

**THE VIEW FROM THE CENTER OF THE UNIVERSE**

*Discovering Our Extraordinary Place in the Cosmos*

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**A discussion with**  
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**authors of**  
**THE VIEW FROM THE CENTER OF THE**  
**UNIVERSE:**  
*Discovering Our Extraordinary Place in the*  
*Cosmos*

**Why is understanding the new advances in astronomy important to an ordinary person?**

Most people seek to reach beyond the ordinary world and connect to something large and inspiring – the largest thing they can imagine. If humans were not like this, religions would never have developed – nor art. Science is offering a vision that explodes the imagination. By taking modern cosmology seriously, people can truly reach an amazing reality – one where we belong at the center.

**Give me some examples of how knowing about the universe can change my life.**

The biggest change may be the realization that we humans are not merely a random growth on the surface of a small planet of an average star, as many people have assumed for generations. Instead, we are absolutely central and special in so many ways that we had to write a book. And the universe is not just “out there” but right here, and the more we know about it, the more we’ll perceive a deeper level of ourselves. Cosmic perspective may also help us find solutions to global problems that have seemed overwhelming, if not hopeless.

**You make a distinction between cosmology and scientific cosmology – can you explain?**

Anthropologists use the word “cosmology” to refer to the overall picture of reality of a tribe or people – the way they would answer questions like, What’s out there? Where did it all come from? What’s in control? How do I fit in? “Scientific cosmology,” on the other hand, is the study of the universe. It seeks *accurate* answers to all these questions, except the last one. When we talk about our place in the universe, what we’re doing goes beyond science. Our book reunites the two kinds of cosmology.

### **Why do we still need creation stories in the 21<sup>st</sup> century?**

Why do we still dream at night? We modern people, like all earlier people, need a credible story of our creation to anchor us in reality. Ever since the 1700s, people who had little data from beyond the solar system have extrapolated from Newton's laws of physics to the entire universe, seeing a bleak picture of endless emptiness randomly scattered with stars. Cosmically homeless, our culture downgraded the importance of having a cosmic home. Religions often stick to prescientific descriptions of reality, while the universe in many people's minds is little more than a shapeless space or a fantasy setting for science fiction, neither of which appears to matter much in what people think of as the "real world." This widespread cultural *indifference to the actual universe* is a staggering fact of our time – and possibly our biggest mental handicap in solving global problems. A believable creation story connects us personally to our universe and helps us appreciate all it took to make us.

### **What is the "cosmological revolution" that is happening now?**

Imagine that a runner from ancient Greece were just arriving today, breathless, carrying the news of the defeat of the Persians at Marathon, and we were the first to hear it from his lips. Messengers in every form of radiation and speaking the strangest languages anyone's ever heard have been running for billions of years through space and are arriving on Earth at every moment from all over the universe with news of their eras; the cosmological revolution is human beings finally beginning to decode those languages, understand the news, and put the whole story of the universe together. The result has been a stunningly counter-intuitive new understanding of reality that is nevertheless both coherent and supported by massive amounts of scientific evidence.

### **What are the big questions about the universe that we are beginning to have some answers to now?**

We're figuring out what the universe is made of, how it began, how old it is, how big it is (and what it means to be each particular size), how the galaxies formed, and how likely it may be that other intelligent life exists. But perhaps most importantly, cosmology has developed new ways of thinking about the universe so that we can wrap our minds around the whole thing, but from the inside.

### **How has our science bypassed our common understandings of the universe?**

Modern science has given us the practical ability to tap into the powers of the universe – nuclear energy, for example, or genetic engineering – but until now science has provided no conceptual context in which these powers made sense. Many people whose actions may change the earth for thousands and possibly millions of years are thinking on minuscule time scales and therefore only see short term costs and benefits as real. We need to play catch-up to understand the science we already rely on.

### **What are the challenges in describing the universe accurately?**

Language was invented to discuss things that either happen on Earth, or that people imagine based on what they've experienced on Earth. There is not yet a common language for some of

the strange things that exist on other size scales – like dark matter and dark energy – or that existed in the early universe, so to talk about them we have to use ordinary words metaphorically. In *The View from the Center of the Universe*, we have also compressed some pretty complicated ideas into visual symbols, which we believe can help people understand the universe in a deeper and more intuitive way.

**You talk about metaphor and myth and the need to redefine them—why is that?**

In *The View from the Center of the Universe* we present mythic images that we adapt and use to explain scientific cosmology because it just can't be adequately communicated in everyday language. Traditional religious stories can still arouse in some people a sense of contact with something greater than we are – but that “something” is nothing like what is really out there. We don't have to pretend to live in some traditional picture of the universe just to reap the benefit of the mythic language popularly associated with it. Mythic language is not the possession of any specific religion but is a human tool, and we need it today to talk about the meaning of our universe. People around the world should be given the chance to portray our universe, as science is discovering it, with all the power and majesty that earlier peoples evoked in expressing their own cosmologies.

**What are the recently discovered ingredients making up the universe that have changed what we know of its structure and dynamic?**

Everything people have ever seen is made of atoms. But we now know that almost all the stuff in the universe is *not* made of atoms at all. About a quarter is made of invisible material called “dark matter,” and almost all the rest is made of even stranger stuff called “dark energy.” The “double dark” theory based on this accounts so perfectly for the evolution and structure of the universe that even skeptical astronomers have become convinced. For the first time, we actually have a theory that fits all the data.

**How old is the universe?**

The universe is nearly fourteen billion years old where we are, according to (theoretical) clocks that have been moving since the Big Bang with the matter in our own Galaxy. A mistake sometimes made in the name of religion is to miscalculate our past and foreshorten our future, and to teach that we are living in the end times. We are living at the center of Earth's existence and the center of Earth's habitable period, not the end. Our descendants could have billions of years to live if we can just solve today's problems.

**In your chapter on the size of the universe you discuss size scales and how that concept is critical to grasping our centrality in the universe. Could you explain?**

Many people look into the night sky and feel insignificantly small compared to the vastness of the universe, but their instinct is wrong because in fact *the size of a human being is at the center of all the possible sizes in the universe*. In the universe there is a largest and a smallest size, and in the wide range of sizes in between, our size is almost at the center.

Although each size is in seamless continuity with the others, an increase of a few powers of ten results in a qualitative change, like the sudden appearance of temperature or consciousness. In short, *more is different*. This is a universal pattern in the growth of size and it may also be true

in the growth of complexity. If it is, then it perhaps helps us understand why groups of people cannot act human.

**What is cosmic inflation and what impact does it have on the universe?**

Cosmic inflation is the hypothesis that, for a very brief moment at the beginning of the Big Bang, the universe expanded much faster than the speed of light and then suddenly slowed down. Quantum effects that occurred during cosmic inflation, together with the “double dark” theory, explain what astronomers observe on all large scales in the universe – that there are complicated structures whose building blocks are galaxies. To the extent they’ve been tested, all predictions of cosmic inflation theory have been verified.

**How can this new understanding of the universe alter the way we do business here on earth?**

For the first time it gives us a vast, new perspective on what we’re doing. For example, the sudden end of exponential growth represented by cosmic inflation in the early universe has some similarities to the end of the exponential human population growth that is now occurring on Earth. Today the human impact on Earth is still increasing exponentially, but that must soon change to a slower rate of growth to permit what we call in the book “sustainable prosperity.” The universe made such a transition, and only after its explosive growth was transformed to slow and steady expansion did the universe enter its most creative and long-lived phase, out of which have come galaxies and life. This model could be valuable in helping us face our own coming transition.

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