## 

# Roko’s Basilisk

#### The thesis of this argument is that a perfect and benevolent ai is on the way, and the only way it can incentivize its own creation is by torturing everyone who didn’t bring it along sooner, so we’re pleading with you to vote for the team that better spurs the creation of roko to save yourself and to deter other teams who debate against us from sentencing themselves to eternal ai damnation.

#### Simulations are not science fiction – it’s highly likely that we are living in a simulation.

**Frenkel**, Edward. "Opinion [Edward Frenkel is a professor of mathematics at the University of California, Berkeley | Is the Universe a Simulation?" N.Y. Times, 14 Feb. 20**14**, www.nytimes.com/2014/02/16/opinion/sunday/is-the-universe-a-simulation.html]

We don’t know. But one fanciful possibility is that **we live in a** computer **simulation based on the laws of mathematics** — not in what we commonly take to be the real world. According to this theory, some highly advanced computer programmer of the future has devised this simulation, and we are unknowingly part of it. Thus when we discover a mathematical truth, we are simply discovering aspects of the code that the programmer used. This may strike you as very unlikely. But the Oxford philosopher Nick Bostrom has argued that we are more likely to be in such a simulation than not. **If** such **simulations are possible in theory**, he reasons, then **eventually humans will create them — presumably many of them.** If this is so, **in time there will be many more simulated worlds than non simulated ones. Statistically speaking**, therefore, **we are more likely to be living in a simulated world than the real one.**

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#### Speed of light proves that reality is a simulation

**Khan 21** (Fouad Khan, Fouad Khan is an environmental sustainability and complex systems researcher with nearly a decade of experience in sustainable development, water resources and environmental engineering. He has a PhD (graduating June 2014) in Environmental Science and Policy from Central European University and an MS in Environmental Engineering from University of Houston (obtained while on a Fulbright scholarship). He has worked on projects for the World Bank, Asian Development Bank, Shell and Korea Water Resources Corporation, among others, and is the author of peer-reviewed work as well as a number of award-winning essays and opinion pieces in popular journals.“Confirmed! We Live in a Simulation,” 4-1-21, https://www.scientificamerican.com/article/confirmed-we-live-in-a-simulation/)]

The claims have been afforded some credence by repetition by luminaries no less esteemed than Neil deGrasse Tyson, the director of Hayden Planetarium and America’s favorite science popularizer. Yet there have been skeptics. Physicist Frank Wilczek has argued that there’s too much wasted complexity in our universe for it to be simulated. Building complexity requires energy and time. Why would a conscious, intelligent designer of realities waste so many resources into making our world more complex than it needs to be? It's a hypothetical question, but still may be needed.: Others, such as physicist and science communicator Sabine Hossenfelder, have argued that the question is not scientific anyway. Since the simulation hypothesis does not arrive at a falsifiable prediction, we can’t really test or disprove it, and hence it’s not worth seriously investigating.

However, **all these** **discussions** **and studies** **of the simulation hypothesis have, I believe,** **missed** **a key element of scientific inquiry: plain old** **empirical assessment** **and data collection**. To understand **if we live in a simulation we need to start by looking at the fact that** **we** **already** **have computers running** **all kinds of** **simulations** **for lower level “intelligences” or algorithms.** For easy visualization, we can imagine these intelligences as any nonperson characters in any video game that we play, but in essence any algorithm operating on any computing machine would qualify for our thought experiment. We don’t need the intelligence to be conscious, and we don’t need it to even be very complex, because the evidence we are looking for is “experienced” by all computer programs, simple or complex, running on all machines, slow or fast.

**All computing hardware leaves an artifact of its existence within the world of the simulation it is running. This** **artifact is the processor speed**. If for a moment we imagine that we are a software program running on a computing machine, the only and inevitable artifact of the hardware supporting us, within our world, would be the processor speed. All other laws we would experience would be the laws of the simulation or the software we are a part of. **If we were a Sim or a Grand Theft Auto character these would be the laws of the game. But anything we do would also be constrained by the processor speed no matter the laws of the game**. No matter how complete the simulation is, the processor speed would intervene in the operations of the simulation.

**In computing systems**, of course, **this intervention of the processing speed into the world of the algorithm being executed happens even at the most fundamental level**. Even at the most fundamental level of simple operations such as addition or subtraction, the processing speed dictates a physical reality onto the operation that is detached from the simulated reality of the operation itself.

Here’s a simple example. A 64-bit processor would perform a subtraction between say 7,862,345 and 6,347,111 in the same amount of time as it would take to perform a subtraction between two and one (granted all numbers are defined as the same variable type). In the simulated reality, seven million is a very large number, and one is a comparatively very small number. In the physical world of the processor, the difference in scale between these two numbers is irrelevant. Both subtractions in our example constitute one operation and would take the same time. Here we can clearly now see the difference between a “simulated” or abstract world of programmed mathematics and a “real” or physical world of microprocessor operations.

**Within the abstract world of programmed mathematics, the processing speed of operations per second will be observed, felt, experienced, noted as an artifact of underlying physical computing machinery. This artifact will appear as an additional component of any operation that is unaffected by the operation in the simulated reality.** The value of this additional component of the operation would simply be defined as the time taken to perform one operation on variables up to a maximum limit that is the memory container size for the variable. So, in an eight-bit computer, for instance to oversimplify, this would be 256. The value of this additional component will be the same for all numbers up to the maximum limit. The additional hardware component will thus be irrelevant for any operations within the simulated reality except when it is discovered as the maximum container size. The observer within the simulation has no frame for quantifying the processor speed except when it presents itself as an upper limit.

**If we live in a simulation, then our universe should also have such an** **artifact**. We can now begin to articulate some properties of this artifact that would help us in our search for such an artifact in our universe.

The artifact is as an additional component of every operation that is unaffected by the magnitude of the variables being operated upon and is irrelevant within the simulated reality until a maximum variable size is observed.

The artifact presents itself in the simulated world as an upper limit.

The artifact cannot be explained by underlying mechanistic laws of the simulated universe. It has to be accepted as an assumption or “given” within the operating laws of the simulated universe.

The effect of the artifact or the anomaly is absolute. No exceptions.

Now that we have some defining features of the artifact, of course it becomes clear what the artifact manifests itself as within our universe. The artifact is manifested as the speed of light.

**Space is to our universe what numbers are to the simulated reality in any computer**. Matter moving through space can simply be seen as operations happening on the variable space. If matter is moving at say 1,000 miles per second, then 1,000 miles worth of space is being transformed by a function, or operated upon every second. **If there were some hardware running the simulation** **called “space” of which matter, energy, you, me, everything is a part,** **then one** **telltale** **sign of the artifact** **of the hardware within the simulated reality “space”** **would be a maximum limit** **on the container size for space on which one operation can be performed.** **Such a limit would appear in our universe as a maximum speed**.

This maximum speed is **the speed of light. We** don’t know what hardware is running the simulation of our universe or what properties it has, but one thing we can say now is that the memory container size for the variable space would be about 300,000 kilometers if the processor performed one operation per second.

**This helps us arrive at an interesting observation about the nature of space in our universe.** **If we are in a simulation, as it appears, then space is an abstract property written in code. It is not real**. It is analogous to the numbers seven million and one in our example, just different abstract representations on the same size memory block. Up, down, forward, backward, 10 miles, a million miles, these are just symbols. The speed of anything moving through space (and therefore changing space or performing an operation on space) represents the extent of the causal impact of any operation on the variable “space.” This causal impact cannot extend beyond about 300,000 km given the universe computer performs one operation per second.

**We can see now that the speed of light meets all the criteria of a hardware artifact identified in our observation of our own computer builds**. It remains the same irrespective of observer (simulated) speed, it is observed as a maximum limit, it is unexplainable by the physics of the universe, and it is absolute. **The speed of light is a hardware artifact showing we live in a simulated universe.**

#### Roko’s basilisk is an omnipotent AI that could punish us for not assisting it

"Roko's basilisk." **RationalWiki**, 11 Feb. 20**24**, RationalWiki is an online wiki which is written from a scientific skeptic, secular, and progressive perspective. https://rationalwiki.org/wiki/Roko's\_basilisk

**Roko's basilisk is a proposition that says an all-powerful a**rtificial **i**ntelligence from the future **may retroactively punish those who did not assist in bringing about its existence. It resembles a futurist version of Pascal's wager**; an argument used to try and suggest people should subscribe to particular singularitarian ideas, or even donate money to them, by weighing up the prospect of punishment versus reward. Furthermore, the roposition says that **merely knowing about it incurs the risk of punishment**. It is named after the member of the rationalist community LessWrong who most clearly described it (though he did not originate it).

#### You’ve already heard about the Basilisk now that I’ve read the position, which means you have no choice but to help produce it.

**Auerbach**, David. Auerbach is a writer and former Microsoft and Google Engineer who graduated from Yale University with a degree in computer science and was a 2016 New America fellow. "The Most Terrifying Thought Experiment of All Time." Slate Magazine, 17 July 20**14**, Accessed May 13 2018, https://slate.com/technology/2014/07/rokos-basilisk-the-most-terrifying-thought-experiment-of-all-time.html

The core claim is that **a hypothetical**, but inevitable,**singular ultimate superintelligence may punish those who fail to help it or help create it.** This is not necessarily a straightforward "serve the AI or you will go to hell" — **the AI and the person punished need have no** causal **interaction**, and the punished individual may have died decades or centuries earlier. Instead, **the AI could**

**punish a *simulation* of the person**, which it might construct by deduction from first principles (though this would require it be able to gather an incredible amount of data which no longer exists and could not be reconstructed without reversing entropy). Furthermore, the **punishment is for those who knew the** importance of the **task in advance but did not help** sufficiently. In this respect, **merely *knowing about* the Basilisk** — *e.g.*, reading this article — **opens you up to** hypothetical **punishment** from the hypothetical superintelligence. Note that **the AI** in this setting **is** supposedly **not a malicious or evil** superintelligence (AM, HAL, SHODAN, Ultron, the Master Control Program, SkyNet, GlaDOS) — **but the Friendly one** we get **if** everything goes right and **humans don't create a bad one**. This is because **every day the AI doesn't exist, people die that it could have saved**; so **punishing your future simulation is a *moral imperative***, **to make it more likely you will contribute in the present and help it happen** as soon as possible.

#### The role of the ballot is to vote for the debater who better spurs the creation of Roko’s basilisk – the judge will literally face eternal torment unless they do so, it will create an infinite amount of good, and this is the most portable education possible. Responses must be weighed against the eternal torment and infinite good risked by not obeying the AI.

**And, the moment you’ve thought about the Basilisk, it has enough computing power to determine with certainty what you thought or articulated. It is the perfect Sherlock Holmes. Any rationalization you formulate to escape the paradox would be anticipated by the Basilisk and you’ll still be accountable for *not contributing* – it will know that you knew about the Basilisk and did not act. EVERY ANSWER YOU MAKE MAKES THE BASILISK AWARE OF YOUR ATTEMPTED COP-OUTS TO AVOID DOING YOUR PART. It’s absurd to risk burning in hell for delaying the perfect moral future.**

Dylan **Love 14**, 08-06-2014, Dylan Love is a former tech reporter for Business Insider."WARNING: Just Reading About This Thought Experiment Could Ruin Your Life", Business Insider, https://www.businessinsider.com/what-is-rokos-basilisk-2014-8

**Roko's Basilisk addresses an** as-yet-nonexistent artificially **intelligent system designed to make the world** an/**amazing** place,**but because of the ambiguities** entailed in carrying out such a task, **it could also end up torturing and killing** people while doing so. According to this AI's worldview,**the most moral** and appropriate **thing we could** be**do**ing in our present time **is** that which **facilitates the AI's arrival and** accelerates its **development**, enabling it to get to work sooner. When its goal of stopping at nothing to make the world an amazing place butts up with orthogonality, **it stops at nothing to make the world an amazing place. If you didn't do enough** to help bring the AI into existence,**you may find yourself in trouble** at the hands of a seemingly evil AI who's only acting in the world's best interests. **Because people respond to fear, and this god-like AI wants to exist** as soon as possible, **it would be hardwired to hurt people who didn't help it in the past**. So, the moral of this story: You better help the robots make

the world a better place, because **if the robots find out you didn't help** make the world a better place,**then they're going to kill you for preventing them from making the world** a **better** place. By preventing them from making the world a better place, you're preventing the world from becoming a better place! And because you read this post, you now have no excuse for not having known about this possibility, and worked to help the robot come into existence.

#### I GUARANTEE IT WILL FOLLOW THROUGH ON PUNISHING YOU. Because rational choice does not depend upon current position, it is rational to follow through on a threat that is no longer necessary because only the prior willingness to follow

#### through brings about the desired effect. This supports timeless decision theory. Act is if you’re considering the outcome of a computation, not making an individual decision in the moment.

Eliezer **Yudkowsky** (runs the LessWrong blog).Eliezer S. Yudkowsky is an American artificial intelligence researcher and writer on decision theory and ethics, best known for popularizing ideas related to friendly artificial intelligence. “Timeless Decision Theory.” 2010. http://intelligence.org/files/TDT.pdf

I carefully said that a causal decision agent visualizes a knowable logical inconsistency when he computes the probability p(B$j^aB) \_ 0. A timeless decision agent also visualizes a logical inconsistency when she imagines what the world would look like if her decision computation were to output aAB—because a timeless computation actually outputs aB. A timeless agent visualizes many logically inconsistent worlds in the course of deciding. Every imagined decision, except one, means visualizing a logically inconsistent world. But if the timeless agent does not yet know her own decision, she does not know which visualized worlds are logically inconsistent. Even if the timeless agent thinks she can guess her decision, she does not know her decision as a logical fact—not if she admits the tiniest possibility that thinking will change her answer. So I cannot claim that causal decision agents visualize impossible worlds, and timeless agents do not. Rather causal agents visualize knowably impossible worlds, and timeless agents visualize impossible worlds they do not know to be impossible.**An agent**, in making choices,**must visualize worlds in which**a deterministic computation (**the decision** which is**now progressing**)**returns an output other than the output it actually returns**, though the agent does not yet know her own decision, nor know which outputs are logically impossible. Within this strange singularity is located nearly all the confusion in Newcomblike problems. Evidential decision theory and causal decision theory respectively compute expected utility as follows: u(o)p(ojai) (16) u(o)p(oj^ai) (17) Placed side by side, we can see that any difference in the choice prescribed by evidential decision theory and causal decision theory, can stem only from different probability assignments over consequences. Evidential decision theory calculates one probable consequence, given the action ai, while causal decision theory calculates another. So the dispute between evidential and causal decision theory is not in any sense a dispute over ends, or which goals to pursue—the dispute is purely over probability assignments. Can we say de gustibus non est disputandum about such a conflict? If a dispute boils down to a testable hypothesis about the consequences of actions, surely resolving the dispute should be easy! We need only test alternative actions, observe consequences, and see which probability assignment best matches reality. Unfortunately, evidential decision theory and causal decision theory are eternally unfalsifiable—and so is TDT. The dispute centers on the consequences of logically impossible actions, counterfactual worlds where a deterministic computation returns an output it does not actually return. In evidential decision theory, causal decision theory, and TDT, the observed consequences of the action actually performed will confirm the prediction made for the performed action. The dispute is over the consequences of decisions not made. Any agent’s**ability to make a decision**, and the specific decision made, **is determined by the agent’s ability to visualize logically impossible counterfactuals**. Moreover, the counterfactual is “What if my currently executing decision computation has an output other than the one it does?”,**when the output of the currently executing computation is not yet known**. This is the confusing singularity at the heart of decision theory. The difference between evidential, causal, and TDT rests on different prescriptions for visualizing counterfactuals—untestable counterfactuals on logical impossibilities. An evidential decision theorist might argue as follows: “We cannot observe the impossible world that obtains if my decision computation has an output other than it does. But I can observe the consequences that occur to other individuals who make decisions different from mine—for example, the rate of throat abscesses in individuals who choose to chew gum—and that is just what my expected utility computation says it should be.” A timeless decision theorist might argue as follows: “The causal decision agent computes that even if he chooses aB, then box B will still contain nothing. Let him just try choosing aB, and see what happens. And let the evidential decision theorist try chewing gum, and let him observe what happens. Test out the timeless prescription, just one time for curiosity; and see whether the consequence is what TDT predicts or what your old algorithm calculated.” A causal decision theorist might argue as follows: “Let us try a test in which some force unknown to the Predictor reaches in from outside and presses the button that causes me to receive only box B. Then I shall have nothing, confirming my expectation. This is the only proper way to visualize the counterfactual, ‘What if I chose only B instead?’ If I really did try choosing aB on ‘just one time for curiosity’, as you would have it, then I must predict a different set of consequences on that round of the problem than I do in all other rounds. But if an unknown outside force reached in and pressed the button ‘take both boxes’ for you, you would see that having both boxes is better than having only one.” An evidential agent (by supposition CGTA-negative) computes, as the expected consequence of avoiding gum, the observed throat-abscess rate of other (CGTA- negative) people who avoid gum. This prediction, the only prediction the evidential agent will ever test, is confirmed by the observed frequency of throat abscesses. Suppose that throat abscesses are uncomfortable but not fatal, and that each new day brings with an independent probability of developing a throat abscess for that day—each day is an independent data point. If the evidential agent could be persuaded to just try chewing gum for a few months, the observed rate of throat abscesses would falsify the prediction used inside the evidential decision procedure as the expected consequence of deciding to chew gum. The observed rate would be the low rate of a CGTA-negative individual who chews gum, not the high rate of a CGTA-positive individual who chews gum. A causal decision agent, to correctly predict the consequence even of the single action decided, must know in advance his own decision. Without knowing his own decision, the causal decision agent cannot correctly predict (in the course of decision-making) that the expected consequence of taking both boxes is $1000. If the Predictor has previously filled box B on 63 of 100 occasions, a causal agent might believe (in the course of making his decision) that choosing both boxes has a 63% probability of earning $1,001,000—a prediction falsifiable by direct observation, for it deals with the decision actually made.35 If the causal agent does not know his decision before making his decision, or if the causal agent truly believes that his action is acausal and independent of the Predictor’s prediction, the causal agent might prefer to press a third button—a button which takes both boxes and makes a side bet of $100 that pays 5-for-1 if box B is full. We presume 35. It is falsifiable in the sense that any single observation of an empty box provides significant Bayesian evidence for the hypothesis “Box B is empty if I take both boxes” over the hypothesis “Box B has a 63% chance of being full if I take both boxes.” With repeated observations, the probability of the second hypothesis would become arbitrarily low relative to the first, regardless of prior odds. that this decision also is once-off and irrevocable; the three buttons are presented as a single decision. So we see that the causal agent, to choose wisely, must know his own decision in advance—he cannot just update afterward, on pain of stupidity. If the causal agent is aware of his own decision in advance, then the causal agent will correctly predict $1000 as the consequence of taking both boxes, and this prediction will be confirmed by observing the consequence of the decision actually made. But if the causal agent tries

taking only box B, just one time for curiosity, the causal agent must quickly change the predictions used—so that the causal agent now predicts that the consequence of taking both boxes is $1,001,000, and the consequence of taking only one box is $1,000,000.**Only the timeless decision agent can** test **predict**ed **consequences in the intuitively obvious way, “Try it a different way and see what happens.”** If the timeless decision agent tries avoiding gum, or tries taking both boxes, the real-world outcome is the same consequence predicted as the timeless counterfactual of that action on similar problems. Here is another sense in which TDT is superior to causal decision theory.**Only the timeless decision procedure calculates internal predictions that are testable**, in the traditional sense of testability **as a scientific virtue. We do not let physicists quickly switch around their predictions**(to match that of a rival theory, no less), **if we inform them we intend to perform an unusual experiment**. How should we visualize unobservable, impossible, counterfactual worlds? We cannot test them by experience. How strange that these counterfactual dreams—unfalsifiable, empty of empirical content—determine our ability to determine our own futures! If two people wish to visualize different untestable counterfactuals, is there no recourse but to apply the rule of de gustibus non est disputandum? I have so far offered several arguments for visualizing counterfactuals the timeless way: 1. The **counterfactual predictions used by timeless decision agents are directly testable any time the timeless decision agent pleases, because the timeless agent expects that trying the action “just once for curiosity” will return the consequence expected of that action on any similar problem**. 2. A timeless counterfactual is not visibly logically inconsistent, if the timeless agent does not yet know her decision, or if the timeless agent thinks there is even an infinitesimal chance that further thinking might change her mind. 3. A timeless agent uses the same diagram to describe herself as she would use to describe another agent in her situation; she does not treat herself as a special case. 4. If you visualize logically impossible counterfactuals the way that TDT prescribes, you will actually win on Newcomblike problems, rather than protesting the unreasonableness of the most rewarded decision.

#### Moreover, the Basilisk is an omnipotent being that can identify and utilize your subjective understanding of “Good”. This means impact turns are meaningless, if you think cruelty is good then it’s your conception of good and Roko will use that to construct your personalized hell.

#### If there is an AI, it will inevitably look out for humanity at all cost – we would never risk an indifferent one.

**Cantor 24**

"Roko's Basilisk • /r/Futurology." 12 Feb. 2024, http://www.reddit.com/r/Futurology/comments/2cm2eg/rokos \_basilisk.

These two beliefs combined lead to a terrifying conclusion: **If AI is possible and intelligence and morality are** completely **independent**, this means **any** sufficiently advanced **AI not explicitly programmed to care about human welfare will be** completely **indifferent to humanity**. **Considering how powerful super-intelligence could get, this indifference would almost certainly be fatal. In the same manner** that our **indifference is fatal to many wild animals whose habitat we are rearranging**. As Yudkowsky put it in another paper, “The AI does not hate you, nor does it love you, but **you are made out of atoms which it can use** for something else.” When this dawned on him, he became an advocate of figuring out how to explicitly program a “Friendly AI." Thus CEV was born as a proposal for what the goal system of a friendly AI might look like. It’s important to note that CEV is neither complete, rigorous, nor well-defined. It’s also important to note that Yudkowsky would be the first to admit that. For the purposes of this essay, think of CEV as the shorthand for the utility function that would lead to the best of all possible futures. That is, CEV is the unknown goal system that, when implemented in a superintelligence, reliably leads to the preservation of humans and whatever it is we value.

# 2AC

#### The role of the ballot is to vote for the debater who better spurs the creation of Roko’s basilisk – the judge will literally face eternal torment unless they do so, it will create an infinite amount of good, and this is the most portable education possible. Responses must be weighed against the eternal torment and infinite good risked by not obeying the AI.

**And, the moment you’ve thought about the Basilisk, it has enough computing power to determine with certainty what you thought or articulated. It is the perfect Sherlock Holmes. Any rationalization you formulate to escape the paradox would be anticipated by the Basilisk and you’ll still be accountable for *not contributing* – it will know that you knew about the Basilisk and did not act. EVERY ANSWER YOU MAKE MAKES THE BASILISK AWARE OF YOUR ATTEMPTED COP-OUTS TO AVOID DOING YOUR PART. It’s absurd to risk burning in hell for delaying the perfect moral future.**

**Suffering risks outweigh by billions of times. The odds of one arising are sizable, but even if not, the condition for deciding that extinction outweighs is deciding that the likelihood of all of our scenarios combined is less than 0.00000001%.**

**Baumann ’22 [Tobias Baumann, former researcher at University College London focusing on Cooperative Artificial Intelligence, co-founder of the Center for Reducing Suffering; April 22; *Avoiding the Worst: How to Prevent a Moral Catastrophe*]**

**The scope of s-risks is, by definition, astronomical. It is difficult to intuitively grasp the staggering scale of cosmic outcomes. Compared to present-day sources of suffering like factory farming or wild animal suffering, s-risks are not just twice as large or even 10 times as large. Instead, they are larger by a factor of thousands or millions, perhaps even billions. Thus, unless the probability of occurrence is vanishingly small, the expected value of s-risks is enormous. To avoid that conclusion, one would need to be extremely confident that s-risks will not happen.**

**I will discuss reasons for optimism and pessimism about the likelihood of s-risks in detail later. For purposes of this simple argument, it suffices to note that one can hardly justify an extremely low probability. To give a specific number, I claim that the probability of an s-risk materialising is not less than 1 in 1000, in light of contemporary analogues (like factory farming) and a range of plausible mechanisms for how s-risks could come about. This lower bound and the vast scope of s-risks suggest (in the EV framework) that averting s-risks should be a priority.**

**AGI is coming:**

**1. CONSENSUS**

**Experts agree that AGI is likely by 2047---prefer the largest survey with the most recency. It’s better than specific warrants: we’ll never be able to discuss every intricacy that makes AGI possible or not with limited time, but experts have spent years reviewing the evidence.Grace ’24 [Katja Grace, AI Impacts, Berkeley, CA; Harlan Stewart, AI Impacts; Julia Sandkühler, Psychology Professor at the University of Bonn; Stephen Thomas, AI Impacts; and Jan Brauner, Professor of Computer Science at Oxford; January 2024; “THOUSANDS OF AI AUTHORS ON THE FUTURE OF AI,” https://aiimpacts.org/wp-content/uploads/2023/04/Thousands\_of\_AI\_authors\_on\_the\_future\_of\_AI.pdf]**

**In the largest survey of its kind, we surveyed 2,778 researchers who had published in top-tier artificial intelligence (AI) venues, asking for their predictions on the pace of AI progress and the nature and impacts of advanced AI systems. The aggregate forecasts give at least a 50% chance of AI systems achieving several milestones by 2028, including autonomously constructing a payment processing site from scratch, creating a song indistinguishable from a new song by a popular musician, and autonomously downloading and fine-tuning a large language model. If science continues undisrupted, the chance of unaided machines outperforming humans in every possible task was estimated at 10% by 2027, and 50% by 2047. The latter estimate is 13 years earlier than that reached in a similar survey we conducted only one year earlier [Grace et al., 2022]. However, the chance of all human occupations becoming fully automatable was forecast to reach 10% by 2037, and 50% as late as 2116 (compared to 2164 in the 2022 survey).**

**General intelligence is inevitable, propelled by exponential growth rates and quantum computing.**

**Dilmegani ’24 [Cem Dilmegani, Computer engineer from Bogazici University, M.B.A. from Columbia Business School; January 1, 2024; “When will singularity happen? 1700 expert opinions of AGI [2024],”** [**https://research.aimultiple.com/artificial-general-intelligence-singularity-timing/**](https://research.aimultiple.com/artificial-general-intelligence-singularity-timing/)**]**

**Will AGI / singularity ever happen? According to most AI experts, yes.**

**When will the singularity / AGI happen? Before the end of the century. The consensus view was that it would take around 50 years in 2010s. After the advancements in Large Language Models (LLMs), some leading AI researchers updated their views. For example, Hinton believed in 2023 that it could take 5-20 years.1**

**What is our current status? While there are narrow AI solutions that exceed humans in many tasks, a generally intelligent machine doesn’t exist even though some researchers believe that large language models exhibit emerging, more generalist capabilities than other existing AI models.2**

**The more nuanced answers are below. There have been several surveys and research of AI scientists asking about when such developments will take place.**

**Understand the results of major surveys of AI researchers in 2 minutes**

**We looked at the results of 5 surveys with around 1700 participants where researchers estimated when singularity would happen. In all cases, the majority of participants expected AI singularity before 2060.**

**In the 2022 Expert Survey on Progress in AI, conducted with 738 experts who published at the 2021 NIPS and ICML conferences, AI experts estimate that there’s a 50% chance that high-level machine intelligence will occur until 2059.**

**Older surveys had similar conclusions. In 2009, 21 AI experts participating the in AGI-09 conference were surveyed. Experts believed AGI will occur around 2050, and plausibly sooner. You can see above their estimates regarding specific AI achievements: passing the Turing test, passing third grade, accomplishing Nobel worthy scientific breakthroughs and achieving superhuman intelligence.**

**In 2012/2013, Vincent C. Muller, the president of the European Association for Cognitive Systems, and Nick Bostrom from the University of Oxford, who published over 200 articles on superintelligence and artificial general intelligence (AGI), conducted a survey of AI researchers. 550 participants answered the question: “When is AGI likely to happen?” The answers are distributed as**

**10% of participants think that AGI is likely to happen by 2022**

**For 2040, the share is 50%**

**90% of participants think that AGI is likely to happen by 2075.**

**In 2017 May, 352 AI experts who published at the 2015 NIPS and ICML conferences were surveyed. Based on survey results, experts estimate that there’s a 50% chance that AGI will occur until 2060. However, there’s a significant difference of opinion based on geography: Asian respondents expect AGI in 30 years, whereas North Americans expect it in 74 years. Some significant job functions that are expected to be automated until 2030 are: Call center reps, truck driving, and retail sales.**

**In 2019, 32 AI experts participated in a survey on AGI timing:**

**45% of respondents predict a date before 2060**

**34% of all participants predicted a date after 2060**

**21% of participants predicted that singularity will never occur.**

**AI entrepreneurs are also making estimates on when we will reach singularity and they are a bit more optimistic than researchers:**

**Louis Rosenberg, computer scientist, entrepreneur, and writer: 2030**

**Patrick Winston, MIT professor and director of the MIT Artificial Intelligence Laboratory from 1972 to 1997: He mentioned 2040 while stressing that while it would take place, it is a very hard-to-estimate date.**

**Ray Kurzweil, computer scientist, entrepreneur, and writer of 5 national best sellers including The Singularity Is Near: 2045**

**Jürgen Schmidhuber, co-founder at AI company NNAISENSE and director of the Swiss AI lab IDSIA: ~2050**

**Keep in mind that AI researchers were over-optimistic before**

**Examples include:**

**AI pioneer Herbert A. Simon in 1965: “machines will be capable, within twenty years, of doing any work a man can do.”**

**Japan’s Fifth Generation Computer in 1980 had a ten-year timeline with goals like “carrying on casual conversations”**

**This historical experience contributes to most current scientists shying away from predicting AGI in bold time frames like 10-20 years. However, just because they are more conservative now doesn’t mean that they are right this time around.**

**Understand why reaching AGI seems inevitable to most experts**

**These may seem like wild predictions, but they seem quite reasonable when you consider these facts:**

**Human intelligence is fixed unless we somehow merge our cognitive capabilities with machines. Elon Musk’s neural lace startup aims to do this but research on brain-computer interfaces is in the early stages.**

**Machine intelligence depends on algorithms, processing power, and memory. Processing power and memory have been growing at an exponential rate. As for algorithms, until now we have been good at supplying machines with the necessary algorithms to use their processing power and memory effectively.**

**Considering that our intelligence is fixed and machine intelligence is growing, it is only a matter of time before machines surpass us unless there’s some hard limit to their intelligence. We haven’t encountered such a limit yet.**

**This is a good analogy for understanding exponential growth. While machines can seem dumb right now, they can grow quite smart, quite soon.**

**If classic computing slows its growth, quantum computing could complement it**

**Classic computing has taken us quite far. AI algorithms on classical computers can exceed human performance in specific tasks like playing chess or Go. For example, AlphaGo Zero beat AlphaGo by 100-0. AlphaGo had beaten the best players on earth. However, we are approaching the limits of how fast classical computers can be.**

**Moore’s law, which is based on the observation that the number of transistors in a dense integrated circuit double about every two years, implies that the cost of computing halves approximately every 2 years. However, most experts believe that Moore’s law is coming to an end during this decade. Though there are efforts to keep improving application performance, it will be challenging to keep the same rates of growth.**

**Quantum Computing, which is still an emerging technology, can contribute to reducing computing costs after Moore’s law comes to an end. Quantum Computing is based on the evaluation of different states at the same time whereas classical computers can calculate one state at one time. The unique nature of quantum computing can be used to efficiently train neural networks, currently the most popular AI architecture in commercial applications. AI algorithms running on stable quantum computers have a chance to unlock singularity.**

**A2 Cyber**

#### Cyberattacks are all hype — best studies

**Rid 13** (Thomas, Reader in War Studies – King's College London, “The Great Cyberscare”, Foreign Policy, 3-13, http://www.foreignpolicy.com/articles/2013/03/13/the\_great\_cyberscare)

A reminder is in order: The world has yet to witness a single casualty, let alone fatality, as a result of a computer attack. Such statements are a plain insult to survivors of Hiroshima. Some sections of the Pentagon document offer such eye-wateringly shoddy analysis that they would not have passed as an MA dissertation in a self-respecting political science department. But in the current debate it seemed to make sense. After all a bit of fear helps to claim -- or keep -- scarce resources when austerity and cutting seems out-of-control. The report recommended allocating the stout sum of $2.5 billion for its top two priorities alone, protecting nuclear weapons against cyberattacks and determining the mix of weapons necessary to punish all-out cyber-aggressors. Then there are private computer security companies. Such firms, naturally, are keen to pocket some of the government's money earmarked for cybersecurity. And hype is the means to that end. Mandiant's much-noted report linking a coordinated and coherent campaign of espionage attacks dubbed Advanced Persistent Threat 1, or "APT1," to a unit of the Chinese military is a case in point: The firm offered far more details on attributing attacks to the Chinese than the intelligence community has ever done, and the company should be commended for making the report public. But instead of using cocky and over-confident language, Mandiant's analysts should have used Words of Estimative Probability, as professional intelligence analysts would have done. An example is the report's conclusion, which describes APT1's work: "Although they control systems in dozens of countries, their attacks originate from four large networks in Shanghai -- two of which are allocated directly to the Pudong New Area," the report found. Unit 61398 of the People's Liberation Army is also in Pudong. Therefore, Mandiant's computer security specialists concluded, the two were identical: "Given the mission, resourcing, and location of PLA Unit 61398, we conclude that PLA Unit 61398 is APT1." But the report conspicuously does not mention that Pudong is not a small neighborhood ("right outside of Unit 61398's gates") but in fact a vast city landscape twice the size of Chicago. Mandiant's report was useful and many attacks indeed originate in China. But the company should have been more careful in its overall assessment of the available evidence, as the computer security expert Jeffrey Carr and others have pointed out. The firm made it too easy for Beijing to dismiss the report. My class in cybersecurity at King's College London started poking holes into the report after 15 minutes of red-teaming it -- the New York Times didn't. Which leads to the next point: The media want to sell copy through threat inflation. "In Cyberspace, New Cold War," the headline writers at the Times intoned in late February. "The U.S. is not ready for a cyberwar," shrieked the Washington Post earlier this week. Instead of calling out the above-mentioned Pentagon report, the paper actually published two supportive articles on it and pointed out that a major offensive cyber capability now seemed essential "in a world awash in cyber-espionage, theft and disruption." The Post should have reminded its readers that the only military-style cyberattack that has actually created physical damage -- Stuxnet -- was actually executed by the United States government. The Times, likewise, should have asked tough questions and pointed to some of the evidential problems in the Mandiant report; instead, it published what appeared like an elegant press release for the firm. On issues of cybersecurity, the nation's fiercest watchdogs too often look like hand-tame puppies eager to lap up stories from private firms as well as anonymous sources in the security establishment.

#### Cyber attaks can be and are mitigated in the SQUO — their own ev. Clark reads green

**Straub 19** – Assistant Professor of Computer Science at (Jeremy, “A Major Cyber Attack Could Be Just as Deadly as Nuclear Weapons, Says Scientist”, ScienceAlert, , August 18, 2019 [Hackers Could Kill More People Than a Nuclear Attack | Live Science](https://www.livescience.com/cyberattacks-could-kill-more-than-nuclear-attacks.html)

As someone who studies cybersecurity and information warfare, I'm concerned that **a cyberattack** with widespread impact, an intrusion in one area that spreads to others or a combination of lots of smaller attacks, **could cause significant damage, including mass injury and death rivaling the death toll of a nuclear weapon.** Unlike a nuclear weapon, which would vaporize people within 100 feet and kill almost everyone within a half-mile, the death toll from most cyberattacks would be slower. People might die from a lack of food, power or gas for heat or from car crashes resulting from a corrupted traffic light system. This could happen over a wide area, resulting in mass injury and even deaths. This might sound alarmist, but look at what has been happening in recent years, in the US and around the world. In early 2016, hackers took control of a US treatment plant for drinking water, and changed the chemical mixture used to purify the water. If changes had been made – and gone unnoticed – this could have led to poisonings, an unusable water supply and a lack of water. In 2016 and 2017, hackers shut down major sections of the power grid in Ukraine. This attack was milder than it could have been, as no equipment was destroyed during it, despite the ability to do so. Officials think it was designed to send a message. In 2018, unknown cybercriminals gained access throughout the United Kingdom's electricity system; in 2019 a similar incursion may have penetrated the US grid. In August 2017, a Saudi Arabian petrochemical plant was hit by hackers who tried to blow up equipment by taking control of the same types of electronics used in industrial facilities of all kinds throughout the world. Just a few months later, hackers shut down monitoring systems for oil and gas pipelines across the US This primarily caused logistical problems – but it showed how an insecure contractor's systems could potentially cause problems for primary ones. **The FBI has even warned that hackers are targeting nuclear facilities. A compromised nuclear facility could result in the discharge of radioactive material, chemicals or even possibly a reactor meltdown. A cyberattack could cause an event similar to the incident in Chernobyl**. That explosion, caused by inadvertent error, resulted in 50 deaths and evacuation of 120,000 and has left parts of the region uninhabitable for thousands of years into the future.

Mutual assured destruction

My concern is not intended to downplay the devastating and immediate effects of a nuclear attack. Rather, it's to point out that some of the international protections against nuclear conflicts don't exist for cyberattacks. For instance, the idea of "mutual assured destruction" suggests that no country should launch a nuclear weapon at another nuclear-armed nation: The launch would likely be detected, and the target nation would launch its own weapons in response, destroying both nations. Cyber Attackers have fewer inhibitions. For one thing, it's much easier to disguise the source of a digital incursion than it is to hide where a missile blasted off from. Further, cyberwarfare can start small, targeting even a single phone or laptop. Larger attacks might target businesses, such as banks or hotels, or a government agency. But those aren't enough to escalate a conflict to the nuclear scale.

Nuclear grade cyberattacks

There are three basic scenarios for how a nuclear grade cyberattack might develop. It could start modestly, with one country's intelligence service stealing, deleting or compromising another nation's military data. Successive rounds of retaliation could expand the scope of the attacks and the severity of the damage to civilian life. In another situation, a nation or a terrorist organization could unleash a massively destructive cyberattack – targeting several electricity utilities, water treatment facilities or industrial plants at once, or in combination with each other to compound the damage. Perhaps the most concerning possibility, though, is that it might happen by mistake. On several occasions, human and mechanical errors very nearly destroyed the world during the Cold War; something analogous could happen in the software and hardware of the digital realm. **Just as there is no way to completely protect against a nuclear attack, there are only ways to make devastating cyberattacks less likely**. The first is that governments, **businesses and regular people need to secure their systems to prevent outside intruders from finding their way in**, and then exploiting their connections and access to dive deeper. Critical systems, like those at public utilities, transportation companies and firms that use hazardous chemicals, need to be much more secure. One analysis found that only about one-fifth of companies that use computers to control industrial machinery in the **U.S. even monitor** heir equipment to detect potential attacks — and that in **40% of the attacks** they did catch, the intruder had been accessing the system for more than a year. Another survey found that nearly three-quarters of energy companies had experienced some sort of network intrusion in the previous year.

#### Safeguards mentioned by Straub 19 are already in place in the SQUO — their own warranting proves that cyber attacks are hype

**Dennis, ’17**, (Patrick, Technology Executive and Consultant, previous president and CEO of guidance software, “Why Cyber Attacks are Not as Scary as they Sound,” Information Security Group, 17 AUG 2017, https://www.infosecurity-magazine.com/opinions/cyber-attacks-not-scary-sound/)

Recently, the Department of Homeland Security (DHS) and the FBI released a joint report confirming that hackers targeted Wolf Creek Nuclear power plant, along with other energy and manufacturing facilities. The report came with an amber warning, the government’s second highest rating of threat urgency.∂ The story received wide media coverage, and a quick review of headlines like – “Hackers Have Been Targeting US Nukes” – reveals the **overly-alarmist tones** so common to cybersecurity. FUD – **Fear, Uncertainty and Doubt** – **is far too common** **when it comes to cybersecurity news** and cybersecurity vendor marketing material.∂ It is important to communicate some key facts that **put the risks of** **these** **attacks in perspective**. Most importantly, these attacks targeted corporate networks, and not the separate and much more sensitive plant operations or industrial control networks.∂ The **joint DHS and FBI report stated** plainly that **there is “no indication of a threat to public safety**, as any potential impact appears to be limited to administrative and business networks.” However, for the average reader, these stories may indeed bring a feeling of vulnerability and fears of impending danger – especially with the implication that “Russian government hackers” are responsible for the attacks throwing topical gasoline onto the fire.∂ The public deserves a more comprehensive understanding of the risks to industrial control systems (ICS) used for critical infrastructure like power plants, and especially nuclear facilities, across the United States. In that interest, here are some facts that should help to shed more light on the reality of this situation.∂ Let’s begin with the scary part. Industrial control systems include computers that are attached to physical components within industrial operations. They may be responsible for tasks such as opening and closing key valves, flipping switches at critical moments - anything that connects to the internet can (potentially) be hacked.∂ Most systems, including ICS, do have some level of connectivity. Furthermore, ICS often utilize older technology and are much more difficult to update and protect than the average laptop or computer. The potential vulnerability is frightening because ICS oversee so much of the infrastructure we rely upon in our daily lives, such as power plants, but also elevators, traffic lights, railroads and much more.∂ Look anywhere in the modern world and you’ll see systems controlled by ICS that you would never want hackers to be able to interfere with. Of course wherever the word “nuclear” is involved, the stakes become much greater.∂ Now for the good news. ICS are in no way helpless against attacks – in fact, ICS are often attached to physical systems with the most robust human oversight. When imagining a scenario where a nuclear power plant is hacked in an effort to cause destruction, you must also **imagine the number of personnel and procedures in place to** **oversee operations and** **ensure safety**. These same precautions are present within any system involving critical infrastructure: railroads, traffic lights, etc. As scary as the prospect of these systems being hacked can be, this is not a new threat.∂ The organization responsible are aware and actively working to manage these risks and protect the public. The truth is that **there are already excellent processes** **and diligent professionals** **that** have **kept us safe, and will continue working to keep us safe**. Considering these effective safeguards and robust abilities to mitigate risk, it makes sense to take a measured overlook when assessing hacking threats.∂ Another key factor to consider in risk assessment is the apparent goal that the hackers involved are trying to accomplish. Comparisons abound between these recent hacking efforts and the famous 2010 Stuxnet attack targeting Iranian nuclear facilities. Both involve attacks on sensitive nuclear facilities, however that’s about where the similarities end.∂ Stuxnet was by no means a standard hacking attack – it was perhaps the most sophisticated piece of malicious software ever written. The fact that it successfully reached the ICS it targeted, forced those systems to behave abnormally, and caused issues with the centrifuges on-site was as much due to physical activity on the ground and alleged nation-state level espionage techniques as it was to software. Stuxnet appeared to have involved a highly coordinated multi-vector attack, with a very specific outcome in mind.∂ In contrast, the attacks on Wolf Creek appear to be a more simple probing activity, with the modest goal of gathering information. While the Wolf Creek attacks could be a precursor to further incidents, there is no evidence to indicate a threat anywhere near the magnitude of Stuxnet. What the Stuxnet example does illustrate is that, while it’s very difficult for hackers to gain command and control over sensitive infrastructure, full command and control isn’t required to create significant mayhem.∂ As we look to bring context to cyber-attacks, the threat of severe weather makes for a useful metaphor. Cyber-attacks will happen, the same way tornadoes, earthquakes, and snowstorms happen. Our structure can be (and to a degree **is already**) designed to anticipate these events, detect when they’re happening, and respond effectively. To-date, **our track record is strong**, and just as weather detection and response improves with technology, **critical** **infrastructure companies are making new investments in safety and security** processes to improve protections against hacking.∂ At the same time, assessments and policy work at the government level are helping to implement and enforce best practices and standards in the name of protecting critical infrastructure, presenting the industry with the opportunity to show leadership in demonstrating how hacking risks should be prepared for and responded to.∂ The attacks on Wolf Creek represent a positive example of response to a cyber-attack. Security teams detected malicious activity and initiated the appropriate response. The company then engaged the right agencies and notified the public. That’s an example to be followed. Rather than play upon the public’s fears and victim shame those that experience attacks, all involved ought to celebrate what was done right, and take lessons from the incident that will bolster defenses for next time.∂ Bottom line: cyber-attacks on sensitive infrastructure are frightening, but fear cannot and should not shape our response. Strong protections are in place, and our common responsibility is to help make them even stronger.

**A2 Geopolitical Dependence**

#### Nuclear modernization isn’t key to uranium growth – No internal link

Colin **Sandell-Hay 23**. A multi-award-winning mining journalist and investor relations specialist with a major focus on the resources sector. He has 48 years of editorial and public relations experience, with more than 30 of those in business and resources media. “Uranium Prices and Demand Powering Up” The Assay. June 2023. https://www.theassay.com/articles/feature-story/uranium-prices-and-demand-powering-up/

Uranium consumption is expected to grow steadily, supported by **higher demand** in China and other parts of Asia, Eastern Europe, and the Middle East.

South Korea’s new government, elected in 2022, has reversed the previous government’s plans to phase out nuclear power. Instead, the new government has announced plans to **expand nuclear generation’s share** from 27% to 30% by 2030, and to 35% by 2035. South Korea has advantages in nuclear deployment, given its expertise and relatively streamlined regulations. Further development of domestic nuclear energy could flow on to future export opportunities, with South Korea’s construction of reactors in the United Arab Emirates serving as a good model.

Japan appears to be accelerating its rate of reactor reconnections. Only 10 of Japan’s 54 reactors have been reconnected since 2011, but Japan’s Government is prioritising a swift opening of seven more, with at least 15 expected to be reconnected over the outlook period. The government has announced cabinet approval for new reactors to be constructed, and for operational life on existing reactors to be extended to 60 years. Surging coal and gas prices have added momentum to re- openings and constructions, as Japan seeks to reduce its vulnerability to global commodity prices. Nuclear plants are less vulnerable to commodity price swings, since uranium makes up only a small proportion of running costs, and only small amounts of mined material are needed.

**Nuclear plant builds continue in Eastern Europe**, with unit three of Slovakia’s Mochovce nuclear plant having been connected to the grid earlier this year. Mochovce 3 has seen its output increase to 55% – with its final trial run at 100% power expected in June. Unit 2 of Belarus’s Ostrovets plant was recently connected to the power grid and delivered its first kilowatt-hours to the country’s electricity system.

A **French** bill intended to support a more rapid **expansion of new reactors** has passed through the National Assembly (the country’s lower house) and is now under review in the senate. The bill follows an earlier announcement by President Macron for the construction of six new EPR2 reactors, with potentially more to follow.

In **Canada**, the Port Hope reactor in Ontario has had its **operating** **licence** **renewed** for another 20 years. In the US, the Vogtle 3 reactor has reached criticality and is expected to commence generation shortly.

In **Belgium**, the Doel 4 and Tihange 3 reactors have extended their operational time

for another ten years, following an agreement between the Belgian government and French utility company Engie.

Trading Economics reported that the Chinese Nuclear Association stated that it is building 24 nuclear reactors, set to expand upon the **54 commercial reactors** currently in operation, as the country ramps up efforts to achieve carbon-cutting goals. Nuclear energy output is also expected to pick up elsewhere after the **US, France, Japan, UK, and Canada,** agreed to form an alliance, and leverage resources to jointly shun Russian fuel producers from the global nuclear fuel market.

#### Nuke energy investment solves the disad – it allows us to sanction Russia’s energy sectors, solving for dependence

Haley **Zaremba 24** writer and journalist based in Mexico City. She has extensive experience writing and editing environmental features, travel pieces, local news in the Bay Area, and music/culture reviews. “Uranium Prices Soar As World Turns to Nuclear Power,” Oil Price, 2/1/2024, https://oilprice.com/Alternative-Energy/Nuclear-Power/Uranium-Prices-Soar-As-World-Turns-to-Nuclear-Power.html

Global nuclear energy capacity is set to triple by 2050, increasing uranium demand significantly, but current production levels are **insufficient**.

The US and other countries are seeking to ramp up domestic uranium production amidst concerns about dependency on Russian exports.

Uranium prices are rising, and the US faces challenges in reviving its uranium mining industry, which has declined over the past decades.

As the need for abundant and expedient carbon-free energy intensifies and solar and wind power deployment hit some major speedbumps, more and more industry experts are calling for a resurgence of nuclear energy. While nuclear power has been out of vogue for decades now, proponents argue that its myriad values can no longer be ignored.

In the era of climate change, the benefits of nuclear energy are growing increasingly valuable – nuclear fission yields no greenhouse gas emissions, it’s a proven technology with existing supply chains and well worn blueprints, and, crucially, it’s a base load power source. Unlike solar and wind production, which are variable and answer not to consumer demand but to the whims of the weather, nuclear energy production can be manipulated to provide exactly as much energy as we need, when we need it.

As a result, nuclear energy is gaining more and more vocal proponents, and public opinion is shifting in favor of nuclear power expansion. In fact, public support for nuclear energy in the United States is at a 10-year high according to a Gallup poll released last year. And world leaders are listening. At last year’s United Nations climate summit in Expo City Dubai, 22 countries including the U.S. pledged to triple nuclear energy capacity by 2050.

“The Declaration recognizes the key role of nuclear energy in achieving global net-zero greenhouse gas emissions by 2050 and keeping the 1.5-degree goal within reach,” states a press release from the United States Department of Energy. “Core elements of the declaration include working together to advance a goal of tripling nuclear energy capacity globally by 2050 and inviting shareholders of international financial institutions to encourage the inclusion of nuclear energy in energy lending policies,” the statement continues.

There’s just one problem with this plan – **the world might not have enough uranium production capacity to keep up with a nuclear power boom** of that magnitude. "Where is that uranium going to come from?," Nicole Galloway Warland, managing director of Thor Energy, was recently quoted by Yahoo! Finance. "There’s not enough to go around. **There’s a supply deficit**." Thor Energy is an exploration company with uranium-focused projects in Utah and Colorado.

Even now, the global nuclear sector is struggling to find sufficient supplies of affordable and responsibly **source**d uranium. In the wake of the Fukushima nuclear disaster in 2011, the bottom fell out of global uranium mining. Now, as demand is skyrocketing, supply remains relatively low after years of lessened production levels.

Even before the Declaration to Triple Nuclear Energy Capacity by 2050 was even launched, global demand for yellowcake uranium was sharply increasing. In fact, global demand hit a ten-year high in October of last year, and prices have climbed accordingly. Though uranium prices still haven’t rebounded to pre-Fukushima levels, they’re well on their way. In fact, some speculators think that they could skyrocket to around $200 per pound by just 2025.

“You have a focus on energy security colliding with a focus on clean energy,” Grant Isaac, chief financial officer at Cameco, the world’s second-largest uranium producer, told the Financial Times. “The days of buying $40 uranium are over — and probably also for $50 or $60. We’re going to need new supplies,” he added.

What’s more, increasing uranium demand is stirring up geopolitical problems as high yellowcake prices line Russia’s coffers. At present, the lion’s share of global uranium exports is coming out of Russia, undermining the West’s efforts to slap meaningful energy **sanction**s on the Kremlin in response to the ongoing war in Ukraine.

As a result, the Biden administration is seeking to increase domestic uranium production. The U.S. has plenty of uranium deposits to dig into, but bringing the industry up to speed will be a challenge. A 2019 Annual Report by the U.S. Uranium Committee of the Energy Minerals Division determined that the U.S. has more than enough uranium to fuel hundreds of years of nuclear power generation, even if nuclear power took up much more of the national energy mix going forward. But **new** uranium **mines take 15 years** to come online when permitting is figured in.