

1. INTRODUCTION:

Framing the Discussion – I have found little conflict between Science and Scripture, or between Scientific Theory and Biblical Theology. Having said that, it is often the case that science often prefers to operate independently by dismissing God from the equation, and similarly theologians often prefer to render science to a secondary position to Scripture. There are three main competing theories employed to explain the natural universe.

- a. Emerging in the mid 1800's following the publishing of Darwin's Origin of Species, the concept of *Scientific Naturalism* became the dominant view guiding scientific methodology. This view holds that the universe, its characteristics, and its behaviors are to be investigated and understood in purely naturalistic terms. Everything that exists and everything that occurs is part of the natural universe and is subject to examination as purely natural phenomenon.
 - i. Scientific Naturalism assumes that the universe is a closed system where all events occur for exclusively naturalistic reasons.
 - ii. In essence, there cannot be anything or anyone from outside the natural system which acts upon it. Furthermore, scientific naturalism holds to the conceptual logic of an agnostic... meaning a person who believes that nothing is known or can be known of the existence or nature of God or of anything beyond the material phenomena at hand.
 - iii. Therefore, Scientific Naturalism excludes the possibility of the meta-physical, of the supernatural, or any manifestation of God as an explanation for any phenomena. As a result, faith and science have been unnecessarily placed in opposition.
- b. In the late 19th century, there emerged the view of *Creationism* born of a more literal view of Scripture espousing a six-day creation cycle, a young earth, human descent from Adam and Eve, etc. The website allaboutphilosophy.org explains that, "the popular media often portrays the creation vs. evolution debate as science vs. religion, with creation being religious and evolution being scientific. Unfortunately, if you don't agree with this label, you are labeled anyway. Regardless of whether you're a Creationist or an Evolutionist, if you disagree with the stereotype, you're condemned and "exposed" as a religious fanatic who is secretly trying to pass religion off as science or, even worse, trying to disprove science in order to redeem a ridiculous, unscientific, religious worldview.
- c. The New World Encyclopedia explains that "*Intelligent design* (ID), which emerged in the 1980's, is the view that it is possible to infer from empirical evidence that "certain features of the universe and of living things are best explained by an intelligent cause, not by an undirected process such as Natural Selection." Inferring design from nature is at least as old as Plato and Aristotle, and Christian writers have used the inference for centuries to argue for God's existence and attributes. ID however, uses scientific method to enter the Creation discussion from the front door of science... much to the chagrin of the Scientific Naturalists.
- d. The fact is none of these models of origins has been established beyond a reasonable doubt. Whether we like to admit it or not, those of us who subscribe to the theory of evolution do so by faith. And while the recognition of Intelligent design in biology may have theological

implications, it is not based upon religious premise – It's based upon scientific observation... empirical observation and logic.

- e. **Personally, I have found that faith and science are not necessarily competing disciplines but are often complementary. Further, enforcing one discipline over the other, we often lose perspective. In my early undergraduate years long before I became a Christian, I loved science [I still do] and employed the components of scientific method. As a result, I observed the prevalence of order in Nature and the symbiotic interconnectedness of all life. I found that Darwinian Evolution based on chance, competition, and chaos was inadequate to provide me with a working explanation for the perfection I observed in Creation. Years later as a Christian pastor and theologian, I have found that God is actually hard-wired into Creation... I find the perfection of the natural order as the best explanation of Romans 1:20-21 – “For since the creation of the world God’s invisible qualities—His eternal power and divine nature—have been clearly seen, being understood from what has been made, so that all of humanity are without excuse. For although they knew God, they neither glorified him as God nor gave thanks to Him, but their thinking became futile and their foolish hearts were darkened.”**
- f. **The following two articles speak to the scientific and theological conjunction of thought development on Creation, with a focus on Intelligent Design which I believe best answers my questions about the forces behind creation. Both articles look at creation and seek to explain the reality as we know it, where we may observe the Presence of God. The first article was presented in Christianity Today as an editorial brief from the co-founder of String-Theory. The second article is from The New World Encyclopedia on the Theory of Intelligent Design. I have edited these articles both for content and clarity.**

2. PARTICLE PHYSICS, STRING THEORY, AND THE ORIGIN OF CREATION:

- a. Dr. Michio Kaku, a theoretical physicist at the City College of New York (CUNY) and co-founder of *String Field Theory*, says theoretical particles known as “primitive semi-radius tachyons” are physical evidence that the universe was created by a higher intelligence.
- b. In physics, String Theory is a theoretical framework in which the “point-like particles” of particle physics are replaced by “one-dimensional objects called strings.” String Theory describes how these strings propagate through space and interact with each other. On distance scales larger than the string scale, a string looks just like an ordinary particle, with its mass, charge, and other properties determined by the vibrational state of the string. One of the many vibrational states of the string corresponds to the graviton, a quantum mechanical particle that carries gravitational force. Thus, String Theory is a theory of quantum gravity.
- c. After analyzing the behavior of these sub-atomic particles - which can move faster than the speed of light and have the ability to “unstick” space and matter – using technology created in 2005, Dr. Kaku concluded that the universe is a “Matrix” governed by laws and principles that could only have been designed by an *intelligent being*. “I have concluded that we live in a world made by rules created by an intelligence. Believe me, everything that we call chance today won’t make sense

anymore,” Dr. Kaku said according to an article published in the Geophilosophical Association of Anthropological and Cultural Studies.

- d. “To me it is clear that we exist in a planned environment which is governed by rules that were created, shaped by a universal intelligence and not by chance.” He goes on to say, “The final resolution of my investigations could be that God is a mathematician,” Dr. Kaku, author of The Future of the Mind: The Scientific Quest to Understand, Enhance, and Empower the Mind, said in a 2013 Big Think video posted on YouTube. “The mind of God, we believe, is cosmic music... the music of strings resonating through 11-dimensional hyperspace.”

Dr. Kaku’s conclusion is in essence an argument for “Intelligent Design” – meaning that the careful application of scientific principles reveals a planned purpose of an Intelligence behind Creation. Dr. Kaku’s conclusion is an excellent introduction to the following article that provides a more thorough description and development of the concepts of Intelligent Design and the scientists who developed this scientific perspective of reality.

3. DEFINITION OF INTELLIGENT DESIGN:

Intelligent Design (ID) is the view that it is possible to infer from empirical evidence that "certain features of the universe and of living things are best explained by an intelligent cause, not an undirected process such as natural selection." Intelligent design cannot be inferred from complexity alone, since complex patterns often happen by chance. ID focuses on just those sorts of complex patterns that in human experience are produced by a mind that conceives and executes a plan. According to adherents, ID can be detected in the natural laws and structure of the cosmos; it also can be detected in at least some features of living things.

- a. Greater clarity on the topic may be gained from a discussion of what ID is not considered to be by its leading theorists. ID generally is not defined the same as creationism, with proponents maintaining that ID relies on scientific evidence rather than on Scripture or religious doctrines. ID makes no claims about biblical chronology, and technically a person does not have to believe in God to infer intelligent design in nature. As a theory, ID also does not specify the identity or nature of the designer, so it is not the same as natural theology, which reasons from nature to the existence and attributes of God. ID does not claim that all species of living things were created in their present forms, and it does not claim to provide a complete account of the history of the universe or of living things.
- b. ID also is not considered by its theorists to be an "argument from ignorance"; that is, ID is not to be inferred simply on the basis that the cause of something is unknown (any more than a person accused of willful intent can be convicted without evidence). According to various adherents, ID does not claim that design must be optimal; something may be intelligently designed even if it is flawed (as are many objects made by humans).
- c. ID may be considered to consist only of the minimal assertion that it is possible to infer from empirical evidence that some features of the natural world are best explained by the action of an intelligent agent. ID conflicts with views claiming that there is no real design in the cosmos (e.g., materialistic philosophy) or in living things (e.g., Darwinian evolution) or that design, though real, is

undetectable (e.g., some forms of theistic evolution). Because of such conflicts, ID has generated considerable controversy.

- 4. HISTORY OF THE SCIENTIFIC METHOD OF INTELLIGENT DESIGN:** Inferring ID from nature is at least as old as Plato and Aristotle, and Christian writers have used the inference for centuries to argue for God's existence and attributes. The minimalist ID view described above, however, emerged in the 1980s.
- a. Cosmologist Fred Hoyle used the term "Intelligent Design" in 1982, writing that unless a person is "deflected by a fear of incurring the wrath of scientific opinion, one arrives at the conclusion that biomaterials with their amazing measure of order must be the outcome of intelligent design." Soon afterward, chemist Charles B. Thaxton was impressed by chemist and philosopher Michael Polanyi's argument that the information in DNA could not be reduced to physics and chemistry. Something more was needed. Thaxton later said that he preferred intelligent design to creationism because he "wasn't comfortable with the typical vocabulary that for the most part creationists were using because it didn't express what I was trying to do. They were wanting to bring God into the discussion, and I was wanting to stay within the empirical domain and do what you can do legitimately there."
 - b. In 1984, Thaxton joined with materials scientist Walter L. Bradley and geochemist Roger L. Olsen to publish The Mystery of Life's Origin, which criticized "chemical evolution," the idea that unguided natural processes produced the first living cells abiotically, from non-living materials. The authors distinguished between order (such as found in crystals), complexity (such as found in random mixtures of molecules), and "specified complexity" (the information-rich complexity in biological molecules such as DNA). Relying on the *uni-formitarian principle*... "that the kinds of causes we observe producing certain effects today can be counted on to have produced similar effects in the past," the authors argued, "What is needed is to identify in the present an abiotic cause of specified complexity." Thaxton, Bradley, and Olsen concluded: "We have observational evidence in the present that intelligent investigators can (and do) build contrivances to channel energy down nonrandom chemical pathways to bring about some complex chemical synthesis, even gene building. May not the principle of uni-formity then be used in a broader frame of consideration to suggest that DNA had an intelligent cause at the beginning?"
 - c. The following year (1985), molecular biologist Michael Denton published Evolution: A Theory in Crisis, which criticized the evidence for Darwin's theory and defended the view that design could be inferred from living things. Since "living things are *biological machines* for the purposes of description, research, and analysis," Denton wrote, "it is legitimate to extend the analogy between living things and machines to attribute their origin to include ID." He concluded: "The inference to design is a purely a posteriori induction based on a ruthlessly consistent application of the logic of analogy. The conclusion may have religious implications [though Denton did not draw any], but it does not depend on religious presuppositions."
 - d. In 1989, biologists Percival Davis and Dean H. Kenyon (under the editorship of Charles Thaxton) published Of Pandas and People: The Central Question of Biological Origins. The book's

introduction explained that it was “not intended to be a balanced treatment” of the subject, but a presentation of “a favorable case for intelligent design” in order “to balance the overall curriculum” in biology classes. *The book concluded: “Any view or theory of origins must be held in spite of unsolved problems..., [but] there is impressive and consistent evidence, from each area we have studied, for the view that living things are the product of intelligent design.”*

- e. Two years later (1991), Berkeley law professor Phillip E. Johnson published Darwin On Trial, which critically analyzed the logic and assumptions Darwinists use to rule out design in living things. *Johnson concluded: “Darwinist scientists believe that the cosmos is a closed system of material causes and effects, and they believe that science must be able to provide a naturalistic explanation for the wonders of biology that appear to have been designed for a purpose. Without assuming those beliefs, they could not deduce that common ancestors once existed for all the major groups of the biological world, or that random mutations and natural selection can substitute for an intelligent designer.”*
- f. A second edition of Pandas came out in 1993. The same year, Johnson hosted a small, private meeting of ID proponents at *Pajaro Dunes, near Monterey, California*. Participants included many of the scholars who later became prominent in controversies over ID, some of whom are described below. Some scenes from the Pajaro Dunes meeting are included in the 2002 film, *Unlocking the Mystery of Life*. Another, much larger meeting was held in 1996 at Biola University in La Mirada, California, and the proceedings were later published.
- g. In 1996, geologist and philosopher of science Stephen C. Meyer (a participant of the 1993 Pajaro Dunes meeting) and political scientist John G. West started the *Center for the Renewal of Science and Culture (CRSC)* as a project of the *Discovery Institute in Seattle, Washington*. The Discovery Institute, a nonprofit public policy organization focusing on a variety of political, social, and economic issues, had been founded in 1990 by Bruce K. Chapman, formerly Secretary of State for Washington, Director of the U. S. Census Bureau under President Ronald Reagan, and U. S. Ambassador to the United Nations Organizations in Vienna.
- h. The same year (1996), biochemist Michael J. Behe (who also attended the Pajaro Dunes meeting) published *Darwin’s Black Box: The Biochemical Challenge to Evolution*. In it, Behe argued that some features of living cells are characterized by an “irreducible complexity” that cannot be explained by Darwinian processes but points instead to ID. Behe’s views are described in more detail below.
- i. Between 1996 and 2000, scholars who had attended the Pajaro Dunes and Biola University meetings published many other books important to ID. Johnson alone published four. In 1998, mathematician and philosopher William A. Dembski published The Design Inference, which formalized and quantified the way people routinely infer design and extended the same reasoning to features of the natural world, and in 1999 he established the Michael Polanyi Center at Baylor University to study ID. Dembski’s work is described in more detail below.
- j. At a conference held in Kunming, China, in 1999, American, European and Chinese scientists discussed the implications of fossils that had been found at nearby Chengjiang. The fossils documented in great detail the abrupt appearance of most major animal body plans (*phyla*) in the

Cambrian Explosion, a feature of the fossil record that gives the appearance of conflict with the branching-tree pattern expected from Darwin's theory. Michael Denton, along with philosopher of biology Paul A. Nelson and molecular biologist Jonathan Wells (both of whom had attended the 1993 Pajaro Dunes meeting) presented controversial papers challenging Darwinian hypotheses of the origin of animal body plans.

- k. In 2000, the Michael Polanyi Center at Baylor hosted an *International "Nature of Nature" Conference* at which several hundred scholars (including some Nobel laureates) discussed the pros and cons of ID. The same year, the CRSC changed its name to the *Center for Science & Culture (CSC)*, which counts among its fellows many of the people prominent in the ID movement. CSC fellow Jonathan Wells published *Icons of Evolution*, which criticized the way biology textbooks exaggerate the evidence for Darwin's theory and misuse it to promote a materialistic philosophy.
- l. In 2001 the U. S. Congress adopted the *No Child Left Behind Act*, accompanied by a joint House-Senate report stating that *"a quality science education should prepare students to distinguish the data and testable theories of science from religious or philosophical claims that are made in the name of science. Where topics are taught that may generate controversy (such as biological evolution), the curriculum should help students to understand the full range of scientific views that exist."* Although the report did not mention (much less advocate teaching) ID, it was widely regarded as a major victory for ID supporters. By then, ID had become front-page news in *The New York Times*. There continue to be controversies over it in philosophy, science, education, and theology.

5. LEADING INTELLIGENT DESIGN THEORISTS:

a. Michael J. Behe:

- i. In *The Origin of Species*, Charles Darwin wrote: "If it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down." In his 1996 book *Darwin's Black Box*, biochemist Michael J. Behe wrote: "What type of biological system could not be formed by "numerous successive, slight modifications? Well, for starters, a system that is *irreducibly complex*. By irreducibly complex I mean a single system composed of several well-matched interacting parts that contribute to the basic function, wherein the removal of any one of the parts causes the system to effectively cease functioning."
- ii. Behe described several features of living cells—features unknown to Darwin—that he considered to be irreducibly complex. These include 1) the light-sensing mechanism in eyes, the 2) the human blood-clotting system, and the 3) the bacterial flagellum. In the first example, when light strikes a photosensitive cell in an animal eye, it is absorbed by a molecule that alters an attached protein, which then initiates what biochemists call a "cascade"—a precisely integrated series of molecular reactions—that in this case causes a nerve impulse to be transmitted to the brain. If any molecule in the cascade is missing or

- defective, no nerve impulse is transmitted; the person is blind. Since the light-sensing mechanism does not function at all unless every part is present, it is irreducibly complex.
- iii. A second example offered of irreducible complexity is the human blood-clotting cascade. A clot itself is not all that complicated, but the blood-clotting cascade consists of more than a dozen protein molecules that must interact sequentially with each other to produce a clot only at the right time and place. Each protein is extremely complex in its own right, but it is the cascade that Behe identified as irreducibly complex, because all of the molecules must be present for the system to work. If even one is missing (as in the case of hemophilia), the system fails. Thus, it is irreducibly complex.
 - iv. A third example of irreducible complexity is the motor of the bacterial flagellum, a long, hair-like external filament. The common intestinal bacterium *E. coli* has several flagella; when they turn in one direction, they bundle together to form a long, rapidly rotating whip that propels the organism through the surrounding liquid, and when they reverse direction, the whip unravels and the organism stops abruptly and tumbles. At the base of each flagellum is a proton-driven motor that can turn thousands of times a minute and reverse direction in a quarter turn. The motor's drive shaft is attached to a rotor that turns within a stator, and the entire assembly is anchored in the cell wall by various bushings. The filament itself is attached to the drive shaft by a hook that functions as a universal joint so the flagellum can twist as it turns. By knocking out genes and screening for cells that can no longer move, researchers have identified several dozen gene products (proteins) required for assembly and operation of the flagellum and its motor. Remove any one of them, and the apparatus stops working. Like the light-sensing mechanism and the blood-clotting cascade, the bacterial flagellum is considered to be irreducibly complex.
 - v. Behe searched the scientific literature but found no articles proposing detailed, testable explanations of how these and other irreducibly complex systems originated through Darwinian evolution. "There is no publication in the scientific literature," he wrote, "that describes how molecular evolution of any real, complex biochemical system either did occur or even might have occurred. There are assertions that such evolution occurred, but absolutely none are supported by pertinent experiments or calculations."
 - vi. Behe argued that biochemists know what it takes to build irreducibly complex systems such as these; it takes design. He wrote: *"The conclusion of intelligent design flows naturally from the data itself—not from sacred books or sectarian beliefs. Inferring that biochemical systems were designed by an intelligent agent is a humdrum process that requires no new principles of logic or science. It comes simply from the hard work that biochemistry has done over the past forty years, combined with consideration of the way in which we reach conclusions of design every day."*

b. William A. Dembski:

- i. In The Design Inference (1998), mathematician and philosopher William A. Dembski formalized, quantified, and generalized the *Logic of Design Inferences*. According to Dembski, people infer design by using what he calls an *Explanatory Filter*. He wrote: “Whenever explaining an event, we must choose from three competing modes of explanation. These are regularity [i.e., natural law], chance, and design.” When attempting to explain something, “regularities are always the first line of defense. If we can explain by means of a regularity, chance and design are automatically precluded. Similarly, chance is always the second line of defense. If we can’t explain by means of a regularity, but we can explain by means of chance, then design is automatically precluded. There is thus an order of priority to explanation. Within this order regularity has top priority, chance second, and design last.” According to Dembski, the Explanatory Filter “formalizes what we have been doing right along when we recognize intelligent agents.”
- ii. Of course, different aspects of the same thing can be due to different causes. For example, an abandoned car will rust according to natural laws, though the actual pattern of rust may be due to chance. Yet, the car itself was designed. *So... regularity, chance, and design, though competing, can also be complementary.*
- iii. When inferring design, ruling out regularity is the easiest step. Ruling out chance is more difficult, since mere improbability (i.e., complexity) is not sufficient to infer design. Something that is complex could easily be due to chance. For example, if several dozen letters of the alphabet were randomly lined up, it would not be surprising to find a two-letter word such as “it” somewhere in the lineup. A two-letter word is not improbable enough to rule out chance. So, how complex must something be? Dembski sets a quantitative limit on what chance could conceivably accomplish with his *Universal Probability* bound. The total number of events throughout cosmic history cannot possibly exceed the number of elementary particles in the universe (about 10^{80}) times the number of seconds since the Big Bang (much less than 10^{25}) times the maximum rate of transitions from one physical state to another (about 10^{45} , based on the Planck time). Thus, the total number of state changes in all elementary particles since the Big Bang cannot exceed 10^{150} , and anything with a probability of less than 10^{-150} cannot be due to chance.
- iv. In practice, however, the universal probability bound is not always useful, so Dembski introduces another criterion... *Specificity, or Conformity to an independently given pattern*. For example, if we see twenty-eight letters and spaces lined up in the sequence WDLMNLT DTJBKWIRZREZLMQCOP we would not infer design, even though the exact sequence is highly improbable (and thus complex). But if we see twenty-eight letters and spaces lined up in the sequence ME THINKS IT IS LIKE A WEASEL, we would immediately infer design, because the sequence conforms to an independently given pattern (namely, a line from Shakespeare’s Hamlet). So, in order to infer design, the *Explanatory Filter* requires answering “Yes” to all three of the following questions: Is the feature contingent (i.e., not

due to natural law or regularity)? Is the feature complex (i.e., highly improbable)? And is the feature specified (i.e., does it conform to an independently given pattern)?

- v. The hallmark of design is thus *Specified Complexity*. According to Dembski, it is our universal human experience that whenever we encounter specified complexity it is a product of an intelligent agent (though the agent need not be supernatural). If specified complexity can be found in nature, then it, too, must be due to intelligent agency. As Dembski put it in The Design Revolution (2004): *“The fundamental claim of intelligent design is straightforward and easily intelligible: namely, there are natural systems that cannot be adequately explained in terms of undirected natural forces and that exhibit features which in any other circumstance we would attribute to intelligence.”*

c. Stephen C. Meyer:

- i. Irreducible Complexity and Specified Complexity are not the only ways to formulate a design inference. According to philosopher Paul Thagard: *“Inference to a scientific theory is not only a matter of the relation of the theory to the evidence, but must also take into account the relation of competing theories to the evidence. Inference is a matter of choosing among alternative theories, and we choose according to which one provides the best explanation.”*
- ii. Geologist and philosopher of science Stephen C. Meyer uses this “inference to the best explanation” approach to supplement the Explanatory Filter. According to Meyer, the subunits of DNA are like a four-letter alphabet carrying information “just like meaningful English sentences or functional lines of code in computer software.” This information cannot be reduced to the laws of chemistry and physics. In 2003, Meyer wrote: “The information contained in an English sentence or computer software does not derive from the chemistry of the ink or the physics of magnetism, but from a source extrinsic to physics and chemistry altogether. Indeed, in both cases, the message transcends the properties of the medium. The information in DNA also transcends the properties of its material medium.” So biological information is not due to natural laws or regularities.
- iii. Since a typical gene contains hundreds of such subunits, and organisms contain hundreds of genes, the information carried in an organism’s DNA is extremely complex. Furthermore, a living cell needs not just any DNA, but DNA that encodes functional proteins. To be functional, a protein must have a very specific sequence, so the information in DNA is not only contingent and complex, but also specified.
- iv. Historical science typically relies on a uni-formitarian appeal to causes that can be observed in the present to explain events in the past. Following this line of reasoning, Meyer formulated a scientific inference to the best explanation for the origin of information in DNA. “We know from experience,” he wrote, “that conscious intelligent agents can create informational sequences and systems.” Since “we know that intelligent agents do produce large amounts of information, and since all known natural processes do not (or cannot), we can infer Intelligent Design as the best explanation of the origin of information in the cell.”

- v. “Inferences to the best explanation,” according to Meyer, “do not assert the adequacy of one causal explanation merely on the basis of the inadequacy of some other causal explanation. Instead, they compare the explanatory power of many competing hypotheses to determine which hypothesis would, if true, provide the best explanation for some set of relevant data.” The principal hypothesis competing with ID to explain the origin of biological information is that the molecular subunits of DNA self-assembled to form primitive cells. Yet, although scientists have shown that some of the molecular building-blocks of DNA, RNA, and protein can form under natural conditions, without pre-existing cells or Intelligent Design those building-blocks do not spontaneously assemble into large information-carrying molecules. Since the only cause known to be capable in the present of producing such molecules outside of living cells is ID, Meyer argues that it is reasonable to infer that an intelligence acted somehow in the past to produce the existing information-rich sequences in living cells.
 - vi. In 2004, Meyer published an article in Proceedings of the Biological Society of Washington titled “The Origin of Biological Information and the Higher Taxonomic Categories.” Arguing that the origin of major animal body plans in the Cambrian explosion required an enormous increase in complex specified information, Meyer wrote: *“Analysis of the problem of the origin of biological information... exposes a deficiency in the causal powers of natural selection that corresponds precisely to powers that agents are uniquely known to possess. Intelligent agents have foresight. Such agents can select functional goals before they exist.” Intelligent Design theorists “are not positing an arbitrary explanatory element unmotivated by a consideration of the evidence. Instead, they are positing an entity possessing precisely the attributes and causal powers that the phenomenon in question requires.”*
- d. **Guillermo Gonzalez and Jay W. Richards:**
- i. Although most ID arguments currently focus on design in living things, some focus on design in the cosmos. In The Privileged Planet: How Our Place in the Cosmos is Designed for Discovery (2004), astronomer Guillermo Gonzalez and philosopher Jay W. Richards argued that *the universe and our place in it are designed not only for life, but also for science.*
 - ii. The authors reiterate a point made by others—that *over a dozen universal constants (including the strength of gravity, the strength of the electromagnetic force, and the ratio of the masses of the proton and electron) are remarkably fine-tuned for life. If any of these constants were even slightly different, the universe would be uninhabitable.* Gonzalez and Richards also point out that the Milky Way is just the right kind of galaxy to support life, and our solar system is situated in a relatively narrow “galactic habitable zone” in the Milky Way that minimizes threats from dangerous radiation and comet impacts, and also ensures the availability of heavy elements needed to form large rocky planets.
 - iii. Our Sun is just the right size and has the necessary stability to support life. Unlike the other planets in our solar system, the Earth is in a “circumstellar habitable zone” that permits moderate temperatures and liquid surface water. Furthermore, the Earth is just the right

size to hold an atmosphere, consist of dry land as well as oceans, and produce a protective magnetic field. Finally, the Moon is just the right size and distance from the Earth to stabilize the tilt of the latter and thereby prevent wild fluctuations in temperature. It also helps to generate tides that mix nutrients from the land with the oceans.

- iv. Not only is the Earth especially suited for life, but it is also well situated for scientific discovery. Because the Milky Way is a spiral galaxy, it is relatively flat, so that from our vantage point midway from its center to its edge we can enjoy clear views of distant galaxies and the subtle cosmic background microwave radiation that provided evidence for the Big Bang. Our solar system is also well suited to scientific discovery. The simple near-circular orbits of the planets, and the large Moon orbiting the Earth, have guided scientists to an accurate understanding of gravity.
- v. The same parameters also make possible total solar eclipses, which have played a crucial role in astronomy. During a total solar eclipse... the Moon exactly covers the face of the Sun, leaving only its tenuous outer atmosphere visible from the Earth. Studying that outer atmosphere has enabled astronomers to make discoveries about the composition of the Sun and other stars. Total solar eclipses have also provided tests of Einstein's Theory of General Relativity. If the Moon were smaller or larger, or closer or farther away, such discoveries and tests would have been delayed, perhaps indefinitely. To Gonzalez and Richards, it seems as though the size and orbit of the Moon were tailor-made for science.
- vi. So, the most habitable places in the universe are also the best places to make scientific discoveries about it. According to Gonzalez and Richards: *"There's no obvious reason to assume that the very same rare properties that allow for our existence would also provide the best overall setting to make discoveries about the world around us. We don't think this is merely coincidental. It cries out for another explanation, an explanation that suggests there's more to the cosmos than we have been willing to entertain or even imagine."* They conclude that the correlation between the factors needed for complex life and the factors needed to do science "forms a meaningful pattern" that "points to purpose and Intelligent Design in the cosmos."

6. REFRAMING THE CONTROVERSY BETWEEN DARWINISM AND CREATIONISM:

- a. Intelligent Design emerged in the 1980s in the midst of a long-standing controversy between Darwinism and Creationism:
 - i. Darwinism maintains that all living things are descendants of a common ancestor that have been modified by unguided natural processes over hundreds of millions of years.
 - ii. Young-Earth Biblical Creationism interprets Genesis to mean that God created the major kinds of living things in six 24-hour days only a few thousand years ago.
 - iii. Accordingly, much of the controversy between Darwinism and Creationism has focused on geological chronology and whether the Bible is a reliable account of biological origins. In the United States, various court decisions have ruled that Creationism is religion rather than

science, and thus cannot be presented as an alternative to Darwinism in public school science classrooms.

- b. Some critics of ID call it “intelligent design creationism,” or “creationism light,” both implying that court decisions against creationism also apply to ID. However, ID advocates maintain that ID is not based on the Bible or any other religious texts or doctrines; it takes no position on the age of the Earth; it does not attempt to identify the designer as God; and it does not claim that the major kinds of living things were created separately rather than descended from a common ancestor. Thus, historian Ronald L. Numbers (who is not an ID proponent) concludes that it is inaccurate to call it Creationism [or even Creationism light]... though that identity is “the easiest way to discredit Intelligent Design.”
- c. Much of the controversy surrounding Intelligent Design appears to stem from equating (one might say confusing) it with Creationism, but there are aspects of the controversy that are independent of this. Some are 1) philosophical, while others are 2) scientific, 3) educational, or 4) theological.

- i. **Philosophy:**

- 1. One philosophical aspect of the controversy concerns the legitimacy of arguing by analogy from human design to non-human design. According to some critics of ID, we can infer design in the products of human actions because we have personal knowledge of the goals and abilities of human agents, but we do not know enough about whatever entity or entities produced the universe and living things to attribute design to them.
 - a. Philosopher Elliott Sober considers this “the Achilles heel of the design argument.” Using the famous watch metaphor of nineteenth-century natural theologian William Paley, Sober writes: “When we behold the watch on the hearth, we know that the watch’s features are not particularly improbable, on the hypothesis that the watch was produced by a Designer who has the sorts of human goals and abilities with which we are familiar. This is the deep dis-analogy between the watchmaker and the putative maker of organisms and universes. We are invited, in the latter case, to imagine a Designer who is radically different from the human craftsmen with whom we are familiar. But if this Designer is so different, why are we so sure” that it would produce what we see?
 - b. Mathematician and philosopher William A. Dembski rejects Sober’s criticism and defends the analogy. “We infer design regularly and reliably,” Dembski wrote, “without necessarily knowing the characteristics of the designer or being able to assess what the designer is likely to do... We do not get into the mind of designers and thereby attribute design. Rather, *we look at the effects in the physical world that exhibit clear marks of intelligence and from those marks infer a designing intelligence.* This is true even for those most uncontroversial of embodied designers, namely, our fellow human beings.

We recognize their intelligence not by merging with their minds but by examining their actions and determining whether those actions display marks of intelligence.”

2. A second philosophical aspect of the controversy concerns the nature of science. Although philosophers have been unable to agree on how to define science or demarcate it from non-science, there is general agreement that a scientific hypothesis must somehow be empirically testable. In 1999, the U. S. National Academy of Sciences declared that “intelligent design and other claims of supernatural intervention in the origin of life or of species are not science because they are not testable by the methods of science.”
 - a. One possible way to test a hypothesis is to find evidence consistent with it (“verification”), yet most scientists regard astrology as unscientific even though astrologers sometimes make verifiably true predictions. Another possible way to test a hypothesis is to find evidence inconsistent with it (“falsification”), yet as philosopher of science Larry Laudan points out this “has the untoward consequence of countenancing as ‘scientific’ every crank claim which makes ascertainably false assertions.”
 - b. Since science cannot be adequately defined in terms of verification or falsification, some have defined it in terms of “*Methodological Naturalism*.” According to this view, science is limited to natural explanations because it relies on empirical evidence that cannot be obtained in cases of supernatural causation. Critics of ID argue that it invokes a supernatural designer and thus cannot be tested and cannot be regarded as scientific. Defenders of ID counter that they infer design from its empirically observable effects and that its cause need not be any more supernatural than the human intellect.
 - c. Methodological Naturalism is distinguished from metaphysical (or ontological or philosophical) naturalism, the view that nature is all there is and that supernatural entities such as spirit and God do not exist. The former is a statement about the limits of science, while the latter is a statement about the whole of reality, but some philosophers argue that the distinction fails in practice because scientists tend to act as though the whole of reality is accessible to their methods. As philosopher Del Ratzsch wrote: “If one restricts science to the natural, and assumes that science can in principle get to all truth, then one has implicitly assumed philosophical naturalism.... Methodological naturalism is not quite the lamb it is sometimes pictured as being.”
3. Philosophers disagree not only over specific definitions of science, but also over the legitimacy of using them to rule out a specific hypothesis such as intelligent design—as though its truth or falsity could be determined by appealing to a definition.

According to Laudan, our focus “should be squarely on the empirical and conceptual credentials for claims about the world. The ‘scientific’ status of those claims is altogether irrelevant.”

ii. Science:

1. In addition to declaring that ID is unscientific because it is empirically untestable, critics of ID also argue that empirical evidence has proven it false. For example, Michael J. Behe considers the irreducible complexity of the human blood-clotting cascade to be evidence for ID.
 - a. In 1997, however, biochemist Russell F. Doolittle wrote that experiments had shown that if one component of the cascade is knocked out in one group of mice and another component is knocked out in another group, both groups lack functional clotting systems. But, Doolittle claimed, “When these two lines of mice were crossed... [then] for all practical purposes, the mice lacking both genes were normal!” He concluded: “Contrary to claims about irreducible complexity, the entire ensemble of proteins is not needed,” and the blood-clotting cascade can be explained within the context of Darwinian evolution.
 - b. According to Behe, however, Doolittle misunderstood the scientific articles on which he based his argument. When mice from the two abnormal groups were crossed, their offspring were not normal, but lacked a functional clotting system and suffered from frequent hemorrhages. Behe concluded “that there are indeed no detailed explanations for the evolution of blood clotting in the literature and that, despite Darwinian protestations, the irreducible complexity of the system is a significant problem for Darwinism.”
2. Biologist Kenneth R. Miller disagrees with Behe’s claim that the bacterial flagellum is irreducibly complex.
 - a. Some pathogenic bacteria possess a structure called the type III secretory system, or TTSS, with which they inject toxin into cells of their victims. The TTSS resembles a subset of the flagellar apparatus possessed by other bacteria, and Miller argues that since the TTSS has a function apart from the flagellum as a whole, the latter is not irreducibly complex. Miller concludes: “What this means is that the argument for intelligent design of the flagellum has failed.”
 - b. Behe replies that irreducibly complex systems sometimes contain parts that perform other functions in other contexts. For example, a mechanic could dismantle an outboard motor and run the gasoline engine by itself, but the outboard motor cannot function without it. According to Behe, Miller is “switching the focus from the function of the system to act as a rotary propulsion machine to the ability of a subset of the system to transport

proteins across a membrane. However, taking away the parts of the flagellum certainly destroys the ability of the system to act as a rotary propulsion machine, as I have argued. Thus, contra Miller, the flagellum is indeed irreducibly complex.”

3. Miller also argues that evidence from origin-of-life research refutes Stephen C. Meyer’s hypothesis that ID is the best explanation for the origin of information-rich sequences in DNA.
 - a. According to the “RNA World” hypothesis, life originated when a non-living mixture of relatively simple proteins and RNA molecules began to self-replicate. Based on this hypothesis, Miller argues that natural selection then refined the mixture and begin to accumulate enough information to produce the first living cells—without the need for ID.
 - b. Meyer responds that the proteins and RNA molecules Miller describes already contain complex specified information, the origin of which remains unexplained. Furthermore, even with intelligently designed molecules in a carefully controlled laboratory situation, RNA World researchers have not produced anything approaching the specified complexity in a living cell. According to Meyer, intelligence remains the only cause known to be capable of producing the large amounts of biological information in RNA and DNA.
4. Critics of ID also point out that the consensus of scientific opinion overwhelmingly favors Darwinian evolution and rejects ID. Many scientific societies in the U. S. have issued statements to this effect. ID proponents counter that what matters in science is evidence, not opinion polls, and that history shows that the scientific consensus is often unreliable.
5. Other critics object that ID can never be scientifically fruitful, because instead of exploring possible mechanisms it merely puts a stop to inquiry by saying “God did it.” ID theorists disagree, predicting that scientists who regard living things as designed will discover mechanisms that have been overlooked by scientists who regard living things as accidental by-products of unguided natural processes.

iii. Education:

1. Much of the controversy over ID in education stems from confusing ID not only with Biblical Creationism but also with criticisms of Darwinian Evolution. Although the latter is a step in inferring design by the explanatory filter or an inference to the best explanation, one can criticize Darwinian Evolution (as many scientists have) without advocating Intelligent Design.
2. Kansas, Ohio, and Pennsylvania have figured most prominently in U. S. education controversies. When the Kansas State Board of Education revised its science standards in 1999, several members wanted to include some acknowledgment of the scientific controversy over macroevolution (the origin of new species, organs,

and body plans), but pro-Darwin board members refused. The resulting compromise increased the space devoted to evolution but included only microevolution (changes within existing species). Darwinists then claimed that Kansas had prohibited the teaching of evolution or mandated the teaching of creationism; Intelligent Design was not an issue. In the next school board election, pro-Darwin candidates won a majority of seats on the Kansas Board and revised the state standards in 2001 to include macroevolution—with no mention of the scientific controversy over it.

3. In 2002, the Ohio State Board of Education debated whether to revise its science standards to include ID as an alternative to Darwinian Evolution. The Board eventually adopted new science standards that included a benchmark requiring students to “describe how scientists continue to investigate and critically analyze aspects of evolutionary theory,” but the standards also stated: “The intent of this benchmark does not mandate the teaching or testing of Intelligent Design.” As in Kansas, Darwinists then claimed that the Board had mandated the teaching of Creationism—and, in this case, ID.
4. In 2004, the pro-Darwin members lost their majority on the Kansas State Board of Education, which decided to take another look at the science standards. After hearing testimony from several ID proponents in 2005, the Board adopted standards that required critical analysis of the evidence for Darwinian evolution but did not mandate the study of intelligent design. When Darwinists accused the Board of inserting ID into the science curriculum, the Board emphasized: “The curriculum standards call for students to learn about the best evidence for modern evolutionary theory, but also to learn about areas where scientists are raising scientific criticisms of the theory... We also emphasize that the Science Curriculum Standards do not include Intelligent Design.”
5. In 2004, a local school board in Dover, Pennsylvania, adopted a policy requiring school administrators to read the following statement to public high school students who were about to study Darwinian Evolution: “Because Darwin's Theory is a theory, it continues to be tested as new evidence is discovered. *The Theory is not [necessarily] a fact.* Gaps in the Theory exist for which there is no evidence. A theory is defined as a well-tested explanation that unifies a broad range of observations. Intelligent Design is an explanation for the origin of life that differs from Darwin's view. The reference book, Of Pandas and People, is available for students who might be interested in gaining an understanding of what Intelligent Design actually involves. With respect to any theory, students are encouraged to keep an open mind.”
6. The Center for Science and Culture (CSC) at the Discovery Institute in Seattle urged the Dover School Board to rescind its policy. (The CSC advocates teaching the controversy over Darwinian Evolution and protecting the rights of teachers who

choose to discuss Intelligent Design, but it advises school boards not to mandate the teaching of ID because that will "only politicize the theory and will hinder fair and open discussion of the merits of the theory among scholars and within the scientific community.") The Dover School Board persisted, however, and the American Civil Liberties Union (ACLU) brought suit in federal district court. In December 2005, Judge John E. Jones III ruled that the Dover policy violated the First Amendment to the U. S. Constitution. Jones concluded "that ID is an interesting theological argument, but that it is not science," and he prohibited the Dover School Board from requiring teachers to "denigrate or disparage the scientific theory of evolution" or to mention ID.

7. Critics of Intelligent Design applauded the ruling as a complete victory, though law professor (and ID critic) Jay D. Wexler questioned "whether judges should be deciding in their written opinions that ID is or is not science as a matter of law." Law professor (and ID defender) David K. DeWolf, along with political scientist (and CSC co-founder) John G. West, pointed out that the judge had copied over 90 percent of the section on ID in his ruling—including several factual errors—from the ACLU's proposed "Findings of Fact and Conclusions of Law" submitted a month earlier.
8. In February 2006, influenced partly by the Dover court decision, the Ohio State Board of Education deleted the critical study of Darwinian Evolution from that state's science standards. A few months later pro-Darwin members regained a majority on the Kansas State Board of Education, and in February 2007 the newly constituted Board eliminated the critical study of evolution from Kansas's science standards as well. In the meantime, South Carolina had adopted science standards requiring critical analysis of evolutionary theory. Contrary to many news accounts, however, none of these state standards included the teaching of ID.

iv. Theology: The controversy between Darwinian Evolution and Intelligent Design involves several theological issues:

1. In the second edition of *The Origin of Species*, Darwin wrote that life had "been originally breathed by the Creator into a few forms or into one." In his correspondence, however, he wrote: "There seems to be no more design in the variability of organic beings, and in the action of natural selection, than in the course which the winds blow." He concluded: "I cannot look at the universe as the result of blind chance, yet I can see no evidence of beneficent design, or indeed of design of any kind, in the details." One may surmise that in Darwin's thinking, a deity may have designed the universe and its laws, but the products of evolution (such as human beings) are undesigned.
 - a. A century later, paleontologist George Gaylord Simpson wrote in The Meaning of Evolution: "Man is the result of a purposeless and natural process that did not have him in mind. He was not planned." Molecular

biologist Jacques Monod declared that with the discovery of the chemical basis of DNA mutations “the mechanism of Darwinism is at last securely founded,” so “man has to understand that he is a mere accident.” And paleontologist Stephen Jay Gould wrote that Darwinian evolution “took away our status as paragons created in the image of God.”

- b.** For many people, these statements contradict the Christian doctrine of creation (not to be confused with Biblical Creationism), which affirms that God planned human beings from the very beginning. In his 2005 inaugural homily, Pope Benedict XVI said that, “we are not some casual and meaningless product of evolution. Each of us is the result of a thought of God.” According to philosopher Alvin Plantinga, Darwinism claims “that human beings are, in an important way, merely accidental; there wasn't any plan, any foresight, any mind, any mind's eye involved in their coming into being. But of course, no Christian theist could take that seriously for a minute.” Although ID does not entail the existence of God or the claim that human beings were created in God's image, its affirmation of design embroils it in this theological controversy.
- 2.** A second theological issue concerns providence, the Christian doctrine that God not only created the universe but also continues to sustain and guide it. The materialistic view that unguided natural processes are sufficient to explain everything contradicts this doctrine.
 - a.** Some Christians resolve the contradiction by saying that although the chain of natural causes is unbroken, it persists only because God sustains it with His providential power. Geologist Keith B. Miller (an Evangelical Christian) criticizes ID for being a “God of the gaps” approach in which “God intervenes to interrupt cause-and-effect processes.” “I believe that God is involved at all times,” Miller says, while ID proponents “are essentially looking for gaps in our current scientific understanding and then using them as evidence of divine action.”
 - b.** ID proponent William A. Dembski (also an Evangelical Christian) counters that there is no good reason to assume that natural causes are sufficient; the gaps in them may be real, not just artifacts of our limited understanding. Dembski considers the “central issue in the debate” to be the following: *“Is nature [defined as a closed system of material causes] complete in the sense of possessing all the resources needed to bring about the information-rich biological structures we see around us, or does nature also require some contribution of design to bring about those structures?”* Even then, Dembski points out, design does not necessarily entail God, [nor does it exclude God].

3. A third theological issue concerns “Theodicy” — meaning the problem of evil. Christian theology traces human moral evil to the Fall, which occurred when human beings misused their free will. But what about “natural evils” that are independent of human free will, such as predation, disease, and natural disasters? If God is all-good and all-powerful, why did He create a world with such evils?
 - a. Darwin was deeply troubled by this question. In a letter to botanist Asa Gray he wrote: “There seems to me too much misery in the world. I cannot persuade myself that a beneficent & omnipotent God would have designedly created the *Ichneumonidae* [parasitic wasps] with the express intention of their feeding within the living bodies of caterpillars, or that a cat should play with mice. Not believing this, I see no necessity in the belief that the eye was expressly designed.” According to biophysicist Cornelius G. Hunter, it was partly this concern that motivated Darwin to formulate his theory of natural selection, which by leaving the details to chance “absolved God of responsibility for nature’s iniquity.”
 - b. Some critics of Intelligent Design object that by eliminating chance it again makes God responsible for natural evil. But the Explanatory Filter explicitly acknowledges the reality of chance; that is why it rules out explanations based on chance before inferring design. Furthermore, ID asserts only that design is detectable in some, but not necessarily all features of the world; it is not a theological claim about God’s omnipotence.
4. In 1997, Stephen Jay Gould wrote that all theological controversies involving Darwinian Evolution are ill-conceived because science and religion each “has a legitimate magisterium, or domain of teaching authority, and these magisteria do not overlap (the principle that I would like to designate as NOMA, or 'nonoverlapping magisteria'). The net of science covers the empirical universe... The net of religion extends over questions of moral meaning and value.” For Gould, the world of objective facts belongs to science, and thus to Darwinism, while religion is limited to subjective value judgments.
5. But ID proponent Phillip E. Johnson objects that NOMA “really is a power play emanating from the magisterium of science.” From the NOMA perspective, “theology is not entitled to any cognitive status because it provides no knowledge. It is science—founded on materialist premises—that discovered not only evolution but everything else that is known about the universe and how human beings came into existence. All modernist theologians can do is to put a theistic spin on the story provided by materialism.” According to Johnson, accepting NOMA is equivalent to surrendering theism and embracing metaphysical naturalism.

7. **CONCLUSION:** Science and Theology are not necessarily adversaries; however, they are both involved in a philosophical battle in our attempts to define the natural order and what it means to be human. Science and theology have been and should remain collaborative partners, not adversaries. See AD article on Spiritual life for more on this topic: <http://www.authenticdiscipleship.org/pdfs/3-leadership-dev/LD%20-%206.5%20-%20On%20Developing%20a%20Spirit%20Driven%20Life.pdf>