

# Our Finely Tuned Universe

by Bert Thompson, Ph.D.  
Brad Harrub, Ph.D.

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Imagine donning a gown and mask, and walking into the operating suite of a Level One trauma center. That cool, sterile environment exudes extreme order and neatness—after all, surgeons need to have instant access to a multitude of surgical supplies. Lives are at stake, and time is of the utmost importance. Now, consider for a moment if someone were to suggest that this precisely ordered surgical suite happened by mere chance, and that every single item just “happened” to find its way there by chance. Sound ludicrous? Well, then, consider for a moment how ludicrous it is for men dressed in starched white lab coats to stand before college students and proclaim that this finely tuned Universe just “happened” without any intervention. It is an undeniable fact that the Universe is delicately ordered and intricately complex—far more so than any operating room. Yet, we continue to be told that we, and the Universe around us, are the end result of some vast, inexplicable cosmological accident that occurred 13.7 billion years ago.

How can this be—in light of the impressive amount (and quality) of design that we routinely see all around us? Australian astrophysicist Paul Davies, in his book, *The Cosmic Blueprint*, opined:

There is for me powerful evidence that there is something going on behind it all.... It seems as though somebody has fine-tuned nature’s numbers to make the Universe.... **The impression of design is overwhelming** (1988, p. 203, emp. added).

Our Universe is indeed “fine-tuned” in such a way that it is impossible to suggest logically that it simply “popped into existence out of nothing” and then went from the chaos associated with the inflationary Big Bang Model (as if the Universe were a giant firecracker!) to the sublime order that it presently exhibits. Nancey Murphy and George Ellis discussed this very point in their book, *On the Moral Nature of the Universe*:

The symmetries and delicate balances we observe in the universe require an extraordinary coherence of conditions and cooperation of laws and effects, suggesting that in some sense they have been **purposely designed**. That is, **they give evidence of intention**, realized both in the setting of the laws of physics and in the choice of boundary conditions for the universe (1996, p. 57, emp. added).

The suggestion that the Universe and its laws “have been purposely designed” has surfaced much more frequently in the past several years. For example, the late British cosmologist Sir Fred Hoyle wrote:

A common sense interpretation of the facts suggests that a superintellect has monkeyed with physics, as well as with chemistry and biology, and that there are no blind forces worth speaking about in nature. The numbers one calculates from the facts seem to me so overwhelming as to put this conclusion almost beyond question (1982, 20:16).

In his book, *Superforce: The Search for a Grand Unified Theory of Nature*, Davies made this amazing statement:

If nature is so “clever” as to exploit mechanisms that amaze us with their ingenuity, **is that not persuasive evidence for the existence of intelligent design behind the universe?** If the world’s finest minds can unravel only with difficulty the deeper workings of nature, how could it be supposed that those workings are merely a mindless accident, a product of blind chance? (1984, pp. 235-236, emp. added).

Eight years later, in 1992, Davies authored *The Mind of God*, in which he remarked:

I cannot believe that our existence in this universe is a mere quirk of fate, an accident of history, an incidental blip in the great cosmic drama.... Through conscious beings the universe has generated self-awareness. This can be no trivial detail, no minor by-product of mindless, purposeless forces. **We are truly meant to be here** (1992, p. 232, emp. added).

That “we are truly meant to be here” is reminiscent of the statement made by physicist Freeman Dyson of the Princeton Institute for Advanced Study. In his semi-autobiographical book, *Disturbing the Universe*, Dyson stated:

...[T]he universe is an unexpectedly hospitable place for living creatures to make their home in. Being a scientist, trained in the habits of thought and language of the twentieth century rather than the eighteenth, I do not claim that the architecture of the universe proves the existence of God. I claim only that the architecture of the universe is consistent with the hypothesis that mind plays an essential role in its functioning.... **The more I examine the universe and study the details of its architecture, the more evidence I find that the universe in some sense must have known that we were coming** (1979, pp. 250,251, emp. added).

The idea that in some sense the Universe “must have known that we were coming,” is the same sentiment expressed by two prominent cosmologists, Frank Tipler and John Barrow, in their 1986 book, *The Anthropic Cosmological Principle*, which discussed the possibility that the Universe seems to have been “tailor-made” for man. Interestingly, a mere eight years after that book was published, Dr. Tipler authored another book, *The Physics of Immortality*, in which he professed:

When I began my career as a cosmologist some twenty years ago, I was a convinced atheist. I never in my wildest dreams imagined that one day I would be writing a book purporting to show that the central claims of Judeo-Christian theology are in fact true, that these claims are straightforward deductions of the laws of physics as we now understand them. I have been forced into these conclusions by the inexorable logic of my own special branch of physics (1994, preface).

In 1995, NASA astronomer John O’Keefe stated in an interview:

We are, by astronomical standards, a pampered, cosseted, cherished group of creatures.... If the Universe had not been made with the most exacting precision we could never have come into existence. It is my view that these circumstances indicate the universe was created for man to live in (as quoted in Heeren, 1995, p. 200).

Then, thirteen years after British molecular biologist Michael Denton published his 1985 book, *Evolution: A Theory in Crisis*, he shocked everyone—especially his evolutionist colleagues—when he published his 1998 tome, *Nature’s Destiny*, in which he acknowledged:

Whether one accepts or rejects the design hypothesis...there is no avoiding the conclusion that the world **looks** as if it has been tailored for life; it **appears to have been designed**. All reality **appears** to be a vast, coherent, teleological whole with life and mankind as its purpose and goal (p. 387, emp. in orig.).

Fred Hoyle, in addressing the fine-tuning of the nuclear resonances responsible for the oxygen and carbon synthesis in stars, observed:

I do not believe that any scientist who examined the evidence would fail to draw the inference that **the laws of nuclear physics have been deliberately designed** with regard to the consequences they produce inside stars. If this is so, then my apparently random quirks have become part of a deep-laid scheme. If not, then we are back again at a **monstrous sequence of accidents** (1959, emp. added).

When we (to use Hoyle’s words) “examine the evidence,” what do we find? Michael J. Murray answered:

Almost **everything about the basic structure of the universe**—for example, the fundamental laws and parameters of physics and the initial distribution of matter and energy—**is balanced on a razor's edge** for life to occur.... Scientists call this extraordinary balancing of the parameters of physics and the initial conditions of the universe the “fine-tuning of the cosmos” (1999, p. 48, emp. added).

But what is the evidence for that “fine-tuning of the cosmos”? Consider just a small sampling of the many pieces of evidence that are available.

Our Universe operates in accordance with exact scientific laws. The precision of the Universe, and the exactness of these laws, allow scientists to launch rockets to the Moon, with the full knowledge that, upon their arrival, they can land within a few feet of their intended target. Such precision and exactness also allow astronomers to predict solar/lunar eclipses years in advance, or to determine when Halley's Comet can be seen once again from the Earth. Science writer Lincoln Barnett observed:

This functional harmony of nature Berkeley, Descartes, and Spinoza attributed to God. Modern physicists who prefer to solve their problems without recourse to God (although this seems to be more difficult all the time) emphasize that nature mysteriously operates on mathematical principles. It is the mathematical orthodoxy of the Universe that enables theorists like Einstein to predict and discover natural laws, simply by the solution of equations (1959, p. 22, parenthetical item in orig.)

While many evolutionists willingly concede complexity—and even order—they are not prepared to concede design because the implication of such a concession would demand a Designer. Is there evidence of **design**? The person who does not believe in a Creator claims no such evidence exists. The individual who acknowledges the existence of that Creator, affirms that it does, and offers the following information in support of such an affirmation.

We live in an incredibly large Universe. While its outer limits have not been measured, it is estimated to be as much as 20 billion light-years in diameter. [A light-year is the distance that light travels in a vacuum in one year at a speed of slightly more than 186,000 miles per second. Distances expressed in light-years express the time that light would take to cross that distance.] There are an estimated one billion galaxies in the Universe (Lawton, 1981), and an estimated 25 **sextillion** stars. The Milky Way galaxy in which we live contains over 100 billion stars, and is so large that even traveling at the speed of light would require 100,000 years to cross its diameter. Light travels approximately  $5.88 \times 10^{12}$  miles in a single year; in 100,000 years, that would be  $5.88 \times 10^{17}$  miles, or 588 **quadrillion** miles just to cross the diameter of a single galaxy. Without doubt, this is a rather impressive Universe.

Yet while the size itself is impressive, the inherent design is even more so. The Sun, which is like a giant nuclear engine, gives off more energy in a single second than mankind has produced since the Creation. It converts eight million tons of matter into energy **every single second**, and has an interior temperature of more than twenty million degrees Celsius (see Lawton, 1981). The Sun also produces radiation, which, in certain amounts, can be deadly to living things. The Earth, however, is located at exactly the correct distance from the Sun to receive the proper amount of heat and radiation to permit life as we know it. We should be grateful that we live so far from the Sun, because the 93 million miles of empty space between the Earth and the Sun help stop the destructive pressure waves produced by the Sun as it converts matter to energy. If the Earth were much closer to the Sun, human life could not survive because of the horrible heat and pressure. If the Earth were moved just 10% closer to the Sun (about 10 million miles), far too much radiation (and heat) would be absorbed. If the Earth were moved just 10% farther from the Sun, too little heat would be absorbed. Either scenario would spell doom for life on the Earth.

Fortunately, creatures living on Earth receive some protection from the Sun's radiation because in one of the layers of the atmosphere (known as the mesosphere—about 12 to 18 miles above the Earth), there is a form of oxygen known as ozone, which filters out most of the ultraviolet rays from the Sun that would be harmful (or fatal) in larger amounts. In addition, the Sun constantly sends out an invisible wind that is composed of protons and electrons. These particles approach the Earth from outer space at an extremely high speed, and could be very dangerous to humans. Fortunately, most of these protons and electrons are

reflected back into space because the Earth was created like a giant magnet that pushes away the solar wind and makes life on this planet both possible and comfortable.

The Earth is rotating on its axis at 1,000 miles per hour at the equator, and moving around the Sun at 70,000 miles per hour (approximately 19 miles per second), while the Sun and its solar system are moving through space at 600,000 miles per hour in an orbit so large it would take over 220 million years just to complete a single orbit. This rotation provides periods of light and darkness—a phenomenon necessary for sustaining life as we experience it. If the Earth rotated much faster, fierce cyclones would stir over the Earth like a kitchen food-mixer. If the Earth turned significantly slower, the days and nights would be impossibly hot or cold. Venus, for example, turns only once every 243 days—a fact that accounts in part for daytime temperatures reaching as high as 500 degrees Celsius (water boils at 100° C). The Earth's orbital speed and tilt are "just right." Just by accident? The Earth completes its orbit roughly once every 365.25 days—the time period we designate as a year. This, together with the fact that the Earth is tilted on its axis, allows for what we refer to as seasons.

The Earth's orbit is not a perfect circle, however, but is elliptical. This means that sometimes the Earth is closer to the Sun than at other times. In January, the Earth is closest to the Sun; in July, it is farthest away. When it is closer, the Earth "speeds up" to avoid being pulled into the Sun; when it is farther away, it "slows down," so that it remains in a position in space that is "just right." How does the Earth "know" to do all of this?

Interestingly, as the Earth moves in its orbit around the Sun, it departs from a straight line by only one-ninth of an inch every eighteen miles. If it departed by one-eighth of an inch, we would come so close to the Sun that we would be incinerated; if it departed by one-tenth of an inch, we would find ourselves so far from the Sun that we would all freeze to death (see *Science Digest*, 1981). What would happen if the rotation rate of the Earth were cut in half—or doubled? If it were halved, the seasons would be doubled in their length, which would cause such harsh heat and cold over much of the Earth that it would be difficult, if not impossible, to grow enough food to feed the Earth's population. If the rotation rate were doubled, the length of each season would be halved, and again it would be difficult or impossible to grow enough food to feed the Earth's population.

The Earth is tilted on its axis at exactly 23.5 degrees. If it were not tilted as it is, but instead sat straight up in its orbit around the Sun, there would be no seasons. The tropics would be hotter, and the deserts would get bigger. If the tilt went all the way over to 90 degrees, much of the Earth would switch between very cold winters and very hot summers.

The Earth is poised some 240,000 miles from the Moon. This, too, is just right. The Moon helps control the movement of the oceans (tides). This movement is very beneficial to the Earth, because it provides a cleansing of shorelines, and helps ocean life to prosper. Tides are an important part of ocean currents. Without these currents, the oceans would stagnate, and the animals and plants living in the oceans and seas soon would perish. Our existence as humans depends upon the Moon's tides as they help balance a delicate food chain in nature. If the Moon were moved closer to the Earth by just a fifth, the tides would be so enormous that twice a day they would reach 35-50 feet high over most of the surface of the Earth.

The Earth's oceans are another good example of perfect design. Water covers about 72% of the Earth's surface, which is good because the oceans provide a reservoir of moisture that constantly is evaporating and condensing. Eventually, this causes rain to fall on the Earth. It is a well-known fact that water heats and cools at a much slower rate than a solid land mass, which explains why desert regions can be blistering hot in the daytime and freezing cold at night. Water, however, holds its temperature longer, and provides a sort of natural heating/air-conditioning system for the land areas of the Earth. The Earth's annual average temperature (56°F; 13.3°C) is closely maintained by the great reservoir of heat contained within the waters of the oceans. Temperature extremes would be much more erratic than they are, were it not for the fact that approximately three-fourths of the Earth is covered with water. In addition, humans and animals inhale oxygen and exhale carbon dioxide. On the other hand, plants take in carbon dioxide and give off oxygen. We depend upon the world of botany for our oxygen supply, yet we often fail to realize that approximately 90% of our oxygen comes from microscopic plants in the seas (Asimov, 1975, 2:116). If our oceans were appreciably smaller, we soon would be out of air to breathe.

Wrapped around the Earth is a protective blanket we know as the atmosphere. It is composed of nitrogen (78%), oxygen (21%), and carbon dioxide (0.03%), in addition to water vapor and small levels of other gases. The proper balance of these gases is essential to life on the Earth. The atmosphere of Venus is too thick to sustain life; that of Mars is too thin. But the Earth's atmosphere does several things. It scatters light waves so that you can read the words on this page. It captures solar heat so that it does not escape too rapidly. Without atmosphere, the heat would escape as soon as the Sun set each day, and nights would be unbearably cold. Frequently, meteors fall from space. Were it not for the fact that most of them burn up (from friction) when they strike the atmosphere, the Earth would be pounded almost daily by these unwelcome visitors. And, electronically charged particles (ions) in the upper atmosphere (referred to as the ionosphere) help make radio communications on the Earth possible. The Earth has an atmosphere that is "just right." Just by accident?

Richard Dawkins once remarked: "The more statistically improbable a thing is, the less we can believe that it just happened by blind chance. Superficially, **the obvious alternative to chance is an intelligent Designer**" (1982, 94:130, emp. added). Twenty years later, in an article on *Nature's* August 13, 2002, on-line Science-Update, Philip Ball wrote: "Our Universe is so unlikely that we must be missing something." We agree: evolutionists **are** "missing something." But that "something" is actually a "Someone"—the intelligent Designer!

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230 Landmark Drive  
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