# PERA Negative

## File Explanation

This file contains negative answers to the PERA affirmative.

#### Competitiveness Advantage Answers

The best negative argument is that the United States is winning the technology race with China. Successful negative arguments will hinge on the explanation of the Lewis evidence. Other good arguments are that there really isn’t any uncertainty in the status quo: courts and patent examiners are interpreting the *Alice-Mayo* framework consistently, and patent applications are increasingly being granted.

Not every 1ac will have time to read a democracy impact. The “1NC Competitiveness Advantage Answers” includes a democracy answer at the end and is marked with an asterisk. Only read that evidence if the 1ac read a democracy impact. Otherwise, skip the evidence.

#### Innovation Advantage Answers

There are several important arguments in these answers. First, the argument that ‘innovation is high’ is likely true, and a negative team that can cast doubt on the affirmative’s claims about low rates of innovation will go a long way towards discrediting the advantage. Second, there is a ‘patent trolls’ turn, which argues that returning to the pre-*Alice-Mayo* framework is bad because it increases the power of patent trolls to tax innovation. ‘Patent trolls’ is a pejorative term for “non-practicing entities” (NPEs) or “patent assertion entities” (PAEs), and it refers to companies that don’t innovate themselves, but instead buy patents for the purpose of suing people for infringement. Third, the negative can argue that increasing patent eligibility creates “patent thickets.” This refers to the phenomena where a particular type of technology might have dozens or hundreds of patents associated with it, so to work on innovating in that area requires buying countless patent licenses and acts as a disincentive to innovation.

#### Pathogen Patents Disadvantage

This disadvantage argues that the plan makes genetic information eligible for patents, and that gene patents make it more difficult to research cures for diseases. The *Myriad* decision, one of the four cases in the *Alice-Mayo* framework, expressly banned patents on genes. PERA would result in overturning *Myriad*, and therefore allow genetic patents on modified genes.

The **uniqueness** for this advantage argues that the status quo has banned gene patenting with the *Myriad* decision, and that means companies can’t patent the genetic information in microorganisms, such as bacteria or viruses. The result is that there is international research cooperation over pathogen genetic information, and that makes it easier and quicker to develop cures for new diseases.

The **link** argues that overturning *Myriad* would cause companies to try to patent genetic material for pathogens such as COVID-19, because it would give them an exclusive monopoly over developing a cure. This hinders international cooperation. One of the authors, Contreras, says that part of the reason a vaccine for COVID was developed with unprecedented speed was because there was widespread international research cooperation, and no one tried to patent the genetic material for the virus.

The **impact** argues that genetic patenting slows the discovery of a cure, and in a new pandemic, the speed of response is important to mitigating the death toll from a disease. The impact evidence argues that pandemics are inevitable, either from natural sources or from genetic engineering from bad actors. COVID, despite killing millions of people, had a relatively low lethality rate. A new pandemic that had a much larger lethality rate could have a catastrophic impact on the world population if there was limited international cooperation due to gene patenting.

#### Prizes Counterplan

The prizes counterplan argues that instead of granting patent rights, the government should create an innovation prize system to reward inventors with a cash prize but deny the exclusive monopoly power of a patent to a prize winner.

The counterplan would give an inventor a cash prize up front based on the expected value of the innovation, and then adjust the prize annually based on the economic value of the invention (measured by sales data or other metrics of how the invention was used). The primary argument in favor of prizes is that the monopoly power of the patent is socially harmful, because it makes subsequent innovation more expensive by bestowing monopoly pricing on the inventor. A prize system lowers consumer prices because the government will allow anyone to innovate using the invention without being charged licensing fees that a patent would require.

The **net benefits** to the counterplan are any argument why patents are bad: the inflation DA, the AI DA, the pathogen patents DA, and the patent trolls and patent thickets case turns.

# Case

## Competitiveness Advantage Answers

### 1NC Competitiveness Advantage Answers

#### 1. The US is winning now – China is falling behind, the US has many other metrics stronger than China than emerging tech

James Andrew Lewis, 2024 - Senior Vice President; Pritzker Chair; and Director, Strategic Technologies Program at the Center for Strategic and International Studies “America is Losing the Shoe Race With China” 4/1, <https://www.csis.org/blogs/working-papers/america-losing-shoe-race-china> //DH

A better question might be who cares. The number of shoes is not a good indicator of national power. In fact, no single technology is a good indicator of national power. The U.S. economy is vast, decentralized, continental in size, and is guided by actively competitive markets. It has been exceptionally innovative for decades. Leading in a single technology (like railroads in the 19th century or semiconductors today) reflects a common analytical error that misjudges how economies and technology actually create national power. The concept of a “race” itself is a questionable legacy of Cold War thinking – the Cold War had a finish line (identified by Eisenhower and Dulles at the onset), while the current situation does not.

Stories about the United States falling behind are so predictable that they form a literary genre. In 1957, the President’s Science Advisor predicted that Soviet performance in math and science education would give it global leadership in a decade. In 1969, the Departments of Treasury, Commerce and Agriculture warned President Nixon that a powerful new economic entity, the European Union, would displace the United States. Starting the 1980s, assorted pundits announced that Japan would dominate the global economy. And until recently, there were routine predictions that China would displace the United States, predictions that still make regular appearances.

These predictions have two things in common. First, they were wrong. Second, they were wrong because they counted the wrong things. They did not place their analyses in the context of larger national economies. Instead, they relied on picking illustrative metrics, usually proxy indicators that provide an indirect measurement of technological success. One recurring problem is the tendency to measure inputs rather than outcomes. A politician may have great staff and spend more on an election, but the ultimate metric is how many votes are received. Claims that the Unites States is falling behind China in 5G because China has deployed more base stations or has more 5G enabled phones reflects a similar confusion over metrics. It is not the number of base stations that is important, it is the ability to use 5G to create new goods and services (or be more efficient in the use of existing goods and services) that is important, and this is best measured by the monetization of new 5G enabled services and products and their revenue.

A report that announces that China leads in 37 technologies out of 44 technologies does not explain why the United States is the center for development of artificial intelligence, quantum technology, and biotechnology. China did not develop successful COVID vaccines, lags in quantum, and there are anecdotes that China’s leaders asked the author of a best-selling 2018 book on China’s coming dominance of artificial intelligence why, if that was the case, were GPT technologies developed first in the United States? Of the 37 technologies listed, China’s alleged lead is open to question in 23. Does China really lead in cybersecurity, as the Report asserts? The digital economy depends on cloud computing, next generation networks (like 5G and 6G), and software (like AI products) and these are technologies where the United States has a strong if not dominant position.

#### 2. No impact to tech leadership – other factors determine military power

James Andrew Lewis, 2024 - Senior Vice President; Pritzker Chair; and Director, Strategic Technologies Program at the Center for Strategic and International Studies “America is Losing the Shoe Race With China” 4/1, <https://www.csis.org/blogs/working-papers/america-losing-shoe-race-china> //DH

Nor does technological “leadership” guarantee military advantage. Other factors determine military success, the most important being political will, leadership, and strategy. An opponent that has an advantage in these areas will be able to resist and thwart a more technologically advanced opponent (the Taliban, for example). Advanced technology in the service of flawed strategy will not change outcomes. There is an assumption that technology provides an advantage and, in a contest, where other factors are equal, technological leadership can be critical, but in most situations this technological advantage is only one factor among many in determining effectiveness. Specific quantitative measures may not actually measure what we want to assess. It may be better to ask what nations want (wealth, international influence, military power) to determine the contribution of a basket of technologies.

#### 3. No uncertainty - The *Alice* framework is consistently interpreted by the courts and USPTO

Nikola L. Datzov, 23 – Assistant Professor of Law, University of North Dakota School of Law. “THE ROLE OF PATENT (IN)ELIGIBILITY IN PROMOTING ARTIFICIAL INTELLIGENCE INNOVATION” 92 UMKC L. Rev. 1 \*, Nexis Uni, accessed via University of Michigan //DH

As the Supreme Court is the only court that can overturn its precedent, absent intervention from Congress, the Alice framework will continue to govern the analysis of whether an invention is patent eligible. However, lower courts led by the Federal Circuit have and will continue to refine the boundaries and application of the Alice framework. The USPTO also has taken steps to provide clarity in this area of law by promulgating iterative guidance to those seeking a patent, including example AI claims that are patent eligible.84 Importantly, such guidance while helpful to practitioners and examiners comes with an important disclaimer, as it is not "the law of patent eligibility, does not carry the force of law, and is not binding on" the courts.85

Despite the criticisms, and the need for further clarity regarding the application of the Alice framework, some evidence suggests that the law is much more predictably applied now86 (and perhaps always has been),87 including with regard to AI patents.

Indeed, a co-author and I's empirical examination of all post-Mayo Federal Circuit decisions on § 101 found that the lower tribunal correctly decided the eligibility issue nearly 90% of the time.88 Additionally, perhaps somewhat surprisingly, the affirmance rate on § 101 decisions has remained incredibly [\*14] consistent since 2014 never falling below 81%.89 Moreover, looking more closely to determine whether lower tribunals were reaching the correct outcome but still misapplying the law, the Federal Circuit noted an error in the lower court's analysis in a very small percentage of decisions in which the overall result was correctly decided.90 Thus, it appears that the district courts and USPTO are not only reaching the correct outcomes in nearly all cases, they are also applying the law correctly.

#### 4. Uncertainty turn - *Alice* created a balanced patent process. Overturning it increases uncertainty and litigation costs

David Jones, 2024 – executive director of the High Tech Inventors Alliance. Questions for the Record from Senator Alex Padilla , Hearing on “The Patent Eligibility Restoration Act – Restoring Clarity, Certainty, and Predictability to the U.S. Patent System” 1/24, <https://www.judiciary.senate.gov/imo/media/doc/2024-01-23_-_qfr_responses_-_jones.pdf>

**Italics in original**

6. How did Alice/Mayo impact patent litigation and how would PERA impact patent litigation?

The U.S. Supreme Court’s decision in Alice Corp. v. CLS Bank Int’l, 573 U.S. 208 (2014), has had a tremendously beneficial effect on patent litigation in the United States. During the decade and a half before Alice, virtually any type of subject matter was patentable under the Federal Circuit’s misguided decision in State Street Bank & Trust Co. v. Signature Financial Grp., Inc., 149 F.3d 1368 (Fed. Cir. 1998). Alice overruled State Street and returned the patent system to its roots. Under Alice, patents once again can only be obtained for improvements to technology.

Thus under Alice, patents can no longer be obtained or enforced for business methods and other human activities that have traditionally been outside the patent system. Alice has been robustly applied over the last decade to block patents for ideas such as running a type of business; for advertising and sales strategies; for investment schemes, ways of structuring a transaction, or financial instruments; and for copyrighted media content, games, and other forms of entertainment.

Alice has also restored the long-standing requirement, first articulated by the U.S. Supreme Court in Corning v. Burden, 56 U.S. 252 (1853), and O’Reilly v. Morse, 56 U.S. 62 (1853), that a patent must claim an actual *means* or *method* for achieving a result. Under this well-settled rule, it is improper for a patent to simply claim the *result* or *objective* itself, and thereby claim all possible means of achieving that objective (including those invented by others in the future). This rule prohibits, for example, software patents that end with a claim to “a module that solves for X”—and that can then be asserted against anyone who does the real work of figuring out the solution to problem X.

PERA would destroy all the progress made since the Alice decision. Under PERA, any type of subject matter—business methods, advertising techniques, legal contracts, games and entertainment, or claims to mere objectives or results—could be claimed in a patent so long as the invention cannot be “practically performed” without the use of a “machine or manufacture.”

As witnesses testifying in support of PERA made clear at the January 23 Senate IP Subcommittee hearing, the “practically performed” test would mean that any process that requires communicating across long distances in “real time,” or that requires storage and retrieval of large amounts of data—and thus practically requires the use of computers and electronic communications equipment—would become patent eligible. Under PERA, a patent would no longer need to describe and claim an *improvement* to technology. Rather, to be eligible, the patent need only *use* technology—including off-the-shelf technology that was developed by others.

PERA would also effectively overrule hundreds of decisions of the U.S. Court of Appeals for the Federal Circuit that have issued over the last ten years. It is difficult to fathom just how destabilizing PERA would be for the U.S. patent system and for the American manufacturing and technology sectors. The result would be enormous uncertainty for a broad spectrum of U.S. industries and billions of dollars in additional (and unnecessary) litigation costs, most of which would be passed along to American consumers in the form of higher prices.

#### 5. Plan can’t solve - Chinese IP theft prevents winning the tech race

Derek Scissors, 23 - Senior fellow, American Enterprise Institute “Oversight of US Investment Into China” Written statement for The House Select Committee on the Chinese Communist Party On Ensuring U.S. Leadership in the Critical and Emerging Technologies of the 21st Century, 7/26, <https://selectcommitteeontheccp.house.gov/sites/evo-subsites/selectcommitteeontheccp.house.gov/files/evo-media-document/scc-expert-written-testimony_20230726_derek-scissors.pdf> //DH

While we claim to be competing, there are two giant holes through which America helps China develop technologies that are potentially vital to winning the competition. The first is our failure to respond to theft of intellectual property (IP). Even if claims of trillions in IP losses are exaggerated, the amount is certainly in the hundreds of billions. American retaliation against PRC beneficiaries of coerced or stolen IP is nearly non-existent, guaranteeing more theft.13

Outbound investment is the second. The US attempts to protect technology embedded in goods sales through the export control regime, though the regime has its own problems. For inbound investment, the Committee on Foreign Investment in the United Sates (CFIUS) has a solid track record in preventing loss of sensitive technology through acquisition here. Yet the same technologies that are controlled in exports or shielded off from acquisition can be developed in China, with American funding.

Consider a Chinese entity bidding for an American company developing a useful technology. It is likely be rebuffed by CFIUS. Then it tries to buy the company’s products to reverse-engineer. There’s at least a chance this is prevented by export controls. Yet the Chinese entity, often backed by Chinese government guarantees which make investment much more appealing, can freely solicit American money to develop the technology in the PRC. There’s no barrier to this at all – CFIUS has no jurisdiction and export controls (contrary to some claims) do not apply. And it’s actually the worst outcome, since we are helping China become more self-sufficient.

#### **\*6. Democracy’s resilient – backsliding is limited**

Steven Levitsky and Lucan A. Way, 2023 – \*professor of government at Harvard University and \*\*professor of political science at the University of Toronto “Democracy’s Surprising Resilience” Journal of Democracy, October, https://muse.jhu.edu/pub/1/article/907684/pdf //DH

Democracy has proven surprisingly resilient in the twenty-first century. The extraordinary global democratic expansion of the late twentieth century has ended, and several prominent democracies, including those in Hungary, India, the Philippines, Thailand, Turkey, and Venezuela, have experienced backsliding or breakdown. But the vast majority of “third wave” democracies—regimes that became democracies between 1975 and 2000—endure.1 Despite an increasingly unfavorable international environment, fears of a “reverse wave” or a global “authoritarian resurgence” have yet to be borne out. And the last quarter-century remains by far the most democratic in history.

### Extend: “US Winning Now”

#### Patents are a bad metric for tech leadership – other factors matter more

James Andrew Lewis, 2024 - Senior Vice President; Pritzker Chair; and Director, Strategic Technologies Program at the Center for Strategic and International Studies “America is Losing the Shoe Race With China” 4/1, <https://www.csis.org/blogs/working-papers/america-losing-shoe-race-china> //DH

There is no easy way to directly measure innovation, so there can be a tendency to use proxies like number patent issued, amount spent on R&D, number of PhDs and publications. It seems reasonable to assume that more R&D spending, more publications, and more patents correlate with more innovation and one of their attractions is that they are easier to count, but by themselves they do not explain strength in technological innovation. Until the last few years, the United States lagged in investment in basic research (the foundation of innovation) and in the infrastructure to support innovation. Yet it has over eighty years outperformed other economies when the measures are the creation of valuable new technologies and national income. The strength of the U.S. “innovation machine” lies somewhere else.

The discussion of technology and innovation relies on indirect proxy measurements, like the number of patents. Patents are a metric that must be used carefully. The assertion that “when a measure becomes a target, it ceases to be a good measure” is particularly true for China’s centrally directed economy, where people perform to meet measures set by Beijing, leading to situation where researchers are rewarded for the number of patents issued (or number of publications) even if no one uses those patents.

Many quantitative measures may not actually measure technological leadership as it relates to national power. Specific metrics such as the percentage of national income spent on R&D or the number of patents issued, are inadequate by themselves to predict technological leadership. It is the ability to use technology for commercial and military purposes that is essential. Looking at the U.S. economy, it is investment in R&D, access to skilled labor, supportive business and intellectual property laws, a dynamic financial system, and an entrepreneurial business culture that explains its overall strength compared to other economies.

#### Chinese innovation is declining

James Andrew Lewis, 2024 - Senior Vice President; Pritzker Chair; and Director, Strategic Technologies Program at the Center for Strategic and International Studies “America is Losing the Shoe Race With China” 4/1, <https://www.csis.org/blogs/working-papers/america-losing-shoe-race-china> //DH

China is good at manufacturing what others have invented but no longer so good at innovation itself. This is the result of political change. China was becoming a leading innovator when it was politically open, before 2012. It still has advantages, but now that it is becoming politically closed, idea creation has slowed, entrepreneurs, investors and researchers are leaving, foreign investment is in decline (because of a perception of increased political risk), and geopolitics frays connections to global research and tech. Under different political leadership, China would be a much more formidable competitor, but China made a political decision that values continued party control over innovation and its ability to innovate is at risk.

Similarly, the EU spends significantly on R&D and has excellent research facilities, but its regulations are a powerful disincentive to entrepreneurship and commercialization. Europe’s major economies have shown flat income growth for more than a decade. It is not positioning itself to compete in a digital economy, since this requires a willingness to accept risk and allow entrepreneurship. Europe values privacy over innovation.

### Extend: “No Impact to Tech Leadership”

#### Technology doesn’t drive military power, strategy does. Tech advantages are offset by countermeasures

Adam Wunische, 2019 – Ph.D. candidate at Boston College and a U.S. Army veteran of Afghanistan. Previously he was a consulting analyst for the International Institute for Strategic Studies “Nothing New: Why the 'Revolution' in Military Affairs Is the Same as the Old One” National Interest, 9/2, <https://nationalinterest.org/feature/nothing-new-why-revolution-military-affairs-same-old-one-77266> //DH

Technological-deterministic arguments that view technology as the sole driver of the conduct of war and its outcomes grossly oversimplifies one of the most complex endeavors humans can engage in. Scholars of military revolutions have said that, “the mastery seemingly demonstrated in the Gulf revived the very worst feature of U.S. defense culture: the recurring delusion that war can be understood and controlled in the mechanized top-down fashion of Robert Strange McNamara and his entourage in the 1960s.” Essentially, war is more complex than the tools used to fight it, and the conduct and outcome depend on myriad factors.

With Measures, Come Counter-Measures

The early promise of new technology is frequently inflated, and this isn’t a new phenomenon. When new tools with new capabilities are developed, new counter-measures are created shortly after to undermine their effectiveness. Tank development was paralleled by anti-tank advances and tactics designed to exploit the tank’s weaknesses. This type of standard innovation is constantly occurring within militaries, and thus, does not constitute anything new or revolutionary. With aircraft came radar and anti-aircraft guns. With submarines came depth charges. With poisonous gas came gas masks. With the prospect of drone swarms in future warfare comes the U.S. Air Force’s development of the THOR system, among others, designed to destroy drone swarms. It’s unreasonable to think that technology will develop new tools that increase the pace and lethality of the battlefield and to simultaneously think that counter-measures to those new tools won’t also be developed.

Social and financial factors also drive war outcomes, regardless of technological disparities. Cathal J. Nolan showed that wars are not, contrary to popular narratives, won by spectacular victories in decisive battles. Rather, great power wars are won through attrition by the ability to divert more resources towards the war effort than the adversary. For instance, Rosella Cappella Zielinski showed the importance of war financing. Most of these factors operate independent of the specific technological tools of war and will continue to do so.

### Extend: “No Uncertainty”

#### *Alice* has almost no effect on patent litigation – they are overwhelmingly approved

Nikola L. Datzov, 23 – Assistant Professor of Law, University of North Dakota School of Law. “THE ROLE OF PATENT (IN)ELIGIBILITY IN PROMOTING ARTIFICIAL INTELLIGENCE INNOVATION” 92 UMKC L. Rev. 1 \*, Nexis Uni, accessed via University of Michigan //DH

1. AI Patent Litigation

As already explained, even though Alice issued almost a decade ago, its criticism continues to be loud and prominent.218 Thus, before addressing the impact of Alice to AI litigation specifically, it is helpful to briefly address the impact of Alice in litigation generally.

In that regard, Alice's visible litigation footprint, overall, with regard to all patent cases, has been relatively small. Between June 2014 (issue date of Alice) and June 2019, there were approximately 650 district court decisions involving patent eligibility.219 Between March 2012 (issue date for Mayo) and December 2022, there were about 360 decisions by the Federal Circuit that involved § 101.220 So, the number of cases involving a § 101 decision is a very small fraction of the [\*37] overall patent cases filed during that timeframe: 21,944 patent cases were filed from June 1, 2014 to June 1, 2019 and 48,942 patent cases were filed from March 1, 2012 to December 31, 2022.221 Thus, even with the spike in § 101 decisions since 2014, § 101 decisions represent "a very small number of cases relative to the volume of litigation in the system,"222 much less the volume of patents that exist outside of litigation. In fact, "for every single patent invalidated in court [under any basis], there [are] about 3000 applications filed and 1500 patents granted."223

#### The Alice cases aren’t negatively impacting investment

Nikola L. Datzov, 23 – Assistant Professor of Law, University of North Dakota School of Law. “THE ROLE OF PATENT (IN)ELIGIBILITY IN PROMOTING ARTIFICIAL INTELLIGENCE INNOVATION” 92 UMKC L. Rev. 1 \*, Nexis Uni, accessed via University of Michigan //DH

One of the concerns frequently raised with regard to a narrower scope of patent protection for AI as with any software is that investors will be hesitant to provide capital without powerful monopoly rights to exclude others from practicing the inventions, particularly with regard to larger companies that can rely on their market dominance for competition.263 Although there is no shortage of theoretical arguments and opinions on Alice's impact on investment, as Professor David Taylor remarked in his recent study of the issue, "[e]xisting literature provides surprisingly little data even to begin to answer [the question]."264 Generally, the argument is fundamentally sound and well-founded: the less power a company has to exclude others from the marketplace, the less attractive the company is for investment, since any other market player can swoop in to overtake their place. Existing empirical evidence also supports this proposition, generally, at least with regard to some industries.265 However, factors other than patent protection often play a key role, and thus, details very quickly complicate the analysis.

Although Professor Taylor's study found "negative impact of the Supreme Court's eligibility cases generally on investment," it also found that "most investors do not report changing their investment decision making based upon the Supreme Court's eligibility decisions," though a significant portion of those investors were also not informed about the relevant decisions.266 One additional key finding from the study was that "[t]he availability of patents... was not the most important consideration to the investors."267 Instead, "[t]he quality of a target [\*47] company's people ranked as most important, followed by the quality of the company's technology and the size of the potential market for the technology."268 Only 6% of respondents identified the availability of patents as the first or second most important factor in deciding whether to invest.269 Additionally, Professor Taylor's second key finding was that "reduced patent eligibility correlates with particular investment behaviors in particular industries."270 As one example, in contrast to biotechnology, "[i]nvestors overwhelmingly indicated... that the elimination of patents would either not impact their firms' decisions whether to invest in companies or only slightly decrease investments in companies developing technology in... software and Internet (80%)."271 In light of Professor Taylor's important findings, perhaps it is not surprising that other evidence also shows that investment and private equity funding for AI, in particular, has continued to increase substantially, notwithstanding the concerns over the patentability of software and AI raised by Alice.272 More so, some evidence shows that when AI startups are acquired there appears to be little focus on their existing patent portfolio,273 suggesting that a lack of patent protection in the AI space, at least at this time, is not as detrimental as might be the case in other industries. Further empirical research in the context of AI companies is necessary.

#### Prefer our evidence – it’s based on overwhelming data. Their evidence is outdated or not qualified

David Jones, 2024 – executive director of the High Tech Inventors Alliance. Questions for the Record from Senator Alex Padilla , Hearing on “The Patent Eligibility Restoration Act – Restoring Clarity, Certainty, and Predictability to the U.S. Patent System” 1/24, <https://www.judiciary.senate.gov/imo/media/doc/2024-01-23_-_qfr_responses_-_jones.pdf> //DH

As I noted in my testimony, the USPTO has published a study examining the application of section 101 that considered both patent-eligibility rejection rates and the variability of examiners’ eligibility determinations.3 This study found by 2020, both rejection rates and examiner variability were lower than they were before the Alice case was decided.4 I also cited an academic study that examined all 368 patent eligibility decisions that were made by the Federal Circuit between 2012 and 2022.5 The authors found that patent eligibility decisions by district courts and the Patent Trial and Appeal Board are affirmed at the high rate of 87%, indicating that eligibility determinations are (at least according to the Federal Circuit) overwhelmingly correct. Perhaps more importantly, the study also found that there was relatively little evidence of disagreement among Federal Circuit judges regarding how to apply the Supreme Court’s patent-eligibility jurisprudence. As the authors noted in a summary of their study, “under one of the most well-established metrics for measuring the predictability in the law, § 101 proved to be more predictable than other areas of patent law over the past decade.”6 In my oral testimony, I further noted that the USPTO’s own internal quality metrics indicate that Section 101 is the most accurately applied by examiners of the major statutory requirements.7 I also cited a number of additional studies that indicated, e.g., that Alice resulted in increased R&D investment8 and that there was “a positive association between Alice and both R&D spending by software firms and patenting by firms that held relatively more software patents prior to the Court’s opinion.”9 Finally, in previous testimony, I cited additional data and studies.10

In contrast, Director Kappos’s testimony cited a trade press article, a student note, and an academic article reporting the results of an opinion survey conducted in 2017.11 Notably, Director Kappos and others continue to cite this opinion survey prominently, despite the fact that venture capital investment data are now available for the seven years since the survey was conducted. Presumably, the proponents of PERA would cite the actual data rather than an outdated opinion survey if those data supported their contentions.

#### Rejection rates have declined since before *Alice*

David Jones, 2024 – executive director of the High Tech Inventors Alliance. Statement Before the Subcommittee on Intellectual Property U.S. Senate Committee on the Judiciary, Hearing on “The Patent Eligibility Restoration Act – Restoring Clarity, Certainty, and Predictability to the U.S. Patent System” 1/24, <https://www.judiciary.senate.gov/imo/media/doc/2024-01-23_-_testimony_-_jones.pdf> //DH

I. The current patent eligibility jurisprudence results in predictable and appropriate outcomes

The current test for patent eligibility is both clear and in line with historical and global standards for patenting: to be eligible under § 101, a patent must reflect the practical application of an advance in technology. This notion traces its origins back to the U.S. Constitution itself, in which the Framers authorized the grant of patents for the purpose of promoting the progress of the “useful arts,” which has always been understood to mean technology.1 Shortly after the Constitution’s adoption, this understanding was confirmed in one of the very first Patent Acts: the Patent Act of 1793 defined patent-eligible subject as “any new and useful art, machine, manufacture or composition of matter”—in other words, the means for the practical implementation of an advance in technology.

The 1952 Patent Act replaced the word “art” with the more modern term “process,” but it made clear that it was not changing the meaning of the word,2 which continues to be defined by the industrial context of the words that surround it: machines, manufactures, and compositions of matter.3 This same statutory standard, virtually unchanged since 1793, remains the law today.

The current eligibility jurisprudence retains this focus on technological progress and can be distilled into two basic rules:

1. A patent must claim an advance in technology and cannot merely reflect a non-technological innovation in methods of organizing human activity, such as a business or financial method;4 displaying or curating information for human consumption;5 detecting or anticipating fraud or other human wrongdoing;6 or games and aesthetic creations.7

2. A patent must claim a practical implementation, as opposed to claiming mere goals or results,8 the context in which the invention is implemented,9 or an underlying law of nature or scientific principle in the abstract.10

These basic concepts are not confusing or overly complex. To the contrary, they are relatively simple and have proven to allow for consistent and predictable application by the USPTO and the courts.

Based on data from the decade since the Supreme Court’s decision in Alice Corp. v. CLS Bank International, 573 U.S. 208 (2014), it has become clear that the current test for patent eligibility is—in fact—being predictably applied. For example, the USPTO has published a study examining the application of section 101 that considered both patent-eligibility rejection rates and the variability of examiners’ eligibility determinations.11 This study found that in the initial years after the Supreme Court’s Alice decision, both rejection rates and examiner variability increased. Over time, however, the USPTO and the patent bar absorbed the teachings of Alice: the USPTO’s study also found that by 2020, both rejection rates and examiner variability were *lower than they were before the Alice case was decided*.12

These decreases indicate that rejections under section 101 are both less frequent and more consistent today than they were before the Alice decision, which is precisely the opposite of what the stakeholders advocating reform contend. A review of the raw data on USPTO office actions confirms the conclusions of the USPTO study. After an initial spike, patent eligibility rejections appear to have fallen to rates that are equivalent to or lower than the pre-Alice rates. Assuming that the USPTO is not simply flouting the law, the only plausible explanation for this is that patent applicants are successfully predicting how examiners will assess patent eligibility.

### Extend: “Uncertainty Turn”

#### PERA increases uncertainty by wiping out 200 years of case law – judicial exceptions create greater flexibility and can adapt to changing technology – that’s better for innovation

Katie Crocker, 24 - St. Cloud State University, B.S. Biomedical Sciences; Mitchell Hamline School of Law J.D. Candidate 2025 "Just for Show: Eliminating Judicial Exceptions to Section 101 Would Render Limits on Patent-Eligible Subject Matter Meaningless," Cybaris®: Vol. 15: Iss. 3, Article 3. Available at: https://open.mitchellhamline.edu/cybaris/vol15/iss3/3 //DH

The Patent Eligibility Restoration Act also fails to achieve its purpose of bringing clarity to the subject matter eligibility standard. The proposed legislation cites the supposed “extreme confusion and uncertainty” surrounding the current subject matter eligibility standard as its reasoning for getting rid of the judicially created exceptions but then uses subjective terms in the proposed legislation without providing guidelines for their meanings, while also ignoring the confusion and uncertainty that are certain to result from wiping out 200 years of jurisprudence. Moreover, the Act’s use of language that is taken directly from some cases that the Act intends to overrule would lead to uncertainty, since the meanings of those words and phrases would be unsettled without caselaw to support them. This would lead to years of widespread confusion regarding the standard until the Court could interpret their meanings, and possibly beyond that point.

As previously stated, the Act also asserts that the judicial exceptions should be eliminated because their application by judges has caused “extreme confusion and a lack of consistency” within the judicial branch of the federal government and federal agencies, and among patent practitioners.249 However, as discussed previously, independent analysis shows district court and PTO judges are applying the Alice/Mayo framework accurately and consistently arriving at the correct outcome for correct reasons.250 Further, Federal Circuit judges seldom disagree with one another on the outcomes of subject matter eligibility cases.251 Accordingly, it seems that Federal Circuit judges are not actually confused by how to apply the standard, nor are they applying it inconsistently. So why trade this system that seems to be working well at the moment for a completely new one that would introduce a new set of problems?

Accordingly, the best solution for right now is to do nothing. As mentioned above, there are many benefits to keeping the eligibility standard free of statutory exclusions.252 One of the most important benefits is that the judicial exceptions are more flexible and seem to stand the test of time better than statutory exclusions.253 Moreover, patent laws do not seem to be an important issue to many in Congress and, accordingly, it takes many years for new legislation regarding patent laws to pass. The authors of this Act have been trying to get it passed for four years and it is highly unlikely that it will be passed this session.254 Moreover, the other most recent legislation affecting patent law, the America Invents Act, took six years to pass.255 If the statute had to be amended often to keep up with advances and changes in perceptions, it would be highly inefficient, if not impossible. Thus, because judicial exclusions are much more capable of quickly adapting to advances in science and technology, as well as peoples’ perceptions of what is worthy of a patent, they are superior to statutory exclusions. Accordingly, the Patent Eligibility Restoration Act of 2023 and any future legislation that shares its goal of eliminating the judicial exceptions to patent-eligible subject matter should be opposed.

### Extend: “IP Theft Prevents Solvency”

#### China and Russia will just steal US tech – patents don’t solve

Loren B. Thompson, 2020 - Ph.D., Chief Operating Officer of the non-profit Lexington Institute, former Deputy Director of the Security Studies Program at Georgetown University. “WHY U.S. NATIONAL SECURITY REQUIRES A ROBUST, INNOVATIVE TECHNOLOGY SECTOR” <https://www.lexingtoninstitute.org/wp-content/uploads/2020/10/100820-WHY-U.S.-NATIONAL-SECURITY-REQUIRES-A-ROBUST-INNOVATIVE-TECHNOLOGY-SECTOR-002.pdf> //DH

China and Russia employ cyberattacks and other illegal means to steal U.S. intellectual property.

China’s aspiration to achieve technological dominance is understandable. Many of the market-distorting measures Beijing undertakes to build up its domestic technology sector, such as subsidies and tariffs, are employed by other industrial nations even though they are in conflict with trade commitments. What puts China in a class by itself, however, is the extensive, state-supported use of illegal means to secure access to the intellectual property and trade secrets of U.S. technology companies. As of mid-2020, the U.S. Federal Bureau of Investigation (FBI) had over a thousand cases of technology theft by China under investigation.

FBI Director Christopher Wray told a Washington audience in July of 2020 that Beijing’s heavy use of espionage and cyber intrusions targeting U.S. companies has resulted in “one of the largest transfers of wealth in human history.” Wray said the value of the property stolen “almost defies calculation,” but most experts estimate its long-term worth in the hundreds of billions of dollars, with a corresponding loss in U.S. jobs. Some of these jobs are in the defense industry, but China targets intellectual property across every segment of the U.S. technology sector. Its goal clearly is to compress the amount of time required for China’s own tech sector to catch up with and surpass America’s.

For example, Chinese agents targeted the business secrets of U.S. aerospace suppliers even as those suppliers were contributing content to its first indigenous commercial jet, with the apparent intent of displacing such companies with domestic sources. Google disclosed in 2010 that it had suffered “a highly sophisticated and targeted attack” on its corporate infrastructure originating in China “that resulted in the theft of intellectual property”—at the same time Google was providing the operating system for most of China’s cell phones.

These attacks follow a pattern in Chinese behavior of gaining access to U.S. technology by fair means or foul, and then working to undermine the business interests of the enterprises that developed the technology. The pattern repeats so frequently that it must be a reflection of official policy, supported by government funding. The number of hackers employed by the Chinese government is estimated at 50,000-100,000, making Beijing by far the biggest source of intellectual property theft in the world.

While cyber theft seems to be the most common tool employed by Beijing for illegally appropriating foreign technology, its espionage efforts are diverse and multifaceted, including recruiting trusted insiders at technology companies, surreptitious copying of patented innovations, and the subversion of academic research. In 2020 the chair of Harvard University’s chemistry and chemical biology department was charged with attempting to conceal cooperation with a Chinese program aimed at securing technical information. Similar charges were leveled in 2019 against a biological engineering professor at Virginia Tech.

However, China is by no means the only country whose cyber and espionage activities pose a threat to U.S. security. Russian espionage in the United States predates World War Two, and appears to have gotten a major boost from the advent of the internet. In September of 2020 Microsoft disclosed that Russia is the biggest source of state-sponsored attacks on its customers. That same month, the U.S. government revealed that hackers apparently working in support of Russian military intelligence used novel malware to penetrate the networks of a federal agency and steal sensitive information. The targeted agency was not identified, but undoubtedly is just the latest in a lengthy roster of public and private organizations against which Russian operatives have perpetrated cyberattacks.

Moscow has multiple reasons for mounting such efforts. First, it wants to appropriate U.S. intellectual property for application to its own military capabilities. Second, it wants insight into U.S. military plans and vulnerabilities. Third, it seeks to learn information about Americans in sensitive positions who might be targets for other types of espionage activity. Fourth, it seeks to disrupt operations of the U.S. political system including its electoral processes, and sow distrust within U.S. society. As in the case of Beijing, Moscow does not rely solely on information technologies to perpetrate its attacks, but there is little doubt that the information revolution has given Russian operatives increased options for penetrating and disrupting the U.S. government and technology sector.

#### China weaponizes IP theft faster than the US military

Loren B. Thompson, 2020 - Ph.D., Chief Operating Officer of the non-profit Lexington Institute, former Deputy Director of the Security Studies Program at Georgetown University. “WHY U.S. NATIONAL SECURITY REQUIRES A ROBUST, INNOVATIVE TECHNOLOGY SECTOR” <https://www.lexingtoninstitute.org/wp-content/uploads/2020/10/100820-WHY-U.S.-NATIONAL-SECURITY-REQUIRES-A-ROBUST-INNOVATIVE-TECHNOLOGY-SECTOR-002.pdf> //DH

Property protection. China’s rise has been accompanied by massive theft of American intellectual property. U.S. military commanders in the Pacific say that the Chinese often weaponize and field that property faster than the U.S. does, even though the insights originated in America. While the technology sector has made big strides in implementing better cybersecurity, there is more Washington can do to help. Until recently, little was done to penalize companies like Huawei that may have benefited from the misappropriation of U.S. intellectual property. Sanctions against foreign actors who aim to undermine the competitiveness of U.S. technology companies need to be a bigger and more consistent feature of federal policy. Washington’s response to the threat of espionage and cyber intrusion shouldn’t be aimed just at the perpetrators—it should also be aimed at the foreign companies that benefit from illegal behavior.

### Extend: “Democracy Is Resilient”

#### Data is overwhelmingly in favor of democratic resilience

Steven Levitsky and Lucan A. Way, 2023 – \*professor of government at Harvard University and \*\*professor of political science at the University of Toronto “Democracy’s Surprising Resilience” Journal of Democracy, October, https://muse.jhu.edu/pub/1/article/907684/pdf //DH

These emerging crises produced a dramatic mood swing among observers of democracy. Scholars wrote of an emerging “democratic recession,” a global “authoritarian resurgence,”8 and even a “third wave of autocratization.”9 Freedom House’s 2022 annual report pointed to a “global expansion of authoritarian rule.” The Varieties of Democracy (V-Dem) Project’s 2023 report claimed that global levels of democracy had declined to 1986 levels and, thus, that the global democratic advances of the last thirty-five years had been “wiped out.”10

The data do not support such claims. In its report covering the year 2013, Freedom House listed ninety countries as Free. A decade later, that number was 84. According to V-Dem, the number of liberal and electoral democracies in the world declined from 96 in 2016 to 90 in 2022. Both indices report that there are about as many democracies today as there were at the turn of the twenty-first century—and many more democracies than there were in 1995, at the height of the third wave. This modest democratic decline contrasts sharply with the period between the two world wars, when the number of democracies fell by more than a third from 27 to 17.11 Other indices, such as the Polity database and the Lexical Index of Electoral Democracy, find little or no evidence of a democratic recession. Most prominently, Andrew Little and Anne Meng, who developed a democracy index based on objective measures including incumbent turnover, incumbents’ vote and seat shares in elections, and data on repression of journalists compiled by the Committee to Protect Journalists, find “little evidence of backsliding.”12 Little and Meng’s measures are blunt and fail to capture many forms of authoritarian abuse, but their analysis highlights an important fact: The rate of incumbent turnover “has remained fairly constant since the late 1990s.”13

Thus, even if Freedom House and V-Dem are correct in identifying an increase in incumbent abuse over the last decade or so, the consequences of that abuse appear to be modest, for many autocratic-leaning incumbents are failing to entrench themselves in power. Regimes in Albania, Benin, Bolivia, Bulgaria, Croatia, the Dominican Republic, Ecuador, Ghana, Guatemala, Honduras, Malawi, Mexico, Moldova, Mongolia, Panama, Peru, Romania, Ukraine, and Zambia have each experienced between three and six electoral turnovers since 1990. Some of these regimes are not fully democratic, but the competitiveness of elections and regularity of turnover suggest that they are also not “autocratizing.”

#### Backsliding is usually temporary and causes a slide back to democracy

Steven Levitsky and Lucan A. Way, 2023 – \*professor of government at Harvard University and \*\*professor of political science at the University of Toronto “Democracy’s Surprising Resilience” Journal of Democracy, October, https://muse.jhu.edu/pub/1/article/907684/pdf //DH

A second reason why perceptions of global democratic decline do not match reality is that instances of democratic backsliding are frequently short-lived. Many of the elected autocrats who subverted democratic institutions in the twenty-first century lost power within a decade, very often resulting in a “slide back” to democracy. For example, Moldova’s democracy backslid after the Communist Party came to power in the 2000s, but recovered when the Communists lost at the polls in 2009. In Ukraine, backsliding under Viktor Yanukovych was reversed after his fall in the 2014 EuroMaidan uprising. In Sri Lanka, the slide into autocracy was checked by President Mahinda Rajapaksa’s electoral defeat in 2015—and again after the Rajapaksa family was toppled by civil unrest in 2022. In North Macedonia, backsliding under Prime Minister Nikola Gruevski was halted after public protests forced Gruevski to resign. In Ecuador, backsliding under President Rafael Correa was reversed after he left office in 2017. Likewise, backsliding was reversed in Zambia after President Edgar Lungu was defeated in the 2021 elections and in Honduras after President Juan Orlando Hernández left power in 2022.

A third reason why the overall level of “autocratization” is more modest than it appears is that cases of democratic backsliding have been offset by democratic advances in other countries. Armenia, Colombia, the Gambia, Liberia, Malaysia, Moldova, Nepal, Senegal, Sierra Leone, and Sri Lanka have all made democratic advances over the last fifteen years, but these cases received less attention—from both media and scholars—than such well-known backsliders as Hungary, Turkey, and Venezuela. The same is true of many unsung successes, or democracies that have survived in “hard places,” such as Romania, Ghana, and Mongolia. Even though democratic resilience in Romania—a poor country under Stalinist rule just a few decades ago—is as surprising as backsliding in neighboring Hungary, the latter case has received far greater attention.

In sum, democratic erosion in this century has been modest. There is little evidence of a reverse wave comparable to those which followed the first and second waves. Given that so many third-wave transitions occurred in countries with unfavorable domestic conditions; that the international environment has grown less supportive; and that economic volatility, state weakness, corruption, and criminal violence have eroded public trust in elected governments across the world, the survival of so many new democracies reveals striking resilience.

## Innovation Advantage Answers

### 1NC Innovation Advantage Answers

#### 1. Innovation is high - Investment increased since *Alice*

David Jones, 2024 – executive director of the High Tech Inventors Alliance. Statement Before the Subcommittee on Intellectual Property U.S. Senate Committee on the Judiciary, Hearing on “The Patent Eligibility Restoration Act – Restoring Clarity, Certainty, and Predictability to the U.S. Patent System” 1/24, <https://www.judiciary.senate.gov/imo/media/doc/2024-01-23_-_testimony_-_jones.pdf> //DH

Moreover, the benefits of the Alice decision are not limited to the relative increase in predictability. Other empirical studies have, for example, separately concluded that the Alice decision directly resulted in increased R&D investment,15 was correlated with increased sales by software firms,16 that “Alice was associated with a significantly higher likelihood of receiving a new round of VC funding” for tech startups,17 and there was “a positive association between Alice and both R&D spending by software firms and patenting by firms that held relatively more software patents prior to the Court’s opinion.”18

In sum, the current patent eligibility jurisprudence is neither unpredictable in its outcomes nor harmful to venture capital or R&D investments. Rather, it is Alice and its progeny that encourages and protects technological innovation.

#### 2. Patent trolls turn – increasing patent eligibility causes over-enforcement that extorts money from innovators

Joe Mullin, 2022 - senior policy analyst at the Electronic Freedom Foundation, where he works on patents, encryption, platform liability, and free expression online. “New Bill Would Bring Back Terrible Software and Genetic Patents” Electronic Freedom Foundation, 8/18, <https://www.eff.org/deeplinks/2022/08/new-patent-bill-would-open-floodgates-return-terrible-software-and-genetic-patents> //DH

A recently introduced patent bill would authorize patents on abstract ideas just for including computer jargon, and would even legalize the patenting of human genes. The “Patent Eligibility Restoration Act,” sponsored by Sen. Thom Tillis (R-NC), explicitly overrides some of the most important Supreme Court decisions of the past 15 years, and would tear down some of the public’s only protections from the worst patent abuses.

Pro-patent maximalists are trying to label the Tillis bill as a “consensus,” but it’s nothing of the sort. We need EFF supporters to send a message to Congress that it isn’t acceptable to allow patent trolls, or large patent-holders, to hold our technology hostage.

We Don’t Need 'Do it on a Computer' Patents

Starting in the late 1990s, the U.S. Court of Appeals for the Federal Circuit essentially did away with any serious limits on what could be patented. This court, the top patent appeals court in the U.S., allowed patents on anything that produced a “useful result,” even when that result was just a number. This allowed for a period of more than a decade during which the U.S. Patent Office issued, and the courts enforced, all kinds of ridiculous patents.

Several Supreme Court decisions eventually limited the power of bad patents. Most importantly, the Supreme Court’s 2014 Alice Corp. v. CLS Bank decision made a clear rule—just adding “on a computer” to an abstract idea isn’t enough to make it patentable.

The Alice Corp. decision was not a panacea. It did not eliminate the serious problem of patent trolls—that is, companies that have no products or services, but simply sue and threaten others over patents. But it did put a big dent in the patent trolling business. Vaguely worded software patents can still be used to extort money from software developers and small businesses. But when those patents can be challenged in court, they now rarely survive.

#### 3. Patent thickets turn - Expanding eligibility increases patent thickets that decrease innovation

Wayne Brough, 24 - policy director for R Street’s Technology and Innovation team. Prior to R Street, Wayne was the president of the Innovation Defense Foundation. PhD in economics from George Mason University “Congress Wants to Revive Patents but May Strangle Innovation and Damage Health Care Access Instead” R Street Institute (a public policy think tank), 4/3, <https://www.rstreet.org/commentary/congress-wants-to-revive-patents-but-may-strangle-innovation-and-damage-health-care-access-instead/> //DH

Expanding Patent Eligibility Limits Innovation and Competition

Supporters claim that patent eligibility practices in the wake of the aforementioned Supreme Court decisions hinder innovation and investment in critical technologies like AI, personalized medicine, and diagnostic testing. On the other hand, critics assert that the PERA would restore an earlier patent regime that granted patent protections too broadly, making it difficult for true innovators to navigate complex and far-reaching patents that limit entry into the market.

“Patent thickets” became prevalent in the late 1990s and early 2000s, particularly among pharmaceutical companies seeking to extend their exclusivity over blockbuster drugs in order to keep generic competitors at bay. This term refers to the practice of creating impenetrable walls of patents on different aspects of the same drug—from the primary patent covering the compound itself to secondary patents on characteristics like method of use, formulation, and other aspects of drug delivery—thereby creating a dense web, or “thicket,” of patents surrounding a single product. For example, I-MAK found that America’s top 10 best-selling drugs possess an average of 74 granted patents. These patent thickets extend the monopoly protection enjoyed by drug manufacturers well beyond the original patent while keeping low-cost generics out of the market.

Another tactic for extending monopoly protection of brand-name drugs is “evergreening,” or adding new patents to a drug as existing ones expire. By pursuing patents on different aspects of a drug, such as packaging, dosage, or other properties, it is possible to extend its dominance in the marketplace. While some changes may be warranted, others may simply protect exclusivity. This makes it important to evaluate a patent’s validity—something proposed changes within the PERA would make more difficult.

“Product hopping” is yet another way to game the patent system. Here, a company produces a reformulated version of a drug—by changing the dosage or introducing an extended-release version, for instance—and markets the new product heavily while urging prescribers to switch. They may even take the old product off the market. In one example, as the patent on its popular anti-ulcer drug Prilosec expired, AstraZeneca switched to Nexium, a drug with minimal modifications and an additional 13-year patent life. This product hop was estimated to cost the U.S. health care system over $2 billion annually.

Expanding patent eligibility to allow companies to obtain patents on abstract ideas, natural phenomena, or even basic computing functions would significantly extend the monopolies of patent owners, stifling innovation and competition by giving patent holders greater authority to challenge new entrants for infringement as they try to access the market. It would abuse the tools of government to slow down competition and stifle innovation.

#### 4. No chemical pollution impact – it’s regional not global so it won’t cause extinction

Dr Jennifer Bernstein, 2024 - is Editor-in-Chief of the academic journal, Case Studies in the Environment, Senior Fellow Liaison at the Breakthrough Institute, and adjunct faculty at Tarleton State University. “Climate in crisis: The deceptive call of the apocalypse” The Academic, 5/2, <https://theacademic.com/climate-crisis-deceptive-call-of-apocalypse/> //DH

“Planetary boundaries” are problematic

Much of the apocalyptic rhetoric is based on the idea that quantifiable limits, once breached, signal the end of life on this planet. Johan Rockström and colleagues coined the term in 2009. It defines nine biophysical factors—land-use change, biodiversity loss, nitrogen and phosphorous levels, freshwater use, ocean acidification, climate change, ozone depletion, aerosol loading, and chemical pollution—which are “hard boundaries”. The appeal of the Planetary Boundaries hypothesis lies in its clarity and clear directives.

But like so many scientific theories, the concept of planetary boundaries does not emerge objectively from science; rather, it is the product of a number of methodological—and sometimes prescriptive—decisions made by very human scientists at a particular place and time.

Rockström clearly stated that the Planetary Boundary hypothesis was a normative project. But science is infused with problematic assumptions. For one, planetary boundaries are determined using the global scale. Assuredly, one of the nine factors—climate—is global in scope. However, the other eight factors vary at the local and regional scale. Some, like biodiversity, have no global tipping point at all. Despite appearing as hard science, the Planetary Boundaries hypothesis is part of science and advocacy.

#### 5. Synthetic biology innovation fails – innovation is incremental and won’t be scaled up for remediation

Andrew D. Hanson and Víctor de Lorenzo, 2023 - \*Horticultural Sciences Department, University of Florida and \*\*Systems Biology Department, Centro Nacional de Biotecnología-CSIC, Campus de Cantoblanco, Madrid “Synthetic Biology—High Time to Deliver?” ACS Synth Biol. 2023 Jun 16; 12(6): 1579–1582. //DH

**SynBio = Synthetic Biology**

Like any advance, SynBio evokes sincere evangelical zeal in its practitioners, which is good in itself and helps spread SynBio ideas and technology throughout the public and private sectors.16 Informed, data-driven forecasting of what SynBio advances could enable is likewise good and helpful. Diffusing advances and faithfully predicting their impacts fuel hope, a virtue we cannot afford to lose in facing what has been called a global polycrisis.17 Like any crisis, though, this one creates opportunities for merchants of false hope, or hype. Hype flourishes when disoriented, poorly informed populations want to believe in easy solutions to difficult problems; SynBio can be–and sometimes is–pushed in this way as a techno-fix in areas such as atmospheric CO2 drawdown,18 nitrogen pollution in agriculture,19 and green jet fuel production.20 It is not that SynBio cannot contribute to these areas; it can. The problem is one of claims for the scale and timeline of the contribution that do not follow the engineering practice of running the numbers to get rough but robust estimates of how much a SynBio-based project could possibly do and how fast,21 and then sticking to these estimates when advocating and publicizing the project. A habitual disregard of what is involved in scale-up is an Achilles’ heel of the whole field. It is one thing to have a smart genetic construct showing a spectacular phenotype in a Petri dish or small bioreactor for a short period of time but a very different thing to have the same at an industrial or even global scale10 and following rigorous implementation standards. Going from one dimension to the other makes the whole difference between a merely intellectual exercise and a truly transformative development.22 Alas, the conceptual excitement occasioned by SynBio has thus far been more supported than scale-up technologies–unfairly considered a lower-rank endeavor.23 The solution is just to learn from and to follow sound engineering practices and traditions. Not doing so, in the long term, only weakens public trust in bioscience and biotechnology.

### Extend: Innovation High Now

#### Innovation is fueling startups which is fueling innovation

The Economist, 2024 - the Economist is a British weekly news magazine founded in 1843 that focuses on international affairs. It rarely provides author information based on tradition “America is in the midst of an extraordinary startup boom” 5/12, <https://archive.ph/It1eR> //DH

**Haltiwanger = John C. Haltiwanger, is a Distinguished University Professor in the Department of Economics at the University of Maryland.**

Perhaps even more important than the numbers is the kind of ventures that are being created. In 2020 and 2021 many startups catered to the working-from-home revolution. These included online retailers, small trucking firms and landscapers. Since mid-2022, however, the baton has been passed to technology firms, according to Ryan Decker of the Fed and John Haltiwanger of the University of Maryland. A paper published in March by the Census Bureau found a particularly sharp increase last year in business applications based around artificial intelligence (ai). For researchers, this carries echoes of the 1990s, when computers and the internet took off. “It feels like a step-change increase across the economy in entrepreneurial potential,” says Kenan Fikri of Economic Innovation Group, a think-tank. “You never know which firm is going to be the next growth firm. So the more shots on goal you have, the better.”

What has fuelled the boom? The pandemic got things going, as millions lost their jobs and more shifted to remote work. “People realised that they do like being around their families, and it gave many a sense of freedom,” says Jeanette Brewster of Village Launch, a nonprofit in Greenville that supports black entrepreneurs. Most of the new firms are tiny and destined to stay that way. Startups in Ms Brewster’s network include food trucks, handicraft makers and paralegals. Still, these can be important steps towards greater wealth. Researchers at the Brookings Institution, a think-tank, found that in 2019 just 5% of business-owning families were black and 4% Hispanic. By 2022 their shares had risen to 8% and 7%, respectively.

The strength of the economy has also helped. When the job market is tight, it is easier for a potential startup founder to take risks, knowing that they can fall back on paid work if need be. The advent of new technologies, especially ai, also feeds into it. Entrepreneurs are creating ai-powered tools to interact with customers, prepare taxes, sift through court records and more. “The causality isn’t necessarily running from startups to innovation. It runs both ways,” says Mr Haltiwanger. “Innovation attracts startups, particularly when there are rapid changes that have potentially large market opportunities.”

#### Innovation is increasing rapidly through startups

The Economist, 2024 - the Economist is a British weekly news magazine founded in 1843 that focuses on international affairs. It rarely provides author information based on tradition “America is in the midst of an extraordinary startup boom” 5/12, <https://archive.ph/It1eR> //DH

Suddenly, what was old appears to be new. An array of data indicate that Americans are rediscovering their go-getting spirit. The most striking evidence comes from applications to form businesses, a proxy for startup activity. These soared in mid-2020, when America was still in the grip of covid-19. The initial surge was easy to dismiss: some of the new firms were scams, trying to profit from the government’s financial assistance for small businesses; others reflected the strangeness of the moment, with companies set up to import face masks or flog hand sanitiser.

But now, well after the pandemic has faded away, the surge continues (see chart 1). Last year applications to form businesses reached 5.5m, a record. Although they have slowed a touch this year, the monthly average is still about 80% higher than during the decade prior to covid, compared with just a 20% rise in Europe. Startups normally play an outsized role in creating employment in America, as elsewhere. By definition, every startup job counts as new, whereas mature companies have more churn. That difference has become even starker. In the four years before the pandemic, established firms added one net job for every four created by startups; in the four years since the pandemic, established firms have actually lost one job for every four created by startups (see chart 2).

### Extend: Patent Trolls Turn

#### Increasing patent protection causes over-enforcement and diverts resources from R&D to litigation – that undermines innovation

Charles Duan, 2019 -Technology and Innovation Director at the R Street Institute, where his research focuses on intellectual property issues. “U.S. PATENTS AND COMPETITIVENESS WITH CHINA” R Street, February, <https://www.rstreet.org/wp-content/uploads/2019/02/Final-Short-No.-671.pdf> //DH

As temporary monopolies that suppress competition, patents are an important part of innovation but must be used in appropriate measures. Failing to do so undermines the rate of American innovation for at least two reasons. First, increasing patent rights encourages companies to put resources into patent disputes rather than research and development. Patent licensing can be an incredibly lucrative business for lawyers but it does not engage scientists and engineers to innovate. Obviously some level of patent protection is necessary to preserve the value of R&D investments but scaling up protection too far can make rent-seeking more valuable than research.20 And second, U.S. patents are not solely owned by U.S. firms. A rapidly growing number of patents in the United States are held by Chinese companies.21 If patents become too powerful an enforcement tool, they could ultimately be turned into weapons against American companies, further stymieing domestic innovation and giving a leg up to foreign competitors.

#### The *Alice* decision substantially limited patent trolls and protected startups

Joe Mullin, 2022 - senior policy analyst at the Electronic Freedom Foundation, where he works on patents, encryption, platform liability, and free expression online. “New Bill Would Bring Back Terrible Software and Genetic Patents” Electronic Freedom Foundation, 8/18, <https://www.eff.org/deeplinks/2022/08/new-patent-bill-would-open-floodgates-return-terrible-software-and-genetic-patents> //DH

**The “Tillis bill” refers to the Patent Eligibility Restoration Act. Tillis is one of its sponsors**

It’s now been eight years since the Alice Corp. decision, and judges have thrown out hundreds of bad patents that couldn’t stand up to this test. It’s likely that many more bad patents have been abandoned because their owners know they can’t keep using them to threaten people. The patents knocked down by Alice Corp. include:

* A patent that claimed using pictures menus on a computer, which a patent troll called DietGoal Innovations LLC used to sue more than 70 companies
* The Alice Corp. patent itself, which claimed a well-known form of mitigating settlement risks in financial transactions—but simply did it on a computer
* A patent on watching ads online before viewing content (Before Alice Corp., an appeals court wrongly upheld this patent, owned by a company called Ultramercial)
* A patent on playing bingo on a computer
* A patent on filtering email
* A patent that claimed “storing and labeling information,” which was used to sue more than 150 companies

Ten years ago, there weren’t effective legal mechanisms to throw out the worst types of patents. If someone targeted by a patent troll felt the patent was wrongly granted, they’d likely have to pay millions of dollars in patent litigation costs just to take their chances in front of a jury. The Tillis bill will make it easier to use exactly the types of weak, overbroad patents that often threaten startups and small businesses.

Since the Alice Corp. decision, it’s much harder to demand money using questionable patents. That’s why patent trolls, among others, don’t like the decision, and would like to see a bill like this pass to override it. But the Senate should not grant this wish.

### Extend: Patent Thickets Turn

#### Limiting judicial exceptions increases patent thickets

Nikola L. Datzov, 23 – Assistant Professor of Law, University of North Dakota School of Law. “THE ROLE OF PATENT (IN)ELIGIBILITY IN PROMOTING ARTIFICIAL INTELLIGENCE INNOVATION” 92 UMKC L. Rev. 1 \*, Nexis Uni, accessed via University of Michigan //DH

With regard to the balancing test in the context of patent eligibility specifically, the primary concern with imposing limits to broad eligibility relates to preemption.201 The three judicial exceptions are "the basic tools of scientific and technological work."202 Allowing single parties to exercise a monopoly over such broad rights would "inhibit further discovery by improperly tying up the future use of[] these building blocks of human ingenuity."203 Some empirical evidence specifically analyzing the impact of the Alice decision has found that "an overly permissive intellectual property rights system can slow the very growth it was intended to promote."204

With these broad principles in mind, there exist conflicting views on the role of patent eligibility in promoting innovation. The theory behind patent subject matter eligibility,205 as well as its criticisms and defenses have been extensively covered.206 Some view a meaningful eligibility threshold as important to prevent broad patent rights that can impede more than promote the progress of "science and the useful arts."207 The proliferation of an astronomical number of software patents creates patent thickets that can make it incredibly difficult (and expensive) [\*35] to facilitate the incremental innovation common in the industry.208 As a classic example, Professor Mark Lemley cites to the Wright Brothers' broad patent written in functional language that stalled innovation in flight for many years.209

#### Patent thickets turn the case – companies will weaponize thickets to block competitors and collapse innovation

Greg Day and Steven Udick, 19 – Gregory Day J.D., Ph.D., is an Assistant Professor at the University of Georgia Terry College of Business with a courtesy appointment in the School of Law. Steven Udick J.D., is an Associate at Skiermont Derby, LLP. “Patent Law and the Emigration of Innovation”, 94 Wash. L. Rev. 119 (2019), Available at: <https://digitalcommons.law.uga.edu/fac_artchop/1508> //DH

Could patent density in the United States explain the hesitancy of companies to center their R&D in the states? The chance of litigation mounts when the market is saturated with patents—known as a patent thicket.160 This is because, as a primary concern, a large volume of patents in an industry increases the odds that an inventor may accidentally infringe one of them.161 For example, approximately 250,000 active patents are used in the modern smartphone, ignoring the dormant patents that can also form the basis of an infringement lawsuit.162 Even if an inventor detects each blocking patent, the existence of a thicket raises the costs of innovation by forcing the inventor to design around the anticommons.163

Patent thickets also create troublesome incentives to wage meritless litigation.164 Some bad faith litigants have overwhelmed practicing entities by acquiring thousands of patents regardless of the patents’ quality. This type of action allows an entity to essentially weaponize their own patent thickets:

Their scale often enables them to license without litigation because defendants are reluctant to challenge an entire portfolio of patents. The patent aggregation model depends on patent intensity in an industry; it works because the patent aggregator has so many patents that read on a particular target that a challenge to the validity of the patents makes little sense.165

And because patent infringement is a strict liability tort, the question of whether an inventor accused of infringement was aware of the preexisting patent, or made a good faith effort to find it, has no exculpatory value.166 As a result, patent thickets can ex ante and ex post raise the costs of innovation, thereby discouraging R&D investment.167

The countries with the most patents in force are the most likely to be burdened by patent thickets. Historically, the United States has issued the most patents, which is attributable to the size of the American market; since both domestic and foreign inventors sell their technologies in the United States, inventors have sought to guard their market share by obtaining U.S. patents. Indeed, there are no requirements—in the United States, China, Japan, Europe, Korea, and most other nations—that a patent applicant reside in the country where the applicant seeks protection. As one may imagine, firms have not been bashful in applying for patents in their non-resident jurisdictions.168 Despite the alarm expressed in some corners that the United States no longer receives the most patent applications, there are substantially more patents currently in force in the United States than anywhere else, sitting at a little over 2.5 million.169

As a result, firms intending to innovate in the United States face the largest existing base of patents blocking the item’s potential use. In many situations, the patents in force create patent thickets that make entry into those markets risky and costly. If a company primarily intends to sell its invention abroad, developing technology where relatively fewer patents are in force makes sense. The next Part tests not only whether inventors prefer to innovate in countries that offer less costly and risky patent schemes, but also whether firms even care about foreign patent laws when making innovation decisions.

#### China’s likely to use the plan to create patent thickets – they’ll flood the US with low-quality patents

Charles Duan, 2023 –Assistant Professor and senior policy fellow with the Program on Information Justice and Intellectual Property, American University Washington College of Law; Postdoctoral Fellow, Cornell Tech; member of the Patent Public Advisory Committee, U.S. Patent and Trademark Office. Testimony Before the Subcommittee on Courts, Intellectual Property, and the Internet of the Committee on the Judiciary U.S. House of Representatives “INTELLECTUAL PROPERTY AND STRATEGIC COMPETITION WITH CHINA PART I”, 3/8, <https://judiciary.house.gov/sites/evo-subsites/republicans-judiciary.house.gov/files/evo-media-document/duan-testimony.pdf> //DH

This glut of low-quality patents cannot be ignored for at least three reasons. First, it strains the USPTO's limited examination resources, potentially delaying the issuance of valuable patents representing commercializable innovation.24 Second and more importantly, it crowds the space of potential liability for American innovators and businesses. A company entering a market often conducts a "freedom to operate" analysis, assessing what patents cover a certain technological area and what licenses the company needs to negotiate. In doing that analysis, the company must wade through all the patents in the relevant area, high-quality or not. A mass of patents from China could multiply this search and legal analysis cost many times over.25 Indeed, these filings may render it more difficult for American firms to protect their own IP rights, as they constitute facially cognizable prior art that could potentially draw out the patent examination process.26

Several pointers suggest how a glut of low-quality foreign patents could end up interfering with domestic innovation. In the analogous field of trademark law, scholars have already worried that high-volume applications for trademark registrations from China are crowding the market so much that the United States might be "running out of trademarks."27 And in the early 2000s, a glut of software patents of questionable validity enabled a variety of patent assertion business models to spring up and harass technology companies and Main Street businesses for decades.28 History suggests that China's strategy of inducing high-volume patent filings regardless of quality may have substantial implications for the American economy.

### Extend: Synthetic Biology Innovation Fails

#### Biotech innovation is hyped and won’t be scaled up

Víctor de Lorenzo and Jillian Couto, 2019 – \*Centro Nacional de Biotecnología‐CSIC Campus de Cantoblanco, Madrid, and \*\*School of Engineering, University of Glasgow “The important versus the exciting: reining contradictions in contemporary biotechnology” Microb Biotechnol v.12(1); 2019 Jan, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6302708/> //DH

The applicability agenda of modern Biotechnology needs no explanation or justification. As any technology, the ultimate value of Biotech is to deliver materials, molecules or processes of interest for the medical, agricultural and environmental market. However, if one takes a look at high‐impact journals or reads grant proposals on topics presented as Biotechnological research, one legitimately wonders when and how the many exciting results and concepts that often make headlines will get close to actual, beneficial uses to society and economy. There is indeed a Valley of Death in terms of funding between original scientific discoveries and applications that is typically punctuated by the scores (1–9) of the so‐called Technical Readiness Level (TLR). But – important as it is – in our opinion, the issue is not just about funding but also about overcoming the conundrum exciting vs. important. The first gets all the attention, receives all funding and it is frequently published in prestigious journals. No surprise that the most creative minds flock to identify and get engaged in exciting endeavours, not the least because of the career benefits involved. However, exciting seminal discoveries in Biotechnology are worth nothing if they are not followed up all the way to technological readiness. Fleming's observations on penicillin had to wait two decades until Florey and Chain figured out ways to scale‐up the production process. But who remembers the last two? In sum, it seems that finding or developing properties with a biotechnological potential is exciting. But scaling up and designing processes is perceived as boring, a sort of second‐level endeavour to be addressed also by second‐level professionals. In this Crystal Ball, we would like to take the opportunity to argue how wrong this is.

Scale‐up is in fact the most important bottleneck that contemporary Biotech has to address if it is to find its niche in a large‐scale industrial landscape. This is different from the small‐scale production of very high added value biomolecules, such as pharmaceuticals, and the GMO‐based agriculture. Let us take an example close to the core Microbial Biotech agenda: whole‐cell catalysis and biotransformations. The literature has plenty of metabolic engineering cases where microbial strain A (or even an artificial consortium) is heavily refactored genetically by scientist B to produce compound C (biopolymers, biofuels, fragrances, food additives, speciality chemicals etc.). Although the yields are typically not great, the high‐prominence work on this project done by researcher B often stops there (the generation of a new property). What happens next (if it does) generally disappears from the high‐visibility radar and B moves on to engineer another strain A that produces another interesting molecule C and so on. The scale‐up and the downstream processing (the most limiting factors for raising industrial interest) are taken for granted, handed over to engineers and generally considered devoid of much interest. This state of affairs creates a scenario in which genetic and metabolic engineering of biological systems advance at the speed of light. But process engineering seems to be stuck in century‐old principles.

#### Patents don’t correlate with the scale-up of a firm

Charles Plant, 2024 – PhD in economics. As founder of The Narwhal Project, he works with technology startups to help them figure how to raise funding and scale their businesses. Charles spent seven years on the faculty of York’s Schulich School of Business teaching in the MBA program and has taught innovation and entrepreneurship at the University of Toronto. “If patents are so important, why aren’t they correlated with scaleup success in any way?” 5/22, <https://www.linkedin.com/pulse/patents-so-important-why-arent-correlated-scaleup-success-plant-3misc?trk=public_post_main-feed-card_feed-article-content> //DH

As it turns out, there is absolutely no correlation between the number of patents a firm has and, its scaleup ranking, its financial velocity, its employee growth rate, the amount of capital it has raised or any other factor I looked at. The highest degree of correlation is 0.05 between the number of patents and the amount of capital raised.

I was not satisfied with that answer, because, after all, most governments seem to think that patents are the key to successful scaling and building an innovation economy. So, I looked at the stats for employee growth based on the binary measurement as to whether a firm had patents or not.

A table with text and numbers

Description automatically generated

As you can see, the only sector where patenting had a material positive effect on employee growth rate was that of clean technology. For Unicorns and health technology firms, they were actually better off if they didn’t get patents. Let’s look at whether getting patents influences the amount of capital you get.

A table with numbers and text

Description automatically generated

Oops, same thing here. Unicorns seem to raise more money if they don’t take out patents and the same is true for health tech companies and I must admit, this latter fact and all of the data on health tech patenting surprised me. As for computer tech firms and clean tech firms, there was some difference and it looks like they benefitted from getting patents. But Canada's Unicorns are made up primarily of computer tech firms and there is no benefit to patenting among this group so I think for computer tech firms, it is a wash. As to scaleup ranking there are also clear results.

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Description automatically generated

Clean tech firms are again better off from getting patents and the others are all worse off. Based on this data I’ve concluded that Unicorns and health tech companies are worse off if they get patents, for computer tech firms, it doesn’t really matter, and clean tech firms should invest in patents.

# Pathogen Patents Disadvantage

### 1NC– Pathogen Patents Disadvantage

#### The next offcase position is the pathogen patents da

#### Uniqueness - Current limits on patent eligibility are spurring innovation vital to mitigating future pandemics

Alex Moss, 24 - the executive director of the Public Interest Patent Law Institute. She was previously at the Electronic Frontier Foundation and a patent litigator at Sullivan & Cromwell. After graduating from Stanford Law School, she served as a judicial clerk to the Honorable Timothy B. Dyk of the U.S. Court of Appeals for the Federal Circuit. Letter to Senators Durbin, Coons, Tillis, and Representatives Issa and Lofgren on the Patent Eligibility Restoration Act of 2023, signed by American Civil Liberties Union, Electronic Frontier Foundation, Generation Patient, Public Citizen, Public Interest Patent Law Institute, and the R Street Institute. 1/30, <https://static1.squarespace.com/static/60e5457fb89be21d705fa914/t/65b9687cbb120871dd820938/1706649724600/Public+Interest+Letter+re+PERA+-+01.30.24.pdf> //DH

Indeed, Captain Kimberly J. Elenberg, Director for Force Modeling and Analytics for the Department of Defense Coronavirus 2019 Task Force, has credited current patent eligibility jurisprudence for playing a large role in allowing her team to coordinate the military’s response to the pandemic.14 For example, researchers discovered that a significant proportion of individuals infected with COVID-19 shed virus RNA in their stool, and therefore the level of virus RNA in wastewater can be measured to track community infection trends.15 Under existing patent eligibility law, the correlation between the amount of virus RNA in stool samples and community infection levels was not eligible for patenting, even with the addition of a conventional wastewater test. Therefore, both the CDC and military could freely conduct wastewater tests and use the results to determine where to allocate testing resources.

Current patent eligibility law also plays a key role in protecting the public from *future* pandemics. Just like tracking new variants, detecting the emergence of new viruses requires unrestricted access to gene sequences, natural correlations, and conventional analytic methods implemented on generic computers. For example, Dr. Christopher Mason of Wiell Medical College has led a coordinated effort among researchers to sequence and characterize microbiota (bacteria, fungi, viruses, and other microbes) in cities across the world.16 Thus far, their work has identified 10,928 viruses and 748 kinds of bacteria that had never before been documented. 17 Thanks to the ability to freely match genes associated with pathogenic viruses as well as antimicrobial resistance to newly identified strains, Dr. Mason’s program is already helping us prepare for (and potentially mitigate) future health crises.18

#### Link - PERA makes pathogen genetic sequences eligible for patenting – that undermines the speed and international cooperation necessary for pandemic mitigation

Jorge L. Contreras, 2022 - James T. Jensen Endowed Professor for Transactional Law and Director of the Program on Intellectual Property and Technology Law, University of Utah S.J. Quinney College of Law. Adjunct Professor, Department of Human Genetics, University of Utah School of Medicine “Another Legislative Attempt to Revive Gene Patenting” 8/4, <https://blog.petrieflom.law.harvard.edu/2022/08/04/another-legislative-attempt-to-revive-gene-patenting/#:~:text=The%20Supreme%20Court's%20decision%20in,genetic%20testing%20companies%20like%2023andMe>. //DH

The Impact of Myriad

The Supreme Court’s decision in Myriad had an immediate effect on the price and availably of BRCA testing, and today consumers, for about $100, can learn whether they carry the primary BRCA mutations from direct-to-consumer (DTC) genetic testing companies like 23andMe. The *Myriad* decision eliminated not just patents on the BRCA genes, but *all* gene patents in the United States, suddenly opening a major segment of the genetic testing market to free and open competition.

More recently, as I have written previously, the unavailability of patents on genomic sequences has enabled researchers around the world to study the SARS-CoV-2 viral genome without fear of patent infringement and without the need to negotiate complex patent licensing agreements and pay royalties to the first researchers to determine its sequence. This open and unencumbered environment enabled researchers to identify and trace the spread of multiple pathogenic variants around the world, to understand the biological mechanisms of the virus, and to develop vaccines, diagnostics and therapeutics in record time. As we witnessed with respect to prior viral outbreaks such as SARS, MERS and H5N1, all of this work would have been hindered by patent claims to the basic genomic sequence of SARS-CoV-2.

Prior Efforts to Reverse Myriad

Not surprisingly, efforts to reverse or limit the Myriad decision began before the ink was dry on the page. In late 2013, Myriad sued competing BRCAtest vendors under patents that it believed were not affected by the Court’s decision. The company proved to be wrong: both the federal district court in Utah (3 F. Supp. 3d 1213 (D. Utah 2014)) and the Court of Appeals for the Federal Circuit (774 F.3d 755 (Fed. Cir. 2014)) confirmed that Myriad’s patents covering naturally occurring DNA sequences, no matter how short, were ineligible for patent protection. That same year, the Federal Circuit held that, under the precedent established in Myriad, the cloned offspring of “Dolly”, the ewe made famous as the first successfully cloned mammal, were not themselves patentable (In re Roslin Inst. (Edinburgh), 750 F.3d 1333 (Fed. Cir. 2014)).

Given the courts’ unwillingness to contravene the holding of Myriad, opponents turned to Congress. In response to a 2016 USPTO request for public comments, in 2017 several organizations asked Congress to amend the patent lawsto overrule Myriadand other recent Supreme Court precedents relating to patent eligibility. In 2019, Senators Chris Coons (D-DE), Tillis and others released a draft bill that would have “abrogated” any judicial exceptions to patentable subject matter involving, among other things “laws of nature” and “natural phenomena”. The effect of these provisions would have been to permit, once again, the patenting of any previously undiscovered natural substance or genomic sequence. One hundred sixty civil rights, medical, scientific, patient advocacy, and women’s health organizations opposed the Coons-Tillis bill, arguing that if it were enacted, “Patients will again be at risk of lacking access to information about their genes, about their very selves. We likely will again see high prices for tests with no competition in the market, and harms to innovation and useful research with no guarantee that the law would eventually provide the same protections that it now offers.” The Senate Judiciary Committee held three sets of hearings on the bill in 2019, after which the draft legislation stalled.

In 2021, Senators Coons, Tillis and others requested that the USPTO conduct a study of public views on “how the current [patent eligibility] jurisprudence has adversely impacted investment and innovation in critical technologies like quantum computing, artificial intelligence, precision medicine, diagnostic methods, and pharmaceutical treatments.” A total of 145 comments were submitted in response to the PTO’s public request for information (RFI). The responses were mixed, with a majority of respondents in the life sciences sector generally disposed favorably to existing judicial tests for patent eligibility.

Nevertheless, on August 1, 2022, Senator Tillis introduced the Patent Eligibility Restoration Act of 2022, which would explicitly overturn the Supreme Court’s ruling in Myriad.

The Patent Eligibility Restoration Act

The draft Patent Eligibility Restoration Act released on August 2 would effect numerous changes to the law of patent eligibility under Section 101 of the Patent Act as interpreted over the years by the courts. At first, the draft Act appears to exempt genomic sequences from the sweeping changes that the it introduces in other technology areas. Thus, Section 101(b)(1)(C) of the bill states that “a person may not obtain a patent for … an unmodified human gene, as that exists in the human body.” Yet this “exclusion” is a sleight of hand. Despite the rhetoric on both sides of the argument, the USPTO never granted patents on human genes “in the human body”, as I explain in this article (p. 28). Instead, the patents obtained by Myriad and others always covered, among other things, “isolated and purified” genes. Which is why Section (b)(2)(B) of the proposed Act expressly allows patenting of “a human gene or natural material that is isolated, purified, enriched, or otherwise altered by human activity” (i.e., by saying that these altered substances are not “unmodified”). The result of this clever drafting is a complete reversal of the Supreme Court’s conclusion in Myriad that “genes and the information they encode are not patent eligible under §101 simply because they have been isolated from the surrounding genetic material” (569 U.S. at 596).

What’s more, the Act would place non-human genomic sequences squarely back into the realm of patentable subject matter, returning us to the days of preemptive patenting of emergent viral strains when speed and global cooperation are critical to protect global health.

#### Impact - Both natural and engineered pandemics risk extinction – but early, rapid response contains the impact

Jaime M. Yassif, et al, 2023 - PhD, is Vice President, Nuclear Threat Initiative, Washington, DC. “Guarding Against Catastrophic Biological Risks: Preventing State Biological Weapon Development and Use by Shaping Intentions” Health Secur. July/August 2023; 21(4): 258–265. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10357110/> //DH

The devastating impact of COVID-19 has highlighted global vulnerabilities to high-consequence biological events. The international community was woefully unprepared for a pandemic that has led to millions of deaths and trillions of dollars in economic losses, and has upended daily life. However, notwithstanding the severe damage caused by COVID-19, it should be viewed as a warning shot.1 It will not be the last pandemic humanity faces, and the next high-consequence biological event could be as destructive or substantially worse.

We define global catastrophic biological risks (GCBRs) as biological events of tremendous scale that could cause severe damage to human civilization, potentially jeopardizing its long-term survival.2 The Johns Hopkins Center for Health Security has also developed a working definition of GCBRs,3 and this term is part of a broader discussion about global catastrophic risks that could arise from a variety of sources, including nuclear war, anthropogenic climate change, and advanced artificial intelligence that has not been sufficiently safeguarded.4,5 GCBRs could be caused by a naturally emerging infectious disease outbreak, an accidental release of a pathogen, or a deliberate attack. Naturally emerging infectious disease outbreaks that can grow into pandemics are likely to increase in frequency due to urbanization, globalization, and environmental degradation, and the world faces an increasing risk of high-consequence biological events resulting from accidental or deliberate misuse of the tools of modern bioscience and biotechnology.6-8 Not all outbreaks or global pandemics will grow to the scale of a GCBR as we define it in this article and as others have defined global catastrophic risks more broadly, because the threshold for this type of event is extremely high.

Although COVID-19 does not rise to the level of a GCBR-scale event, it has demonstrated that a biological event can have a devastating global impact, and it should serve as a warning to global leaders that the world needs much more robust protections against high-consequence biological events that could emerge in the future and be substantially worse.

In our view, human-caused biological events involving the accidental or deliberate misuse of an engineered pathogen are more likely to lead to a GCBR-scale event than a naturally emerging pandemic.9 Scientists have the capacity to deliberately or inadvertently engineer pathogens that are more virulent and transmissible than what nature creates by chance, and the upper limit of damage that could be caused by a human-engineered biological event is unknown.10-12 Prevention, early detection, and rapid response are all crucial for guarding against GCBR-scale events. However, in this article, we focus on effective strategies for preventing biological events that could become GCBRs, specifically by disincentivizing development and use of biological weapons by states and other powerful actors.

## 2NC/1NR Blocks

### They Say: “Non-unique – Global cooperation decreasing”

#### The US is partnering with 100 countries to cooperate on pandemic response now

Sophia Samantaroy, 2024 - Interview with Stephanie Psaki, the inaugural US Coordinator for Global Health Security and Deputy Senior Director for Global health security and biodefense at the US National Security Council. “US Expands Bilateral Pandemic Preparedness Measures and Establishes Global Health Security Coordinator Post”, Health Policy Watch, 6/10, <https://healthpolicy-watch.news/us-agencies-must-collaborate-to-tackle-one-health-challenges-an-interview-with-us-global-health-security-coordinator-stephanie-psaki/> //DH

Health Policy Watch: The COVID-19 pandemic illustrated that weaknesses in the public health response in one part of the world can be a threat globally. Why did the US Administration release a Global Health Security Strategy now?

Stephanie Psaki: The goal is to build on and learn from the lessons of the COVID-19 pandemic. We started working on this new strategy as we emerged from the acute phase of the COVID pandemic feeling like it’s going to be enough in our rearview mirror that we can understand and learn from the lessons and have a more forward-looking approach with how we can prevent and address the next pandemic.

We tried to not just assume that the next pandemic or the next biological threat will be the same as COVID-19 because chances are it will take a different form. We wanted to develop a system and a process that works quickly and is adaptable, depending on different threats that can easily bring in the different parts of the inter-agency that have relevant expertise to inform decision-making.

The last global health security strategy was released in the previous administration in 2019. So the idea was to build on that, five years later. Very practically this is something that was called for in a national security memorandum as well as the Global Health Security Act, passed as part of the NDAA [National Defense Authorization Act] last year. So both Congress and the President asked us to do it.

HPW: What is remarkable about the new strategy is the expansion of global partners from 50 to over 100 countries. Partners now include countries across almost all continents. How are these countries chosen?

Psaki: There are a number of different criteria we use to select partners. You’ll see that some of them are countries where we’ve been working with for a while in global health broadly or global health security, specifically, and then some are countries where this is a new global health security partnership.

Need is top of the list in terms of where there are gaps in their global health security capacity and their ability to detect, prevent, and respond to an outbreak. There also is political will. So these are partnerships that we formed with the countries – with the government directly to just make sure that there was interest, not just in getting government support, but also investing them domestically in global health security so that we can move the goal forward together.

And then the third criterion is risk both to the United States and to the rest of the world in terms of an outbreak. So looking at countries where there’s emergence of pathogens that pose a pandemic threat or you know, otherwise have expressed concern about their own preparedness.

We also launched a website that lays out who the 50 countries are, how long we’ve been working with them, what we’re working with them on.

#### Even if formal global cooperation stalls, the US is working bilaterally to ensure pathogen access for pandemic response

Sophia Samantaroy, 2024 - Interview with Stephanie Psaki, the inaugural US Coordinator for Global Health Security and Deputy Senior Director for Global health security and biodefense at the US National Security Council. “US Expands Bilateral Pandemic Preparedness Measures and Establishes Global Health Security Coordinator Post”, Health Policy Watch, 6/10, <https://healthpolicy-watch.news/us-agencies-must-collaborate-to-tackle-one-health-challenges-an-interview-with-us-global-health-security-coordinator-stephanie-psaki/> //DH

HPW: One of the biggest points of contention in the pandemic agreement negotiations is pathogen access and benefit sharing, governing how World Health Organization (WHO) member states share the biological material of pathogens that may cause pandemics. How has the US addressed this in its global health security strategy?

Psaki: This goes back to the point that every experience is not going to be exactly like the COVID pandemic. But if we think for example, about some of the other outbreaks that I mentioned before, Ebola, in particular, we’ve had very, very few Ebola cases in the US. It is not a major threat to the United States. And so when we are thinking about how to respond to Ebola and how to ensure that countermeasures are developed and available, to date, it has largely been to ensure that those countermeasures are available to people living in the countries where the outbreak is emerging.

We have had a really forward leaning approach, not just in this Administration, but historically from the United States to make sure that vaccines, therapeutics and countermeasures are available when there is an outbreak based on a pathogen with pandemic potential. But also other disease outbreaks with existing vaccines, thinking about cholera, dengue, and other outbreaks around the world.

We are by far the leading donor to respond to these outbreaks, most of which don’t have a direct impact on Americans. So when we talk about the importance of access to samples and the data early on in an outbreak, that is the quickest way to make sure that medical countermeasures are developed and available, not just to Americans but to the rest of the world. The only impact of constraining access to pathogens and data will allow the pathogen to spread more widely, and delay access to countermeasures. I would pose it the other way: what is the upside to holding back access to pathogens?

#### Current case law allows rapid international cooperation on pandemics - the Covid response was possible because of *Myriad*

Alex Moss, 24 - the executive director of the Public Interest Patent Law Institute. She was previously at the Electronic Frontier Foundation and a patent litigator at Sullivan & Cromwell. Letter to Senators Durbin, Coons, Tillis, and Representatives Issa and Lofgren on the Patent Eligibility Restoration Act of 2023, signed by American Civil Liberties Union, Electronic Frontier Foundation, Generation Patient, Public Citizen, Public Interest Patent Law Institute, and the R Street Institute. 1/30, <https://static1.squarespace.com/static/60e5457fb89be21d705fa914/t/65b9687cbb120871dd820938/1706649724600/Public+Interest+Letter+re+PERA+-+01.30.24.pdf> //DH

Existing Patent Eligibility Law Improves Pandemic Response and Preparedness

The striking contrast between the response to COVID-19 and severe acute respiratory syndrome (SARS) highlights the importance of patent eligibility limits. During the 2003 outbreak of SARS, the Supreme Court had not yet clarified that naturally occurring gene sequences are ineligible for patenting. That led multiple companies to seek patents on the virus and its genetic sequence.10 Concerned about the detrimental impact these patents would have on research needed to combat the SARS crisis, the U.S. Centers for Disease Control and Prevention (CDC) defensively filed its own patent applications, explaining this step was deemed necessary to “prevent folks from controlling the technology” and “give the industry and other researchers reasonable access to the samples.”11

Thanks to the Supreme Court’s clarification of patent eligibility law, patent races have not hampered the COVID-19 response. Scientists around the world are contributing information about the thousands of new strains of coronavirus they have sequenced, data that is vital to understanding the virus (including its many variants) and developing testing and treatments.11 While there have certainly been serious obstacles to providing sufficient access to testing and vaccines, this is not because longstanding patent eligibility limits undermined incentives to develop them. Dozens of laboratories have created and are offering diagnostic tests.12 Numerous companies across the world have developed and are offering effective vaccines.

Had it been otherwise, if one company had been allowed to patent the viral genome, the rapid development of testing, treatment, and multiple vaccines that occurred would have been substantially complicated and delayed, because the patent holder would have had the power to block others from developing or offering competing treatments, tests, or vaccines.13

### They Say: “Nonunique and Turn: Foreign Patents”

#### The Myriad decision set a global precedent against patenting genes – only limited patenting of legacy sequences occurs now

Jorge L. Contreras, 2023 - James T. Jensen Endowed Professor for Transactional Law and Director of the Program on Intellectual Property and Technology Law, University of Utah S.J. Quinney College of Law. Adjunct Professor, Department of Human Genetics, University of Utah School of Medicine “ PATHOGEN GENOMES AS GLOBAL PUBLIC GOODS (AND WHY THEY SHOULD NOT BE PATENTED)”, 55 N.Y.U. J. Int'l L. & Pol. 533, Nexis Uni, Accessed via University of Michigan //DH

As shown in Part III.A, attempts by research groups to patent pathogenic genomic sequences were fairly routine prior to the 2013 U.S. Supreme Court decision in *Myriad*.

These patents, however, resulted in disruption and delays to research during major disease outbreaks such as SARS, H5N1 influenza and MERS. After *Myriad*, though the sharing of pathogenic sequences has not always been without political controversy,115 patents on genomic sequences appear to have played little or no role in these disputes. Though some patents on pathogenic sequences have recently been issued in, for example, Europe (MERS)116 and Canada (Ebola),117 these are largely the result of legacy applications filed prior to the *Myriad* decision. Few patents claiming pathogenic genomic sequences have been filed anywhere after the *Myriad* decision.118

Why does Myriad, a U.S. Court decision, seem to carry such weight on a global scale? One possibility is that the demise of genomic sequence patents in the United States established a new set of international norms and expectations around pathogenic patenting. Researchers identifying a new pathogenic strain, aware that patents are unavailable in the United States, might not find it worthwhile to file elsewhere when research, development, and production could proceed there unimpeded by such patents.

#### Empirically – when pathogen patenting was legal, it had a greater negative effect on foreign cooperation

Jorge L. Contreras, 2023 - James T. Jensen Endowed Professor for Transactional Law and Director of the Program on Intellectual Property and Technology Law, University of Utah S.J. Quinney College of Law. Adjunct Professor, Department of Human Genetics, University of Utah School of Medicine “ PATHOGEN GENOMES AS GLOBAL PUBLIC GOODS (AND WHY THEY SHOULD NOT BE PATENTED)”, 55 N.Y.U. J. Int'l L. & Pol. 533, Nexis Uni, Accessed via University of Michigan //DH

Further, as discussed in Sections II.A and II.B, certain foreign governments have sought to delay international research on outbreaks and response efforts in order to gain concessions under the banner of "access and benefit sharing" (ABS).156 The most prominent example of this approach occurred during 2006-07, when the government of Indonesia refused to share samples of the H5N1 influenza virus with the WHO.157 Some countries adopted similar approaches during the MERS, Ebola and Zika outbreaks.158 If countries are willing to delay international research and the response to a pandemic in order to secure ABS benefits for themselves, then they are also [\*568] likely to use patents to extract further concessions from the international community. Demands for ABS concessions are not necessarily unjustified in view of past exploitation of local resources by foreign firms.159 Yet, these barriers to the international response to emergent disease outbreaks can negatively impact global health. Reintroducing pathogen patenting will give countries where outbreaks emerge yet another tool to hold up critical international research and development to the detriment of all.

### They Say: “No Link – Patents Won’t be Enforced”

#### Even if unenforced, gene patenting chills research and blocks cooperation

Jorge L. Contreras, 2023 - James T. Jensen Endowed Professor for Transactional Law and Director of the Program on Intellectual Property and Technology Law, University of Utah S.J. Quinney College of Law. Adjunct Professor, Department of Human Genetics, University of Utah School of Medicine “ PATHOGEN GENOMES AS GLOBAL PUBLIC GOODS (AND WHY THEY SHOULD NOT BE PATENTED)”, 55 N.Y.U. J. Int'l L. & Pol. 533, Nexis Uni, Accessed via University of Michigan //DH

2. Legal Limitations on the Enforcement of Patents During Public Health Crises

Some might argue that pathogen patents need not be limited because patent holders are already constrained from enforcing their patents, especially during global health crises. For example, in the United States, a patent holder cannot obtain a permanent injunction preventing an infringer from practicing a patented invention unless it demonstrates that the public interest would not be disserved by the entry of the injunction.172 Likewise, the International Trade Commission, when assessing the appropriateness of an exclusion order barring the importation of infringing goods into the United States, must take into account "the effect of such exclusion upon the public health and welfare."173 These limitations have significantly reduced the number of injunctions and exclusion orders that are issued with respect to medical and health-related technologies.174 And under 28 U.S.C. §1498, injunctions may not be obtained for patent infringement against the U.S. federal government or its contractors the remedy for such infringement is limited to monetary damages as assessed by the Court of Federal Claims.175

[\*572] These limitations might suggest that, at least in the United States, the existence of patents claiming pathogenic sequences might not represent a significant threat. However, the existence of patents on these basic research tools, no matter the eventual litigation outcomes, can chill research, impose delays, and provide leverage for the demand of unwarranted fees.176 Even meritless claims are costly to defend against and impose some level of risk to defendants, particularly in the United States, where fee shifting is rare. Despite the seeming assurance under §1498 that firms operating under government contracts to produce vaccines and other biomedical supplies will be shielded from actions in district court, this has not always been the case.177 Accordingly, while various litigation doctrines may tend to lessen the threat that pathogen patents will successfully be enforced in the United States, that threat is not entirely eliminated and may still impose a significant cost on firms that are engaged in research and development of pathogen-based biomedical products.

#### Commitments to not enforce patents still raise costs of cooperation – and state actors empirically use patents to block R&D

Jorge L. Contreras, 2023 - James T. Jensen Endowed Professor for Transactional Law and Director of the Program on Intellectual Property and Technology Law, University of Utah S.J. Quinney College of Law. Adjunct Professor, Department of Human Genetics, University of Utah School of Medicine “ PATHOGEN GENOMES AS GLOBAL PUBLIC GOODS (AND WHY THEY SHOULD NOT BE PATENTED)”, 55 N.Y.U. J. Int'l L. & Pol. 533, Nexis Uni, Accessed via University of Michigan //DH

1. Informal Non-Enforcement Commitments Are Not Enough

In the past, some entities that have patented pathogenic sequences have claimed to have done so with no intention of profiting from those patents or excluding others from conducting research or developing competing products. For example, the Erasmus researchers who patented the MERS virus insisted that their patent would not be used to inhibit research, and that they would continue to be open to collaboration.160 Likewise, the U.S. CDC, which obtained patents covering the SARS, H5N1, and Ebola viruses,161 has stated that such patents are "protective measure[s] to make sure access to the virus remains available to anyone."162 Similar sentiments were [\*569] expressed by the British Columbia Cancer Agency, which obtained patents claiming SARS-CoV.163 One Canadian researcher suggested that the government participated in obtaining this patent only to prevent private companies from doing the same.164

Of course, not all holders of pathogen patents have made such assurances and there is no guarantee that future holders, even of the same patents, will do so.165 It would be imprudent to rely on the goodwill of future (or current) holders of pathogen patents when assessing the threat posed by these patents. Additionally, it is not clear that much comfort can be derived even from those patent holders that have made such informal assurances regarding their intentions concerning enforcement. While patent holders' expressions of public-spirited intent may help defuse criticism, these statements taken alone are unlikely to result in legally binding commitments.166 Even [\*570] when public pledges are sufficiently robust to be legally binding, patentees have been known to violate these commitments, even during global health crises, thereby causing uncertainty in the market and requiring significant cost to enforce.167

Absent legally binding commitments - which no pathogen patent holder appears to have made yet - the public cannot rely on statements of goodwill by patent holders, even when they are government agencies and academic institutions. The NIH was partially responsible for enabling Myriad Genetics to corner the U.S. market for BRCA testing by granting the company full control over NIH's rights in the BRCA patents - patents that Myriad then asserted against other clinical test providers.168 Governmental and academic institutions have increasingly engaged in patent assertion and litigation, both directly and through professional patent assertion entities, for the sole purpose of monetizing their patent assets.169 The CDC is an aggressive enforcer of patents, as exemplified by its recent infringement action against one of its own researcher collaborators - an action held by a federal court to violate CDC's agreements with that collaborator.170 For all of these reasons, informal assurances that patents will not be asserted or monetized should not be relied upon. While more formal [\*571] pledge mechanisms may be utilized by some patent holders,171 a more reliable and comprehensive solution is to stop issuing pathogen patents at all.

#### The research exception has been construed narrowly by courts and doesn’t really exist

Josh Saul, 2024 - J.D. Candidate, 2025, Fordham University School of Law; Ph.D., 2021, Massachusetts Institute of Technology; B.A., 2014, University of California, Berkeley. “GENE PATENTS: STRIKING THE RIGHT BALANCE BETWEEN INCENTIVE AND INNOVATION” FORDHAM LAW REVIEW, Vol. 92: 2765, May, <https://fordhamlawreview.org/wp-content/uploads/2024/05/Vol.-92_29_Saul-2765-2804.pdf> //DH

Additionally, an accused infringer can argue that their use is covered by the research use exception, which permits certain uses of a patented innovation that would otherwise constitute infringement.76 Such uses include those undertaken “for amusement, to satisfy idle curiosity, or for strictly philosophical inquiry”—often uses associated with academic pursuits77—as well as some limited statutorily authorized exceptions.78 However, courts have traditionally construed the research use exception narrowly, for example, holding that the use of patented materials by universities to conduct research furthers the university’s business objective by enhancing its status and thus does not fall under the exception.79 Such a narrow scope for the research use exception has led some to suggest that— outside of statutory exceptions—there is effectively no research exception in the United States.80

### They Say: “Turn: Gene Patents key to Vaccines”

#### Patenting pathogens creates patent thickets that block research and inhibit information sharing necessary for pandemic response

Richard L. Blaylock, 2024 - partner with the law firm Pillsbury Winthrop Shaw Pittman LLP and have been a practicing intellectual property attorney since the mid-1990s. Statement Before the Subcommittee on Intellectual Property of the Committee on the Judiciary United States Senate Hearing on The Patent Eligibility Restoration Act – Restoring Clarity, Certainty, and Predictability to the U.S. Patent System, 1/24, <https://www.judiciary.senate.gov/imo/media/doc/2024-01-23_-_testimony_-_blaylock.pdf> //DH

Thus, PERA would threaten the ongoing discovery of new biomarkers relevant to personalized or precision medicine that depends on the characterization of the specific variants of a patient’s genes. PERA would permit all such new discoveries to be patented and privatized. The result would be the great proliferation of patents covering the many genetic variants for which clinicians would want to test a patient. A patent thicket would emerge that would impede patient care by making it very hard to conduct genetic testing comprehensively for a patient.

However, the threats to the life sciences research, innovation and patient care are not limited just to concerns about our unfolding appreciation of additional biomarkers and their effective incorporation into precision medicine. Had PERA been the law at the start of the COVID-19 pandemic it would have severely interfered with and almost certainly impeded the progress of COVID-19 diagnostics and vaccines. The severe acute respiratory syndrome (SARS) coronavirus 2 was new at the time and therefore its characteristic DNA and protein sequences would have been patentable under PERA. Indeed, the virus itself, for example in an attenuated (or “killed”) form would have been patentable as a traditional vaccine. And the sequences needed to make an RNA vaccine would also have been privatized and constrained research and development of the vaccines that were the cornerstone of the response to the pandemic. The opportunity to patent would translate into a competitive imperative to patent and would have dramatically curtailed sharing of information which was critical to the rapid public health response in the development of diagnostics and vaccines.

The fact that the pandemic preceded PERA does not mean that PERA would not pose future harm. Under PERA, one could patent an unpublished viral gene by claiming the gene in its isolated, purified or enriched form. Note that practically all genetic sequencing involves an enrichment step and thus such a patent would cover anyone sequencing a sample of the virus’s DNA for research or diagnostic purposes. Even the whole virus could be patented if its virality is attenuated or killed. A traditional form of vaccine is made of attenuated virus which could hinder the development and access to necessary vaccines. The potential to patent newly observed viruses would impede public health goals reliant upon data sharing because there would be an incentive to make a patent filing before disclosing publicly a newly observed virus. This could even apply to new variants of the SARS coronavirus 2 that may yet emerge.

#### But downstream innovation that results from research can be patented now – COVID shows it’s common despite the lack of patents

Jorge L. Contreras, 2023 - James T. Jensen Endowed Professor for Transactional Law and Director of the Program on Intellectual Property and Technology Law, University of Utah S.J. Quinney College of Law. Adjunct Professor, Department of Human Genetics, University of Utah School of Medicine “ PATHOGEN GENOMES AS GLOBAL PUBLIC GOODS (AND WHY THEY SHOULD NOT BE PATENTED)”, 55 N.Y.U. J. Int'l L. & Pol. 533, Nexis Uni, Accessed via University of Michigan //DH

4. There Are Ample Opportunities to Patent Downstream Innovations Beyond Pathogen Sequences

It is not necessary to patent underlying pathogenic sequences in order to protect novel and innovative technologies such as diagnostics, vaccines, therapeutics, and genetic modifications. There are, in fact, numerous innovative aspects of these technologies that can be and routinely are patented.132 [\*562] For example, the manufacture and delivery of vaccines involves multiple complex technologies and processes including active ingredients, adjuvants, delivery vectors and manufacturing, storage, and transport processes.133 According to a 2012 WIPO study, there were more than 50,000 patents and published patent applications in fifty-seven countries that claimed the active ingredients of vaccines for pneumonia, typhoid and influenza alone.134 Similar levels of variety and opportunities for innovation exist in the area of therapeutics.135 For instance, Regeneron filed more than one hundred patent applications around the world for its Ebola drug Inmazeb,136 even though the viral sequence was publicly available in GenBank.

The broad availability of patents protecting innovation directed toward the containment and prevention of pathogenic disease outbreaks was clearly demonstrated during the COVID-19 pandemic. While, as noted in Part III.B, there are no known patents claiming the SARS-CoV-2 genomic sequence or its variants, several diagnostics and vaccines for COVID-19 were developed, tested, and administered to the public in record time. Even without patents covering the viral genomic sequence, the governmental and private sector researchers that [\*563] developed these technologies applied for large numbers of patents. For example, one 2020 study found that with respect to mRNA vaccine technology alone, fifty-six different entities ranging from large pharmaceutical companies such as Bayer, Bristol Myers Squibb, and GlaxoSmithKline to small and medium-sized firms including Moderna, CureVac, and BioNTech, controlled nearly 120 different patent families.137 Several reports and studies describe the different patented vaccine technologies developed to address COVID-19, from novel spike proteins to lipid nanoparticle delivery mechanisms to specialized adjuvant excipients.138 Perhaps the most convincing evidence that sizeable numbers of patents have been issued in this field is the patent litigation being waged by half a dozen vaccine manufacturers and technology developers, recently dubbed the "COVID-19 Patent Wars".139 All of these examples demonstrate that COVID-19 technology innovations - and vaccines in particular - have been amply protected by patents and are extremely profitable, all without patents on pathogenic sequences.

#### Patents on genetic information block research cooperation which is more essential to innovation

Joe Mullin, 24 - is a senior policy analyst at the Electronic Frontier Foundation, where he works on patents, encryption, platform liability, and free expression online. “Congress Must Stop Pushing Bills That Will Benefit Patent Trolls” 3/12, <https://www.eff.org/deeplinks/2024/03/congress-must-stop-pushing-bills-will-benefit-patent-trolls?scrlybrkr=241c98ff> //DH

Don’t Bring Back Patents On Human Genes

PERA goes further than software. It would also overturn a Supreme Court rule that prevents patents from being granted on naturally occurring human genes. For almost 30 years, some biotech and pharmaceutical companies used a cynical argument to patent genes and monopolize diagnostic tests that analyzed them. That let the patent owners run up the costs on tests like the BRCA genes, which are predictive of ovarian and breast cancers. When the Supreme Court disallowed patents on human genes found in nature, the prices of those tests plummeted.

Patenting naturally occurring human genes is a horrific practice and the Supreme Court was right to ban it. The fact that PERA sponsors want to bring back these patents is unconscionable.

Allowing extensive patenting of genetic information will also harm future health innovations, by blocking competition from those who may offer more affordable tests and treatments. It could affect our response to future pandemics. Imagine if the first lab to sequence the COVID-19 genome filed for patent protection, and went on to threaten other labs that seek to create tests with patent infringement. As an ACLU attorney who litigated against the BRCA gene patents has pointed out, this scenario is not fantastical if a bill like PERA were to advance.

#### Covid proves – the reason testing and vaccine development occurred quickly was the lack of pathogen patenting

Jorge L. Contreras, 2023 - James T. Jensen Endowed Professor for Transactional Law and Director of the Program on Intellectual Property and Technology Law, University of Utah S.J. Quinney College of Law. Adjunct Professor, Department of Human Genetics, University of Utah School of Medicine “ PATHOGEN GENOMES AS GLOBAL PUBLIC GOODS (AND WHY THEY SHOULD NOT BE PATENTED)”, 55 N.Y.U. J. Int'l L. & Pol. 533, Nexis Uni, Accessed via University of Michigan //DH

The genomic sequence1 of SARS-CoV-2 (the virus responsible for COVID-19) was first elucidated in early January 2020 by a team of researchers in China.2 On January 5, they uploaded the sequence to the publicly accessible GenBank database maintained by the U.S. National Center for Biotechnology Information.3 On January 11, an Australian researcher [\*536] posted the sequence to the website Virological.org and attracted widespread attention to its availability via Twitter.4 Days later, new diagnostic tests for the virus had been developed.5 Within months, new COVID-19 vaccines were being tested.6 By October 2021, nearly five million different sequences of the SARS-CoV-2 virus had been uploaded to public databases,7 where they continue to be used to monitor the evolution of the virus, to identify virulent mutations, and to trace the spread of infection.8

The speed and extent of international research cooperation in response to COVID-19 was immediate and widespread.9 SARS-CoV-2 sequence data was utilized by a broad range of researchers from geneticists and virologists to epidemiologists [\*537] and public health officials.10 As one researcher observed, "[t]he enormous, immediate impact of sharing this data highlights the wealth of information encoded in pathogen genomes, particularly for understanding their origins and potential to cause disease."11 This sentiment was echoed by the Director of the U.S. Office of Science and Technology Policy (OSTP), who stated that "[i]mmediate public access to COVID-19 research is a powerful case study on the benefits of delivering research results and data rapidly to the people."12 The COVID-19 pandemic has brought into sharp focus the value of open access to and rapid sharing of pathogenic genomic data in response to infectious disease outbreaks.13

Data sharing at the speed and on the scale observed with COVID-19 has not always been the norm. During the H5N1 influenza pandemic and the SARS and MERS coronavirus outbreaks, researchers sought to patent newly identified viral genomic sequences shortly after they were determined.14 These efforts stymied research cooperation and imposed delays and barriers to the development of diagnostics, vaccines, and therapeutics.

[\*538] The genomic sequence of SARS-CoV-2 and its many variants, however, were not patented. This lack of patenting activity on a potentially lucrative pathogen is likely due to the unavailability of U.S. patents on naturally occurring genomic sequences following the 2013 Supreme Court decision in Association for Molecular Pathology v. Myriad Genetics.15 Since this decision, U.S. patents have not been available on pathogenic genomes, and while few countries have explicitly followed the U.S. in abolishing patent protection on naturally occurring genomic sequences, such patents have rarely been sought.16 It is probable that the unavailability of patent protection for pathogenic sequences motivated researchers in China to share SARS-CoV-2 sequence data so rapidly.

### They Say: “Disease Won’t Cause Extinction”

#### New pandemics could kill billions and outweighs nuclear war

Anjali Gopal, et al, 2023 – Research Scientist at MIT, where her work spans technical and policy research at the intersection of biosecurity, pandemic preparedness, and emerging technology. “Securing Civilisation Against Catastrophic Pandemics” October, <https://dam.gcsp.ch/files/doc/securing-civilisation-against-catastrophic-pandemics-gp-31> //DH

By the end of 2022 SARS-CoV-2 had infected most of humankind and directly or indirectly killed perhaps 20 million people – an effective global fatality rate of 0.25% inclusive of reinfections.8 Many viruses are far more lethal. Variola major, the causative agent of smallpox, killed approximately 30% of patients while maintaining high transmissibility (estimated R0=3.5-6);9 the virus was responsible for the deaths of 500 million people in the century before its eradication.10 The 1971 Aralsk outbreak, which involved a potentially weaponised strain, was transmitted by vaccinated individuals and exhibited 100% lethality in the three unvaccinated patients.11 More devastating pathogens exist in other animals that live in tight-knit groups: rabbit haemorrhagic disease virus (RHDV) is highly contagious, transmitted asymptomatically in young animals, and 80-100% lethal in adults.12 If such a virus were to sweep the world anywhere near as quickly as the Omicron variant of SARS-CoV-2, billions would perish.

Even at the height of the Cold War, a city-targeting nuclear exchange would not have seriously threatened the viability of most nations in the southern hemisphere.13 Given humankind’s demonstrated failure to reliably contain the moderately transmissible SARS-CoV-2 virus and the dearth of large-scale subsequent investments aimed at halting pandemic transmission by any government, a sufficiently severe pandemic-class agent would threaten the stability of every unprepared nation. Today, this includes every country in the world. Thankfully, most of the technologies required to mount a reliable defence already exist. With dedicated preparations, many nations could become highly resistant to catastrophic pandemics – but only if they anticipate more severe threats than a reprise of COVID-19.

#### Engineered pathogens create a much higher risk of an extinction-level pandemic

Anjali Gopal, et al, 2023 – Research Scientist at MIT, where her work spans technical and policy research at the intersection of biosecurity, pandemic preparedness, and emerging technology. “Securing Civilisation Against Catastrophic Pandemics” October, <https://dam.gcsp.ch/files/doc/securing-civilisation-against-catastrophic-pandemics-gp-31> //DH

An accident involving a biological weapons programme working with a sufficiently dangerous pathogen could also trigger a Wildfire scenario. Rates of civilian laboratory-acquired infections and the history of accidental bioweapon releases yield estimated annual likelihoods mostly in the single-digit percentages conditional on a nation-state bioweapons programme working with a Wildfire agent (see Appendix 1). This includes the possibility of a rogue state building a system to deliberately cause a Wildfire pandemic as a dead-hand switch to deter outside interference, which could accidentally leak. Given that the Soviet Union’s bioweapons programme apparently aimed at enhancing variola major,24 there are reasons to believe current and future programmes may pursue similar goals, particularly if other nations view a specific pandemic-class agent as a credible threat.

The last potential source of a Wildfire pandemic is a deliberate release. Zealots of many different ideologies aim to inflict mass death and civilisational collapse, from omnicidal cultists,25 to apocalyptic terrorists,26 anti-civilisation or suffering-focused ideologues,27 deep ecologists,28 nihilists,29 and those who see no future for their own value system and way of life.30 While the capabilities of these non-state actors are severely limited relative to those of nation states, civilian research will eventually provide widespread access to genomic blueprints: many well-meaning research programmes explicitly aim to identify credible pandemic pathogens and share their genome sequences and pathogen-specific reverse genetics protocols.31 Even if they were to refrain from such activities, other advances in biotechnology and artificial intelligence will provide widespread access. Scientists will continue to seek to understand and program biology, including pandemics, and therefore will eventually learn to create them.

Thankfully, the vast majority of natural pandemic pathogens are not at the Wildfire level, sharply limiting the probability that any given deliberate release event would trigger a Wildfire scenario. Eventually, however, such an agent will be discovered or created, whether through advances in artificial intelligence,32 increasingly powerful biological design tools,33 or well-intended efforts to enhance the transmission of an already lethal virus.34 If the genomic blueprints to such an agent become widely available and access to unscreened DNA synthesis35 remains widespread,36 the likelihood of a deliberate Wildfire pandemic will increase sharply. Under these circumstances, historical data suggests that the annual probability of a deliberate Wildfire release may substantially exceed that of an accidental release from a state programme, with likelihoods ranging from the low single to low double digits per year (see Appendix 1).

#### COVID had a low mortality rate and still killed millions. More lethal pandemics are possible and risk extinction

Joanna Nurse, 2023 - Strategic Advisor, InterAction Council; Director, Health Systems, Commonwealth Centre for Digital Health; Co-Chair, WAAS Existential Risks for Humanity (ER4H) Working Group; Fellow, World Academy of Art and Science. “Human Security and Existential Threats: A Governance Framework for Planet, Peace, People & Prosperity” Cadmus: Trieste: The Risk Institute, August, Proquest. Accessed via University of Michigan //DH

Historically, Pandemics have had a decimating impact upon human civilisation. For example, the bubonic plague killed an estimated 30-60% of the European medieval population, with cities and urban populations mainly being affected. Whilst a devastating 90% of the indigenous populations died following colonisation, of which the main cause was due to a previously uninfected population being exposed to measles, smallpox and influenza for the first time. Even in the 20th Century smallpox killed an estimated 100 million people around the world before it was totally eliminated in 1980; (Oldstone M, 2020). The COVID-19 pandemic has had a fatality rate of approximately 3% of those infected-a similar rate to the Spanish flu, whilst in comparison the mortality rate from Ebola was approximately 50%. The devasting impact of pandemics have altered the course of history and shaped our current geo-political landscape. The recent experience of COVID-19 with a relatively low mortality rate, reveals how disruptive pandemics are to human civilisation-even without the risk of decimating the human population.

Existential risks exist from pandemics that are allowed to spread widely, with new mutations emerging. A particular threat is from the increasing development of synthetic biology and 'gain of function' research, whereby infections are genetically engineered to enhance their lethality for research or for the purposes of biological warfare. The potential existential risks from engineering future pandemics are of particular concern, especially as the technology becomes increasingly available, combined with very variable and absent governance mechanisms. The widescale and rapid spread of the COVID-19 Pandemic revealed how unprepared individual countries and the global community were for dealing with an infection with relatively low fatality rates, and calls into question our current capacity and collective ability to deal with a more lethal pandemic in the future; (IAC, 2022).

### Disease Turns War

#### Pandemics increase the risk of nuclear war

Tatsujiro Suzuki, 2021 – Vice President of the Research Center for Nuclear Weapons Abolition, Nagasaki University. This report is an outcome document of the Nagasaki 75th Anniversary Pandemic-Nuclear Nexus Scenarios Project, co-sponsored by the Research Center for Nuclear Weapons Abolition, Nagasaki University (RECNA), the Asia-Pacific Leadership Network for Nuclear Non-proliferation and Disarmament (APLN), and the Nautilus Institute for Security and Sustainability, in cooperation with the Nagasaki University Planetary Health Project and the Panel on Peace and Security of Northeast Asia (PSNA). “Pandemic Futures and Nuclear Weapon Risks: The Nagasaki 75th Anniversary pandemic-nuclear nexus scenarios final report” Journal for Peace and Nuclear Disarmament Volume 4, 2021 - Issue sup1, https://www.tandfonline.com/doi/pdf/10.1080/25751654.2021.1890867 //DH

The relationship between pandemics and war is as long as human history. Past pandemics have set the scene for wars by weakening societies, undermining resilience, and exacerbating civil and inter-state conflict. Other disease outbreaks have erupted during wars, in part due to the appalling public health and battlefield conditions resulting from war, in turn sowing the seeds for new conflicts. In the post-Cold War era, pandemics have spread with unprecedented speed due to increased mobility created by globalization, especially between urbanized areas. Although there are positive signs that scientific advances and rapid innovation can help us manage pandemics, it is likely that deadly infectious viruses will be a challenge for years to come.

The COVID-19 is the most demonic pandemic threat in modern history. It has erupted at a juncture of other existential global threats, most importantly, accelerating climate change and resurgent nuclear threat-making. The most important issue, therefore, is how the coronavirus (and future pandemics) will increase or decrease the risks associated with these twin threats, climate change effects, and the next use of nuclear weapons in war.Footnote5

Today, the nine nuclear weapons arsenals not only can annihilate hundreds of cities, but also cause nuclear winter and mass starvation of a billion or more people, if not the entire human species. Concurrently, climate change is enveloping the planet with more frequent and intense storms, accelerating sea level rise, and advancing rapid ecological change, expressed in unprecedented forest fires across the world. Already stretched to a breaking point in many countries, the current pandemic may overcome resilience to the point of near or actual collapse of social, economic, and political order.

In this extraordinary moment, it is timely to reflect on the existence and possible uses of weapons of mass destruction under pandemic conditions – most importantly, nuclear weapons, but also chemical and biological weapons. Moments of extreme crisis and vulnerability can prompt aggressive and counterintuitive actions that in turn may destabilize already precariously balanced threat systems, underpinned by conventional and nuclear weapons, as well as the threat of weaponized chemical and biological technologies. Consequently, the risk of the use of weapons of mass destruction (WMD), especially nuclear weapons, increases at such times, possibly sharply.

The COVID-19 pandemic is clearly driving massive, rapid, and unpredictable changes that will redefine every aspect of the human condition, including WMD – just as the world wars of the first half of the 20th century led to a revolution in international affairs and entirely new ways of organizing societies, economies, and international relations, in part based on nuclear weapons and their threatened use. In a world reshaped by pandemics, nuclear weapons – as well as correlated non-nuclear WMD, nuclear alliances, “deterrence” doctrines, operational and declaratory policies, nuclear extended deterrence, organizational practices, and the existential risks posed by retaining these capabilities – are all up for redefinition.

A pandemic has potential to destabilize a nuclear-prone conflict by incapacitating the supreme nuclear commander or commanders who have to issue nuclear strike orders, creating uncertainty as to who is in charge, how to handle nuclear mistakes (such as errors, accidents, technological failures, and entanglement with conventional operations gone awry), and opening a brief opportunity for a first strike at a time when the COVID-infected state may not be able to retaliate efficiently – or at all – due to leadership confusion. In some nuclear-laden conflicts, a state might use a pandemic as a cover for political or military provocations in the belief that the adversary is distracted and partly disabled by the pandemic, increasing the risk of war in a nuclear-prone conflict. At the same time, a pandemic may lead nuclear armed states to increase the isolation and sanctions against a nuclear adversary, making it even harder to stop the spread of the disease, in turn creating a pandemic reservoir and transmission risk back to the nuclear armed state or its allies.

### Disease Turns Agriculture

#### Pandemics will collapse the global food supply, killing billions

Anjali Gopal, et al, 2023 – Research Scientist at MIT, where her work spans technical and policy research at the intersection of biosecurity, pandemic preparedness, and emerging technology. “Securing Civilisation Against Catastrophic Pandemics” October, <https://dam.gcsp.ch/files/doc/securing-civilisation-against-catastrophic-pandemics-gp-31> //DH

The magnitude of a risk is the product of severity and likelihood. A global collapse of modern civilisation would constitute the greatest disaster in human history. In addition to the direct casualties from Wildfire or Stealth pathogens, the loss of the essential workers who currently generate and distribute industrially produced fertiliser – to name just one essential process – would cause 3 billion people to starve.20 Unlike comparably severe natural disasters such as major asteroid impacts and supervolcanic eruptions,21 the likelihood of a civilisation-threatening pandemic is non-trivial and growing as access to advanced biotechnology increases.

# Prizes Counterplan

### 1NC – Prizes Counterplan

#### The next offcase position is the prizes counterplan

#### Text: The United States federal government should establish an innovation prize system for novel, non-obvious inventions that are ineligible for patents.

#### The counterplan solves better through commercialization and follow on innovation. Patents’ monopoly power lowers social welfare

Maxwell Tabarrok, 2021 - Likely an undergraduate economics major at the University of Virginia when this was written. Currently is a pre-doctoral researcher at Dartmouth College, previously a Research Assistant at the University of Virginia, a Research Intern at the Charter Cities Institute. “Patents vs Prizes” Maximum Progress blog, 11/14, <https://www.maximum-progress.com/p/patents-vs-prizes> //DH

Most debates about government funding of science and technology revolve around the extent to which the government should support research, usually measured in dollars. Those against government funding will point out crowding out effects and the dangers of government picking winners, while those for it will argue that because scientific discovery produces positive externalities it will be underproduced by a private market. What’s left out of these debates is the effect of how the government chooses to support R&D. Patents have been a standard method for centuries but their distortionary and monopolistic effects work to offset their benefits. Prizes can offer all of the benefits of patents without the costly second order effects.

Properties of Technology

Evaluating the effectiveness of prizes and patents requires understanding the value of what they are trying to promote: technological growth. There are two elements to technological growth: Zero-to-one improvements and one-to-n improvements. Both are required for it to have large effects on human welfare. Zero-to-one improvements are new discoveries that extend our understanding and control of the universe. The Wright Brother’s first flight at Kitty Hawk was a zero-to-one moment. One-to-n improvements take the ideas and prototypes of zero-to-one and commercialize them. The growth of aviation from a scientific marvel to mass-market product was one-to-n. Mass production, vertical integration, and learning by doing lower the costs of new technologies and bring them to a wide audience. One-to-n improvements are the link between technological discovery and the impacts on human welfare that we actually care about.

Another important aspect of technological growth is that ideas are infinitely copy-able. This is unlike all other physical goods. If one wishes to share a pie they made, they must take slices away from their own portion. Once an idea is discovered, it can be spread to every mind without requiring anything to be taken from the originator. Physical goods are divided among people, but ideas are multiplied. This property of ideas implies that we are losing out whenever ideas are not maximally spread. Since the marginal cost of producing new copies of an idea is basically zero, if there is anything to be gained from spreading an idea, it should be done.

Patents vs Prizes

These two properties of technological growth usefully frame the properties of prizes vs patents. Both strategies of government support target zero-to-one technological growth. Prizes do this directly by simply paying for new discoveries, while patents reward inventions with the promise of monopoly profits. Where they begin to differ is in their effects on the one-to-n growth.

The promise of monopoly profits incentivizes individuals and firms to invent. Since invention produces a positive externality, this government incentive pushes the supply of new ideas closer to the social optimum. However, several costs either push against the supply increase promoted by patents or dilute the value of the ideas that are protected by them. Patents reward idea creators by restricting the spread and use of the idea after its creation. Since ideas cost nothing to spread once they are created, restricting the number of people who can use them after conception is a waste of resources. To maximize the social impact of an idea, it should be spread and productized as quickly as possible, but this restriction is required to produce monopoly profits. Patents require resources to enforce. Tens of billions of dollars are spent by inventors and firms each year litigating patent infringement in courts, and the average case costs more than three million dollars. The time and money spent on litigation dissipates the incentive that patents provide for invention. Patents can also harm future innovation by attaching licensing fees to combinations of and incremental improvements to patented ideas. All of invention is building off of previous ideas to an extent. Since patents add costs to iteration and the spread of new ideas/technology, they work against their original goal of subsidizing invention.

Prizes also incentivize invention but in a simpler way. Instead of promising to enforce monopoly profits, prizes simply pay the inventor upfront. For any given patent there is a quantifiable value of monopoly rights which depends on the marginal cost of production and demand for the product. Monopolies can sustainably charge a price above what it costs to make their product (including opportunity cost) because no other firm is allowed to enter the market and undercut them.

A prize could be awarded equal to the value of these monopoly profits. This transfer would have exactly the same effect on the supply of innovations as the patent, but without incurring the costs of monopoly. The rewarded idea could be spread openly, commercialized by anyone, and built upon by other inventors.

### Net Benefit: Inflation

#### Patents increase consumer prices, but prizes avoid the link

Buccafusco, Christopher and Weinstein, Samuel N. (2024) - Christopher Buccafusco is the Edward & Ellen Schwarzman Distinguished Professor at Duke University School of Law. Samuel N. Weinstein is a Professor and Co-Director of the Heyman Center on Corporate Governance at the Benjamin N. Cardozo School of Law, Yeshiva University "Antisocial Innovation," Georgia Law Review: Vol. 58: No. 2, Article 4. Available at: https://digitalcommons.law.uga.edu/glr/vol58/iss2/4

Patents differ from prizes, grants, and tax incentives in another way. While the latter are paid directly by the government (and, thus, taxpayers) through spending, issuing patents doesn’t cost the government much.84 But patents definitely have a price. Patent incentives are financed by consumers of products that incorporate patents who must pay higher prices for those goods.85 By enabling patent owners to charge supracompetitive prices, patents act as a tax paid by consumers for the benefit of innovators.86 Thus, unlike other innovation expenditures, when governments promote innovation with the exclusive rights patents confer, their expenditures are “off-budget.”87 This means that it is enormously difficult to estimate the size of society’s contribution to innovation promotion through higher prices for patented goods.88

### They Say: “No Net Benefit - Patents Cause Competition”

#### Patents create monopoly pricing – prizes are comparatively better at innovation and competition

Anthony E. Chavez, 2021 - Professor of Law, Chase College of Law, Northern Kentucky University “Turning Carbon Into Gold: Incentivizing The New Alchemy” 32 Duke Envtl. L. & Pol'y F. 1 \*, Nexis Uni, Accessed via University of Michigan //DH

Analysts have identified a number of benefits that prizes have over other incentive systems, especially patents. A primary advantage is that prizes can encourage researching technologies that markets do not value sufficiently. 254 Markets fail to encourage the development of technologies whose market prices do not reflect their value. 255 Prizes (and grants) "reward innovations that 'are publicly valued but not privately marketable.'" 256 A government prize, for instance, is essentially a government intervention into the markets where they have failed to sufficiently incentivize a public good. 257 Prizes are also [\*31] well suited to encourage high-risk research on technologies that are still at their earliest stages. 258 Similarly, they might also be well suited to encouraging research in circumstances where scientific opinion is divided concerning the appropriate path to direct technological development. 259In other words, prizes fit circumstances where goals are clear, but the best paths to achieve them are less certain. 260 A number of competitions have demonstrated this pattern. Specifically, the Longitude Bill, the Netflix Prize, and the Progressive Insurance Automotive X Prize all involved identifiable goals where the means to achieve them were uncertain. 261 By establishing criteria that encourage research in particular areas, prizes can offer ex ante incentives to pursue a targeted objective. 262 Finally, by setting criteria that suggest a particular result, organizers can signal the importance of a particular issue. 263

Prizes also avoid the deadweight loss of patents. 264 Unlike the X Prize Foundation's provisions, organizers of other prizes usually require winners of traditional prizes to place their intellectual property into the public domain. 265 Consequently, if the proceeds from prizes are comparable to the returns inventors would receive from patent rights, then inventors receive fair compensation while the public gains ready access to their inventions without incurring the deadweight loss of monopoly patent rights. 266 In programs like those of the X Prize Foundation, which allow innovators to retain their patent rights, the prizes augment the rewards of the patent system. 267 This may be especially helpful where markets do not price in the social value of innovations because the prizes can help to close the gap between investment cost and market compensation. 268

Another advantage of prizes is that they often broaden the pool of [\*32] prospective innovators. Prizes attract persons who might not otherwise engage in commercial efforts 269 or who might not otherwise have pursued a particular field. 270 The competitive nature of prizes may also attract new parties interested in pursuing the awards. 271 As with the Longitude Act, prizes can attract parties who might normally not be among the anticipated pool of prospective inventors. 272Also, by broadening the range of participants in the competition, prizes bring the advantages of diversification to the efforts, thereby increasing the likelihood that the competition will generate solutions to the problem. 273 Prizes broaden the pool of participants in part because they also bring attention to their subject matter. 274

The publicity surrounding prizes appears to be a significant advantage that they provide. Prizes can both generate interest in a topic and add to the prestige of participants. 275 Indeed, historical analysis suggests that the publicity from prizes without cash awards can encourage innovation. 276 One result of publicity is that it attracts additional inventors to the subject. 277Furthermore, prizes often signal to other possible inventors the significance of innovation in a particular area. 278

Unlike patents, prizes do not impede - and can support - follow-on innovations. As discussed previously, the exclusive rights and monopoly pricing of the patent system can deter follow-on innovations. 279 Empirical evidence indicating that patents deter such innovations suggests that prizes would be more favorable to them. 280Similarly, assuming that large awards encourage substantial research efforts for breakthrough inventions, organizers can use a series of smaller prizes to encourage follow-on inventions. 281

#### Patent monopoly power means research is wasted – only the patent holder reaps the benefits. 95% of infringement isn’t willful – it represents R&D that was wasted because someone else discovered the same thing, but wasn’t first to file

Derek Khanna, 2015 - associate fellow of the R Street Institute. He previously was acting policy director for Lincoln Labs, a visiting fellow at Yale Law School’s Information Society Project, JD from Georgetown University Law Center. “USING PRIZES TO SPUR INNOVATION AND GOVERNMENT SAVINGS” R Street Policy Study No. 44, <https://web.archive.org/web/20160304015157/https://www.rstreet.org/wp-content/uploads/2015/11/RSTREET44.pdf> //DH

Even when they work properly, patents limit competition by granting a 20-year legal monopoly.7 De jure legal monopolies are able to use the power of the law to extract excess rents from consumers and other firms. In practice, it is not unusual that multiple teams work simultaneously on similar concepts and make similar or iterative discoveries, but only the team that receives the patent enjoys the windfall. The others typically will be barred from bringing their independent invention to market, rendering the research and development invested in such projects sunk costs.

As one notable example: the Wright brothers made a modest improvement to existing flight technology, but their patent allowed them to monopolize the U.S. market and, in essence, to prevent innovation until World War I.8 Other pioneers in the field effectively were shut out from bringing similar, even superior, technologies to market. As Steven Johnson demonstrates with dozens of anecdotes in his book Where Good Ideas Come From, independent invention is the rule, not the exception.9 Outside of the pharmaceutical industry, more than 95 percent of patent lawsuits do not even claim willful infringement – essentially conceding that the accused infringers likely developed the technology independently.10

#### Business will maximize patents at the expense of innovation

Derek Khanna, 2015 - associate fellow of the R Street Institute. He previously was acting policy director for Lincoln Labs, a visiting fellow at Yale Law School’s Information Society Project, JD from Georgetown University Law Center. “USING PRIZES TO SPUR INNOVATION AND GOVERNMENT SAVINGS” R Street Policy Study No. 44, <https://web.archive.org/web/20160304015157/https://www.rstreet.org/wp-content/uploads/2015/11/RSTREET44.pdf> //DH

If businesses are rational economic actors, we should assume they will maximize their opportunities to file for and obtain patents. When patents of dubious quality are granted, this distortion can become more pronounced and more harmful to the goal of innovation. Maximizing patents can mean investing in lawyers, rather than engineers, and filing applications for inventions and processes which the firm has no intent ever to bring to market. In such cases, innovation and competition suffer, for no discernable benefit.

### They Say: “Looting Deficit”

#### Rent seeking can be discouraged by requiring the prize to incorporate comparative effectiveness trials

Heidi Williams, 2010 – Professor of Economics at Dartmouth College and Director of Science Policy at the Institute for Progress. “Incentives, prizes, and innovation” 11/14, <https://web.archive.org/web/20170125070713/https://www.nsf.gov/sbe/sosp/tech/williams.pdf> //DH

(2) How can rewards under prize mechanisms be calibrated to be roughly in line with the incremental social benefits of the rewarded innovations, in the absence of a price mechanism? Here, a key issue is to design metrics that are non-maniputable by firms, thus avoiding distortions that could otherwise arise due to pure rent seeking. In the case of prize awards for pharmaceutical products, this could involve the use of comparative effectiveness trials to determine the incremental social value of a new pharmaceutical innovation, relative to the next best available therapy.

#### Patents link just as much or more

Michele Boldrin and David Levine, 2013 - Michele Boldrin is Joseph Gibson Hoyt Distinguished University Professor of Economics and David K. Levine is John H. Biggs Distinguished University Professor of Economics, both at David K. Levine is John H. Biggs Distinguished University Professor of Economics. “The Case Against Patents” Journal of Economic Perspectives—Volume 27, Number 1—Winter 2013—Pages 3–22, <https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.27.1.3> //DH

Given this set of players and their incentives, the patent game moves naturally towards its equilibrium, as we have observed over time. Two centuries or so ago, patents were restricted in their areas of applicability and limited in both depth and duration over time; they were somewhat "reasonable," to the extent social gains and costs seemed balanced. But we have witnessed a steady process of enlargement and strengthening of patent laws. At each stage, the main driving force was the rent-seeking efforts of large, cash-rich companies unable to keep up with new and creative competitors. Patent lawyers, patent officials, and wannabe patent trolls usually acted as foot soldiers. While this political economy process is pretty straight- forward in broad terms, we are still missing an empirical, quantitative analysis of the stakes involved and of the gains and losses accruing to both the active players and to the rest of society, from the general public to the innovators that never emerged due to preexisting patent barriers.

Perhaps surprisingly, despite the key importance of political economy in understanding why we have the patent system we have, economists have had relatively little to say on the subject. The few prominent papers that we know of on this subject typically build from analyses very similar to what we have presented here—but then shy away from drawing the logical conclusions.

For example, Landes and Posner (2004) recognize that patent laws are mostly designed by interest groups keen to increase their monopoly rents, not aggregate welfare, and that this drove the enormous growth in patent legislation and judiciary activity during the last 30 years. The more elaborate writing by Scherer (2009) on "The Political Economy of Patent Policy Reform in the United States" follows a similar approach. It focuses on the fact that "government emphasis on patent systems increased" while academic research was starting to become more and more aware that patents are playing a minor positive role, if any at all, in creating incentives for high R&D and in fostering productivity growth. After providing a concise and very well-informed historical survey of all major changes in US patent policies over the last century or so, Scherer (p. 195) wonders why the political system would increase patent protection so much in light of the fact "that the record of debates on the enabling bill contains no solid evidence that the change would in fact stimulate R&D, and that there is no evidence of an acceleration in company-financed R&D between the 27 years before the bill was enacted and the 18 years thereafter." He then extends the same argument to the international arena, paying particular attention to the case of pharmaceutical patents. While Scherer's language and arguments are strongly critical of current trends in patents, he does not seek to explain why an institution, such as the patent system, that was supposed to be theoretically sound would degenerate into something so socially damaging over same 30-year period that academic researchers were realizing the institution's limitations and potential dangerousness.

In our view, even insightful writers such as Landes and Posner (2004) and Scherer (2009) seem unable to shake themselves free of the belief that patents are essential in fostering innovation and that any problems can be fixed with some tweaks to the patent system; they fail to seriously consider the possibility of intrinsic problems with the design of the institution itself. This belief in patents flies in the face of the structural realities: Marginal extensions of patents result in substantially higher per capita rents for the few holders of the right while marginally reducing the individual welfare of the much larger number of nonpatent holders. The rent of the monopolist is a lot higher than an individual consumer's deadweight loss, so the monopolist has an incentive to perpetuate the system while the individual consumer has no incentive to fight it. Those who possess a patent do not hold a "property right" in the conventional sense of that term, but they do hold a socially granted "monopoly" right, and will tend to leverage whatever initial rents their monopoly provides in order to increase their monopoly power until all potential rents are extracted (and, in all likelihood, also largely dissipated by the associated lobbying and transaction costs). This scenario helps explain how patents interact with the industry lifecycle—why patents are either ignored or scarcely used in new and competitive industries, while being highly valued and overused in mature and highly concentrated ones.

### They Say: “Central Planning Deficit”

#### Prize systems empirically can incentivize innovation just as well as patents

Heidi Williams, 2010 – Professor of Economics at Dartmouth College and Director of Science Policy at the Institute for Progress. “Incentives, prizes, and innovation” 11/14, <https://web.archive.org/web/20170125070713/https://www.nsf.gov/sbe/sosp/tech/williams.pdf> //DH

Do prizes successfully incentivize innovation? Clearly they need not in all cases: for example, in some cases the reward may be too low to successfully encourage R&D, or firms may not perceive the promise of a future reward to be credible. Given these types of concerns, it is helpful to look at the historical record to ask whether past prizes have been successful in spurring innovation. Prior to two very recent papers, such analyses were limited to a relatively small number of historical case studies. For example, a frequently discussed case study is a 1714 prize offered by the British government for a method of measuring longitude. While detailed analyses of such case studies (as provided by Sobel 1996 for the case of this “Longitude” prize) are invaluable in highlighting potential pitfalls arising with prize mechanisms, such case studies are unable to answer the question of whether prize mechanisms can be systematically used to incentivize innovation. Two recent papers gather new datasets on prizes in order to shed more systematic light on this question: Brunt, Lerner and Nicholas (2008) and Nicholas (2010).

Brunt, Lerner and Nicholas (2008) collect a novel dataset in order to analyze prizes awarded (for “inventiveness”) by the Royal Agricultural Society of England (RASE) between 1839 and 1939. The goal of RASE was to encourage scientists to apply their skills to improving agricultural technologies. Starting in 1839, RASE held annual prize competitions. One year in advance of the competitions, RASE announced which technological areas would be targeted as well as the number and value of prizes to be awarded in each area; judges authorized payment of awards, or withheld them if the criteria for winning were not met, and were also given discretion to award additional ex post prizes. These competitions awarded substantial monetary prizes (in excess of £1 million in current prices) as well as prestigious but non-pecuniary medals. Between 1839 and 1939, 15,032 inventions competed for these prizes and a total of 1,986 awards were made.

In order to examine the question of whether these prizes encouraged innovation, the authors assemble data on all applications for (and grants of) British patents from 1839 to 1939, matched to information on competition entrants, prize winners, and prize “schedules” (that is, the pre-announced targeted technological areas as well as the number and value of prizes). Following previous work, they also collect information on whether renewal fees were paid for granted patents as a proxy for the quality of patents (since inventors should be more willing to pay renewal fees for more valuable patents; see, e.g. Schankerman and Pakes 1986).

Using this data, the authors present a number of empirical results. First, they find that the RASE contests attracted large numbers of entrants. This is true for both pecuniary and non-pecuniary prizes, with the largest entry effects arising from the non-pecuniary RASE gold medal. Second, they find that prizes are associated with “real” changes in contemporaneous patenting activity in the technological areas targeted by the RASE contests. This result suggests that RASE prizes were spurring not only the entry of technologies into RASE contests, but actually spurring the development of new technologies (as measured by patents) that would not otherwise have been developed. Importantly, the induced innovation seems to be composed of “high quality” inventions as measured by the renewal fee metric described above. Within the sample of “high quality” patents as defined by this measure, the authors find that a doubling in monetary prize value is associated with a 4 percent increase in contemporaneous patents, and that an additional medal is associated with a 20 to 21 percent increase in contemporaneous patents. In a second recent paper, Nicholas (2010) examines a similar research question in the context of Japan’s Meiji era – during which patents were introduced in Japan (in 1885) and a large number of mostly non-pecuniary prizes were awarded (by 1911, 1.2 million prizes were awarded at 8,503 competitions). Using a methodology similar in spirit to that in Brunt, Lerner, and Nicholas (2010), he finds evidence that prizes increased patent outcomes on the order of 30 percent.

To summarize, both studies suggest prize awards – including non-pecuniary prize awards – can encourage not only entry into prize contests, but also “real” innovation, as proxied by patenting activity. While the results of these studies clearly do not imply that prizes will successfully spur innovation in all cases, they are suggestive that the types of prizes that have been implemented in the past can be successful on this metric.

#### Prizes generate multiplier effects – they spur far more private investment than what the prize is worth

Derek Khanna, 2015 - associate fellow of the R Street Institute. He previously was acting policy director for Lincoln Labs, a visiting fellow at Yale Law School’s Information Society Project, JD from Georgetown University Law Center. “USING PRIZES TO SPUR INNOVATION AND GOVERNMENT SAVINGS” R Street Policy Study No. 44, <https://web.archive.org/web/20160304015157/https://www.rstreet.org/wp-content/uploads/2015/11/RSTREET44.pdf> //DH

A third method to encourage innovation is the use of structured prizes. Under the prize model, government agencies, private organizations or a mix of the two, typically host a competition to achieve some specific breakthrough, with the winner promised a set reward. The prize model is notable for its ability to produce significant multiplier effects, as a relatively small prize can spark major investment by the private sector.

In practice, the prize model offers a uniquely level playing field. Newer teams frequently bring novel solutions that outpace participants with nominally more impressive credentials. While prizes are not as common as other incentives to innovations, the historical basis for the model is at least as old as that as for patents. Prizes sponsored both by the private sector and by the public sector each have proven effective in encouraging research and development. A 2009 McKinsey report found that philanthropic and private-sector investment in prizes has increased significantly in recent years, including $250 million in new prize money brought to bear between 2000 and 2007.17 The Wall Street Journal concluded that “prizes have proliferated because they actually work.”18

### They Say: “Expropriation Deficit”

#### Expropriation assumes that the prize pays less than the invention is worth. The prize system allows ex post adjustments of prize value based on sales, which ensures an accurate payout

Steven Shavell and Tanguy van Ypersele, 2001 - \*Harvard Law School and National Bureau of Economic Research and \*\*University of Namur and Catholic University of Louvain. “REWARDS VERSUS INTELLECTUAL PROPERTY RIGHTS” Journal of Law and Economics, vol. XLIV (October 2001), JSTOR //DH

Government’s Ability to Obtain Information about the Value of Innovations. As we stressed in the analysis, the government’s knowledge about the social value of innovations, embodied in its probability distribution over demand curves, is important to the performance of the reward system and to that of the optional reward system (even though the latter dominates patent no matter how poor the government’s knowledge). In fact, one supposes that the government could obtain significant information about demand. Most obviously, the government can base its rewards on sales data, which should be relatively easy to obtain; thus, the version of rewards discussed in Section IIH is the most relevant one to consider. (Note that if rewards are based on sales, the government should not fear that it would be flooded by claimants for rewards with inferior or meaningless innovations—they would not generate products that would pass the market test.) The government could also attempt to measure more about the demand curve than sales at the market price; it could estimate demand elasticities and undertake surveys to determine the character and frequency of use of, for example, computer software, musical recordings, and cinematic and television productions. As events unfold and information flows to the government, it could appropriately supplement rewards, perhaps on an annual basis. In past proposals for reward systems, payments based on sales and other information that the government receives have sometimes been discussed.37 It would be a gross mistake to envision the reward as having to be premised on the government’s estimate of valuation at the time an innovation is registered.

Government’s Information versus Innovators’. We have just mentioned the ability of the government to obtain information about demand, but we have not considered how good innovators’ information is and its relation to the government’s. In this regard, two comments should be made, which together suggest that the factor of innovators’ superiority of information may be less important than it initially appears to be. First, innovators’ information will often be substantially imperfect ex ante, at the time when they are deciding on research investment—the crucial period for assessment of innovators’ information. Second, the government’s information will often be reasonably good ex post, which is the pertinent period for assessment of government information when rewards are based on sales and other indicia of worth. Thus, when rewards are based on ex post data, the informational comparison that bears on the choice between rewards and intellectuall property rights is that between innovators’ ex ante information and the government’s ex post information. (That innovators’ ex ante information may be superior to the government’s ex ante information would be irrelevant to the choice between rewards and property rights.) This point can be put more sharply. Suppose, as is not implausible, that the government’s ex post, sales-related information about demand is as good as innovators’ ex ante information, when they are deciding on research investment. Then innovators enjoy no informational advantage that favors intellectual property rights, and mandatory rewards (not just optional rewards) are unambiguously superior to intellectual property rights.38

### They Say: “Permute Do Both”

#### The perm includes the exclusive monopoly rights of patents. That means commercialization of innovation suffers, because patent holders will charge higher prices. Monopoly profits reduce demand, producing less of the tech

Maxwell Tabarrok, 2021 - Likely an undergraduate economics major at the University of Virginia when this was written. Currently is a pre-doctoral researcher at Dartmouth College, previously a Research Assistant at the University of Virginia, a Research Intern at the Charter Cities Institute. “Patents vs Prizes” Maximum Progress blog, 11/14, <https://www.maximum-progress.com/p/patents-vs-prizes> //DH

Take Elon Musk’s X-prize for carbon capture as an example.

He is offering $100 million dollars to anyone who can demonstrate a carbon capture technique that sequesters a thousand tons of carbon a year at the lowest possible price. This invention incentive could be translated into monopoly rights over a unique carbon capture technology for some number of years. The incentive to invent the technology might be the same, but we would end up removing far less carbon from the atmosphere since the patent holder would have to restrict the quantity produced to get their monopoly profits, thus offsetting the benefit we got from producing this positive externality good in the first place.

#### Prizes work only if there are limits on patents so that technology can be diffused to the market

Steven Johnson, 2012 – author of the book Future Perfect. “Big Pharma Incentives Are Out of Whack: Why We Need an X-Prize for Drugs” Wired, 10/11, <https://www.wired.com/2012/10/prescription-drug-crisis/> //DH

Prizes create a kind of artificial economic system that maintains most of the key advantages of the free market. They create incentives and competition, and they diversify the number of minds working on the problem. But the prizes eliminate wasteful spending, since they are rewarded only when genuine solutions have been achieved. And when combined with limits on patent monopolies, prizes can ensure that those innovations will flow more readily through the society at large.

Right now, most of the marquee prize-backed challenges are still funded by philanthropists or the nonprofit sector. But governments have begun to get involved. The Obama administration's Open Government Initiative has created more than 150 challenges, everything from developing new fuel scrubbers for the Air Force to a Healthy App contest sponsored by the surgeon general.

Because they are targeted explicitly at individuals or groups who are not on the government's payroll, state-funded challenges offer a way around the traditional complaints about government bureaucracy. The problems may be defined by government insiders or politicians, but the solutions arise from the edges of the network, not the center. A prize system widens and diversifies the web of collaboration, encouraging scientists and entrepreneurs to make a contribution, even if they have no direct connection to the authorities in Washington.

### They Say: “Costs Deficit”

#### A prize system offsets costs relative to patent enforcement

Steven Shavell and Tanguy van Ypersele, 2001 - \*Harvard Law School and National Bureau of Economic Research and \*\*University of Namur and Catholic University of Louvain. “REWARDS VERSUS INTELLECTUAL PROPERTY RIGHTS” Journal of Law and Economics, vol. XLIV (October 2001), JSTOR //DH

Administrative Costs. Under a reward system, administrative costs would be incurred by the government in deciding upon rewards, and these costs presumably would exceed those associated with deciding on the granting of patents. There would also be litigation costs borne in relation to disputes about rewards between innovators and the government, as well as between different innovators. However, under a reward system, there would be a savings in administrative costs relative to under the patent or copyright systems: under these systems, intellectual property rights have to be protected by the state, parties often make efforts to determine if their rights have been violated and also to ascertain if they are violating someone’s else’s rights, and litigation costs are expended in disputes over rights; but under the reward system, there are no intellectual property rights to generate such costs. On a priori grounds, one cannot say whether these administrative cost savings of the reward system would outweigh the added administrative costs that the reward system would entail.44

#### Even if it costs money, the government can finance it with deficit spending without causing inflation

Mariana Mazzucato, 2021 - Professor in the Economics of Innovation and Public Value at University College London where she is the founding director of the UCL Institute for Innovation and Public Purpose. MISSION ECONOMY: A Moonshot Guide to Changing Capitalism, chapter 6 //DH

In 2020, events around COVID-19 took this theory of money creation in an unexpected direction. In March that year, the US Congress was terrified that the coronavirus pandemic would cause an economic disaster to rival the Great Depression of the 1930s. It voted for a $2 trillion rescue package. And the Governor of the Bank of England, Andrew Bailey, revealed in June 2020 that the bank had bought £200 billion worth of UK government bonds in April because there was a danger that the government could become insolvent.25 What set the US package apart, however, was not just its size. It was the absence of an offset. When Congress agrees to spending measures, it usually sends two instructions to the Federal Reserve. One is to add dollars by computer to the credit of the US Treasury, which distributes the dollars to be spent as agreed. The other is to subtract dollars in the form of agreed taxes. In the case of the $2 trillion package, however, the instruction was only to add dollars. Money was indeed created out of thin air.

While there are many controversies around who actually benefits from the relief packages, with many arguing that too large a part of the funds went to bailouts for companies rather than to proper relief for workers and citizens, the exceptional size of the package raises fundamental questions about the choices we have during more normal times. On an average night in the 2000s, about 500,000 Americans are homeless. Why had Congress never been able to find money to house them? Or to feed millions of hungry children? Or to provide clean drinking water for the residents of Flint, Michigan and other places who have been plagued for years by polluted water supplies? Why, for that matter, given the pandemic, had Congress not ensured that the USA had a health-care system that adequately covered the entire population? There are, of course, political answers to these questions – answers often to be found in the power of lobby groups. But the choices are not principally financial because, as we have seen, sovereign governments can (and do) create money.26 What convinces them to consider something urgent enough to be acted on without asking the false question: is there enough money in the piggy bank to do it?

Of course, this does not mean that money can or should be created without limit. The real question is, what is the limit? The answer is inflation and how much of it can be tolerated. The key issue, as Greenspan explained, is how productive the spending is. Social security can look like a Ponzi scheme because the number of workers per social security retiree in the USA has fallen from 16:1 in 1950 to about 2:1 today. But if those two workers are much more productive than their sixteen grandparents were in 1950, the pensions will go on being paid. Similarly, as long as additional spending fuelled by government money creation does not bump up against the real resources of the economy – supply of workers, factories, machines, raw materials, technical know-how and so on – the risk of excessive inflation is low.27 And of course that supply is not static – it can grow. Investments in physical capital (machinery, factories) and the underlying organizational and technological innovation can expand capacity.

There is no reason why investing and spending will cause inflation as long as the economy has room to grow and is not running at full capacity (human and physical). This means that making investments which expand the economy due to their strategic nature (patient, long-run and mission-oriented) – as opposed to investments that just pour money into a static economy – rarely cause inflation. They expand the pie rather than increase the money in an existing pie.