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# Part I: PHILOSOPHY OF THE COSMOS

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## Could Our Universe Have Been Initiated Intentionally: An Epistemological Framework

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*The possibility that our universe was initiated intentionally is a compelling philosophical and scientific question that can be evaluated probabilistically based on four primary considerations: fine-tuning in our universe, hypotheses about the multiverse, the likelihood that intelligent life may be able to initiate a universe, and the possibility that we live in a simulation. This paper offers an equation analogous to the noteworthy Drake equation that is intended to be used as a structured thought experiment to help identify factors related to the initiation of our universe and to facilitate examining each in terms of what we know, do not know, and potentially could know about them.*

*Keywords: multiverse, fine-tuned universe, simulation, cosmology, creation of universe, epistemological framework, Drake equation*

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## Introduction

The possibility that our universe was initiated intentionally is a compelling philosophical and scientific question that does not necessarily require involving religious beliefs. This paper offers an epistemological framework for considering factors related to the initiation of our universe and to facilitate examining what we know, do not know, and potentially could know about them. The framework presented should not be rejected as speculative because, as will be shown, the factors it includes are directly correlated to the underlying theories of fine-tuning, the multiverse, and simulations, about which many articles and books have been published. The unique contribution of this paper is that it explores the implications of following details of those theories to their ultimate conclusion and explicates the combined effect of considering all three constructs within the same framework.

To put the value of this approach into context, consider the historically noteworthy Drake equation (see Appendix A). In the 1950s and 60s there was growing interest in the possibility of extraterrestrial life and its potential detection. The astronomer Frank Drake formulated an equation in 1961 (Shostak, 2021) that included all the factors he considered relevant to estimate the number of civilizations in our galaxy with which communication might be possible. This equation was never intended to be precise, but it provided a “conversation starter” (Drake, 2021, para. 7) and an excellent way of “organizing our ignorance” (Dick, 2020: 111).

In recent years, there has been significant scientific interest in the topic of how our universe could have begun. This paper develops an organizational framework in the spirit of the Drake equation – one that allows for some big thinking and captures factors related to the possibility that our universe was initiated intentionally. There are at least four considerations that are relevant for such an equation: fine-tuning in our universe, hypotheses about the multiverse, the likelihood that intelligent life may be able to initiate a universe, and the possibility that we live in a simulation. This paper reviews the current thinking about each of these and then provides an equation to facilitate examining the relevant factors and their interrelationships.

### 1. Fine-tuning

Fine-tuning is not a settled topic. Opinions range from confidence that it is evidence that our universe was initiated by a supreme intelligence (Chan, 2017) to conclusions that what tuning there is, really is not *that* fine (Adams, 2019). However, the consensus seems to be close to the view expressed by Barnes: “Of all the ways that the laws of nature, constants of physics and initial conditions of the universe could have been, only a very small subset permits the existence of intelligent life” (2012: 561).

Understanding fine-tuning starts with the concept that our universe is governed by several laws and parameters that determine what can take place, in a way like a set of very detailed and inviolable building codes. The codes for our universe are such that life like us was able to develop. But if some of those codes were different, conditions might have been impossible for life. Given that there are so many other ways that these parameters could have been, why did they happen to be in the ranges that allow for life? Scholars offer several answers, including (Friederich, 2019: 1012):

1. There may be underlying fundamental laws that require the attributes to be what they are.
2. The parameters of our universe ended up what they are by chance.
3. The parameters were set to those values by some intelligence.

4. There may be many universes, or what is called the multiverse. Given a “sufficiently vast and diverse multiverse, it is only to be expected that it contains at least one universe where the laws and constants are right for life.”

These considerations will be included in the proposed equation.

## 2. Multiple universes

The idea that there could be more than what we perceive as our universe has existed for a long time. For example, “Anaximander, in the 6th Century BC, speculated about a plurality of worlds such as our cosmos, appearing and disappearing in an eternal movement of generation and destruction. A few centuries later, Epicurus described how an unlimited number of worlds fills the infinite vacuum” (Alonso-Serrano & Jannes, 2019: 2).

Current views of the multiverse were summarized by Max Tegmark (2007), who outlined four distinct levels of multiverses: regions in our own universe that we cannot observe or reach, other bubble universes that are separate from ours, quantum physics–related parallel universes, and other universes based on mathematical possibilities. A good general summary of the topic is “ours is not the only universe but part of a multiverse containing an unlimited number of individual universes extending an unlimited distance in all directions and for an unlimited time in the past and future” (Stenger, 2011: 22).

While these ideas may seem more philosophical than scientific, the majority of those who work in the field agree that “some version of the multiverse hypothesis can be defined in a scientifically rigorous way and (...) is or will become testable” (Manson, 2020: 34).

Some conclude that the existence of unlimited universes dismisses intelligence from being involved in the initiation of a universe – even one with fine-tuning – since within the vast numbers, inevitably some will have the right conditions for life. However, that reasoning could lead to the opposite conclusion. According to Adams (2019: 80), “the allowed parameter space is large” for universes to be compatible with life-forming requirements, which means many universes could result in life. If so, what is the likelihood that life in those universes could develop to a level of intelligence capable of initiating other universes?

To answer that question, we have only one data point relating to the capabilities of intelligent life – our own. Somewhat surprisingly, there are scientists who, in fact, think *we* may be able to learn how to trigger the start of a universe. This leads us to our next section.

## 3. If we can figure it out

The idea that we, or any other intelligence, could intentionally initiate a universe is grand indeed. However, some physicists like Brian Greene think it may be “within the realm of possibility” (2020: 247). Alan Guth (2014), Andre Linde (1992), and others have investigated the prospect and concluded the laws of physics do not preclude us from doing so.

Accounting for the element of time deepens the question even more. Life on our planet has existed for three to four billion years. During that time, it has reached a point of intelligence with which it is contemplating how universes are initiated and if it could be done intentionally. Life should continue to be possible on our planet for several billion more years. Beyond our planet, our universe will continue for eons. What levels of knowledge and capabilities will life reach in our universe in the distant future? James Jeans described this future as holding “almost endless possibility and hope” and that “we are drawing plans and laying foundations for a longer future than we can well imagine” (1929: 331). Furthering the

thought, Donald Goldsmith described how currently we “see no sign that life has affected the cosmos on a grand scale. That will change in the future. All the universe will become our garden” (2012: 38).

So, if given enough time and we figure out how to initiate a universe, would we do it? What about other universes from the multiverse that came before us? If they had a life that reached intellectual capabilities equal to or greater than ours, could they have played a role in the initiation of our universe? These considerations will be factored into the proposed equation.

#### 4. Simulation

The idea that we could be living in a simulation is based on the rationale that advanced civilizations could have sufficient computing power to simulate us and our experiences, much like our current video games simulate characters and experiences in a rudimentary way. Those who are open to the possibility that we live in a simulation have already accepted the potential of what this paper is describing as our universe having been initiated intentionally.

The simulation idea was analyzed in 2003 by Nick Bostrom in an article that evaluated if a “technologically mature “posthuman” civilization” (p. 255) might use their capabilities to perform simulations about their ancestors. The concept has been generalized to any advanced civilization – in our future, in another place in our universe, or in another universe – simulating life. As the thinking goes, once the technology is available it would be much easier to run simulations than create physical universes. Therefore, the likelihood of living in a simulation would be greater than living in a physical universe.

Some evaluations based on looking at seemingly arbitrary limits imposed on our universe (like the speed of light) (Khan, 2021) and analyses using Bayesian statistics (Ananthaswamy, 2020) put the chance of us living in a simulation at about 50%. Of course, there are opposing opinions. Frank Wilczek “has argued there’s too much wasted complexity in our universe for it to be simulated” (Khan, 2021, para. 2) and Lisa Randall placed the chances at “effectively zero” (Moskowitz, 2016: 2).

Whatever the probability is for a simulation, the relevant components can be included in the proposed equation.

#### 5. The equation

The intent of creating the proposed equation is similar to the motivation behind the Drake equation, which was “to quantify all of our understanding[,] (...) using our own system as a model” (Flatow, 2022, para. 8) and use it as “a thought experiment, a probabilistic argument, and a framework for thinking” (Drake, 2021, para. 22). Further, it can provide a placeholder for information if and when it becomes available.

The parameters and factors presented here likely will benefit from modifications and are not comprehensive. They are offered as a starting point to allow the thought experiment and discussion to be done with some structure and for revisions to have a base from which to begin.

An equation for the probability that our universe was initiated intentionally,  $P(I)$ , can start with three broad parameters:

- $P(PUI)$ : the probability that intelligent life in a prior universe initiated ours.
- $P(S)$ : the probability that we are in a simulation.
- $P(FTU)$ : the probability that the level of fine-tuning in our universe is unique.

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Putting these into an “at least one” probability equation looks like this:

$$P(I) = 1 - [1 - P(PUI)][1 - P(S)][1 - P(FTU)] \quad (\text{Equation 1})$$

This equation represents that if at least one of the parameters has a probability, it will contribute to the overall probability.

Each of the three parameters in Equation 1 includes several factors.

The probability that a prior universe initiated ours,  $P(PUI)$ , is affected by these factors:

- $PU$ : the probability that there were prior universes.
- $n$ : the number of prior universes.
- $IC$ : the probability of life developing in a prior universe with intellectual capabilities equal to or greater than ours.
- $IP$ : the probability that intentionally initiating a universe is possible.
- $LH$ : the probability that we can learn how to initiate a universe.
- $IM$ : the probability that once learned, the capability to initiate a universe will be implemented.
- $FI$ : the fraction of existing universes that were initiated intentionally.

These factors can be combined into the following subequation:

$$P(PUI) = (PU)(1 - [1 - IC]^n)(IP)(LH)(IM)(FI) \quad (\text{Equation 1.1})$$

This subequation combines the ratio  $FI$  with the compound probability of independent factors  $PU$ ,  $IP$ ,  $LH$ ,  $IM$ , and the probability of at least one  $IC$  based on  $n$ .

The probability that we are in a simulation,  $P(S)$ , is affected by these factors:

- $CP$ : the probability that humans reach a ‘posthuman’ civilization with sufficient computing power to perform simulations with the detail exhibited in our universe (Bostrom, 2003).
- $AS$ : the probability that posthuman civilizations would be interested in performing ancessor simulations (Bostrom, 2003).
- $HUS$ : the probability that other civilizations in our home universe could and would run simulations.
- $OUS$ : the probability that civilizations in other universes could and would run simulations.
- $FS$ : the fraction of existing universes that are simulated.

These factors can be combined into the following subequation:

$$P(S) = \{1 - [1 - (CP)(AS)][1 - HUS][1 - OUS]\}[FS] \quad (\text{Equation 1.2})$$

This subequation combines the ratio  $FS$  with contributions from at least one situation of  $HUS$ ,  $OUS$ , or  $CP$  and  $AS$ .

The probability that the level of fine-tuning in our universe is unique,  $P(FTU)$ , is affected by these factors:

- $NM$ : the probability that there is no multiverse.

- *NFL*: the probability that there are no underlying fundamental laws that require the degree of fine-tuning exhibited in our universe.
- *NR*: the probability that the degree of fine-tuning exhibited in our universe could not happen randomly.

These factors can be combined into the following subequation:

$$P(FTU) = (NM)(NFL)(NR) \quad (\text{Equation 1.3})$$

This subequation represents the compound probability of independent factors *NM*, *NFL*, and *NR*.

In addition to the relationships defined in equation 1 and subequations 1.1, 1.2, and 1.3, the 15 factors presented above can be considered independently in terms of what we know, do not know, and potentially could know about them.

## 6. Discussion

As stated in the introduction, the factors identified in the equation are not speculative. They are directly correlated to the theories of fine-tuning, the multiverse, and simulations. What is speculative is what values will be assigned to each of the factors. This is not a flaw in the equation or the approach; it is a natural part of how science progresses: create a framework that accounts for factors that contribute to a specific phenomenon, speculate on their relative values and interrelationships, then find ways to determine those values through theory or experimentation. Hence, the equation contributes to that process with regard to how our universe began.

As an example, *n*, the factor representing the number of prior universes, is generally thought to be infinite by multiverse theorists. If that is the case, the equation demonstrates that it is extremely likely that some universes will be intentionally initiated – provided that it is possible to do so (and other factors omitted here for simplicity). Whether it is possible to do so, the factor designated by *IP*, is another area of scientific inquiry that so far has resulted in a positive outlook. But is *n* really infinite? Or is *IP* in fact zero? That is the type of discussion the equation facilitates.

Regarding the value of pursuing this kind of reasoning in the first place, recall that the topic of how our universe began has prompted countless philosophical and scientific discussions throughout history. Typically, these discussions derive from two entrenched camps: a great intelligence (God) made it happen through supernatural means, or natural laws brought it about. This equation clarifies the possibility that intelligence could work through natural laws to do it.

Additionally, previous research in this field has missed a critical point. Those who reach conclusions based on the multiverse assert that the existence of essentially infinite universes disproves claims that the fine-tuning in our universe came from any deliberate action because it can all be explained by the huge numbers eventually resulting in a universe where life can develop. Those who lean into our universe's fine-tuning consider the multiverse an extravagant overextension just to explain away its uniqueness. The missed point becomes evident by following the theories beyond the level of just trying to disprove each other. As described previously, it is a valid line of scientific inquiry that we, or other intelligent life that arose because of fine-tuning in our universe, may be able to initiate another universe. Unless we reject the Copernican principle and hold to the view that we are in a unique



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place (spatially or temporally) means we must accept that if there are other universes, some will hold similar prospects as ours, including the possibility of initiating universes. Thus, a full consideration of if our universe could have been initiated intentionally must contain factors related to the theories of fine-tuning and the multiverse in the same analysis. Finally, including in the analysis the possibility of our universe being a simulation furthers the effort to be comprehensive in the treatment of the topic.

## Conclusions

Attempting to quantify the probability that our universe was initiated intentionally is a unique and constructive exercise to identify the relevant factors and examine each independently as well as their interrelationships. The epistemological framework contained herein, with the proposed equation and its 15 factors, is intended to be used as a structured thought experiment to facilitate discussion and further inquiry. This initial equation is presented with the open invitation to add or eliminate terms and adjust how they are combined.

Interestingly, based on this assemblage of parameters and factors, it seems likely that the probability that our universe was initiated intentionally is not zero. While this is not intended to be an example of “anything is possible when dealing with infinities” thinking, this exercise *is* intended to be a way of considering specific ideas judiciously and to see where they lead us. This approach aligns with guidance from Albert Einstein: “To raise new questions, new possibilities, to regard old problems from a new angle, requires creative imagination and marks real advance in science” (1966: 92).

## Considerations for further work

There are additional interrelationships between some of the equation factors. As examples, *IP* affects *LH*, and *PU*, *n*, and *IC* affect *FI* and *OUS*. While the focus of this initial effort was to keep the equation, and its subequations, as simple as possible, more sophisticated models might offer a more thorough accounting of correlating effects.

## References

- Adams, Fred C. (2019) The degree of fine-tuning in our universe – and others. *Physics Reports*, Volume 807, 1–111. <https://doi.org/10.1016/j.physrep.2019.02.001>
- Alonso-Serrano, Ana, and Jannes, Gil. (2019) Conceptual challenges on the road to the multiverse. *Universe*, Volume 5(10), 212. <https://doi.org/10.3390/universe5100212>
- Ananthaswamy, Anil (2020) *Do we live in a simulation? Chances are about 50–50*. Available online: <https://www.scientificamerican.com/article/do-we-live-in-a-simulation-chances-are-about-50-50/>
- Barnes, L.A. (2012) The fine-tuning of the universe for intelligent life. *Publications of the Astronomical Society of Australia*, Volume 29, 529–564. <http://doi.org/10.1071/AS12015>
- Bostrom, Nick (2003) Are we living in a computer simulation? *The Philosophical Quarterly*, Volume 53, 243–255. <https://doi.org/10.1111/1467-9213.00309>
- Chan, Man Ho (2017) The fine-tuned universe and the existence of God. *Open Access Theses and Dissertations*, article id. 447. <https://philarchive.org/archive/CHATFU-2>
- Dick, Steven J. (2020) *Space, Time, and Aliens: Collected Works on Cosmos and Culture*. Springer Nature.



- Drake, Nadia (2021) *Why alien hunters have spent 60 years finding new solutions for the Drake equation*. Available online: <https://www.nationalgeographic.com/science/article/why-alien-hunters-have-spent-60-years-finding-new-solutions-for-the-drake-equation>
- Einstein, A. (1966) In Infeld L. (Ed.), *The Evolution of Physics*. Simon and Schuster.
- Flatow, Ira (2022) *Remembering Frank Drake, who listened to the cosmos*. *Science Friday* (radio show). Available online: <https://www.sciencefriday.com/segments/frank-drake-astro-legacy/#segment-transcript>.
- Friederich, Simon (2019) A new fine-tuning argument for the multiverse. *Foundations of Physics*, Volume 49, 1011–1021. <https://doi.org/10.1007/s10701-019-00246-2>
- Goldsmith, Donald (2012) The far, far future of stars. *Scientific American*, Volume 306, 32–39.
- Greene, Brian (2020) *Until the End of Time: Mind Matter and Our Search for Meaning in an Evolving Universe*. Alfred A. Knopf Publishing.
- Guth, Alan H. (2014) Do the laws of physics allow us to create a new universe? In *The Oskar Klein Memorial Lectures: 1988–1999*, ed. G. Eksping, 207–233. World Scientific. [https://doi.org/10.1142/9789814571616\\_0013](https://doi.org/10.1142/9789814571616_0013)
- Jeans, James H. (1929) *The Universe Around Us*. Macmillan Publishing.
- Khan, Fouad (2021) *Confirmed! We live in a simulation*. Available online: <https://www.scientificamerican.com/article/confirmed-we-live-in-a-simulation/>
- Linde, Andrei (1992) Stochastic approach to tunneling and baby universe formation. *Nuclear Physics B*, Volume 372, 421–442. [https://doi.org/10.1016/0550-3213\(92\)90326-7](https://doi.org/10.1016/0550-3213(92)90326-7)
- Manson, Neil A. (2020) The multiverse: What philosophers and theologians get wrong. *Theology and Science*, Volume 18, 31–45. <https://doi.org/10.1080/14746700.2019.1710348>
- Moskowitz, Clara (2016) *Are we living in a computer simulation?* Available online: <https://www.scientificamerican.com/article/are-we-living-in-a-computer-simulation/>
- Shostak, Seth (2021) *Drake equation*. Available online: <https://www.seti.org/drake-equation-index>
- Stenger, Victor J. (2011) *The Fallacy of Fine-Tuning: Why the Universe Is Not Designed for Us*. Prometheus Books.
- Tegmark, Max (2007) The multiverse hierarchy. In *Universe or Multiverse?* Edited by B. Carr. Cambridge University Press, 99–125. <https://doi.org/10.1017/CBO9781107050990.009>

## Appendix A: The Drake equation

The Drake equation is as follows:

$$N = (R_*) (f_p) (n_e) (f_i) (f_c) (L)$$

$N$  = the number of civilizations in our galaxy with which communication might be possible (i.e., which are on our current past light cone)

$R_*$  = the average rate of star formation in our galaxy

$f_p$  = the fraction of those stars that have planets

$n_e$  = the average number of planets that can potentially support life per star that has planets

$f_l$  = the fraction of planets that could support life and that actually develop life at some point

$f_i$  = the fraction of planets with life that actually go on to develop intelligent life (i.e., civilizations)

$f_c$  = the fraction of civilizations that develop a technology that releases detectable signs of their existence into space

$L$  = the length of time for which such civilizations release detectable signals into space

Source: Shostak, Seth. 2021. Drake equation. SETI Institute. <https://www.seti.org/drake-equation-index>.