



ISSN 1522- 5668

# *Journal of Religion & Society*

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**The Kripke Center**

**Volume 24 (2022)**

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## **Coronation in Physics**

### **String Theory and the Pursuit of the Theory of Everything**

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#### **Abstract**

This study examines the popularization of string theory in science literature and documentary film, which is presented to audiences with emphasis on the irreconcilability of two key paradigms in physics, quantum mechanics and general relativity, enabling the crowning of string theory as the long-sought “theory of everything.” As string theory is presented as physics’ final theory, a metaphysical rather than empirically based description of the cosmos, its writers draw upon heroic and religious language, and employ descriptions of prophecies of string particles, battling criticism of the theory, and finally a coronation and sainthood identity as the field of physics finally finds its theory of everything.

Keywords: religion, science, rhetoric, metaphor, literature

#### **Introduction**

A 2020 article on NASA’s website titled “Chandra’s Data Tests ‘Theory of Everything’” explores how the earth-orbiting Chandra space observatory is being used to examine the possibility of tiny string-like particles in space (Mohon 2020). As the cause of that NASA search, string theory is shifting the way we understand the universe, and this comparatively new scientific idea is based on laws of physics that challenge our traditional understanding of the universe’s particles. As a promoted “theory of everything,” string theorists speak of its ability to unify all other theories of physics. In this study, I examine the language and arguments that are unique to the theory of everything pursuit in string theory literature, specifically popular science books, articles, and documentary film.

I argue that the story of string theory in popular discourse utilizes explicit religious themes, resulting in a transcendent coronation of string theory as the theory of everything, ultimately suggesting that the study of theoretical physics is a finished journey. The metaphysical nature of string theory allows its public discourse to operate at an audience-relatable level and readily take on religious form. Yet, contention persists over string theory despite the proliferation and rhetorical power of the common string theory story. The promotion of string theory as the theory of everything as it has transpired over several decades – particularly the 1980s, 1990s, and early 2000s – is given specific attention in order to capture unfolding events and claims as they happened. Advocates describe string theory’s progress in basic ways that are designed to be read and understood by non-scientific audiences, escalating over the last few decades due to the theory’s significant scientific advances in the 1980s and 1990s. This analysis focuses on the presentation of key people and research advancements surrounding the string theory story, which together offer confidence in it being the final theory of physics. Further, exploration of what these early developments mean now in scientific discourse include reference to contemporary confidence in string theory, highlighted at the end of this article.

Theory of everything discourse in physics adopts a theological and destiny-like tone, which takes audiences through a journey of difficulty and eventually a crowning moment when physicists reverence string theory as the final theory. I demonstrate how within popular string theory discourse, specifically, proponents first display confidence with words of prophetic promise for string theory as the theory of everything. Then, the discourse of theoretical battle intensifies the challenges string theorists face through expressions of criticism from other physicists. Finally, string theory is crowned as the theory of everything. Literary critic Kenneth Burke (1970, 45) describes this literary process of creating a sense of conflict and the need for closure in narratives as “division.” As a result, string theory discourse gives special attention to the historical clash between these two established theories. In the process of creating division within discourse, “transcendence” is then made possible when a solution is prescribed, “Texts explicitly concerned with transcendence, as theological doctrines are, provide us with ‘perfectly through’ instances of such processes,” or in this study, specifically, scientific transcendence over divided, uncooperative theories (Burke 1970, 38). In the process, string theory proponents apply religious language and descriptions to crown string theory as the theory of everything.

With string theory proliferating the phrase “theory of everything,” the popularity of the term grew, including becoming the title to the biopic about the life of legendary physicist Stephen Hawking, *The Theory of Everything* (Marsh 2014). Yet, despite the string theory story as told in numerous popular science texts, the rush of acceptance of string theory legends and heroes also comes with concern about the theory being celebrated too early and without consideration of other explanations, such as how physicist Bernard Lavenda (2015, 1) describes the “backlash against popular science books that mislead the general public into believing that it is only a matter of time that superstring theory . . . will open up a new reality.” Still, the string theory story remains a scientific force, as well as a rhetorical one with its public dissemination, a popularization process which Thomas Lessl (1989, 188) describes as having religious resonances, “Just as the institutional church endeavors to analyze history as the enactment of heavenly design, so the scientist depicts history as the unfolding of

deterministic processes that lead naturally to modern science,” a process that bring public support to a new, exciting idea. String theorists are situated to bypass the demands of hard science and operate in a descriptive format that captures a non-observable existence, thereby offering identification with readers through a religious style, a priestly voice. Therefore, in describing transcendent dimensions of space, religious metaphors and descriptions become available and useful.

### Scientific Rhetoric and Storytelling

Drawing upon the insights of rhetoric of science scholarship, we can situate the telling of the string theory story as its proponents draw upon cultural values. When scientists transfer claims from the technical realm to non-scientific audiences, technical vocabulary is translated into non-technical terminology, therefore engaging in the process of finding and using language that appeals to a non-scientific audience, such as one of the early rhetoric of science explorations, John Angus Campbell’s (1970) analysis of Charles Darwin’s *Origins of Species* as a religious-like transcendence journey. Similar studies of religious themes in scientific stories include examinations of the discourses of Carl Sagan (Lessl 1985), scientific naturalism (Lessl 2005), and the works of Francis Bacon (McKnight 2007). As scientists can take on a “priestly voice” with audiences (Lessl 1989), string theory advocates appeal to themes of sacredness and celebrate scientists as heroes, and this romanticized tale leads to a blissful, final destination in which a grand theory operates as a new, finalized state of scientific understanding.

Lloyd Bitzer (1968, 6) explores how technical problems are magnified for audiences so that the need for a solution is understood as urgent, “Any *exigency* is an imperfection marked by urgency, it is a defect, an obstacle, something waiting to be done.” To address exigencies in science, Lawrence Prelli (1989, 184) describes the necessity of carefully crafting scientific solutions to the public, “This means picking out the crucial points for decision, expressing them so they secure needed attention, and rendering scientifically reasonable the decisions proposed to the community.” But transference of scientific ideas into everyday discourse cannot happen without science writers being familiar with the values that are shared by readers (Perelman and Olbrechts-Tyteca 1969). In dissecting string theory discourse, I am talking about a scientific movement that uses a strategy of division and therefore labors to create an unsettling need for closure, provided by string theory, for the audience to experience regarding the theoretical contradictions of quantum mechanics and general relativity.

Early rhetoric of science scholarship has further enlightened and encouraged the growth of popular science studies, such as Joseph Rhodes’s (2014, 323) “atheistic voice” in response to Lessl. Similarly, Davi Johnson (2004) utilizes Lessl’s model to explore the scientific voice in female body empowerment. Also significant to scientific rhetoric has been the exploration of the solo science hero, which Leah Ceccarelli (2014, 4) describes as scientists “seeing themselves as risk-taking, adventurous loners . . . but that nonetheless comes to rely on the profitable discoveries they bring back from the frontier of research”; a common American scientific discourse of frontier discovery (Hocker Rushing 1983; Smith 2009; Swanson 2020). Other recent scholarship on the rhetoric of science has centered on scientific discourses connected to political and social influence (Smits 2006; Teehan 2018; Young & Carpenter

2018; Ambrus 2019), as well as the empowerment of the scientific feminine (Early 1995; Hamlin 2015; Faithful 2016).

To understand the context of string theory discourse, emphasizing the contradictions in physics paradigms is important. So, as the paradigms of general relativity and quantum mechanics are two primary, established camps in the field of physics, they are presented as contradicting each other. As a result, string theory discourse gives special attention to the historical clash in these other theories' laws of physics, along with focus on the long-sought and needed unifying theory. In the process, string theory proponents rework and apply religious language and descriptions.

### Prophecies of Strings

As part of the prophetic prediction theme, the search for a final theory is an ancient effort (Weinberg 1992; Davies and Brown 1988). Many have spoken of the day when the theory of everything will be discovered, and they do so in religiously themed descriptions, such as University of Michigan physicist Michael Duff (1998, 64) comparing string theory discourse to biblical prophets, that they are “millennial Jeremiahs,” referring to the ability to predict future events. Other string theory discourse is also ripe with predictions, which Lessl (1989, 188) describes as “Priestly communication” that “reminds people of what they might become . . . by nudging them gradually into the symbolic environment” of rhetorical influence. Physicist John Ellis says that “we will eventually discover all the elements which go together to make a Theory of Everything,” and “we [will] eventually reach the Theory of Everything somewhere off in the distant future” (Dine 2007, 166). With similar optimism, Michael Duff (1998, 64) states that, “The Theory of Everything is emerging.” And according to string theory pioneer John Schwarz (1987, 39), string theory is accumulating evidence as the theory of everything at a “breathtaking pace.” In the same way, physicist F. David Peat (1988, 119) states that string theory is approaching theoretical physics’ “final step.” It is also called a “bold step” (Halpern 2004, 1). These kinds of phrases build excitement toward an eventual, transcendent discovery.

Along with the tradition of prophetic-like prediction and descriptions of how a theoretical unification will happen, string theorists speak of scientists being guided by nature, teasing them along to discovering its hidden mysteries in revelatory ways. Nobel laureate Steven Weinberg (1992, 6) writes about how nature is teasing string theorists toward discoveries,

Sometimes in discussions among physicists, when it turns out that mathematically beautiful ideas are actually relevant to the real world, we get the feeling that there is something behind the blackboard, some deeper truth foreshadowing a final theory that makes our ideas turn out so well.

In Weinberg’s argument, nature is teasing physicists along, continually prodding them to realize the true form particle physics. Adopting conclusions of a metaphysical existence as real, string theorists can operate at an authoritative level above empirical description. Their discourse is gracefully philosophical, and observably theological.

The led-by-nature personification is further captured in the depiction, in PBS’s *The Elegant Universe* (McMaster 2003) documentary, of nineteenth-century physicist Theodor

Kaluza's dramatic epiphany of mathematically discovering string theory, a process that Lessl (1989, 188–89) describes as the priestly voice being merely the messenger of what the mysteries of the personified cosmos want to reveal, "the priestly voice does not portray itself as the agency of any merely human group; it is the voice of God or of Nature, a mouthpiece." Also recounting the Kaluza story, physicist Paul Halpern (2004, 3) calls the impetus of string theory the "Kaluza-Klein miracle." In 1919, physicist Theodor Kaluza was an unknown scholar, working as a humble, unpaid lecturer at the University of Königsberg in Germany. One day Kaluza was fiddling with some mathematical ideas while at home when he decided to be creative with the idea of applying Einstein's theory of gravity to a "hypothetical five-dimensional universe" (Halpern 2004, 5; note that string theory's mathematical formulations are based on the concept of extra dimensions of space beyond what we physically experience). He then realized that in a five-dimensional universe, adding one more than Einstein's theory of four dimensions, he could unify Einstein's theories with electromagnetism. This discovery allowed Kaluza to begin thinking about unifying all the laws of physics, and his realization was thrilling, "he froze momentarily in place, then stood up abruptly and – in his own eureka shout – began to hum a Mozart aria" (Halpern 2004, 6). But Kaluza's theory never gained enough support to have a lasting effect on theoretical physics.

Continuing the rhetoric of nature revealing itself to physicists, three years later and on another continent, physicist Oskar Klein, unfamiliar with Kaluza's work, happened to carry out the same tests that Kaluza had done. Klein was teaching basic physics courses at the University of Michigan when he realized that he could examine the electromagnetic strength of particles within gravitational fields, and he was surprised to discover that some basic particles look more like string-like loops than point particles, and that they could disappear into unknown dimensions. Eventually his colleagues convinced him to abandon his theory, and the laws of nature would once again have to try later to reveal themselves to scientists (Halpern 2004).

Halpern (2004) also describes how two other thinkers extended the Kaluza-Klein discovery several decades later when nature showed up again to reveal its deeper mysteries. In the 1950s, the Italian physicist Tullio Regge was tracking the behavior of particles when throwing them against different kinds of surfaces. At the time, physicists assumed that all particles were spheres and behaved as solid objects. But rather than bouncing off various surfaces, Regge noticed that some particles would vibrate, and he found that they were not spherical, point particles, but "spinning blobs of matter . . . that are smeared" (Halpern 2004, 44–45). In essence, Regge understood that particles bend and twist like strings. Then, in the 1960s, Roger Penrose's story brought string theory even closer to being an established theory. A geometrist, Penrose argued that elementary particles are twists. The larger physics community, however, dismissed the findings from these physicists who articulated the early manifestations of string theory, and at the time most physicists remained convinced that particles are indeed spherical points rather than strings.

Despite the resistance from the larger field of physics, string theorists and their predecessors who also sought to find the theory of everything, such as Albert Einstein, are nonetheless consistently framed as oracle-types who are in connection with a personified form of nature, which takes on religious description. In his own efforts to unify theoretical

physics, Einstein was a “minister counseling his flock” and “presented his assistants with an implied list of virtues and sins” when doing theoretical physics (Halpern 2004, 171). Halpern (2004, 171) also tells of a similar religious-like thought process that Einstein employed, “Despite his disinclination to mix science with religion (in the conventional sense), these injunctions took on a biblical tone.” Halpern (2004, 171) then connects string theory’s arrival in physics to divine intervention, “Einstein based the legitimacy of a ‘Theory of Everything’ on whether or not God would have made the universe that way. In that sense, his guidance was an attempt to read and interpret divine preferences.” Ultimately, on their sacred journey in the string theory story, audiences are led to the culminating confrontation, the theory of everything’s triumphant arrival to battle the monolithic physics establishment that would fight to keep string theory at bay.

### Fighting Disbelief

No prophetic prediction is effective without running into confrontations that, through battle, will ultimately lead to triumph. In this way, Peat (1988, 119) employs military metaphors in describing the pursuit of the theory of everything, “From now on, an army of theoretical physicists would shift their focus from particle to string theories. A revolution in theoretical physics had occurred.” Similarly, to describe the commitment to fighting on, physicist and journalist Adrian Cho (2004, 1426) calls these scholars “The Children of the Revolution,” magnifying the need for resolution in the process which Burke describes as literary division in stories. Science journalist George Musser (2008, 277) calls these efforts, “The String Wars.”

Although Einstein also pursued a theory of everything, he was resistant to early ideas that resembled string theory as the answer. The tale of Einstein being a hindrance to Theodore Kaluza is dramatized as Kaluza attempted to publish his findings on a fifth dimension. *The Elegant Universe* (McMaster 2003) portrays a hypothetical one-sided conversation between Kaluza and Einstein as they sit across from one another in Einstein’s office. Kaluza sits to join Einstein and tries to explain his discovery of extra dimensions, which would solve some of the theoretical divisions in physics, but Einstein ignores Kaluza, who then goes on to express his deep frustration with Einstein’s lack of cooperation. But Einstein continues to refuse to acknowledge Kaluza’s presence. The rhetorical division between these two theorists, each representing competing camps, contributes to the need for a rhetoric of conclusion and union amongst divided physicists. In his fixation on his own explanations, Einstein is depicted as incapable of seeing beyond his own idea. Like most physicists at the time, even Einstein is portrayed as lacking the ability to observe the existence of multiple dimensions that the cosmos was beckoning scientists to realize.

The battle theme is also applied in explaining the heightened contention of division between quantum mechanics and general relativity, which allows the advent of string theory as the solution. After Duff (1998, 64) explains the depressing state physics was in with the two non-cooperative paradigms of quantum mechanics and general relativity, he sets up the arrival of a theory of everything coming to fruition as he describes how the division between the established paradigms will soon crumble because a significant change will happen, leading to the conclusion that “Something big has to give.” Schwarz (1987, 36) refers to these dramatic events in physics in his *Physics Today* article as the realization of string theory

as the final theory being capable of offering us “profound implications.” A theory of everything is so important to physicists that Schwarz (1987, 35) believes that in physics there is not a “more significant theoretical proposal.”

String theorists also demonstrate their sense of urgency for readers by reciting their own passion to find a unifying theory of everything, a type of rhetorical effort that Bitzer (1968, 1) describes as the presentation of “a dangerous situation” where “events, persons, or objects . . . threaten him, someone else, or something of value.” Physicist Michio Kaku (Clark 2002) recalls being a young man when he heard about the death of Einstein and of his secret notebook (the notebook Einstein was using to create formulas that would be the final theory of physics) that was found at his bedside when he died. Kaku’s curiosity and realization that something great was going to happen in the world of physics inspired him to embark on a lifelong journey in physics in order to “know what was in that book” (Clark 2002). Einstein is also portrayed as passionately searching for the theory of everything before his death in PBS’s *The Elegant Universe* (McMaster 2003) documentary. In this depiction, Columbia University physicist Brian Greene stands in front of the house where Einstein passed away and tells the story in a haunting scene. Einstein “spent the last two decades of his life . . . relentlessly [seeking] a single theory so powerful it would describe all the workings of the universe.” Greene then emphasizes the weight of the task of seeking a theory of everything on Einstein up to his death, “Convinced he was on the verge of the most significant discovery in the history of science, Einstein ran out of time, his dream unfulfilled.”

Like Einstein’s commitment to finding the theory of everything up to the moment of his last breath, string theorists are similarly expected to fight on, according to Halpern (2004, 148), “To fight for his beliefs, Einstein drew upon what he saw as his most powerful arsenal: his ability to construct a unified field theory.” In a similar way, University of Chicago physicist Jeff Harvey explains the reason for string theorists maintaining such a longstanding faith, “The reason we keep on with it is that it seems to lead to new physical insights and beautiful things, wonderful structures . . . it’s sufficiently convincing that there’s . . . something to it” (Taubes 1999, 513).

As part of a religious-like battle narrative, such as the string theory “millennial Jeremiahs” mentioned early, heroes endure as they await a day of triumph when their predictions will be fulfilled. University of Maryland physicist James Gates (2007) discusses the troubles string theorists have faced in seeking experimental evidence in his letter to *Physics Today*. He suggests string theorists are going to get their revenge against those who do not heed the prophetic call of string theorists when the days of finding the theory of everything come closer, “Researchers excited about superstring[s] . . . are foremost and thoroughly dedicated and well-trained physicists. Accordingly, they are rooting most enthusiastically for the success of their experimentally driven colleagues, if for no other reason than the opportunity for vindication” (Gates 2007, 16).

Within this context of the historical battle over string theory, it becomes clear that calling string theory “the theory of everything” is because “rhetoric is a mode of altering reality, not by the direct application of energy of objects, but by the creation of discourse which changes reality” (Bitzer 4). The name is a reaction to criticism of string theory, and

John Ellis “invented the term in response to critics who had called string theory a ‘theory of nothing,’” referencing string theory’s lack of experimental evidence (Dine 2007, 37). And the resistance toward and criticism of the theory as a solution to divisions in theoretical physics was significant. For example, physicists Paul Ginsparg and Sheldon Glashow are quoted as mocking string theory that it should “be conducted at schools of divinity by the equivalents of medieval theologians” (Musser 2008, 278). But string theory proponents align their efforts with the most famous minds in history. Even before the 20th century, there was a long-standing push for scientists to discover the “final theory,” which was a dream that even Aristotle pursued and was at the forefront of Isaac Newton’s experimental efforts, as explained by physicist Mark McCutcheon (2010, 17).

As part of the fight against doubters and to build suspense in telling the string theory story, authors and directors climactically identify string theory as the theory of everything near the end of string theory books and documentary film. In Musser’s book (2008), he discusses string theory as the final theory only after demonstrating how string theory unifies physics’ theoretical chasms, and physicist Paul Halpern (2004) also saves his discussion of the *Theory of Everything* title until the end of his retelling of the string theory story. Similarly, Weinberg (1992, 230, 241) strategically uses the theory of everything description for string theory only in his last two chapters after discussing unification, with the chapters titled “Facing Finality” and “What About God?”. For these writers, presenting a theory of everything at the end of their tales is a climax, a dramatic presentation for the reader at the end of retelling of the “millennial Jeremiahs” in physics who were shown the hidden laws of nature. *The Elegant Universe* documentary also reserves discussing the theory of everything until it is first shown that string theory is the answer to unifying quantum mechanics and general relativity (McMaster 2003).

In arguing that an eventual cohesion in physics can be achieved, string theorists and their predecessors looked forward to the day when string theory would be firmly established as the theory of everything. They write about it as having previously been only a dream, but also display their faith that the day would come, despite their battles. Nonetheless, as a *Physics Today* writer who goes by the acronym BMS (1985, 17) states, string theory will “save the day.” It allows reflection on human history, can be perceived as confirming cultural assumptions, and opens the door to opportunities between physics and belief, manifest in the use of religious metaphors.

As described so far, proponents of string theory see the significance of recognizing the roles of key scientists who helped bring it to its eventual moment of victory because, in science, “The locus of priestly authority, whether in its religious or secular forms . . . originat[es] in institutional circles from which the audience is largely excluded,” such as the telling of important figures doing extraordinary things, namely the string theory story (Lessl 1989, 195). The pivotal moment of resolution, when string theory arrives as a recognized and respected theory of physics, is the 1984 “Green-Schwarz discovery” (McMaster 2004), also known as the “first revolution” when string theory was proven to be mathematically anomaly-free by physicists Michael Green and John Schwarz (Taubes 1999, 512). This discovery put string theory on the map of physics, and turned it into a seriously studied subject, “String theory has been the subject of thousands of papers since 1984” (Taubes 1999, 512). And one year after Green and Schwarz’s calculation, physicist Mitchell Waldrop

(1985) published an article in which he crowned string theory, “String as a Theory of Everything” in *Science*. In September 1986, Michael Green published an article in *Scientific American* with a title that makes string theory superior to its predecessors with the prefix super- by calling it, “Superstrings.” Then in 1987, John Schwarz joined his colleague Michael Green in calling string theory super- in the widely read journal *Physics Today* with the same article title, “Superstrings.” Within three years of the Green-Schwarz discovery, string theory was introduced to the public as popular science journals shared their zeal for the anomaly-free claims of string theory.

### Coronation and Sainthood

Offering closure in theoretical wars promises to bring a peaceful rest to physicists, as well as for readers of string theory who await a solution to the rhetorical chasm created for them. Audiences come to appreciate string theory’s previous prophetic struggles and predictions because “rhetorical discourse must be embedded in historic context” of the conflicts that are presented as needing transcendence (Bitzer 1968, 3). All previous frustrations are resolved at the point of unification in 1984. The heroes’ struggle to convince the others that a transcendent, final theory has come via a religious-like tale in which theory-prophets struggle, but eventually win, and are rewarded with a mathematically sound solution to the divisions in physics.

I utilize the coronation metaphor as description because it captures the accumulating event process of physics arrival at a theory of everything, which coincides with other described religious metaphors. Coronation comes with narratives of kings being chosen and crowned by deity, such as the description of the return of Jesus in Revelation 14, and in the myth of King Arthur (Monmouth 2007) being chosen above all others to reign, just as string theory also is portrayed as struggling, battling, but eventually reigning above all others. As a result, the idea of a theory of everything is “hailed,” as Peat (1988, 89, 328) emphasizes twice.

Also using religious descriptions of string theory’s arrival as the theory of everything, James Gates (2007, 16) makes explicit comparisons to religious pursuits, that it “would be a point of great pride to have clearly perceived the mind of God.” Also, it is repeatedly called the “perfect theory” (Peat 1988, 119; Clark 2002). And as a heavenly reward these string theorists’ efforts have put them on “grounds for sainthood in the Einstein canon,” demonstrating victory over others’ doubt about string theory (Halpern 2004, 172).

Part of establishing a reigning theory is crowning a governor, someone to preside. If the Kaluza-Klein theory was the breakthrough for the potential of other dimensions and the Green-Schwarz discovery legitimized string theory as the unifying theory, then Edward Witten is the movement’s “impresario” who brought about a second, further convincing string theory revolution about multiple dimensions of space and the soundness of string theory as the great unifying theory (Taubes 1999, 512). Witten’s (1996) discovery solidified knowledge of how the strings in string theory work and how many dimensions of space there truly are, “Ed just walked up the mountain and looked down and saw the connections that nobody else saw . . . he just took a different perspective, and bang, it all came together. And that’s genius” (McMaster 2003). Duff (1998, 64) calls Witten, “the guru of string theory (and according to *Life* magazine, the sixth most influential American baby boomer).” And

Gary Taubes (1986, 48) says that Witten “is considered so bright that his colleagues are willing to take seriously virtually anything he suggests.” Witten’s discovery, as string theory proponents argue, has essentially closed the door on arguments against the theory. String theory now has its Einstein. Fast forwarding several decades, renowned physicist Henry Tye (Cai and Yan 2021, 2) recently concluded that “you have to go with string theory . . . I think the future goal is to understand why string theory can yield a naturally small cosmological constant.”

## Conclusion

In Disney’s animated film *The Sword in the Stone* (Reitherman 1963), King Arthur’s mentor Merlin expresses his frustration about the lack of having a rightful king before Arthur removes the sword from the stone and proves his divine appointment, “A dark age indeed! An age of inconvenience!” Similarly, string theory is presented as lifting theoretical physics out of its inconvenient dark ages, such as physicist when Henry Tye described the process of resolving the mysteries of the cosmos with string theory, “They don’t need to know string theory, they just need string theory to tell them where to look and what to look for” (Cai and Yan 2021, 2). Embracing and utilizing metaphysical explanations, string theorists offer artful descriptions with theological appeal to capture the public’s imagination of the theory’s concrete mathematical models. Like prophets, string theorists speak of tapping into realms beyond human understanding and description. This graceful display of describing a reality beyond our own through oracles is convincing because it bypasses scientific empiricism. As its elegance takes on a form of religious discourse, it implies a reality made of dimensions beyond humanity’s observations, and equally beyond the descriptions of empirical scientific demands.

Burke (1970, 128–29) argues that such strategic storytelling efforts allow imperfect things, such as theoretical physics in this instance, to be “gradually purged . . . of its obscurities,” and that this is a transcendent process that requires rhetorical skill in presenting a solution, “in theological terminology . . . there may be a certain craftiness in unveiling it.” The use of sacred themes gives string theory writers an immediate connection to audiences. This process is observable as we examine the religious metaphors used to dramatize stories of discovery. In this tale, the battle for legitimacy in theoretical physics leads to an eventual peaceful reign of an explanation emerging, and along with Witten as the established leader who wields a priestly voice, as string theory is described as the presiding theory of everything.

Despite the developments and popularity of string theory, it maintains its critics. Amidst the heightened string theory public celebrations, Peter Woit (2007) argues against string theory and its convenient infallibility due to its lack of empirical experimentation in *Not Even Wrong: The Failure of String Theory and the Search for Unity in Physical Law*. Also, Lee Smolin (2020) continues his work on Einstein’s quantum theory as foundational to physics. And with concern about the popularity of string theory emerging more as a social power than a scientific theory, in 2015 Bernard Lavenda concluded his work *Where Physics Went Wrong* with the question, “Has String Theory Become a Religion?” (75). Further, Daniel Cossins (2019, 1) recently described how, at this point, string theory is not yet “verifiable.”

Yet in string theory's elegant mythological references, it is also empowered to situate its critics into camps of disbelief, comparatively atheistic toward this metaphysical description of the universe. Critics are perceived as lacking perspective on the possibilities of string theory and lacking understanding of the fate-like arrival that comprises string theory's repeated mathematical emergence. At the same time, string theory is also being situated with and explored alongside other explanatory models, "Theorists, young ones in particular, are starting to move between the camps for the first time" in the theoretical debate where "neither strings nor loops [is] landing a killer blow" (Cartwright 2017, 29). Hence, although string theorists describe the quest for the theory of everything as concluded, the debate continues, and non-string theory physicists have not thrown in the towel.

### **Bibliography**

- Ambrus, Gabor. 2019. "Creators and Creatures: The Creation Account in Genesis and the Idea of the Artificial Humanoid." *Zygon: Journal of Religion & Science* 54 (3): 557–74.
- Clark, Malcolm. 2002. *Parallel Universes*. DVD. London: BBC.
- BMS. 1985. "Anomaly Cancellation Launches Superstring Bandwagon." *Physics Today* 38 (7): 17–20.
- Bitzer, Loyd F. 1968. "The Rhetorical Situation." *Philosophy and Rhetoric* 1 (1): 1–14.
- Burke, Kenneth. 1970. *The Rhetoric of Religion: Studies in Logology*. Berkeley: University of California.
- Cai, Yi-Fu, and Sheng-Feng Yan. 2021. "Henry Tye: The Future of Theoretical Physics and Advice to Young Researchers." *National Science Review* 8 (74): 1–4.
- Cartwright, Jon. 2017. "When Loops Become Strings." *New Scientist* 233 (3116): 28–31.
- Campbell, John Angus. 1970. "Darwin and *The Origin of Species*: The Rhetorical Ancestry of an Idea." *Communication Monographs* 37 (1): 1–14.
- Ceccarelli, Leah. 2013. *On the Frontier of Science: An American Rhetoric of Exploration and Exploitation*. East Lansing: Michigan State.
- Cho, Adrian. 2004. "String Theory Gets Real – Sort Of." *Science* 306 (5701): 1460–62.
- Cossins, Daniel. 2019. "The Idea Factory." *New Scientist* 241 (3213): 1–5.
- Davies, Paul C. W., and Julian R. Brown, eds. 1988. *Superstrings: A Theory of Everything?* New York: Cambridge University.
- Dine, Michael. 2007. "String Theory in the Era of the Large Hadron Collider." *Physics Today* 60 (12): 33–39.
- Duff, Michael J. 1998. "The Theory Formerly Known as Strings." *Scientific American* 278 (2): 64–70.
- Early, Julie English. 1995. "Unescorted in Africa: Victorian Women Ethnographers Toiling in the Field of Sensational Science." *The Journal of American Culture* 18 (4): 67–75.

- Faithful, George. 2016. "Survivor, Warrior, Mother, Savior: The Evolution of the Female Hero in Apocalyptic Science Fiction Film in the Late Cold War." *Implicit Religion* 19 (3): 347–70.
- Green, Michael. 1986. "Superstrings." *Scientific American* 255 (3): 48–63.
- Halpern, Paul. 2004. *The Great Beyond: Higher Dimensions, Parallel Universes, and the Extraordinary Search for the Theory of Everything*. Hoboken: Wiley.
- Hamlin, Kimberly. 2015. *From Eve to Evolution: Darwin, Science, Women's Rights in Gilded Age*. Chicago: University of Chicago.
- Hocker Rushing, Janice. 1983. "The Rhetoric of the American Western Myth." *Communication Monographs* 50 (1): 14–32.
- Johnson, Davi. 2004. "Selling Sarafem: Priestly and Bardic Discourses in the Construction of Premenstrual Syndrome." *Women's Studies in Communication* 27 (3): 330–51.
- Lessl, Thomas M. 1985. "Science and the Sacred Cosmos: The Ideological Rhetoric of Carl Sagan." *Quarterly Journal of Speech* 71 (2): 175–87.
- Lessl, Thomas. M. 1989. "The Priestly Voice." *Quarterly Journal of Speech* 75 (2): 183–97.
- Lessl, Thomas M. 2005. "The Mythological Conditioning of Scientific Naturalism." *Journal of Communication and Religion* 28 (1): 23–46.
- Lavenda, Bernard H. 2015. *Where Physics Went Wrong*. London: World Scientific.
- Marsh, James, dir. 2014. *The Theory of Everything*. Universal City, CA: Universal Pictures.
- McCutcheon, Mark. 2010. *The Final Theory: Rethinking Our Scientific Legacy*. 2nd ed. Boca Raton: Universal Publishers.
- McKnight, Stephen. A. 2007. "Religion and Francis Bacon's Scientific Utopianism." *Journal of Religion & Science* 42 (2): 463–86.
- McMaster, Joe, dir. 2003. *NOVA-Physics: The Elegant Universe and Beyond*. DVD. Boston: WGBH.
- Mohon, Lee. 2020, March 18. "Chandra's Data Tests 'Theory of Everything.'" (Mar 18) [https://www.nasa.gov/mission\\_pages/chandra/images/chandra-data-tests-theory-of-everything.html](https://www.nasa.gov/mission_pages/chandra/images/chandra-data-tests-theory-of-everything.html).
- Monmouth, Geoffrey. 1136/2007. *The History of the Kings of Britain*. Peterborough, ON: Broadview. First published 1136.
- Musser, George. 2008. *The Complete Idiot's Guide to String Theory*. New York: Alpha.
- Peat, F. David. 1988. *Superstrings and the Search for the Theory of Everything*. New York: Contemporary.
- Perelman, Chaim, and Lucie Olbrechts-Tyteca. 1969. *The New Rhetoric: A Treatise on Argumentation*. Notre Dame: University of Notre Dame.

- Prelli, Lawrence J. 1989. *A Rhetoric of Science: Inventing Scientific Discourse*. Columbia: University of South Carolina.
- Reitherman, Wolfgang, dir. 1963. *The Sword in the Stone*. Burbank, CA: Walt Disney.
- Rhodes, Joseph. 2014. "The Atheistic Voice." *Rhetoric & Public Affairs* 17 (2): 323–47.
- Schwarz, John H. 1987. "Superstrings." *Physics Today* 40 (11): 33–40.
- Smith, Warren. 2009. "Conclusion: To Infinity and Beyond?" *Sociological Review* 67 (1): 204–12.
- Smits, Martijntje. 2006. "Science Fiction: A Credible Resource for Critical Knowledge?" *Bulletin of Science, Technology & Society* 26 (6): 521–23.
- Smolin, Lee. 2020. *Einstein's Unfinished Revolution: The Search for What Lies Beyond the Quantum*. New York: Penguin.
- Swanson, Glen E. 2020. "The New Frontier: Religion in American's National Space Rhetoric of the Cold War Era." *Religions* 11 (11): 592.
- Taubes, Gary. 1999. "String Theorists Find a Rosetta Stone." *Science* 285 (5427): 512–17.
- Teehan, John. 2018. "The Cognitive Science of Religion: Implications for Morality." *Filosofia UNISINOS* 19 (3): 272–81.
- Waldrop, Mitchell M. 1985. "Strings as a Theory of Everything." *Science* 229 (4719): 1251–53.
- Weinberg, Steven. 1992. *Dreams of a Final Theory*. New York: Pantheon.
- Witten, Edward. 1996. "Reflections on the Fate of Spacetime." *Physics Today* 49 (4): 24–30.
- Woit, Peter. 2007. *Not Even Wrong: The Failure of String Theory and the Search for Unity in Physical Law*. New York: Basic.
- Young, Kevin L., and Charli Carpenter. 2018. "Does Science Fiction Affect Political Fact? Yes and No: A Survey Experiment on 'Killer Robots'." *International Studies Quarterly* 62 (3): 562–76.