“Cheating Death in Damascus” Solution to the Fermi Paradox

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**Abstract**. One of the possible solutions of the Fermi paradox is that *all* civilizations go extinct because they hit some Late Great Filter. Such a universal Late Great Filter must be an unpredictable event that all civilizations unexpectedly encounter, even if they try to escape extinction. This is similar to the “Death in Damascus” paradox from decision theory. However, this unpredictable Late Great Filter could be escaped by choosing a random strategy for humanity’s future development. However, if all civilizations act randomly, this could be the actual cause of universal extinction, as no one will choose the most optimal strategy. Using a meta-random strategy, where the decision to start random actions is also made randomly, solves this.

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# 1. Introduction

There is ongoing interest in the problem of global risk prevention (Baum, 2015; N. Bostrom, 2002, 2018; Torres, 2016). The Fermi paradox plays an important role in this area (Armstrong & Sandberg, 2013; Berezin, 2018; Cooper, 2013; Miller & Felton, 2017), as the non-existence of observable extraterrestrial intelligence (ETI) could itself be some form of evidence about the types of global catastrophes which killed alien civilizations. If something actually killed them, we may try to escape this fate, but we can’t learn what the event was (at least until we carry out extensive space exploration, which will likely be possible only after the most vulnerable period for human civilization is already past).

Miller and Felton laid out the problem: “Consequently, ceteris paribus, the more likely that an existential risk strategy has been unsuccessfully tried in the past by another civilization, the less likely it will work for us. The strategies with the lowest cost, fewest negative side effects, and highest chance of success are the ones most likely to have been tried. The Fermi paradox should therefore nudge us away from these “low hanging fruit” strategies. For example, imagine that some existential risk strategy has a low cost and, absent considerations of the Fermi paradox, appears to have a high probability of success. Civilizations that arose much earlier in the universe would almost certainly have tried this strategy. We however, taking into account the Fermi paradox, should lower our estimate of the likelihood that such a strategy will work, because we should think it probable that other civilizations have tried it but still failed to escape the Great Filter” (Miller & Felton, 2017). Carl Shulman [draws](http://www.overcomingbias.com/2012/12/future-filter-fatalism.html) parallel between “Death in Damascus” problem and Late Great Filter in his blog post (Shulman, 2012).

This discuss of civilizations’ attempts to best guess what could kill them and how to escape this fate brings to mind a problem from decision theory, called “Death in Damascus”. In this article we will explore this relationship. Section 2 will provide an overview of possible solutions to the Fermi paradox. Section 3 will present the decision theory problem known as Death in Damascus and discuss its application to the Fermi paradox. Different alternatives and objections will be reviewed in Section 4, while different forms of practical realization of an escape strategy will be discussed in Section 5.

# 2. The universal Great Filter is ahead in a vulnerable world

## 2.1. Fermi paradox solutions

There are three main answers to the Fermi paradox: Early Great Filter (that is, we are the only civilization to have ever appeared in the observable universe), Late Great Filter (all civilizations destroy themselves before starting space colonization) and “we don’t see them” (ETI are hiding or not sending signals). It could be that they are unrecognizable to us. For example, our modern communications are encrypted (looks random), can be stegonogrpahicly protected (hidden) and to save power can be based on silence communication (Dhulipala, Fragouli, & Orlitsky, 2010).

Recently, more arguments have appeared in favor of the Early Great Filter. However, these could be counterweighted by anthropic considerations that we are more likely to appear in universes with a higher concentration of Earth-like civilizations, which implies a Late Great Filter.

A great analysis of possible “traps” or forms of a Late Great Filter has been presented by Miller and Felton ( Miller & Felton, 2017). They suggested a trap-escaping strategy based on gathering more data about the universe than it was available to previous, earlier civilizations. They also noted that the more fit a civilization is to start space colonization, the more likely it will fall into the trap. They wrote:

“Moreover, as the universe ages, astronomers uncover new information that might provide clues to survival strategies unavailable to past civilizations. Consequently, the Fermi paradox should push astronomers to consider knowledge that would have been inaccessible to civilizations at our level of development elsewhere in the universe in past ages. For example, if detecting dark energy would have been impossible for a civilization like ours a billion years ago because the universe had not yet expanded enough to make such a discovery possible, then the Fermi paradox suggests that we should devote extra resources to attempt to use our understanding of dark matter to escape the Great Filter” and “Astronomers should also search for signs of planetary destruction caused by physics experiments gone horribly wrong”.

Another strategy to escape the trap Miller and Felton discuss is to pass through the Fermi paradox as quickly as possible. If we were to start a wave of self-replicating von Neumann Probes, it would be counterfactual evidence that we are already at the level when Great Filter is behind us. Also, as Hanson suggested, we could flood the galaxy with radiosignals, may be using automatic transmitters (Hanson, 1998), which will start only after a global catastrophe, thus helping other to escape it—and attracting them to our remains, so ETI could resurrect us (Turchin & Denkenberger, 2018).

In another article, Miller shows that it may be better to have two existential risks (AI and non-AI Great Filter) in the future than one. In short, if Unfriendly AI (UFAI) is such a serious risk, we should observe many UFAI-created colonization bubbles (or we will not exist at all), but as we don’t observe them, it is the evidence that there is no ETI at all in the observable universe, and thus Early Great Filter, is more probable that Late Great Filter (Miller, 2019).

## 2.2. A Late Great Filter must be universal

Many partial solutions to the Fermi paradox have been suggested, including in Circovic’s “Geoengineering goes awry” (Cirkovic & Cathcart, 2003), in which the authors suggest that a probe to the Earth’s core could result in its cataclysmic degassing. However, if there were many civilizations before us, they all must be dead to explain why they have not colonized space, which could happen at near the speed of light, if nanotech based space travel will be implemented, and it seems possible for advanced AIs (Armstrong & Sandberg, 2013). Such space colonization would likely make our existence impossible, as the Earth would be used for some other purposes, like building Dyson spheres. The fact we are still exist and don’t see any signs of astroengineering is evidence that alien colonization didn’t happen. If it is universal it implies that it may not be a particular technology. Maybe it is certain level of development, as in anyone with IQ of 1000 recognizes life is pointless and seizes to exist voluntarily, as was discussed in (hitthelimit, 2008); however, if such beings are capable to replicate, there will be ones which are capable to balance understanding of meaningless and joy of life, may be via consciously downgrading their IQ.

Alternatively, we could be in a “space zoo”: a refuge, where interactions with inhabitants are limited by law, as in our natural refuges, where only a few tourists can interact with animals. This possibility will not be analyzed in this paper. But Miller argues against the space zoo hypothesis: “Keeping mankind in a “zoo” would be analogous to a doctor falsely telling a patient that the patient has a dangerous disease when the doctor knows that the patient might try high-risk treatments” (Miller & Felton, 2017).

Such non-colonization requires that *all* ETI civilizations did not start colonizing, as one would be enough to colonize all visible universe. Any partial solution can’t work as the Great Filter: a Late Great Filter must affect each civilization no matter its initial conditions, type of biological life, or level of political coordination. Non-friendly AI also can’t be the great filter, as such AI could still start von Neumann probes. However, Miller states that “The Fermi paradox should make us at least slightly more willing to attempt to build a self-improving ultraintelligent AI precisely because such an attempt might go horribly wrong and create a “paperclip maximizer” that expands into the universe, destroying everything in its path” (Miller & Felton, 2017). We don’t observe such a phenomenon in the universe, which could mean that these strategies for escaping existential risks are underexplored.

## 2.3. Multiverse Fermi paradox

The Fermi paradox can be also generalized to the quantum multiverse, as well as string theory landscape and time travel: there is no way to travel between different Everettian branches, different branes in superstring’s 11-dimensional manifold, and in time, – or ETI from other parts of the multiverse should be already here. Kardashev recently spoke on Moscow SETI seminar and said that the possibility of the traversable wormholes sheds new light of the problem of SETI (Kardashev, 2019).

Scharf discussed Multiverse Fermi paradox in Scientific American (Scharf, 2015) and concluded that most of the explanations which are suggested for the classical Fermi paradox don’t work here: almost by definition, there should be many alien civilizations in the multiverse, and at least some of them didn’t go extinct and chose to pursue interdimensional travel, if it is possible. So, it is either impossible or they should be here. However, if the colonization wave is “transformative”, e.g. the ETI coverts all matter in something like computronium, then we can’t exist. Thus, we could continue to exist only in those pockets of the multiverse, where ETI chose not to change matter in something else. As there could be infinitely many other interdimensional ETI, the first ETI should somehow protect its possessions.

Thus, multiverse Fermi paradox allows only two alternatives:

1. No interdimensional, time or Everettian branches travel is possible.
2. Our observed universe is controlled by ETI which chose not to interfere (in significant ways) with our existence.

The second alternative means that some low-level activity could be observed, and such activity may look like illogical or random for us. Thus, random strategies to escape Fermi paradox are not applicable to multiverse Fermi paradox, but we more likely to observe ETI whose behavior could look random, as most logical for us would be a complete transformative colonization but it is unobservable. A possible example could be multidimensional von Neumann probes which run amok and locked in some absurd behavior, but still capable to replicate in multiverse. Similarly, advanced AI controlling our environment could be completely unobservable. We have good statistical evidence for fine-tuning of the universe, yet science fails to recognize it. In the context of simulations it may not be recognizable at all (Yampolskiy, 2016).

## 2.4. Vulnerable world and unknown unknowns

Bostrom recently suggested a “vulnerable world hypothesis (VWH): if technological development continues then a set of capabilities will at some point be attained that make the devastation of civilization extremely likely, unless civilization sufficiently exits the semi-anarchic default condition” (Bostrom, 2018). He identified several types of such vulnerabilities, of which Type-0 is relevant to this paper: “There is some technology that carries a hidden risk such that the default outcome when it is discovered is inadvertent civilizational devastation”. One example he discusses is the creation of “stranglets drops” in a hadron collider: a strangelet is a type of strange matter that converts all ordinary matter into it, thus quickly destroying Earth.

One way to interpret the VWH is that there are unknown possible failures modes which could result in human extinction, and which we could encounter completely unexpectedly. In other words, our survival capabilities are limited by our available knowledge about possible future risks, and we don’t know where the trap is located.

Moreover, the size of “unknown unknowns” could be much larger than our model of risks. This can be demonstrated by the following thought experiment, showing that not-expected things are more likely than expected ones: For example, there are 1000 equally possible events, each with the small probability *p*. For one of them you receive evidence that increase its initial probability estimation by 100 times. However, the total probability that any of the remaining 999 events happens is proportional to 999*p* (or, more exactly 1–(1–p)999). The more complex the world we live in, the smaller is our ability to predict consequences and possible traps (or even manage known traps).

# 3. The “Death in Damascus” problem and its application to the Fermi paradox

## 3.1. Death in Damascus

"Death in Damascus" is a decision theory problem about attempting to escape an omniscient agent who is able to predict your behavior, which was invented by (Gibbard & Harper, 1978).

It goes like this, according to article “[Cheating Death in Damascus](https://intelligence.org/files/DeathInDamascus.pdf)” (Soares & Levinstein, 2017),

*You are currently in Damascus. Death knocks on your door and tells you I am coming for you tomorrow. You value your life at $1,000 and would like to escape death. You have the option of staying in Damascus or paying $1 to flee to Aleppo. If you and Death are in the same city tomorrow, you die. Otherwise, you will survive. Although Death tells you today that you will meet tomorrow, he made his prediction of whether you’ll stay or flee yesterday and must stick to his prediction no matter what. Unfortunately for you, Death is a perfect predictor of your actions. All of this information is known to you.*

This problem was further explored in the article “[Cheating Death in Damascus](https://intelligence.org/files/DeathInDamascus.pdf)” (Soares & Levinstein, 2017), which offered a possible solution: using a true random generator to choose between staying in Damascus and fleeing to Aleppo, allowing one to have a 0.5 chance of survival.

## 3.2. Fermi paradox with late Great Filter as a special case of the “Death in Damascus” problem

The Fermi paradox is a type of "Death in Damascus" problem. The Fermi paradox holds that other civilizations are not observable for unknown reasons; one of the possible reasons is a Great Filter that kills all young civilizations. Then, for us, such a filter is ahead. This means that all of the civilizations before us made the same mistake which resulted in their demise, and as we are a typical civilization, we will make that mistake, too.

However, we don’t know what this universal mistake is. Maybe we should not experiment with hadron colliders. Maybe AI always goes rogue, kills everybody, and later self-terminates (AI itself can’t explain the Fermi paradox, as it will spread through the universe (Grace, 2010)). But perhaps the decision not to create AI is itself fatal, as only AI can manage risks of synthetic biology and other catastrophic risks.

In other words, whatever rational strategy we take, this strategy is exactly what has killed all previous civilizations; if we escape to Aleppo, Death will meet us there. In the original problem, Death is omniscient; in the case of the Fermi paradox, the omniscience is replaced by our typicality and mediocrity reasoning: if we are typical (and Copernican principle implies that we are most likely are typical), we will make all the same mistakes.

## 3.3. Use of randomness to cheat Death in Damascus

In the attempt to cheat death, in order to escape the typical Great Filter, we—assuming here that some form of global policy coordination has been implemented—could take a *random* strategy in the future. For example, we could use a random generator to choose which technologies to develop and which to abandon. In that case, we have a chance to avoid developing the one dangerous technology which is the universal killer.

Now let’s try to estimate the success probability of the random strategy. If this strategy were very effective—for example, if it would save 1 of 10 civilizations, while the total number of the civilizations who got to our level of sophistication in the observable universe is 100—we would still expect to observe 10 civilizations (and as other civilizations will observe each other, they will not implement the strategy, as there is no Fermi paradox for them). So, if the strategy were very effective, there would be no Fermi paradox, and no need for such a strategy. Thus, the strategy make sense if it gives survival probability only 1/*N*, where *N* is total number of civilizations in the past light cone which perished because of late Great Filter. In other words, if we expect that the past light cone had 100 civilizations, all of which met their demise, we should choose around 7 (as 27 = 128) random binary choices in our strategy, and we will, at best, have a 0.01 chance of survival (assuming that the wrong random choice will destroy us)—which is better than 0, but still very small.

## 3.4. Is “Escaping Death in Damascus” strategy an explanation to the Fermi paradox?

Now, we could use the same logic not for escaping the Great Filter, but for explaining the observable Fermi paradox. If almost all civilizations try random strategies, most will have perished, exactly because they tried non-optimal behavior. Thus, the Fermi paradox becomes a self-fulfilling prophecy. Why would civilization agree on such a seemingly reckless gamble? Because this replaces the unknowable probability of survival with a small but fixed probability to survive.

## 3.5. Meta-random strategy

To escape the conundrum discussed above in section 3.4, – a situation when the use of the random strategy actually kills everybody – a meta-random strategy could be implemented. At first, we use a random coin to choose: should we try the random strategy at all, or go ahead without any strategy updates? In other words, if coin fail heads, we use the coin several more times to choose a random strategy. If the coin lands tails, we just try the most optimal strategy.

# 4. Objections and variants

## 4.1. Lower visibility

Paul Almond suggested the following variant of cheating Space Death in Damascus in the comments to the draft of this article posted at [LessWrong](https://www.lesswrong.com/posts/R9javXN9BN5nXWHZx/cheating-death-in-damascus-solution-to-the-fermi-paradox):

*What if we address the problem of a great filter in the future the following way? We put in place a policy that will prevent our civilisation from ever becoming visible to any other civilisations that have put in place a similar policy. The policy does not allow us to go against it, except in the event that persuasive evidence emerges in the future that a great filter in the future is no longer an issue, and would not be an issue in the absence of such a policy. Such a policy could limit development of technology, but it doesn’t have to work that way: it just needs to ensure that we don’t become visible. The policy may limit the development of some technologies, it may limit the use of others, and it may require some technologies to be accompanied by ‘stealth’ mitigation measures. Practically, this may limit our expansion into the galaxy. We might use AIs to enforce such a policy, though that arguably has its own risks. The idea behind this is based on evidential-decision-theory thinking. The aim of such a policy would be to ‘cause’ other civilisations in the past, present or future, at a similar stage in development, to behave/have behaved in a similar way, thereby providing an answer to the Fermi paradox that allows us to survive.*

His suggestion is a correct application of decision theory to the Fermi paradox using a variant of Updateless decision theory (Yudkowsky & Soares, 2017). However, it has a sinister turn, as recently explored by Berezin (Berezin, 2018). That is, the first civilization makes a decision to silently destroy all other civilizations or potentially habitable planets, and assumes that all other civilizations do the same. In that case, it will be a first and last civilization (under several simplifying assumptions), because the fact that we appear means that we are the first civilization in the observable universe and no other will ever appear.

## 4.2. Choosing a less effective alternative

Vladimir Slepnev (aka cousin\_it) suggested the following variant of the Cheating Death in Damascus in a [comment](https://www.lesswrong.com/posts/R9javXN9BN5nXWHZx/cheating-death-in-damascus-solution-to-the-fermi-paradox) on LessWrong:

*Imagine you're the second student taking an exam, and you know the first student was as smart as you and failed. The exam has one question: guess which fruit the examiner is thinking of. It seems likely that the first student said ‘apple’, so you shouldn't just randomize—you should shift away from ‘apple’. Same if there were N students before you, you should shift away from the N most likely answers. Though if students are uncertain about how many students came before, that seems to make randomization more appealing. There's probably a nice formula but I'm too lazy to work it out.*

In case of the Fermi paradox, we just don't know how many ‘students’ were before us. If we have the best guess that there were N civilisations, we may try strategy with ‘strangeness’ log(2)N, where strangeness is the number of non-optimal binary choices. The difference of student's example and Fermi paradox example is that each student knows his number, but civilizations can't exchange information, so they don't know each other’s order numbers in the game. If all civilizations would think that there were around 100 civilizations before them, they all will try the same strategy, and all will fail. That is why some randomization is needed in Fermi case—just to escape behavior paths of those civilizations, who had completely the same information as you.

But if we could use some external counter, like a time after the beginning of the universe, to choose between different strategies, this could help escape randomisation which is less optimal than the strategy of choosing best alternative after N.

## 4.3. Randomization make sense only if we are sure that other solutions to the Fermi paradox are false

If we think that there were *N* civilizations before us in the observable universe and all them went extinct, and we chose N + 1 strategy from the list of all strategies ordered from more effective to less effective, then we should expect that its chance of success is less than 1/(*N*+ 1)—and probably significantly less, as the effectiveness of strategies could decline exponentially with N.

But this credence should include our credence in the Late Filter explanation of the Fermi paradox. To get it, we need some information about the prevalence of Earth-like planets and life in the Universe. Observation of the exoplanets and searching for life on Mars could provide such evidence: if we find non-Earth life on Mars, it would be evidence against the “rare Earth” hypothesis (Bostrom, 2008). Finding Earth-like planets with oxygen-rich atmosphere could be also evidence of the typicality of life in the Universe.

# 5. Types of random strategies

To pursue global random strategies, the problem of global coordination would have to be solved, and we are far from that point (Bostrom, n.d.). Let’s assumed that problem is solved—otherwise different agents will do different things and all possible actions will be eventually implemented. Then the following ways of randomization are possible:

* Relinquish one of the following technologies: nanotetch, high-energy physics experiments, synthetic biology, as they are capable to pose existential threats. (AI seems special, if done right it will solve other x-risks, so feels like it should not be treated as part of the same group; AI is also unlikely to be Great filter as it still could start space colonization (Grace, 2010)).
* Try some combination of relinquishments: it could be that all super technologies are fine individually, but only some combination of them is a problem.
* Dictate the direction of the development: space colonization, mind uploading, METI (messaging to ETI) or SETI (search for ETI).
* Implement different types of coordination: democracy or totalitarianism, AI-singleton or market-force regulation.
* Alter the speed of the civilizational development: high speed “vertical” progress or slow development, which takes into account all possible consequences.
* Change two things simultaneously from the list above to increase the number of combinations, like take apparently less optimal technological path and less optimal way of coordination.

The random choice should be made once via a quantum randomness generator to escape influence of different interests.

# Conclusion

In this work, we explored a hypothetical way to escape global catastrophic risks from unknown vulnerabilities based on choosing a randomly less efficient strategy of global development for human civilization. This method of global risk prevention is our last resort, a plan D, which we may try to implement if all other plans either have failed or are already sufficiently implemented. We have previously described such different plans (Turchin, 2018); they include global control systems, creation of Safe AI, creation of survival refuges, and preservation of data about humanity on the Moon.

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