scheduled to visit Princeton next, but I told my dad it wasn't necessary. I was convinced Cornell was the perfect school for me.

The morning of our departure for home, we were awakened by a phone call from David Cassel, the physicist who was to become my thesis chairman.

"Morning!" he chirped. "Have you looked outside yet?"

"No," I replied, rushing to open the blinds on the big window of our hotel room, revealing a landscape covered in snow.

"Welcome to Ithaca!" Professor Cassel sang out.

After checking out of the hotel, Dad and I couldn't resist. We stepped outside and immediately started playing in the snow like a couple of overgrown kids. The lady behind the front desk stared at us incredulously, and for good reason. As I was to learn, by late March, Ithaca residents were well fed up with snow.

Several months later, when I returned to Cornell by myself to begin my studies, I felt as if I'd won the lottery. This poor little nobody from the wrong side of the tracks was actually going to become a physicist. *Imagine!*

It was the beginning of a brand-new and *very different* life than I'd had up till then.

I was reared in a strict, Spanish-speaking, Pentecostal household. My dad and both my grandfathers were ministers. In fact, for four decades, my paternal grandfather, after whom I am named, was the greatly adored president of *Concilio Latino Americano de Iglesias Cristianas* (CLADIC), the oldest, independent, Spanish-speaking Pentecostal organization in the nation, comprising churches in the US, Mexico, and Central America.²

When I was growing up, my family attended church every day; and the services were long, drawn out, raucous affairs. I remember the entire congregation, including my mother, jumping up and down

and ecstatically speaking in tongues. CLADIC members were forbidden from dancing, watching television, and a host of other things considered mentally, physically, and spiritually unhealthy.

The Bible claims that a blessing is a divine inheritance passed from generation to generation. So everyone I knew expected me to become a minister—and perhaps even one day succeed my grandfather as president of CLADIC.

But I was completely devoted to science, not to church services and what I considered ancient, supernatural beliefs. Even though I lived in a strict Pentecostal home, my mind, attention, and curiosity were somewhere else entirely. I was captivated by numbers and logic, natural phenomena, and the scientific method. And little by little, I absorbed the scientific worldview until it became my own. By the time I graduated from UCLA, I belonged body, mind, and soul to the worlds of science and Atheism, which seemed to me to go hand in hand.

When I departed LA for Cornell, therefore, I was very sad to say good-bye to my family and friends, but I was more than happy to leave behind the religion I had never really embraced. I was also relieved to escape from the pressure of going into the ministry, something I had *zero* interest in doing.

In short, the experience was *liberating!*

When I arrived in Ithaca and it began to sink in that I didn't know a solitary soul there, I realized it was fine with me. More than fine, actually, because it underscored that I was starting a brand-new life. *My* life. *My* dream. The dream I'd worked so hard to attain. The dream of becoming a monk. *A scientific monk.*

Fueled by passion and more than a little caffeine, I spent my days and nights either in class or in a dungeon-like lab—just like Dr. Frankenstein! At most, I slept maybe three hours a night, typically from three to six o'clock in the morning.

My lab was in the basement of Cornell's high-energy physics

building, the Laboratory of Nuclear Studies (LNS).³ Inside that spacious, windowless man-cave, I couldn't tell whether it was day or night, and I didn't care. I barely ate, and when I did, it was mostly from vending machines in and around the LNS. Truth be told, I was a skinny, unkempt, intense uber-geek, sporting tight corduroy jeans and a cloud of unshorn curly brown hair.

I had no social life, no friends to speak of, and my family was 2,700 miles away. But I was perfectly content. All I cared about and thought about was *science*.

At first, as a twenty-one-year-old freshman grad student, my curiosity was laser focused on learning what the universe was made of. What were its most fundamental elements?

I got to thinking: When you magnify a digital photo, you see pixels, right? So, then, if you magnify the universe—push past its electrons, protons, neutrons, quarks, gluons, and so forth—if you keep magnifying and magnifying, what will you ultimately see? Pixels of matter? Pixels of energy? Pixels of spacetime? I was more than eager to find out.

One day, however, a group of observational astronomers, led by Princeton's legendary P. J. E. Peebles, announced that galaxies are not scattered randomly throughout the universe, as we'd always supposed. Rather, they form a pattern, like a magnificent 3D work of art.

Where did this pattern come from? What did it signify? Was it just an accident?

Suddenly, *those* were the deep questions I wanted to answer. But it would mean switching from focusing on *pixels*, the smallest things in the universe, to focusing on *galaxies*, the largest things in the universe.

Changing your major in grad school isn't easy, but I didn't care. I was determined to follow my own path. Told that I needed permission from Hans Bethe, Cornell's legendary theoretical physicist, I went to see him.

In the 1940s, Bethe had led the theoretical division of the Manhattan Project, which created the world's first atomic bomb. In the 1960s, he won a Nobel Prize for explaining why the sun shines.

Bethe was an old-school, no-nonsense German hard-liner, whose office was on the top floor of the LNS. We grad students were afraid of him—and of Velma Ray, his formidable secretary, whom we had to get past in order to see him.

It didn't take long for Bethe to decide my fate. In his thick German accent, he told me I needed to take two semesters of general relativity, arguably the toughest subject in modern physics. If I did well, he'd let me switch. If not . . . well, I'd have to stick to pixels.

The general relativity courses were taught by Saul Teukolsky, a brilliant young physicist whom Cornell had recently hired away from Caltech. The classwork was challenging, but I passed, and with Bethe's blessing, I began studying galaxies.

ONCE UPON A TIME, IN A GALAXY FAR, FAR AWAY

Very quickly I learned that galaxies rotate slowly, like enormous merry-go-rounds. According to a scientific law called the virial theorem, the more massive the galaxy, the faster it spins.

I also learned that galaxies spin much faster than they should, in apparent violation of the virial theorem. It's as if they are far more massive than they appear—like they're bloated with some kind of unseen material that makes them spin abnormally fast. My astronomy professors called this mystery the *missing-mass problem*.

Today, we call this hypothetical missing mass *dark matter*. Based on what little we know, we speculate it could be an entirely new invisible form of matter, ruled by an entirely new kind of force.⁴ But honestly, we don't know *what* it is—or even if it really exists.

More recently, we've discovered another oddity about the heavens that is also totally invisible: *dark energy*. From what we can tell

(which is precious little), it behaves like a *repulsive* force that causes the universe to balloon out at an accelerating speed.

And get this: Together, dark matter and dark energy seem to constitute *95 percent* of the entire universe. That's right, scientists now believe that 95 percent of the universe is invisible to us.

When I first learned about the missing-mass problem and what we now call dark matter, it blew my mind, rocked my reality, and challenged my perception of *everything*. (So did the discovery of dark energy, but that happened after I graduated, when I was teaching at Harvard.)

As a pious scientific monk—a liberated, free-thinking Atheist—I lived by the trusty adage that *seeing is believing*. I refused to believe in anything I couldn't actually see and that couldn't be proved.

But that worldview was now out the window because science had discovered that what we are able to “see”—what we're able to prove the existence of—is only a small fraction of what's out there.

The missing-mass problem made me realize that if I stuck with my hard-nosed, scientific worldview—if I insisted that “seeing is believing”—then I'd be turning a blind eye to 95 percent of what's out there in the universe. Clearly, my worldview was too narrow-minded for the cosmos.

It needed some expanding. It had to become big enough to include belief not only in what I could see and prove but in what I could *not* see or prove—such as dark matter. Otherwise, I couldn't honestly continue calling myself a scientist.

BEYOND MY WILDEST DREAMS

As I dove into my investigation of galaxies, I quickly realized I needed to immerse myself in not one, not two, but three different disciplines: physics, astronomy, and mathematics. Once again, I petitioned for permission to make the change.

BELIEVING IS SEEING

It was an unprecedented request, but I was fortunate to receive permission—thanks in large part to the unwavering support of my thesis chairman, David Cassel. So I ended up having offices in all three departments, surrounded by three distinct groups of wonderful, brilliant colleagues from whom I learned a great deal.

I remember being very excited when I first learned about kinetic theory. It had always been used to describe the behavior of gases, but I struck on the idea of using it to explain the behavior of galaxies.

I immediately pursued my hunch with the encouragement and mentorship of Richard Liboff, a world-renowned expert in kinetic theory, who ultimately became my thesis advisor.⁵ Years later—after one of the most intense, nonstop efforts of my young life—I hit pay dirt. I discovered an elegant mathematical explanation for why galaxies form a spectacular 3D pattern in deep space and published my finding in the *Monthly Notices of the Royal Astronomical Society*.⁶ The implications of this discovery were potentially revolutionary, so I submitted it for a PhD in physics, mathematics, and astronomy.

I'll never forget the day of my defense-of-thesis exam, the final hurdle I needed to clear before I could receive my 3D doctorate. Inside a small classroom on the top floor of the LNS, I stood at the blackboard facing professors from all three disciplines. According to the rules, they were allowed to ask me any questions they wanted, no matter how tough. And, sure enough, they let me have it!

The exam lasted four grueling hours, but I passed! And I'm not ashamed to admit that I wept like a baby as, one by one, my committee members offered a handshake and said, "Congratulations."

My dream had finally come true! I could not imagine being any happier!

Little did I know that, just a short while later, on my way north to Harvard, an even greater, more exciting adventure awaited me—one I never could've dreamed of. For as I'm now fond of saying, "A funny thing happened to me on the way to Cambridge."

On the trip, I stopped at the Museum of Natural History in Washington, DC, to attend a seminar on George Orwell's novel *1984*. It was hosted by Fred Graham, then the legal correspondent for CBS News.

At the reception afterward, I saw Graham and a woman standing alone, so I introduced myself to them. When Graham found out I was a scientist, he said something like "Hey, maybe you can settle an argument I'm having with my producer here."

"Sure," I said. "What's the problem?"

"You know that giant pendulum out in the rotunda? My producer says that once you get it going, it'll never stop swinging. I don't agree," he said. "I think you need to push it now and then to keep it going."

For me, it was a no-brainer.

"It's called a Foucault pendulum," I explained. "And there isn't much friction to slow it down—just a little rubbing where the steel cable attaches to the ceiling. But it's enough to gradually slow it down; so, yes, it *does* need to be nudged now and then."

Graham leapt at my explanation. "Wow!" he said. "Would you like to be on television?"

I thought he was kidding.

"No, really," he said. "CBS News is looking for a science reporter. If it's okay, I'd like to nominate you. I *love* how you explain things."

I went on to Cambridge, hardly believing what had just happened. I started my teaching job and soon began doubting that anything would come of the Graham encounter. But sure enough, weeks later, *CBS Morning News* hired me to be its new science and technology correspondent.

I was assigned to work with a veteran New York-based producer named Gail Eisen; years later, she went on to produce Diane Sawyer at *60 Minutes*. Gail patiently and expertly taught me the ropes, and in no time, I found myself appearing regularly on national television.

At Harvard, meanwhile, I had the honor of teaching under the senior leadership of Roy Glauber, a physicist who later won a Nobel Prize for a discovery he made in quantum physics. I loved teaching (and still do), so I was greatly moved when I was twice awarded Harvard's prestigious Danforth Award for Excellence in Teaching.

After appearing on *CBS Morning News* for a few years, I was stolen away—first by Phil Balboni, the famous news director at WCVB, the ABC affiliate in Boston, and then by ABC News itself, based in New York City.⁷

At first, I did science reports only for *Good Morning America*. But soon enough I also began appearing on *Nightline*, *20/20*, and *World News Tonight*. Altogether, I had the great honor of working with Barbara Walters, Hugh Downs, Ted Koppel, Peter Jennings, Joan Lunden, Diane Sawyer, Oprah Winfrey, Connie Chung, and many other first-rate professionals.

During those years, I split my time between Harvard and ABC News. It was a fun, glamorous life—but also a tumultuous and stressful one. One day I'd be on campus, inside Harvard's Science Center, teaching physics to undergraduates. The next day I'd be flying to Japan to cover a volcanic eruption. Or to Alaska to cover an oil spill. Or to the South Pole to cover the ozone hole. Or to the North Pole to cover the first transarctic dogsled expedition. Or to England to interview Stephen Hawking. Along the way, I won three Emmys and became the first person to broadcast live to North America from the Antarctic and the first television correspondent to travel to the bottom of the Atlantic Ocean and report from the wreck of the *Titanic*.

In 1994, after nine magical years, I reluctantly left Harvard to work full-time in television. It felt weird to no longer be affiliated with an academic institution, but I was tired of leading a hectic double life between the classroom and the studio.

Eventually, after fourteen thoroughly enjoyable years, I also left ABC News. My wife and I were planning to have a family, and we

CALIFORNIA DREAMIN' . . . AND BEYOND

both agreed that my being a jet-setting news correspondent was incompatible with being a good father.

Shortly afterward, the History Channel hired me to host a weekly, prime-time series called *Where Did It Come From?* And later, the John Templeton Foundation gave me a large grant to produce a full-length motion picture celebrating human generosity. That movie, *Little Red Wagon*, won many awards.

To put it mildly, my life did not turn out the way that dreamy little Mexican kid from East LA could ever have imagined. What's more, as you're about to see, the unexpected twists and turns I've just described were just the tip of the iceberg.