# 1NC

### 1NC---ASI v2

#### We negate.

#### Our sole contention is SUPERINTELLIGENCE.

#### Generative AI has caused superintelligence in three sectors of education.

#### 1. UNIVERSITIES---they’ve created self-replicating AI---it’s topical because researchers use Generative AI in education.

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**Artificial intelligence models** can now create smaller **AI systems** **without the help of a human**, according to research published Friday by a group of scientists who said the project was the first of its kind.

Essentially, larger AI models — like the kind that power ChatGPT — can create **smaller**, more **specific** AI **applications** that can be used in everyday life, a **collaboration** between Aizip Inc. and scientists at the **Massachusetts Institute of Technology** and **several University of California campuses** demonstrated. Those specialized models could help improve hearing aids, monitor oil pipelines and track endangered species.

“Right now, we’re using bigger models to build the smaller models, like a bigger brother helping [its smaller] brother to improve. That’s the **first step towards** a bigger job of **self-evolving AI**,” Yan Sun, CEO of the AI tech company Aizip, told Fox News. “This is the first step in the path to show that AI models can build AI models.”

Yubei Chen, one of the researchers, echoed Sun.

One device Sun and Chen demonstrated — a human activity tracker that uses AI to gather and analyze motion data — was housed in a chip smaller than a dime.

That sensor is an example of tiny machine learning, small AI systems that can be used in compact devices or spaces. Tiny machine learning capabilities are crucial for pervasive AI, the notion that nearly any object could become intelligent, Sun said.

“If we think about ChatGPT and tiny machine learning, they are on the two extremes of the spectrum of intelligence. The large models … reside in the cloud,” Chen told Fox News. “On the other hand, we are building the smallest models. They reside in things.”

#### Self-replicating AI surpasses the human superintelligence threshold---this is called Artificial Superintelligence or ASI.

Karina Vold 21, Philosopher of cognitive science and artificial intelligence & an assistant professor at the University of Toronto's Institute for the History and Philosophy of Science and Technology, 6-16-2021, "Karina Vold & Daniel R. Harris, How does Artificial Intelligence Pose an Existential Risk?", Phil Archive, https://philarchive.org/rec/VOLHDA, Accessed 3-3-2025, ARC

An intelligence **explosion** is a hypothetical event in which an AI system enters a **rapid** cycle of **recursive self-improvement**, whereby each new iteration creates a **more intelligent version** of itself, culminating in the creation of a **superintelligence**. Here, a superintelligence is “any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest” (Bostrom 2014, 22). The concept of an intelligence explosion was first articulated by I.J. Good (1965, 33), who argued that an AI system whose intelligence exceeds humanity’s in all intellectual activities would necessarily also exceed it in terms of designing machine intelligence. Hence, if such a system were initially engineered by humans, it would possess the capability to design a machine more intelligent than itself. The subsequent new iteration, being more intelligent than its predecessor, would by the same logic also be capable of **design**ing a machine more intelligent than itself. If each new generation of AI were to utilize its improved design capability, an intelligence explosion would occur (Chalmers, 2010).

Importantly, an intelligence explosion need not begin with the creation of a machine with **greater than human** intelligence, as Good’s argument suggests. In principle, it **could** be sparked via the creation of a more **modest** type of machine intelligence. Some might hold, for example, that an intelligence explosion merely requires a system with artificial general intelligence, where general intelligence is the ability to deploy the same core suite of cognitive resources to complete a wide range of different tasks (Shevlin et al., 2019). An even more modest possibility is that an intelligence explosion could spark from a mere artificial **narrow** intelligence, that is, a system that excels **only** at **specific tasks** and lacks the ability to use its resources to solve problems outside of its narrow domains.4 Bostrom (2014, 29), for example, suggests that a system “capable of improving its own architecture”, what he calls a “seed AI”, would be a sufficient starting point. For example, DeepMind’s AlphaZero, a current narrow AI system, has already shown the capacity to iteratively self-improve by repeatedly playing against itself. This illustrates how, under certain conditions, this process of recursive self- improvement might generate an intelligence explosion that begins from a mere narrow AI, in particular, any narrow AI system that enjoys a decisive strategic advantage (i.e., well above human level capacity) in some relevant domains, coupled with sufficient capacities for real-world modification.5,6

#### 2. MILITARY---we’re leveraging generative AI for next-generation military tech.

Brad Dress, 12-11-2024, Brad Dress is a defense reporter for The Hill focusing on the beat’s intersection with Congress, defense contractors and veterans’ affairs. I also co-author The Hill’s Defense & National Security newsletter. He started at The Hill in November 2021 covering breaking news before joining the defense beat in 2023. "Pentagon announces new AI office as it looks to deploy autonomous weapons", Hill, https://thehill.com/policy/defense/5034805-artificial-intelligence-military/

The Pentagon is seen from Air Force One as it flies over Washington on March 2, 2022.

**The Defense Department on Wednesday announced a new office focused on accelerating and adopting artificial intelligence (AI) technology for the military as it aims to deploy autonomous weapons in the near future.**

The Artificial Intelligence Rapid Capabilities Cell (AI RCC) will aim to install AI tech into systems for the military, **focusing on emerging technologies like generative AI.**

The AI RCC, which will be overseen by the Chief Digital and Artificial Intelligence Office and partner with the Defense Innovation Unit, will come into force as the Pentagon aims to dramatically increase its capabilities to counter Chinese mass in the event of a conflict with its main adversary.

Th**e U.S. wants to deploy thousands of autonomous drones powered by AI through its Replicator initiative**. A second Replicator initiative is focused on using new technologies to counter swarms of autonomous drones.

Chief Digital and Artificial Intelligence Officer Radha Plumb told reporters Wednesday “**this rapid experimentation approach will allow us to test and identify where these cutting edge technologies** can make our **forces more lethal and our processes more effective.”**

“At the same time, it’s important to recognize that AI adoption by adversaries like China, Russia, Iran and North Korea is accelerating and poses significant national security risks,” Plumb said. “We are taking an all-hands-on-deck approach to ensuring the U.S. continues to lead the way.”

The AI RCC is drawing recommendations from Task Force Lima, which was created in August 2023 with the goal of dismantling within 18 months.

The priorities for the new office include using **generative AI for command and control, autonomous drones, intelligence, weapons testing and even for enterprise management like financial systems and human resources.**

The **Pentagon will pour $100 million into the effort in fiscal years 2024 and 2025 for developing generative AI through sandbox experimentations and models**, allowing the AI RCC to experiment and tune the advanced tools it plans to deploy.

One funding effort will center on incorporating AI pilots into real-world experimentations, **and $40 million will be directed to small businesses to draft solutions on AI deployment capabilities.**

The new AI office will also explore capabilities to rapidly deploy AI pilots, leverage AI for mission command decisions and invest in testing tools to accelerate real-world deployment.

**To these ends, the office seeks to work with providers of cloud services to create sandboxes for testing, with two cloud services opening up in January and another two in the summer**. Those services will be responsible for power and data security for the new AI exploration efforts.

Plumb said the goal is to acquire new technologies, **experiment with them and determine if they can be useful**. If they can be used, the office will then work to scale the technology.

“**We experiment using these new technologies integrated into the actual operational workflow to test and evaluate whether they’re useful,**” she said, “and whether war fighters actually want to use them, and usually the first time it needs improvement.”

Plumb said the “top priority” for the new office is to find the “highest return on investment” to where AI can “rapidly improve either lethality or efficiency, depending on whether it’s war fighting or business management.”

“This is about identifying those pilots, proving out the case, and then making sure we have the pathway to scale those quickly,” she added.

#### Specifically, ASI is a major priority---we’re collaborating with universities.

Seth D. Baum 17, PhD, Executive Director, Global Catastrophic Risk Institute, "A Survey of Artificial General Intelligence Projects for Ethics, Risk, and Policy," Global Catastrophic Risk Institute, Working Paper 17-1, 11/12/2017, pg. 2-11. ARC [italics in original]

The survey identifies 45 AGI R&D projects spread across 30 countries in 6 continents, many of which are based in major corporations and academic institutions, and some of which are large and heavily funded. Many of the projects are interconnected via common personnel, common parent organizations, or project collaboration.

For each of the seven attributes, some major trends about AGI R&D projects are apparent:

* Most projects are in corporations or academic institutions.
* Most projects publish open-source code.
* Few projects have military connections.
* Most projects are based in the US, and almost all are in either the US or a US ally. The only projects that exist entirely outside US and its allies are in China or Russia, and these projects all have strong academic and/or Western ties.
* Most projects state goals oriented towards the benefit of humanity as a whole or towards advancing the frontiers of knowledge, which the paper refers to as “humanitarian” and “intellectualist” goals.
* Most projects are not active on AGI safety issues.
* Most projects are in the small-to-medium size range. The three largest projects are DeepMind (a London-based project of Google), the Human Brain Project (an academic project based in Lausanne, Switzerland), and OpenAI (a nonprofit based in San Fransisco).

Looking across multiple attributes, some additional trends are apparent:

* There is a cluster of academic projects that state goals of advancing knowledge (i.e., intellectualist) and are not active on safety.
* There is a cluster of corporate projects that state goals of benefiting humanity (i.e., humanitarian) and are active on safety.
* Most of the projects with military connections are US academic groups that receive military funding, including a sub-cluster within the academic-intellectualist-not active on safety cluster.
* All six China-based projects are small, though some are at large organizations with the resources to scale quickly.

Figure ES1 on the next page presents an overview of the data. The data suggest the following conclusions:

Regarding ethics, the major trend is projects’ split between stated goals of benefiting humanity and advancing knowledge, with the former coming largely from corporate projects and the latter from academic projects. While these are not the only goals that projects articulate, there appears to be a loose consensus for some combination of these goals.

Regarding risk, in particular the risk of AGI catastrophe, there is good news and bad news. The bad news is that most projects are not actively addressing AGI safety issues. Academic projects are especially absent on safety. Another area of concern is the potential for corporate projects to put profit ahead of safety and the public interest. The good news is that there is a lot of potential to get projects to cooperate on safety issues, thanks to the partial consensus on goals, the concentration of projects in the US and its allies, and the various interconnections between different projects.

#### We’re topical---AI in “Education” includes Pentagon research.

Chee-Kit Looi 05, Professor Looi obtained his PhD in Artificial Intelligence from the University of Edinburgh, UK. His research focuses on learning sciences, computer-supported collaborative learning, mobile learning, AI in education, and computational thinking. He has had published more than 120 papers in international journal papers, as well as over 50 books or chapters, and produced 160 refereed international conference papers. He served as the President of the Global Chinese Society for Computers in Education from 2017 to 2019, 2005, "Artificial intelligence in education : supporting learning through intelligent and socially informed technology", Bentley University Library, https://bentley.primo.exlibrisgroup.com/permalink/01BENTLEY\_INST/1avasa6/alma991005228344907436, Accessed 2-18-2025, ARC  
The field of **Artificial Intelligence** in **Education** **includes research** and researchers from many areas of **technology and social science**. This study aims to open opportunities for the cross-fertilization of information and ideas from researchers in the many fields that make up this **interdisciplinary research area**.

#### 3. NEUROSCIENCE---Generative AI is streamlining brain scan technology.

Changwei Gong 23, Master of engineering from Shenzhen Institutes of Advanced Technology and University of Chinese Academy of Sciences, 6-13-2023, "Generative AI for brain image computing and brain network computing: a review", PubMed Central (PMC), https://pmc.ncbi.nlm.nih.gov/articles/PMC10293625/, Accessed 3-3-2025, ARC

This article provides a review of **generative artificial intelligence** for **brain image computing** and **brain network computing**. Generative AI can be divided into four main methods: variational autoencoder (VAE), generative adversarial network (GAN), flow-based model, and diffusion model. These models offer a **promising solution** for **analyzing** and **interpreting** **large-scale** **brain** imaging **data**. Generative AI has enabled researchers to gain a **better understanding** of the brain's **physical basis** and how it adapts to various **cognitive activities** in the field of **brain imaging**. In the context of brain network computing, generative AI can be used to **reconstruct** the **topological connectivity of brain networks**. However, there are limitations associated with using generative AI for analyzing brain imaging data. For instance, medical imaging data is often highly sensitive due to privacy issues involving patients, making it difficult to obtain large-scale datasets directly. Additionally, different brain structures of different patients pose a challenge to the generated results of the model. Therefore, when using generative AI techniques to generate brain diseases or analyze large-scale medical imaging datasets, it is necessary to balance data usage scenarios and model interpretability in order to obtain more accurate and interpretable results. In conclusion, **generative AI** has **broad application** prospects in brain imaging and brain network, which can help to better understand the internal function and structure of the brain, promote the diagnosis and treatment of brain diseases, and provide **new opportunities** and methods for **neuroscience research**.

#### AI developed based on brain scans replicate human capabilities.

Hiroshi Yamakawa 21. Professor at the Graduate School of Engineering at Kyoto University. “The whole brain architecture approach: Accelerating the development of artificial general intelligence by referring to the brain.” *Neural Networks*. SA. December 2021. <https://doi.org/10.1016/j.neunet.2021.09.004>, Accessed 3-3-2025, ARC

5.4. Applications of AI systems based on BRA

AI systems that are developed based on BRA can be expected to replicate human cognitive and behavioral capabilities almost exactly. Therefore, BRA offers several practical applications. It enables the construction of an AI that exhibits familiarity with humans when communicating with them. Furthermore, it can be applied computationally to research fields that deal with mental illness and cognitive impairment. Conversely, findings regarding human cognitive impairment may be used for problematic behavior that is observed in brain-inspired AI. Moreover, we believe that this approach can also be used as a computational model that will serve as a device for mind uploading.

6. Conclusions

In this paper, the current WBA approach has been introduced and BRA-driven development to accelerate brain-inspired AGI has been discussed. The BRA includes standardized data that reflect the brain architecture for the purpose of limiting the large design space that is required for a human-level AGI that cannot be grasped by the cognitive ability of an individual. Even developers who do not have a deep understanding of the brain can develop brain-inspired software based on BRAs that are designed by people with expertise in neuroscience. We explained that the BRA is a description consisting of a BIF supported by a mesoscopic neural circuit and an HCD that is consistent with the BIF. Subsequently, to compensate for the lack of neuroscientific findings, we introduced the SCID method, which formulates the creation of an HCD that is consistent with the anatomical structure of the brain. Furthermore, even if a BRA is used for development, individual development results tend to diverge depending on the diversity of the target tasks. To address this problem, integration development is planned, which will move AGI closer to the functioning of the brain. Moreover, we discussed the evaluation of biological plausibility using BRA to prevent the developed software from veering away from the brain.

The main contribution of this study on BRA-driven development, with the following features, is the establishment of a methodology for accumulating data on brain constraints in a form that can be used for software development.

1. Separation of design information: BRA data can be used in various development projects because they are described in a standard format for software development, which is not dependent on a particular development environment.

2. Standardization of description granularity: As a rule, the description of BRA data at a coarser granularity than the mesoscopic level reduces the possibility that the development will focus on details that are unnecessary for the realization of the target cognitive behavioral level.

3. BRA design: The method of designing computational functions according to anatomy (the SCID method) enables BRAs to be created while compensating for the lack of neuroscientific knowledge in a wide range of brain areas.

4. Tolerance of diversity: Even BRAs that contain mutually contradictory HCDs can be registered if they exhibit a certain level of validity, thereby reducing the risk of overly narrowing the considered design space.

The above features of the BRA will provide a foundation for large-scale whole-brain software development as the comprehensiveness of its data increases. Thus, the brain architecture will provide an anchor for the efficient convergence and eventual completion of the development of human-like AGI, whereas the development results in this field tend to diverge at present.

#### “Education” includes neuroscience.

CEN No Date, University-led research centre, combining the expertise of researchers in child development, neuroscience, and education at three world leading universities, Birkbeck University of London, UCL Institute of Education, and University College London, xx-xx-xxxx, "What is educational neuroscience?", Centre for Educational Neuroscience, https://www.educationalneuroscience.org.uk/about-us/what-is-educational-neuroscience/, Accessed 3-3-2025, ARC

“**Education** **is about enhancing learning**, and **neuroscience is about understanding the mental processes involved in learning**. This common ground suggests a future in which educational practice can be transformed by science, just as medical practice was transformed by science about a century ago.” – Report by the Royal Society, UK, 2011

**ASI will be misaligned with our goals.**

**1. It’s easier, more competitively advantageous, and prone to extreme miscalculation---extinction.**

McAleese ’22 [Stephen; August; software engineer, Amazon Web Services, CloudWatch monitoring, Machine Learning Safety Scholar, Center for AI Safety; Arxiv, “How Do AI Timelines Affect Existential Risk?” <https://arxiv.org/pdf/2209.05459.pdf>] DSL

In a chapter named “Is the default outcome doom?” (p. 140) in Superin- telligence, Nick Bostrom explains why programming an ASI to be beneficial wouldn’t be easy [3]. He gives three reasons:

1. The orthogonality thesis says that there is **no correlation** between **intelligence** and having **beneficial goals**. Therefore, we **cannot expect** an **AI** to **acquire beneficial** goals **simply** **by increasing its intelligence**.

2. **It is** **much easier to program an ASI to have a meaningless goal** such as “count digits of Pi” **rather than** a **complex** and **valuable goal** like “achieve **human flourishing**”.

3. The instrumental convergence thesis says that AIs will have certain subgoals such as resource acquisition for a wide variety of final goals. For example, if we gave an AI a random goal, it is likely that it would acquire resources to help it achieve its goal. An **ASI** **programmed to maximize the probability** of **some goal being achieved would be incentivized** to **pursue extreme and extensive resource acquisition efforts** such as building **huge numbers of mines and power plants** that would make Earth uninhabitable for life. Bostrom calls this particular **risk infrastructure profusion**.

There are two more reasons why ASI would probably not be aligned by default:

4. **To build a beneficial and aligned ASI**, **one would need to solve the problem of creating ASI** in the first place (the AI problem) and also the alignment problem. However, only the AI problem would need to be solved to create a harmful unaligned ASI. If there were a race between organizations creating ASI, the competitor that created the first ASI might then be one that creates an unaligned ASI since doing so would require less effort and time than creating an aligned ASI. **Previous technologies such as nuclear power confirm the hypothesis that building safe technology takes longer than harmful technology**: the hydrogen bomb was invented in the 1950s but we have yet to discover how to use controlled nuclear fusion reactions to generate electricity.

5. The set of desirable and beneficial goals we could program an ASI to pursue is a tiny subset of all possible goals. Therefore an ASI with a random goal is very unlikely to be beneficial.

#### 2. At least some **programmers** will be intentionally malicious.

Lynn Lopucki 18, Security Pacific Bank Professor of Law at UCLA Law and the Bruce W. Nichols Visiting Professor of Law at Harvard Law, “Algorithmic Entities,” Washington University School of Law, <https://journals.library.wustl.edu/lawreview/article/id/3143/>, Accessed 3-3-2025, ARC

An algorithm sufficiently sophisticated to run a complex business and adapt to changing circumstances would cost more. IBM developed Watson, an artificial intelligence program that might have such capabilities, at an estimated cost of $900 million to $1.8 billion.72 An AE initiator would not have to incur costs of that magnitude. The AE would require only a copy of the software and the programming services necessary to modify its objectives. A supercomputer capable of running a modified copy of Watson may cost $500,000 to $1 million. Even if those costs are currently prohibitive, they are likely to decline over time, even as the capabilities of the hardware and software increase. By definition, the initiator of an AE would neither own the entity nor control it after launch. The initiator would, however, have the opportunity to set the algorithm's objectives prior to launch. Initiators might be willing to contribute the funds necessary to launch AEs for a variety of reasons.

1. Terrorism. An initiator could program an AE to raise money to finance terrorism or to directly engage in terrorist acts. It could be programmed for genocide or general mayhem.

2. Benefits. An initiator could program an AE to provide direct benefits to individuals, groups, or causes. For example, an AE might pay excess funds to the initiator or to someone on whom the initiator chose to confer that benefit. The benefits conferred could be indirect. For example, an AE might promote or consume the initiator's products,73 harass the initiator's opponents, manipulate securities prices, or provide positive or negative reviews on the internet.

3. Impact. An initiator could program an AE to achieve some specified impact on the world. The goals might range all of the way from traditional philanthropy to pure maliciousness. Philanthropic AEs might provide a more trustworthy alternative to traditional charities and foundations, which often fail to carry out donors' instructions.74 Alternatively, decedents might choose to entrust AEs to apply their wealth to any purpose whatsoever–– \*901 including manipulation of their descendants in ways not permitted by law, the expression of their political views or racial prejudices, magnifying the decedents' places in history, or supporting causes so unpopular that the inheritance system would not tolerate them.

4. Curiosity. An initiator might launch an AE simply out of curiosity. Initiators have sometimes devoted substantial time and money to launch computer viruses from which they could derive no monetary benefit. Initiators might seek the knowledge or fame that a successful AE could generate.

5. Liability avoidance. Initiators can limit their civil and criminal liability for acts of their algorithms by transferring the algorithms to entities and surrendering control at the time of the launch.75 For example, the initiator might specify a general goal, such as maximizing financial return, and leave it to the algorithm to decide how to do that. If the algorithm later directed the commission of a crime, prosecutors may be unable to prove the intent necessary to convict the initiator of that crime (as opposed to the lesser charge of reckless initiation). Because intelligent agents act and interact in unpredictable ways, most commentators conclude that there is a substantial class of cases in which the initiators of intelligent agents will not be held responsible for the agent's actions. This conclusion is accepted in the literature and referred to as the “accountability gap.”76 Together, these five motivations assure that once the necessary hardware and software are available, humans will launch AEs.

#### ASI creates pandemics.

Winter-Levy ’16 [Sam; Spring; Scholar Fellow at the US Institute of Peace, PhD in politics at Princeton University; World Policy Journal, “Safety First: Entering the Age of Artificial Intelligence,” vol. 33 no. 1] ARC

Second, final values that seem benign could lead to disastrous unintended consequences, even when the AI’s programmers have good intentions. Many final goals, when interpreted precisely, would lead to the acquisition of as many resources as possible and the elimi- nation of threats. Humans may pose such a threat, and they certainly control resources. It is far more difficult than it may seem to ensure that a machine more powerful than its creators doesn’t interpret its goals in ways that run pro- foundly counter to the creators’ true intentions. Bostrom gives two simplified examples to il- lustrate this difficulty. An AI designed for the mundane task of maximizing the number of paperclips produced in a factory would, taken to its logical extreme, start monopolizing resources from elsewhere. Once it realized that humans had the power to shut it down and end its paperclip mission, it might view humans as a threat and take appropriate actions—chang- ing the electronic locks on the factory doors or reprogramming the braking system in the CEO’s Tesla. Or take the final goal of “make humans smile”—a suitably diligent AI may interpret this as “paralyze human facial musculature into constant grins.”

Speculating about more realistic paths to disaster in such detail is likely to be mislead- ing, given that superintelligence remains years away. But such scenarios are not hard to imag- ine. Even today, much of society operates in the digital realm. Servers store financial assets; Wikipedia and Google Books host the sum of human knowledge; and military and commer- cial drones are increasingly guided by software. To adapt a disaster scenario from Eliezer Yud- kowsky, a leading AI safety theorist, an AI with access to the Internet could scan through existing research papers on biotechnology, develop a particularly lethal pathogen, and email specifications of DNA strings to online laboratories that offer DNA synthesis and sequencing with FedEx delivery (such labs already exist). It would only have to find one human who can be paid or fooled into receiving FedEx’d vials and mixing their contents in a specified way to unleash a global pandemic.

#### Engineered pandemics cause extinction.

Bryan Walsh 20, Future Correspondent for Axios. He covers emerging technology and the trends shaping geopolitics, work, warfare and more, 5-13-2020, "The coronavirus pandemic reawakens bioweapon fears", Axios, https://www.axios.com/2020/05/14/coronavirus-pandemic-pathogen-bioweapon, Accessed 3-5-2025, ARC

The immense human and economic toll of the COVID-19 pandemic only underscores the threat posed by pathogens that could be deliberately engineered and released.

Why it matters: New technology like gene editing and DNA synthesis has made the creation of more virulent pathogens easier. Yet security and regulation efforts haven't kept pace with the science.

What's happening: Despite some claims by the White House, overwhelming scientific evidence indicates that the novel coronavirus was not accidentally released from a lab or deliberately engineered, but naturally spilled over from an animal source.

That doesn't mean the threat from bioweapons isn't dire. Along with AI, engineered pandemics are widely considered the biggest existential risk facing humanity.

That's in part because a pathogen could be engineered in a lab for maximum contagiousness and virulence, well beyond what would arise through natural selection.

Case in point: a 2018 pandemic simulation put on by the Johns Hopkins Center for Health Security featured a fictional engineered virus called Clade X that combined the contagiousness of the common cold with the virulence of the real-life Nipah virus, which has a mortality rate of 40-75%. The resulting simulated global outbreak killed 150 million people.

COVID-19 isn't anywhere near that fatal, but the pandemic has shown the vulnerability of the U.S. and the world to biological threats both natural and manmade.

"Potential adversaries are of course seeing the same things we’re seeing," says Richard Pilch of the Middlebury Institute of International Studies. "Anyone looking for a radical leveling approach — whether a state actor like North Korea or a motivated terrorist organization — may be influenced by COVID-19 to consider pursuing a biological weapons capability."

Background: Bioweapons were officially banned by the Biological Weapons Convention in 1975, though North Korea is suspected of maintaining an offensive bioweapons program.

A particular concern about biowarfare and bioterror, though, is that many of the tools and methods that could be used to create a weaponized virus are largely indistinguishable from those used in the course of legitimate scientific research. This makes biotechnology "dual-use" — and that much more difficult to safely regulate without cutting off research that could be vitally important.

While earlier bioweapons fears focused on the possibility that a state or terror group could try to weaponize a known dangerous agent like smallpox — which would require somehow obtaining restricted pathogens — new technology means that someone could obtain the genetic sequence of a germ online and synthesize it in the lab.

#### 3. SAI causes infinite suffering due to self-interest and weak ethics.

Jacobs ’16 [Bob; September 14; BS Moral Sciences at the University of Ghent; Effective Altruism Forum, “Reducing Risks of Astronomical Suffering: A Neglected Priority,” https://forum.effectivealtruism.org/posts/peXSqaEhyXMqyMq9i/crosspost-reducing-risks-of-astronomical-suffering-a] ARC

In discussions about the risks from smarter-than-human artificial intelligence, it is often assumed that the sole reason to consider AI safety an important focus area is because it decides between utopia or human extinction. The possibility that misaligned or suboptimally aligned AI might instantiate suffering in astronomical quantities is, however, rarely brought up.

Misaligned AI as a powerful but morally indifferent optimization process might transform galactic resources into highly optimized structures, some of which might very well include suffering. The structures a superintelligent AI or an AI-based economy decoupled from human interests would build in the pursuit of its goals may for instance include a fleet of “worker bots,” factories, supercomputers to simulate ancestral Earths for scientific purposes, and space colonization machinery, to name a few. In the absence of explicit concern for suffering reflected in the goals of such an optimization process, AI systems would be willing to instantiate suffering minds (or “subroutines”) for even the slightest benefit to their objectives. (Note that, as was the case with natural selection’s use of wild animals, some of these optimization processes might also lead to the instantiation of happy minds.) This is especially worrying because the stakes involved could literally turn out to be astronomical: Space colonization is an attractive subgoal for almost any powerful optimization process, as it leads to control over the largest amount of resources. Even if only a small portion of these resources are used for purposes that involve suffering, the resulting disvalue would tragically be enormous.8 Finally, next to bad states of affairs being brought about for instrumental reasons, because of indifference to suffering, there is also the risk that bad states of affairs could be brought about for strategic reasons: In competition or conflict between different factions, if one side is compassionate and the other not, threatening to bring about bad states of affairs could be used as an extortion tactic.

#### Suffering outweighs extinction.

Daniel ‘17 [Max; 2017; Executive Director of the Foundational Research Institute, Senior Research Scholar at the Future of Humanity Institute, MS in Mathematics from Heidelberg University; Foundational Research Institute, “S-Risks: Why They Are The Worst Existential Risks, And How To Prevent Them,” <https://foundational-research.org/s-risks-talk-eag-boston-2017/>] ARC

To come back to the title of my talk, I can now state why s-risks are the worst existential risks. S-risks are the worst existential risks because I’ll define them to have the largest possible scope and the largest possible severity. (I will qualify the claim that s-risks are the worst x-risks later.) That is, I’d like to suggest the following definition. “S-risk – One where an adverse outcome would bring about severe suffering on a cosmic scale, vastly exceeding all suffering that has existed on Earth so far.” So, s-risks are roughly as severe as factory farming, but with an even larger scope. To better understand this definition, let’s zoom in on the part of the map that shows existential risk. One subclass of risks are those that, with respect to their scope, would affect all future human generations, and, with respect to their severity, would remove everything valuable. One central example of such pan-generational, crushing risks are risks of human extinction.

Risks of extinction have received the most attention so far. But, conceptually, x-risks contain another class of risks. These are risks of outcomes even worse than extinction in two respects. First, with respect to their scope, they not only threaten the future generations of humans or our successors, but all sentient life in the whole universe. Second, with respect to their severity, they not only remove everything that would be valuable but also come with a lot of disvalue – that is, features we’d like to avoid no matter what. Recall the story I told in the beginning, but think of Greta’s solitary confinement being multiplied by many orders of magnitude – for instance, because it affects a very large population of sentient uploads.

#### All barriers against ASI are being broken---development is exponential.

Cem Dilmegani 24. Computer engineer from Bogazici University. “When will singularity happen? 1700 expert opinions of AGI.” *Amultiple*. SA. 01/01/2024. <https://research.aimultiple.com/artificial-general-intelligence-singularity-timing>, DSL

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.

#### Thus, top scientists conclude ASI comes by this year.

Aditi Suresh 11/9. I hold a degree in political science, and am interested in how AI and online culture intersect,"AGI is Coming in 2025." *Analytics India Magazine*. 11/9/2024. https://analyticsindiamag.com/ai-insights-analysis/agi-is-coming-in-2025// Accessed: 11/18/2024] ARC

This time around it is starting to feel real. In a recent interview with YC chief Garry Tan, OpenAI CEO Sam Altman shared his insights about AGI (artificial general intelligence), hinting that AGI may be within reach as soon as 2025.

“I think we are going to get there faster than people expect,” he said, underscoring OpenAI’s accelerated progress.

“We actually know what to do… it’ll take a while, it’ll be hard, but that’s tremendously exciting,” said Altman, reflecting on their recent advancements, signaling that internal developments have already surpassed public expectations.

OpenAI seems to have cracked AGI internally

OpenAI’s strategic focus, rooted in scaling laws and deep conviction, has been pivotal in its progress towards AGI. It emphasises the underestimated value of “a fairly extreme level of conviction on one bet.”

“We said from the very beginning we were going to go after AGI at a time when in the field you weren’t allowed to say that because that just seemed impossibly crazy,” recalled Altman, pushing the boundaries of research.

Further, he said OpenAI had fewer resources than DeepMind and others. “So we said okay they are going to try a lot of things and we have just got to pick one and really concentrate,” he added.

“I’ve heard people claim that Sam is just drumming up hype, but from what I’ve seen everything he’s saying matches the ~median view of OpenAI researchers on the ground,” said Noam Brown, a researcher at OpenAI.

Even OpenAI’s chief financial officer, Sarah Friar, agrees. “One of the best meetings I get to go to is our research meetings, and it would blow your mind to see what is already coming,” she said, touching upon the capabilities of o1 and upcoming GPT models.

“We have the plan in place. I think if Sam was sitting on this seat, he would tell you that it (AGI) is closer than what most people think,” added Friar in a recent interview with Bloomberg.

#### AI outweighs---its unpredictability allows for infinite extinction scenarios.

Dr. David Denkenberger 20, PhD in Engineering, Assistant Professor at Tennessee State University, with Alexei Turchin, advisory board member at the Institute for Ethics and Emerging Technologies, contributor at the Science for Life Extension Foundation, “Classification of Global Catastrophic Risks Connected with Artificial Intelligence”, <https://philpapers.org/rec/TURCOG-2>, Accessed 3-3-2025

According to Yampolskiy (Yampolskiy 2016), the probability and seriousness of AI failures will increase with time. We estimate that they will reach their peak between the appearance of the first self-improving AI and the moment that an AI or group of AIs reach global power, and will later diminish, as late-stage AI halting seems to be a low-probability event.

AI is an extremely powerful and completely unpredictable technology, millions of times more powerful than nuclear weapons. Its existence could create multiple individual global risks, most of which we can't currently imagine. We present several dozen separate global risk scenarios connected with AI in this article, but it is likely that some of the most serious are not included. The sheer number of possible failure modes suggests that there are more to come.

#### Independently, military AI causes nuclear miscalculation regardless of superintelligence.

#### It increases the speed of war, causes false alarms, and drives use-it or lose-it pressures.

Shah Meer 24, Assistant Research Fellow at Balochistan Think Tank Network, Quetta. He often writes on issues pertaining to strategic and nuclear affairs, 10-19-2024, "AI, Autonomy, and Arms Race: The Evolving Role of Autonomous Weapons", Modern Diplomacy, https://moderndiplomacy.eu/2024/10/19/ai-autonomy-and-arms-race-the-evolving-role-of-autonomous-weapons/, Accessed 2-21-2025, ARC

**Militaries** **across the globe** are rapidly progressing and engaged in a **race** for **dominance** in **military technologies**, including **autonomous weapons**. Notably**, the United States**, China, and **Russia** are leading this technology, along with other countries such as **India**, **Turkey**, and **South Korea**. In recent years, Russia has made significant strides in military technologies, also focusing on increasing the level of autonomy in its weapon systems and decision-making. Russia has invested heavily in the design and application of robotic systems which also includes unmanned aerial vehicles. In the ongoing war, Russia and Ukraine have reportedly used AI-powered drones which can kill without sight.

The US Department of Defence `Unmanned Systems Roadmap: 2007-2032` reveals that the US is seeking to develop more and more autonomous weapons systems. The Pentagon’s recently announced [Replicator](https://warontherocks.com/2023/09/scaling-the-future-how-replicator-aims-to-fast-track-u-s-defense-capabilities/) initiative intends to develop and deploy **thousands of LAWS in the military domain in the next few years**. The US Navy has already shown an uncrewed gunboat attacking a fake enemy target using live rockets – without direction from a human operator. During military exercises with Cambodia last month, the Chinese army demonstrated the gun-equipped robot dog. China has also developed a new type of war drone which is capable of swiftly multiplying midair. India is also stepping into the race. The Indian army’s forces are [inducting swarm drone systems](https://www.hindustantimes.com/india-news/army-receives-swarm-drones-eyes-light-tanks-to-check-pla-101661537524265.html) that are said to be operating in tandem with ground forces that can provide significant offensive and defensive edge in the battlefield and warfare. New Delhi has also introduced the Drishti-10 Medium Altitude Long Endurance (MALE) Unmanned Aerial Vehicle (UAV).

AI-equipped LAWS have been central to the national security strategies of many states due to their [increased precision, minimum risk](https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.brookings.edu/articles/rule-of-law-continues-five-year-decline-but-bright-spots-emerge/&ved=2ahUKEwi15pv7xdOHAxVsRPEDHW5nFOwQFnoECB0QAQ&usg=AOvVaw0-vzvNi2KGFSJPbtwMQc9b), cost efficiency, and operational flexibility. Featured [by modern sensor suits and sophisticated](https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://crsreports.congress.gov/product/pdf/IF/IF11150&ved=2ahUKEwiq6aWdxtOHAxUhSPEDHSWJD_EQFnoECBIQAw&usg=AOvVaw3o-awOAV3GCDzTgh9KmZgf) computer algorithms, can operate independently and autonomously. States are increasingly involved in integrating autonomous features into weapon systems. Particularly [major powers](https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://foreignpolicy.com/2022/05/11/killer-robots-lethal-autonomous-weapons-systems-ukraine-libya-regulation/&ved=2ahUKEwj8t-my0N-HAxUiQ_EDHdk-N94QFnoECBIQAw&usg=AOvVaw1u61jj3v8kCAm3hRAq2ED3) are investing in these technologies and developing autonomous systems. The incorporation of LAWs in national security strategies and their use in warfare [**comes with genuine risks**](https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.cnas.org/publications/reports/ai-and-international-stability-risks-and-confidence-building-measures&ved=2ahUKEwizy_iU_9yHAxXXhf0HHcuOL5AQFnoECCAQAQ&usg=AOvVaw0fsJy4aJ5vryoO2WkLD4Cy)**.** It increases the **pace** and **tempo** of **warfare**, [a process called ‘**battlefield singularity’**](https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://scienceandglobalsecurity.org/archive/sgs14podvig.pdf&ved=2ahUKEwjOz6Said2HAxVt57sIHe76CwMQFnoECC0QAQ&usg=AOvVaw3zRoRKYvdXR2pFl9_Tz1Vi). It can also heighten the potential of **erratic launches**, and **false alarms** and **manipulate** the **early warning systems**. The capability of the use of lethal force and autonomy can redefine international relations and cause a tectonic shift in geopolitics. Seeing its **precision and pace**, it has made **nuclear weapons vulnerable** by forcing [states to **pre-delegate** to](https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://margallapapers.ndu.edu.pk/site/article/view/173&ved=2ahUKEwiY4bX0g92HAxXsy7sIHd9MCIsQFnoECCEQAQ&usg=AOvVaw0bKCk0MI5ZAFpgH5yyZU8s) avoid **decapitation** in times of **crisis escalation**. The **vertical** and **horizontal proliferation** of LAWs is also **hard to control,** resulting in **arms race**, **strategic instability** and **technological** **disparities**. Additionally, LAWs can create risks including **miscalculations**, **malfunction**, **accidents**, and **near-misses**, thus **increasing the risk of nuclear** war.

[Given their risk perception](https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://disarmament.unoda.org/the-convention-on-certain-conventional-weapons/background-on-laws-in-the-ccw/&ved=2ahUKEwiY0Yr3rN2HAxV3Q_EDHcdOLUMQFnoECBMQAQ&usg=AOvVaw0JWZE9NFaLj9MG1XSapUlh), the UN has declared them politically unacceptable and morally repugnant and called for a legally binding instrument for their prohibition and restriction in tandem with their development for peaceful applications. Although states call for a ban on LAWs and legal actions and support global efforts, seizing the upper hand across fields including AI and autonomous weapons is undermining these efforts. For instance, the Indian normative stance on LAWs is highly [**duplicitous** while advocating for](https://www.nation.com.pk/04-Jul-2024/india-s-integration-of-autonomous-weapons-raises-complex-legal-ethical-and-security-issues) the **prohibition and regulation** of LAWs on the one hand, and while highly investing in autonomous weapons on the other. The same is the case for the US for which **lethal autonomy is central to its current national defense strategy**.

In future, there would be a serious risk of deploying these weapons without human control. The next decade will witness more heated competition as both powers plan to allocate more funds for autonomous weapons. Therefore, lethal autonomous weapons systems would have a revolutionary impact on warfare in the coming years. The use of LAWs presents a worrying trend that can change the way wars are fought and cause instability and tensions. The need of the hour is to initiate legally binding multilateral instruments on the prohibition and regulations of the like AI, Drones, killer robots etc. Amid intensified geopolitical tensions, it is highly indispensable that the laws be used in compliance with international humanitarian law. Future treaties should focus on the human role. If not, the development, deployment and proliferation of the LAWs will undermine international security.

#### Specifically, we’re in an AI arms race with Russia.

Samuel Bendett 25, Adviser with CNA Strategy, Policy, Plans and Programs Center (SP3), where he is a member of the Russia Studies Program. His work involves research on the Russian defense and technology developments, unmanned and autonomous military systems and Artificial Intelligence, as well as Russian military capabilities and decision-making during crises, 1-10-2025, "Battlefield Drones and the Accelerating Autonomous Arms Race in Ukraine", Modern War Institute -, https://mwi.westpoint.edu/battlefield-drones-and-the-accelerating-autonomous-arms-race-in-ukraine/, Accessed 2-21-2025, ARC

Since **Russia’s full-scale invasion of Ukraine** in February 2022, the war there has been impacted by **attritable,**[**cheap drones**](https://www.washingtonpost.com/world/2024/04/14/ukraine-drones-russia-war-skies/) and rapidly growing roster of **unmanned and robotic systems**. Collectively, these technologies are redefining how military forces can wage modern warfare. With both sides in this war rushing to secure a technological advantage, the Ukrainian battlefield is[transforming](https://time.com/6293398/palantir-future-of-warfare-ukraine/) into a clash between conventional forces backed by a growing number of autonomous and remote-controlled systems. Both Ukraine and Russia have steadily [poured](https://theconversation.com/both-sides-in-the-russia-ukraine-war-are-using-new-and-old-technologies-for-warfare-225451) **more and more resources** into developing this technology in a bid to **stay a step ahead of the adversary**.

Ukraine’s battlefield experience reflects a shift toward unmanned systems that augment or attempt to replace human operators in the most dangerous missions, and against an enemy willing to send more and more manpower into large-scale frontal assaults. After so many autonomous and robotic systems were fielded over the past three years by Kyiv’s forces, Ukrainian officials started to [describe](https://time.com/6691662/ai-ukraine-war-palantir/)their country as a “war lab for the future”—highlighting for allies and partners that, because these technologies will have a significant impact on warfare going forward, the ongoing combat in Ukraine offers the best environment for continuous testing, evaluation, and refinement of such systems. Many companies across Europe and the United States have tested their drones and other systems in [Ukraine](https://en.ain.ua/2024/05/28/brave1-precision-hackathon-ukraine/). At this point in the conflict, these companies are striving to gain “[battle-tested in Ukraine](https://kyivindependent.com/battle-tested-in-ukraine-how-us-drone-makers-turned-ukraine-into-a-tagline-to-sell-west/)” credentials for their products.

For example, **US** defense tech **company**[**Anduril**](https://kyivindependent.com/anduril-announces-selling-drones-after-successful-tests-in-ukraine) recently started selling its new **autonomous drones** after successful tests carried out in Ukraine in October 2024. Ukrainian and Western drone manufacturers have started **partnering more closely** both on drones and on certain types of AI development. The US military is seeking to **speed up the deployment** of **cheap autonomous systems** through its Replicator [program](https://www.defenseone.com/technology/2023/08/hellscape-dod-launches-massive-drone-swarm-program-counter-china/389797/), and is also working closely with the private sector to test systems and technologies in Ukraine that can then be potentially **used in future conflicts**.

Recently, US Army Chief of Staff General Randy George [noted](https://www.defenseone.com/technology/2024/11/newest-replicator-drones-proven-battlefields-ukraine/400997/) that the Ukraine war “has demonstrated the value of small, attritable drones on the battlefield.” This combat application of relatively inexpensive platforms has provided the Pentagon with an opportunity to see how integrating cutting-edge software with scalable drone technology can proceed across the US Department of Defense, drawing [lessons](https://www.defense.gov/News/Speeches/Speech/Article/3992669/the-future-character-of-war-keynote-address-by-deputy-secretary-of-defense-kath/) from the Russia-Ukraine war as it prepares for potential future conflicts, including with [China](https://www.nytimes.com/2024/10/29/us/politics/us-military-army-china.html).

In December 2024, for the first time, Ukrainian forces successfully carried out an attack on Russian positions using only ground and first-person view drones, further evolving how Ukraine is leveraging unmanned technology on the battlefield. According to Sergeant [Volodymyr Dehtiarov](https://kyivindependent.com/for-first-time-ukraine-attacks-russian-positions-using-solely-ground-fpv-drones/) of the Khartiia Brigade involved in this attack, dozens of robotic and unmanned systems, including machine-gun-equipped ground drones and kamikaze first-person view aerial drones, were deployed near Lyptsi, north of Kharkiv. While these were remote-controlled systems that still required a large human complement to operate them, this is the first step in the process of Ukraine gradually working to deploy more combat robots and eventually bring more autonomous systems to the battlefield. Ukraine also previously used a [ground robot](https://www.forbes.com/sites/davidaxe/2024/09/19/ukraines-gun-armed-ground-robot-just-cleared-a-russian-trench-in-kursk/) in an assault on a Russian trench in Kursk Oblast, in September 2024, with numerous other examples of such systems being rapidly built and fielded for combat. In many ways, Ukraine has no choice but to maximize its use of technology, as the [manpower disparity](https://www.forbes.com/sites/davidaxe/2024/12/21/ukraines-first-all-robot-assault-force-just-won-its-first-battle/) between Ukraine and Russia is still significant along the eight-hundred-mile front line of the war.

While technological developments have proceeded at a very rapid pace in this war, it also became clear that systematizing the combined research, development, testing, evaluation, and use of different systems by different units across the entire force was crucial. Therefore, in February 2024, Ukraine’s president Volodymyr Zelenskyy signed a [decree](https://newsukraine.rbc.ua/news/ukraine-to-establish-new-military-branch-1707240981.html) to establish the national Unmanned Systems Forces, with Colonel Vadym Sukharevskyi [appointed](https://www.ukrinform.net/rubric-defense/3873472-vadym-sukharevskyi-appointed-commander-of-ukraines-unmanned-systems-forces.html) as commander in June 2024. In December 2024, the Russian military followed up by [announcing](https://iz.ru/1798517/2024-11-28/putin-soobshchil-o-planakh-vydelit-bespilotniki-v-otdelnyi-vid-voisk) that it was establishing an unmanned systems branch to better integrate its forces’ use of autonomous and robotic technologies, and to make sure that lessons and tactics from combat in Ukraine can be absorbed and codified by different military branches.

Both countries also claim multiple AI developments for their respective militaries, in drones as well as in other **battlefield systems and tactical applications**. Three years into its war against Russian aggression, Ukraine has led the way in conceptualizing large-scale development and application of different unmanned systems and AI technologies across domains and different mission sets. In 2025, Ukraine is [expected](https://www.reuters.com/world/europe/ukraine-sees-use-uncrewed-ground-vehicles-ai-targeting-drones-surging-next-year-2024-12-02/) to field AI-enabled drone swarms and massive numbers of ground vehicles to counter Russian forces. As [one Ukrainian official put it](https://foreignpolicy.com/2024/07/17/ukraine-russia-war-ground-robots-combat/): “We count people, and we want our people to be as far from the front line as we can.”

Ukraine’s private sector has stepped up to **accelerate the development of autonomous and robotic technologies** for enhanced targeting capabilities, with companies like [TAF Drones](https://cepa.org/article/ukraines-drone-front/) leading the way, aided by the [Brave1](https://www.atlanticcouncil.org/blogs/ukrainealert/ukraines-innovative-drone-industry-helps-counter-putins-war-machine/) organization, a coordination platform established by Ukraine’s government playing an important role in helping the private sector. Ukraine’s plan is to ensure [AI-powered](https://united24media.com/latest-news/how-ukraine-is-using-ai-drones-to-outsmart-russia-on-the-battlefield-3833) combat drones can ensure the nation’s advantage over the Russian force on the battlefield. **The Russian military**[**claims**](https://www.cnas.org/publications/reports/the-role-of-ai-in-russias-confrontation-with-the-west)**the** **same** for its military AI research and application in this war.

For example, Russian Defense Minister Andrei Belousov [stated](https://www.reuters.com/business/aerospace-defense/russia-says-it-is-ramping-up-ai-powered-drone-deployments-ukraine-2024-10-11/) in October 2024 that AI-powered drones are playing a pivotal role on the battlefield in Ukraine, though he did not elaborate further. To better understand how different types of robotic and autonomous systems are used in Ukraine combat, the Russian Ministry of Defense launched the [Rubicon Center](https://tass.com/defense/1854991) in August 2024 to help systematize lessons from Ukraine, including the development and application of AI. This initiative is likely to be the epicenter for Russia’s formation of its planned unmanned systems branch. Russian president Vladimir Putin also announced that Russia is [increasing](https://www.reuters.com/world/europe/putin-says-drone-supplies-russian-army-increase-tenfold-2024-2024-09-19/) military drone production to approximately 1.4 million in 2024, aiming to stay abreast of Ukraine’s own [rapid](https://www.forbes.com/sites/davidaxe/2024/05/03/harried-by-100000-ukrainian-drones-a-month-russian-troops-learn-to-dodge-and-beg-for-shotguns/) and large-scale drone manufacturing.

Both Ukrainian and Russian forces [prioritize](https://warontherocks.com/2024/01/how-the-west-can-match-russia-in-drone-innovation/) minimizing drone operator involvement to protect trained assets in a complex combat environment. Ukraine’s survival-driven focus often outweighs ethical concerns tied to lethal autonomous weapon systems. Meanwhile, despite recent [announcements](https://newsukraine.rbc.ua/news/russia-is-trying-to-make-ai-powered-shaheds-1732478625.html) of AI-enabled combat drones already used against Ukraine, Russia’s military AI likely mainly supports data analysis and rapid decision-making. For example, In November 2024, the Russia-allied Donetsk People’s Republic claimed that its “Donbass Dome” airspace defense and electronic warfare system [evaluates](https://www.vesti.ru/article/4245423) different types of information from multitudes of sources to evaluate incoming threats, allegedly done with the help of artificial intelligence algorithms. The evaluated data is [transmitted](https://www.vesti.ru/article/4245423) to the military and law enforcement for follow-on actions.

Considering the Russian military’s attempt at making sense of the Ukrainian battlefield, such data analysis efforts are likely taking place across different systems, though public information on their overall effectiveness is relatively scarce. Similar efforts exist across the Russian defense sector, with a subsidiary of national industrial giant Rostec claiming in 2024 the development of a neural network for optical drone detectors, which [allegedly](https://tass.ru/ekonomika/21333145) allows for increasing their detection range by 40 percent.

On the other side of the war, Ukrainian officials are [on record](https://www.reuters.com/world/europe/ukraine-sees-use-uncrewed-ground-vehicles-ai-targeting-drones-surging-next-year-2024-12-02/) noting the need for tens of thousands of uncrewed robotic ground vehicles in 2025 for combat and logistics missions. These officials also [noted](https://www.reuters.com/world/europe/ukraine-sees-use-uncrewed-ground-vehicles-ai-targeting-drones-surging-next-year-2024-12-02/) that Ukrainian forces have been using dozens of domestically made AI-augmented systems to enable aerial drones to reach targets on the battlefield without being piloted and remain effective in areas protected by extensive jamming. At this point in the war, there are [around](https://www.reuters.com/world/europe/ukraine-sees-use-uncrewed-ground-vehicles-ai-targeting-drones-surging-next-year-2024-12-02/) ten Ukrainian companies competing in state procurements to offer AI products.

Ukrainian officials have stated that in 2025, more autonomous drones with AI targeting [will arrive](https://www.reuters.com/world/europe/ukraine-sees-use-uncrewed-ground-vehicles-ai-targeting-drones-surging-next-year-2024-12-02/) on the battlefield, potentially making way for “real drone swarm uses.” Ukraine’s efforts to use AI on the battlefield are aided by willing partners, such as the Germany-based Helsing AI firm. In December 2024, Helsing [announced](https://www.kyivpost.com/post/43262) that the first few hundred of almost four thousand of its AI-equipped HX-2 Karma unmanned aerial vehicles earmarked for Ukraine were set to be delivered to the Ukrainian front. Apparently, HX-2 is [immune](https://www.kyivpost.com/post/43262) to electronic warfare countermeasures via its ability to search for, reidentify, and engage targets without a signal or a continuous data connection, while allowing a human operator to stay in or on the loop for critical decisions.

Russian technical experts already [acknowledge](https://www.iksmedia.ru/articles/6028640-Patriarx-rossijskogo-kiberpanka.html) that “autonomous flying robots”—drones with artificial intelligence that determine their own targets—are already used in combat and apparently “kill” people, though they usually don’t provide technical specifications for such claims. It is likely that such developments indicate a more limited AI role in aerial drones, such as the terminal guidance and image recognition that allow drones to fly autonomously to designated targets once the human operator has approved strikes on said targets.

While on the receiving end of Ukraine’s increasing AI and autonomy use, many Russian experts express [concerns](https://www.iksmedia.ru/articles/6028640-Patriarx-rossijskogo-kiberpanka.html) that the pace of **AI-enabled military developments** could **get out of control**, thus requiring global regulation “in the interests of all humanity,” while also noting the **difficulty of banning the development of** **AI** for military purposes while the outcomes of wars hang in the balance and national interests are at stake. Still, Russian military experts, such as those writing in key military publications like Arsenal Otechestva, believe in AI’s potential in military applications. These experts highlight its ability to enhance system autonomy, improve tactical decision-making, enable real-time operational support in combat zones, reduce crew risks, and decrease uncertainty through rapid processing of large, unstructured data.

With Russia determined to fight until Ukraine is conquered, and Ukraine resolute in defending its freedom, **the technological arms race in this war continues to accelerate**. Each month in this protracted war brings new technological developments and achievements, with the innovation cycle continuously driven forward by new technologies that are either copied or countered by the adversary, sparking a fresh round of innovation to achieve the next breakthrough.

Ukraine’s Western supporters are closely monitoring how such technologies are developed and fielded in combat. Retired Army General [Mark Milley](https://www.axios.com/2024/07/11/military-robots-technology), former chairman of the Joint Chiefs of Staff, has predicted that within the next ten to fifteen years, up to one-third of the US military could consist of robotic systems, an assessment likely informed by observations of technologies fielded in the Ukraine war. To be sure, certain systems in use by both Ukrainian and Russian forces can function more effectively than others on a battlefield teeming with countermeasures, but the sum total of different autonomous, robotic, and unmanned technologies used in the past three years demonstrates the potential for rapid, large-scale fielding. Both Ukraine and Russia are continuously accelerating their development of different types of battlefield drones and robotic systems, driven by the need for precision, mass employment to overwhelm the adversary, resilience against countermeasures, and reducing risks to human lives. These advancements are impacting the battlefield at the tactical and operational levels and are shaping how future warfare may be conducted.

#### Only US-Russia war causes extinction.

Owen Cotton-Barratt 17, Research Associate at the Future of Humanity Institute; Lecturer in Mathematics at Oxford University; Ph.D. in Pure Mathematics from Oxford University, 2-3-2017, “Existential Risk,” Global Priorities Project, https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf, Accessed 9-26-2024, ARC

1.1.1 Nuclear war The bombings of Hiroshima and Nagasaki demonstrated the unprecedented destructive power of nuclear weapons. However, even in an all-out nuclear war between the United States and Russia, despite horrific casualties, neither country’s population is likely to be completely destroyed by the direct effects of the blast, fire, and radiation.8 The aftermath could be much worse: the burning of flammable materials could send **massive** amounts of **smoke** into the atmosphere, which would **absorb sunlight** and cause sustained **global cooling**, **severe ozone loss**, and **agricultural disruption** – a **nuclear winter**.

According to one model 9, an all-out exchange of 4,000 weapons 10 could lead to a drop in global temperatures of around 8°C, making it **impossible to grow food** for 4 to 5 years. This could leave some survivors in parts of Australia and New Zealand, but they would be in a very precarious situation and the threat of **extinction** from other sources would be great. An exchange on this scale is only possible between the US and Russia who have more than **90%** of the world’s nuclear weapons, with stockpiles of around 4,500 warheads each, although many are not operationally deployed.11 Some models suggest that even a small regional nuclear war involving 100 nuclear weapons would produce a nuclear winter serious enough to put two billion people at risk of starvation,12 though this estimate might be pessimistic.13 Wars on this scale are **unlikely to lead to outright human extinction**, but this does suggest that conflicts which are around an order of magnitude larger may be likely to threaten civilisation. It should be emphasised that there is very large uncertainty about the effects of a large nuclear war on global climate. This remains an area where increased academic research work, including more detailed climate modelling and a better understanding of how survivors might be able to cope and adapt, would have high returns.

# Rebuttal vs Strake SM

## AT: Aff

### AT: Scholarship

#### Recession now---tariffs, inflation, and consumer confidence---prefer, they have no uniquenss.

Daniel Orton 3-4, I am a digital-newsroom leader with over 10 years experience in video production, content strategy and journalism with a focus on producing videos on topics like politics, business and world news. My experience in a number of newsrooms and production environments has made me adaptable to changing demands and workloads, and I am a reliable team player, 3-4-2025, "'Trumpcession' talk surges as US economy could be rapidly shrinking", Newsweek, https://www.newsweek.com/donald-trump-tariffs-trumpcession-economy-shrinking-recession-2039377, Accessed 3-6-2025, ARC

Fears of a **potential recession** under President [Donald Trump](https://www.newsweek.com/topic/donald-trump), dubbed a "**Trumpcession**," are mounting as **consumer confidence** dips and economic concerns grow amid **steep tariffs** and **persistent inflation**.

Why It Matters

Trump promised to [bring down prices "on day one,"](https://www.newsweek.com/us-inflation-rate-january-federal-reserve-trump-2029916) so any economic downturn as a result of his policies could have major political ramifications for the president, as well as financial consequences for Americans.

**Job losses**, **stock market declines**, and **lower consumer confidence** could **hurt businesses** and increase federal deficits.

Historically, recessions have harmed incumbent presidents, as seen in 1992 and 2008. A recession could weaken global trade and reshape public perception of Trump's leadership, giving [Democrats](https://www.newsweek.com/topic/democrats) a shot at victory in the 2026 midterms and 2028 presidential race.

What to Know

On Monday, the Atlanta Federal Reserve's GDPNow model predicted that the U.S. economy would **shrink by 2.8 percent** in the first quarter of **2025**, **reinforcing fears** that the country may be on the brink of a recession.

"The economy appears to be **gagging on** the **uncertainty** created by the haphazard economic policymaking happening in D.C.," Mark Zandi, chief economist at Moody's Analytics, said on X, formerly [Twitter](https://www.newsweek.com/topic/twitter), on Sunday.

#### No impact to economic growth – laundry list of actors and warrants that solve back.

**Posen 16** Adam S. Posen, Government and Economics PhD from Harvard, economic advisor to the Congressional Budget Office, faculty of the World Economic Forum, consultant for the International Monetary Fund and the United States government. [Why We Need A Reality Check, Reality Check for the Global Economy, Peterson Institute for International Economics Briefing 16-3] // DSL

**Greater confidence** in the world economy’s **resilience** and near-term prospects is **justified**. Market fears about the ability of policy to stabilize growth and promote inflation, if understandable, are **exaggerated** or in some cases **unfounded**. All the more reason then not to allow ourselves to be distracted by a financial market tail wagging the macroeconomic dog. At a fundamental level, most of the major economies, starting with China and the United States, are growing **more sustainably now** than a decade ago, at their slower rates. That growth is **not built** on rising private or public leverage, with the notable exception of China—and even in China some restructuring is under way with ample savings to cushion the process. Even where the situation is not so rosy, many in the markets seem to be confusing strains and suboptimal situations with acute instability, not just for Italian banks and for Brazilian budgets but also for Latin America more generally or for trends in global trade. A **more normal muddling** through with **poor but stable** conditions is a **far better bet**. And where some in the **markets moving prices fear** that normal economic laws have been reversed—that monetary policy is ineffective or that low oil prices are on net harmful—they are **likely to be proven** clearly wrong, as they were previously on inflation and commodity prices. Having some clarity to distinguish between the more solid **underlying economic outlook** and the **shadows thrown by financial puppetry** is **critical** to making the right policy decisions to avoid an **unnecessary recession**. A combination of **public policies** and **decentralized private-sector responses** to the crisis have **increased our economic resilience**, **diminished** the **systemic spillovers** between economies, and even created some **room for additional stimulus** if needed. Large parts of the **global financial system** are better **capitalized**, **monitored**, and frankly **more risk averse** than they were a decade ago, with less leverage. The riskier parts of today’s global economy are less directly linked to the center’s growth and fi nancing than when the troubles were within the United States and most of Europe in 2008. Trade imbalances of many key economies are smaller, though growing, and thus accumulations of foreign debt vulnerabilities are also smaller than a decade ago. Most central banks are now so committed to stabilization that they are attacked for being too loose or supportive of markets, making them at least unlikely to repeat some policy errors from 2007–10 of delaying loosening or even excessive tightening. Finally, corporate and household balance sheets are far more solid in the US and some other major economies than they were a decade ago (though not universally), and even in China the perceptions of balance sheet weakness exceed the reality in scope and scale.

#### AND slow growth prevents war.

#### 2 --- Economic decline increases cooperation.

**Davis & Pelc 17** Christina L. Davis & Krzysztof J. Pelc 17, Christina L. Davis is a Professor of Politics and International Affairs at Princeton; Krzysztof J. Pelc is an Associate Professor of Political Science at McGill University, “Cooperation in Hard Times: Self-restraint of Trade Protection,” Journal of Conflict Resolution, 61(2): 398-429 // DSL

Conclusion Political economy theory would lead us to expect rising trade protection during hard times. Yet **empirical evidence** on this count has been mixed. Some studies find a correlation between poor macroeconomic conditions and protection, but the worst recession since the Great Depression has generated surprisingly moderate levels of protection. We explain this apparent contradiction. Our statistical findings show that under conditions of pervasive economic crisis at the international level, states exercise more **restraint** than they would when facing crisis alone. These results throw light on behavior not only during the crisis, but throughout the WTO period, from 1995 to the present. One concern may be that the restraint we observe during widespread crises is actually the result of a decrease in aggregate demand and that domestic pressure for import relief is lessened by the decline of world trade. By **controlling** for **product-level imports**, we show that the restraint on remedy use is not a byproduct of declining imports. We **also** take into account the ability of some countries to **manipulate their currency** and demonstrate that the relationship between crisis and trade protection **holds** independent of exchange rate policies. Government decisions to impose costs on their trade partners by taking advantage of their legal right to use flexibility measures are driven not only by the domestic situation but also by circumstances abroad. This can give rise to an individual **incentive for strategic self-restraint** toward trade partners in similar economic trouble. Under conditions of widespread crisis, government leaders **fear** the **repercussions** that their own use of trade protection may have on the behavior of trade partners at a time when they cannot afford the economic cost of a trade war. Institutions provide **monitoring** and a venue for **leader interaction** that **facilitates coordination** among states. Here the key function is to reinforce expectations that any move to protect industries will trigger similar moves in other countries. Such coordination often draws on shared historical analogies, such as the Smoot–Hawley lesson, which form a focal point to shape beliefs about appropriate state behavior. Much of the literature has focused on the more visible action of legal enforcement through dispute settlement, but this only captures part of the story. Our research suggests that tools of informal governance such as leader pledges, guidance from the Director General, trade policy reviews, and plenary meetings **play a real role** within the trade regime. In the absence of sufficiently stringent rules over flexibility measures, compliance alone is insufficient during a global economic crisis. These **circumstances** trigger **informal mechanisms** that complement legal rules to **support cooperation**. During widespread crisis, legal enforcement would be inadequate, and informal governance helps to bolster the system. Informal coordination is by nature difficult to observe, and we are unable to directly measure this process. Instead, we examine the variation in responses across crises of varying severity, within the context of the same formal setting of the WTO. Yet by focusing on discretionary tools of protection—trade remedies and tariff hikes within the bound rate—we can offer conclusions about how systemic crises shape country restraint independent of formal institutional constraints. Insofar as institutions are generating such restraint, we offer that it is by facilitating informal coordination, since all these instruments of trade protection fall within the letter of the law. Future research should explore trade policy at the micro level to identify which pathway is the most important for coordination. Research at a more macro-historical scope could compare how countries respond to crises under fundamentally different institutional contexts. In sum, the determinants of protection include economic downturns not only at home but also abroad. Rather than reinforcing pressure for protection, pervasive crisis in the global economy is shown to generate countervailing pressure for restraint in response to domestic crisis. In some cases, **hard times bring more, not less, international cooperation**.

#### 3 --- Decline generates austerity incentives that avert conflict.

**Clary ’15** (Christopher; 4/25/15; Ph.D. in political science from the Massachusetts Institute of Technology, M.A. in National Security Affairs, Postdoctoral fellow, Watson Institute for International Studies, Brown University; MIT Political Science Department Research Paper, “Economic Stress and International Cooperation: Evidence from International Rivalries,” <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2597712>) //AM^2 + 7L chingling

Do economic downturns generate pressure for diversionary conflict? Or might downturns encourage austerity and economizing behavior in foreign policy? This paper provides new evidence that economic stress is associated with conciliatory policies between strategic rivals. For states that view each other as military threats, the biggest step possible toward bilateral cooperation is to terminate the rivalry by taking political steps to manage the competition. **Drawing on data from 109 distinct rival dyads since 1950, 67 of which terminated, the evidence suggests rivalries were approximately twice as likely to terminate during economic downturns than they were during periods of economic normalcy.** This is true controlling for all of the main alternative explanations for peaceful relations between foes (democratic status, nuclear weapons possession, capability imbalance, common enemies, and international systemic changes), as well as many other possible confounding variables. This research questions existing theories claiming that economic downturns are associated with diversionary war, and instead argues that in certain circumstances peace may result from economic troubles. I define a rivalry as the perception by national elites of two states that the other state possesses conflicting interests and presents a military threat of sufficient severity that future military conflict is likely. Rivalry termination is the transition from a state of rivalry to one where conflicts of interest are not viewed as being so severe as to provoke interstate conflict and/or where a mutual recognition of the imbalance in military capabilities makes conflict-causing bargaining failures unlikely. In other words, rivalries terminate when the elites assess that the risks of military conflict between rivals has been reduced dramatically. This definition draws on a growing quantitative literature most closely associated with the research programs of William Thompson, J. Joseph Hewitt, and James P. Klein, Gary Goertz, and Paul F. Diehl.1 My definition conforms to that of William Thompson. In work with Karen Rasler, they define rivalries as situations in which “[b]oth actors view each other as a significant politicalmilitary threat and, therefore, an enemy.”2 In other work, Thompson writing with Michael Colaresi, explains further: The presumption is that decisionmakers explicitly identify who they think are their foreign enemies. They orient their military preparations and foreign policies toward meeting their threats. They assure their constituents that they will not let their adversaries take advantage. Usually, these activities are done in public. Hence, we should be able to follow the explicit cues in decisionmaker utterances and writings, as well as in the descriptive political histories written about the foreign policies of specific countries.3 Drawing from available records and histories, Thompson and David Dreyer have generated a universe of strategic rivalries from 1494 to 2010 that serves as the basis for this project’s empirical analysis.4 This project measures rivalry termination as occurring on the last year that Thompson and Dreyer record the existence of a rivalry. Economic crises lead to conciliatory behavior through five primary channels. (1) Economic crises lead to austerity pressures, which in turn incent leaders to search for ways to cut defense expenditures. (2) Economic crises also encourage strategic reassessment, so that leaders can argue to their peers and their publics that defense spending can be arrested without endangering the state. This can lead to threat deflation, where elites attempt to downplay the seriousness of the threat posed by a former rival. (3) If a state faces multiple threats, economic crises provoke elites to consider threat prioritization, a process that is postponed during periods of economic normalcy. (4) Economic crises increase the political and economic benefit from international economic cooperation. Leaders seek foreign aid, enhanced trade, and increased investment from abroad during periods of economic trouble. This search is made easier if tensions are reduced with historic rivals. (5) Finally, during crises, elites are more prone to select leaders who are perceived as capable of resolving economic difficulties, permitting the emergence of leaders who hold heterodox foreign policy views. **Collectively, these mechanisms make it much more likely that a leader will prefer conciliatory policies compared to during periods of economic normalcy**. This section reviews this causal logic in greater detail, while also providing historical examples that these mechanisms recur in practice. Economic Crisis Leads to Austerity Economic crises generate pressure for austerity. Government revenues are a function of national economic production, so that when production diminishes through recession, revenues available for expenditure also diminish. Planning almost invariably assumes growth rather than contraction, so the deviation in available revenues compared to the planned expenditure can be sizable. When growth slowdowns are prolonged, the cumulative departure from planning targets can grow even further, even if no single quarter meets the technical definition of recession. Pressures for austerity are felt most acutely in governments that face difficulty borrowing to finance deficit expenditures. This is especially the case when this borrowing relies on international sources of credit. Even for states that can borrow, however, intellectual attachment to balanced budgets as a means to restore confidence—a belief in what is sometimes called “expansionary austerity”—generates incentives to curtail expenditure. These incentives to cut occur precisely when populations are experiencing economic hardship, making reductions especially painful that target poverty alleviation, welfare programs, or economic subsidies. As a result, mass and elite constituents strongly resist such cuts. Welfare programs and other forms of public spending may be especially susceptible to a policy “ratchet effect,” where people are very reluctant to forego benefits once they have become accustomed to their availability.6 As Paul Pierson has argued, “The politics [of welfare state] retrenchment is typically treacherous, because it imposes tangible losses on concentrated groups of voters in return for diffuse and uncertain gains.”7

### AT: Solvency

#### GAI causes fake and misinformed research. Prefer, their spike is about checking cognitive bias, not misinformation.

PYMNTS 24 . PYMNTS is a recognized global leader for data, news and insights on innovation in payments and the platforms powering the connected economy, “AI-Generated Junk Science Research a Growing Problem, Experts Say | PYMNTS.com.” PYMNTS.com, 10 Sept. 2024, [www.pymnts.com/news/artificial-intelligence/2024/ai-generated-junk-science-research-growing-problem-experts-say/](http://www.pymnts.com/news/artificial-intelligence/2024/ai-generated-junk-science-research-growing-problem-experts-say/). Accessed 17 Feb. 2025. AP //ARC

**A surge of a**rtificial **i**ntelligence-**generated fake research papers is permeating academic search engines** like Google Scholar, potentially **eroding public trust in scientific findings and derailing product development** across industries that rely on cutting-edge research. A study from Harvard Kennedy School Misinformation Review uncovered an academic research trend, first reported by Newsweek. The researchers identified 139 papers suspected of being generated by AI tools, with more than half focused on topics including health, environmental issues and computing technology. “

**Large language models** (LLMs) **generate results based on** a probability **skewed** to the **data** on which the foundation model has been trained,” Sid Rao, CEO and co-founder of AI company Positron Networks, told PYMNTS. “This can result in biases in the text that have no relation to the scientific method used to conceive the paper, as **the** foundation **model is not required to follow a rigorous, fact-based process**.” “[T]he public release of ChatGPT in 2022, together with the way Google Scholar works, has increased the likelihood of lay people (e.g., media, politicians, patients, students) coming across questionable (or even entirely GPT-fabricated) papers and other problematic research findings,” wrote the paper’s authors.

**This** flood of fabricated studies **poses risks to companies investing in research and development**. It could **lead to misguided product launches and wasted resources. It** also **threatens to undermine public trust in science**and the reliability of evidence-based decision-making. Eroding Trust and R&D Risks The consequences of this trend could be far-reaching, affecting not just academic circles but also consumer trust in scientific claims. “Fake research is a cancer to consumer trust,” Andy Stapleton, an AI education YouTuber with over 250,000 subscribers, told PYMNTS. “Once people realize that the ‘science-backed’ label can be bought or fabricated, they’ll start treating real research like snake oil. It’s a one-way ticket to a world where facts are optional and trust in legitimate innovation takes a nosedive. Consumers will stop believing any company that claims to have science on their side.” Rao said AI hallucinations produce inaccurate results and subtly generate erroneous content. For example, a paper could present the correct conclusion but still have unreferenced or subjective supporting statements.

“Even at**a 1%** error or **hallucination rate**, these two problems would fundamentally **erode trust in scientific research”** Rao said. “We have already seen this behavior in psychiatric telemedicine chatbots that have accidentally told patients to harm themselves.” The implications for research and development investments are significant. “AI-generated papers are a huge liability,” Stapleton explained. “**If investors can’t tell what’s real and what’s algorithmic fluff, they’ll start pulling back. R&D** is already risky enough — adding a layer of uncertainty from questionable AI-driven publications makes it even worse. You’re not just losing credibility; you’re bleeding money because bad data leads to bad decisions.” Real-World Consequences The impact of fake papers on business regulations could also be severe. “Unreliable studies muddy the waters for regulators,” Stapleton said. “If the science behind a product is shaky, **lawmakers will** either **clamp down with over-regulat**ion to protect consumers **or** worse, they’ll **make bad policies based on false data**.

Either way, businesses get stuck in a mess of red tape and uncertainty. The bottom line? Bad studies lead to bad laws, which is **a death sentence for innovation**.” Rao warned that **regulators might** respond with overly broad restrictions, potentially **ban**ning **AI use in** medical **research** **altogether**, despite the technology’s applications in areas like forecasting and data analysis. “Worse yet, in critical environments such as medicine, healthcare, civil engineering or material sciences, faulty papers’ negative real-world and material consequences will potentially **shut[ing] down** legitimate avenues of **scientific research**,” he added.

#### Generative AI causes overreliance and impairs independent thinking.

**Zhai 24** [Chunpeng Zhai, Santoso Wibowo, and Lily D. Li (School of Engineering & Technology/Tertiary Education Division, CQUniversity, Rockhampton, Australia) 06/18/24 “The effects of over-reliance on AI dialogue systems on students' cognitive abilities: a systematic review” Smart Learning Environment 11, 28<https://slejournal.springeropen.com/articles/10.1186/s40561-024-00316-7> //doa: 02/12/25 ]//kl recut

Moreover, concerns regarding plagiarism, decreased creativity, data bias, security issues, and potential discrimination have also emerged. Kim et al. ([2023](https://slejournal.springeropen.com/articles/10.1186/s40561-024-00316-7#ref-CR58)) investigated the challenges English as a Foreign Language (EFL) learners face when employing AI dialogue systems for text paraphrasing. The study involved 15 individuals who are non-native English speakers. It reveals that the main difficulty arises from the lack of comprehensive explanations accompanying AI-generated paraphrases. This deficiency makes it challenging for learners to grasp the context and verify the accuracy of the reformulated content. Furthermore, the study highlights the issue of data bias: when explanations are overly simplified, it may result in an increased reliance on AI. Consequently, this undermines learners’ ability to analyze and grasp the information independently, impairing their decision-making skills.

Semrl et al. ([2023](https://slejournal.springeropen.com/articles/10.1186/s40561-024-00316-7#ref-CR98)) examined the feasibility of dialogue systems in addressing scientific questions and assisting academic writing. The findings show that AI dialogue systems are a promising tool for assisting in the writing of scientific papers. However, their lack of originality, the tendency for excessive text, and the use of nuanced and vaguer language could suggest that a paper is produced by AI rather than a human author. Additional challenges identified in the study include limited creativity, data bias issues, AI hallucinations (inaccurate or misleading information generated by the AI), and concerns regarding transparency in the AI’s decision-making processes.

Overreliance on AI dialogue systems can significantly impact decision making, critical and analytical thinking abilities by fostering dependency and potentially diminishing individual judgment skills. When individuals rely heavily on AI for problem-solving or decision-making, they may become less inclined to engage in independent, critical information analysis, decreasing their ability to judge between AI-generated and human-generated insights.

#### 3. Models are expensive - it’s unfeasible for educational institutions.

**Ali et al 24** Omar Ali, College of Business and Entrepreneurship, Abdullah Al Salem University. Peter A. Murray, University of Southern Queensland. Mujtaba Momin, College of Business Administration, American University of the Middle East. Yogesh K. Dwivedi, Digital Futures for Sustainable Business & Society Research Group, School of Management, Swansea University & Symbiosis International (Deemed University). Tegwen Malik, School of Management, Swansea University. Meta-analysis of 185+ published literature papers evaluating the key influences and implications of using AI models in the education sector. February 2024, "The effects of artificial intelligence applications in educational settings: Challenges and strategies", Science Direct,<https://www.sciencedirect.com/science/article/pii/S0040162523007618> DOA: 2/12/25 SLK recut

4.2. Operational challenges 4.2.1. Cost of training methods The adoption of large language and generative technologies **may create infrastructure and economic burdens for educational institutions particularly those with restricted financial resources** (Kasneci et al., 2023). Moreover, the **application model necessitates momentous computational resources and specialized expertise which may not be feasible for these institutions**. Particular issues can be categorized as follows:

(1) Computational resources: Coaching issues will consume significant computational infrastructure i.e., processing power, speed, memory, storage, security **which may be a significant drawback for low-budget and unfunded/under-funded educational institutions** (Okonkwo and Ade-Ibijola, 2021). This reality brings to the forefront problems of universal AI adoption.

(2) Expertise: Developing the AI model requires expertise in NLP, machine learning, and data science, meaning finding expert intelligence is expensive (Hu, 2021).

(3) Training data: As discussed earlier, the input training data is fundamental to the functioning of ChatGPT which if derived from quality sources can be expensive to acquire and maintain. **Investments will be required in data collection, annotation, and curation as well as in the development of tools and processes for managing training data** (Bogina et al., 2022).

#### The increasing cost of parsing data makes GAI unsustainable even with increases in efficiency.

Jim **Mcgregor**, 5-12-20**23**, Jim is a principal analyst and partner at TIRIAS Research, a high-tech research and advisory firm consisting of experienced analysts. Jim has over 30 years of technical and business experience with leading high-tech companies including Intel, Motorola, ON Semiconductor, STMicroelectronics, and General Dynamics Space Systems. Jim focuses on the market inflection points where new technology, usage models and business models collide to drive innovation and growth "Generative AI Breaks The Data Center: Data Center Infrastructure And Operating Costs Projected To Increase To Over $76 Billion By 2028", Forbes, https://www.forbes.com/sites/tiriasresearch/2023/05/12/generative-ai-breaks-the-data-center-data-center-infrastructure-and-operating-costs-projected-to-increase-to-over-76-billion-by-2028/

Tirias Research forecasts that on the current course, **generative AI data center server infrastructure plus operating costs will exceed $76 billion by 2028**, with growth challenging the business models and profitability of **emergent services** such as search, content creation, and business automation incorporating GenAI. **For perspective, this cost is more than twice the estimated annual operating cost of Amazon’s cloud service AWS, which today holds one third of the cloud infrastructure services market according to Tirias Research estimates**. This forecast incorporates an aggressive 4X improvement in hardware compute performance, but this gain is overrun by a 50X increase in processing workloads, **even with a rapid rate of innovation around inference algorithms and their efficiency**. Neural Networks (NNs) designed to run at scale will be even more highly optimized and will continue to improve over time, which will increase each server’s capacity. However, **this i**mprovement is countered **by increasing usage, more demanding use cases, and more sophisticated models with orders of magnitude more parameters.** The cost and scale of GenAI will demand innovation in optimizing NNs and is likely to push the computational load out from data centers to client devices like PCs and smartphones..

#### GAI steals copyrighted data, causing litigation.

**Dzuong et al 24** Jocelyn Dzuong, a master's student in the Knight Foundation School of Computing and Information Sciences at Florida International University, Zichong Wang, a third-year Ph.D. candidate in the Department of Computer Science at Florida International University, Wenbin Zhang, an Assistant Professor in the Knight Foundation School of Computing & Information Sciences at Florida International University, 3-31-2024, "Uncertain Boundaries: Multidisciplinary Approaches to Copyright Issues in Generative AI", arXiv.org,<https://arxiv.org/abs/2404.08221>

In the rapidly evolving landscape of generative artificial intelligence (AI), the in**creasingly pertinent issue of copyright infringement arises as AI advances to generate content from scraped copyrighted data,** prompting questions about ownership and protection that impact professionals across various careers. With this in mind, this survey provides an extensive examination of copyright infringement as it pertains to generative AI, aiming to stay abreast of the latest developments and open problems. Specifically, it will first outline methods of detecting copyright infringement in mediums such as text, image, and video. Next, it will delve an exploration of existing techniques aimed at safeguarding copyrighted works from generative models. Furthermore, this survey will discuss resources and tools for users to evaluate copyright violations. Finally, insights into ongoing regulations and proposals for AI will be explored and compared. Through combining these disciplines, the implications of AI-driven content and copyright are thoroughly illustrated and brought into question. In the swiftly progressing realm of generative artificial intelligence (AI), the pressing concern of copyright infringement emerges prominently. As AI technologies continue to autonomously generate content from copyrighted data, inquiries about ownership and safeguarding rights surface, reverberating across diverse professional domains. This escalating trend raises critical discussions surrounding ethical, legal, and socio-economic implications, necessitating nuanced exploration and strategic interventions to navigate this Figure 1: Actual screenshot from Dune (2021) versus its Midjourney-generated counterpart evolving landscape effectively. For instance, in July 2023 a group of novelists collectively sued OpenAI for alleged usage of their books to train their models and output similar content to the novelists’ prose [117]. Moreover, in December 2023 **The New York Times filed a lawsuit against OpenAI and Microsoft, alleging copyright infringement by having** its articles scraped without permission to train their generative models [118]. More recently, Marcus and Southen revealed how generative models such as Midjourney and OpenAI’s Chat GPT-4 produced outputs strongly reminiscent of scenes from copyrighted films and shows [82, 124]. As a concrete example, Figure 1 illustrates how a prompt from Southen resulted in an output resembling a shot from the trailer of Dune (2021). Notably, Midjourney’s terms of service [87] highlight that users assume liability when requesting the model to generate content featuring copyrighted trademarks. This delegation of responsibility not only places the burden of infringement on users, but also diverts accountability from Midjourney’s developers, who have openly admitted to using copyrighted trademarks without authorization [103]. In light of these developments, this survey aims to delve into the complex interplay between generative AI and protecting intellectual property (IP). Through synthesizing existing methods and legal analyses, we provide a comprehensive overview of the current landscape surrounding copyright in generative AI. To the best of our knowledge, this work presents the first thorough study on robust and applicable solutions to copyright issues in generative AI, which also combines contextual legal analysis for future consideration. The challenges and opportunities inherent in this burgeoning field offer insights that can inform policymakers, practitioners, and researchers alike when developing generative AI. Our main contributions are: i) A detailed examination of the most advanced methods for detecting AI-generated copyright violations across various mediums such as text, image, and video, establishing itself as an invaluable resource for both researchers and practitioners in the field. ii) Innovative strategies designed to safeguard copyrights within the AI sphere, highlighting cutting-edge techniques like watermarking, fingerprinting, and machine unlearning, contributing to the protection of IP. iii) A comprehensive array of tools and resources for assessing copyright violations, including extensive datasets, search engine capabilities, and metrics quantifying infringement. iv) An in-depth analysis of the regulatory framework surrounding generative AI, navigating through current international copyright laws and proposing solutions to tackle the emerging challenges in generative AI.

#### Even a perceived risk of litigation kills innovation.

Abby **Rives 22**. IP counsel at Engine, a D.C.-based policy, advocacy and research organization supporting startups. "Copyright Law & Startup Innovation: Policies That Matter and Where They May be Headed". Medium.https://engineadvocacyfoundation.medium.com/copyright-law-startup-innovation-policies-that-matter-and-where-they-may-be-headed-dea034904e25. accessed 7-4-2024 //nm

Startups need **balanced, certain copyright** frameworks. Well-tailored laws that focus on enforcement of legitimate rights can support innovation. But it is too easy for those frameworks to get **out of whack** and **become imbalanced**, which we’ve seen time and again. For example, right now the law allows bogus infringement allegations to dictate that non-infringing content is (routinely) removed from the Internet. **Uncertainty** over what copyright law permits, coupled with **high** **litigation** **costs**, **slows startups** down and has even forced some out of business. **And the risk of a startup being sued for something a user does — and something the startup knows nothing about — alone can scare away investors.**

But what does balanced, **innovation-friendly** copyright policy look like? And how does this play out in today’s policy debates? Here are just a few examples:

Fair use and interoperability: Some big companies would like to **expand** **the universe** of what software is protected by copyright and which development activities constitute infringement. If that happened, it would prevent startups from using **fundamental software development** **tools**, expose them to new **litigation risks**, and make it harder to launch and compete. But after a decade of litigation, the Supreme Court recently confirmed that developers can use software interfaces — known as application programming interfaces (APIs) — without infringing copyright. The Court held that **reimplementing APIs**, which creates **interoperability and compatibility** between computer programs, is a **fair use** under copyright law.

Intermediary liability and the ability to host user-generated content: Scores of startups engage with user content — helping artists connect with fans, providing e-commerce platforms, hosting podcasts, or offering **basic Internet infrastructure**. These companies, and the creators and small businesses that depend on the Internet, interact with the copyright system every day. And they **rely on balanced laws** that allow the startups to **resolve allegations of infringement** without scrutinizing every post, upload, and comment for **potential copyright violations**. Some countries have started to replace those laws, instead moving to complex and expensive regimes that would force Internet companies to purchase **expensive** and imperfect upload filters, **remove** **more non-infringing** **content**, and **negotiate licenses** with big organizations that own a lot of copyrights. That is all do-able for big Internet platforms, but it will put startups at a substantial disadvantage. Yet similar ideas are being floated in the U.S. — where policymakers have proposed **changes to copyright law** (and trademark law).

Ancillary copyright and link taxes: Countries around the world have adopted or considered new copyright-like laws that would require websites to pay **licensing fees** or **face lawsuits** whenever they — or their users — link to a news article or quote the headline. These proposals, positioned as a solution to problems facing local media, have so far failed to deliver those benefits, but they carry substantial **unintended consequences**. Linking to news articles is something many startups and innovators — from media to edtech — rely on. But engaging with information and current events, **which** is central to public discourse and free speech, requires being able to link to and quote the news. Using copyright-like law to **restrict** that engagement would **hinder innovation** and the creation and **exchange of ideas online.**

Intersection of copyright and artificial intelligence: Startups and other companies developing AI technology have to input a lot of data into their systems, **ingesting content to train**, tune, and test new AI. As countries around the world review how intellectual property law applies to emerging AI, some are asking how copyright law should account for this ingesting of information, data, and content. But redefining copyright infringement to cover these uses of content to train AI could substantially **hamper innovation.**