## 1

**The standard is minimizing material violence.**

**Prefer:**

**[1] Pleasure and pain are intrinsic value and disvalue**

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**Pleasure** is not only one of the three primary reward functions but it also **defines reward.** As homeostasis explains the functions of only a limited number of rewards, the principal reason why particular stimuli, objects, events, situations, and activities are rewarding may be due to pleasure. This applies first of all to sex and to the primary homeostatic rewards of food and liquid and extends to money, taste, beauty, social encounters and nonmaterial, internally set, and intrinsic rewards. Pleasure, as the primary effect of rewards, drives the prime reward functions of learning, approach behavior, and decision making and provides the **basis for hedonic theories** of reward function. We are attracted by most rewards and exert intense efforts to obtain them, just because they are enjoyable [10]. Pleasure is a passive reaction that derives from the experience or prediction of reward and may lead to a long-lasting state of happiness. The word happiness is difficult to define. In fact, just obtaining physical pleasure may not be enough. One key to happiness involves a network of good friends. However, it is not obvious how the higher forms of satisfaction and pleasure are related to an ice cream cone, or to your team winning a sporting event. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure [14]. Pleasure as a hallmark of reward is sufficient for defining a reward, but it may not be necessary. A reward may generate positive learning and approach behavior simply because it contains substances that are essential for body function. When we are hungry, we may eat bad and unpleasant meals. A monkey who receives hundreds of small drops of water every morning in the laboratory is unlikely to feel a rush of pleasure every time it gets the 0.1 ml. Nevertheless, with these precautions in mind, we may define any stimulus, object, event, activity, or situation that has the potential to produce pleasure as a reward. In the context of reward deficiency or for disorders of addiction, homeostasis pursues pharmacological treatments: drugs to treat drug addiction, obesity, and other compulsive behaviors. The theory of allostasis suggests broader approaches - such as re-expanding the range of possible pleasures and providing opportunities to expend effort in their pursuit. [15]. It is noteworthy, the first animal studies eliciting approach behavior by electrical brain stimulation interpreted their findings as a discovery of the brain’s pleasure centers [16] which were later partly associated with midbrain dopamine neurons [17–19] despite the notorious difficulties of identifying emotions in animals. Evolutionary theories of pleasure: The love connection BO:D Charles Darwin and other biological scientists that have examined the biological evolution and its basic principles found various mechanisms that steer behavior and biological development. Besides their theory on natural selection, it was particularly the sexual selection process that gained significance in the latter context over the last century, especially when it comes to the question of what makes us “what we are,” i.e., human. However, the capacity to sexually select and evolve is not at all a human accomplishment alone or a sign of our uniqueness; yet, we humans, as it seems, are ingenious in fooling ourselves and others–when we are in love or desperately search for it. It is well established that modern biological theory conjectures that **organisms are** the **result of evolutionary competition.** In fact, Richard Dawkins stresses gene survival and propagation as the basic mechanism of life [20]. Only genes that lead to the fittest phenotype will make it. It is noteworthy that the phenotype is selected based on behavior that maximizes gene propagation. To do so, the phenotype must survive and generate offspring, and be better at it than its competitors. Thus, the ultimate, distal function of rewards is to increase evolutionary fitness by ensuring the survival of the organism and reproduction. It is agreed that learning, approach, economic decisions, and positive emotions are the proximal functions through which phenotypes obtain other necessary nutrients for survival, mating, and care for offspring. Behavioral reward functions have evolved to help individuals to survive and propagate their genes. Apparently, people need to live well and long enough to reproduce. Most would agree that homo-sapiens do so by ingesting the substances that make their bodies function properly. For this reason, foods and drinks are rewards. Additional rewards, including those used for economic exchanges, ensure sufficient palatable food and drink supply. Mating and gene propagation is supported by powerful sexual attraction. Additional properties, like body form, augment the chance to mate and nourish and defend offspring and are therefore also rewards. Care for offspring until they can reproduce themselves helps gene propagation and is rewarding; otherwise, many believe mating is useless. According to David E Comings, as any small edge will ultimately result in evolutionary advantage [21], additional reward mechanisms like novelty seeking and exploration widen the spectrum of available rewards and thus enhance the chance for survival, reproduction, and ultimate gene propagation. These functions may help us to obtain the benefits of distant rewards that are determined by our own interests and not immediately available in the environment. Thus the distal reward function in gene propagation and evolutionary fitness defines the proximal reward functions that we see in everyday behavior. That is why foods, drinks, mates, and offspring are rewarding. There have been theories linking pleasure as a required component of health benefits salutogenesis, (salugenesis). In essence, under these terms, pleasure is described as a state or feeling of happiness and satisfaction resulting from an experience that one enjoys. Regarding pleasure, it is a double-edged sword, on the one hand, it promotes positive feelings (like mindfulness) and even better cognition, possibly through the release of dopamine [22]. But on the other hand, pleasure simultaneously encourages addiction and other negative behaviors, i.e., motivational toxicity. It is a complex neurobiological phenomenon, relying on reward circuitry or limbic activity. It is important to realize that through the “Brain Reward Cascade” (BRC) endorphin and endogenous morphinergic mechanisms may play a role [23]. While natural rewards are essential for survival and appetitive motivation leading to beneficial biological behaviors like eating, sex, and reproduction, crucial social interactions seem to further facilitate the positive effects exerted by pleasurable experiences. Indeed, experimentation with addictive drugs is capable of directly acting on reward pathways and causing deterioration of these systems promoting hypodopaminergia [24]. Most would agree that pleasurable activities can stimulate personal growth and may help to induce healthy behavioral changes, including stress management [25]. The work of Esch and Stefano [26] concerning the link between compassion and love implicate the brain reward system, and pleasure induction suggests that social contact in general, i.e., love, attachment, and compassion, can be highly effective in stress reduction, survival, and overall health. Understanding the role of neurotransmission and pleasurable states both positive and negative have been adequately studied over many decades [26–37], but comparative anatomical and neurobiological function between animals and homo sapiens appear to be required and seem to be in an infancy stage. Finding happiness is different between apes and humans As stated earlier in this expert opinion one key to happiness involves a network of good friends [38]. However, it is not entirely clear exactly how the higher forms of satisfaction and pleasure are related to a sugar rush, winning a sports event or even sky diving, all of which augment dopamine release at the reward brain site. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure. Remarkably, there are pathways for ordinary liking and pleasure, which are limited in scope as described above in this commentary. However, there are **many brain regions**, often termed hot and cold spots, that significantly **modulate** (increase or decrease) our **pleasure or** even **produce the opposite** of pleasure— that is disgust and fear [39]. One specific region of the nucleus accumbens is organized like a computer keyboard, with particular stimulus triggers in rows— producing an increase and decrease of pleasure and disgust. Moreover, the cortex has unique roles in the cognitive evaluation of our feelings of pleasure [40]. Importantly, the interplay of these multiple triggers and the higher brain centers in the prefrontal cortex are very intricate and are just being uncovered. Desire and reward centers It is surprising that many different sources of pleasure activate the same circuits between the mesocorticolimbic regions (Figure 1). Reward and desire are two aspects pleasure induction and have a very widespread, large circuit. Some part of this circuit distinguishes between desire and dread. The so-called pleasure circuitry called “REWARD” involves a well-known dopamine pathway in the mesolimbic system that can influence both pleasure and motivation. In simplest terms, the well-established mesolimbic system is a dopamine circuit for reward. It starts in the ventral tegmental area (VTA) of the midbrain and travels to the nucleus accumbens (Figure 2). It is the cornerstone target to all addictions. The VTA is encompassed with neurons using glutamate, GABA, and dopamine. The nucleus accumbens (NAc) is located within the ventral striatum and is divided into two sub-regions—the motor and limbic regions associated with its core and shell, respectively. The NAc has spiny neurons that receive dopamine from the VTA and glutamate (a dopamine driver) from the hippocampus, amygdala and medial prefrontal cortex. Subsequently, the NAc projects GABA signals to an area termed the ventral pallidum (VP). The region is a relay station in the limbic loop of the basal ganglia, critical for motivation, behavior, emotions and the “Feel Good” response. This defined system of the brain is involved in all addictions –substance, and non –substance related. In 1995, our laboratory coined the term “Reward Deficiency Syndrome” (RDS) to describe genetic and epigenetic induced hypodopaminergia in the “Brain Reward Cascade” that contribute to addiction and compulsive behaviors [3,6,41]. Furthermore, ordinary “liking” of something, or pure pleasure, is represented by small regions mainly in the limbic system (old reptilian part of the brain). These may be part of larger neural circuits. In Latin, hedus is the term for “sweet”; and in Greek, hodone is the term for “pleasure.” Thus, the word Hedonic is now referring to various subcomponents of pleasure: some associated with purely sensory and others with more complex emotions involving morals, aesthetics, and social interactions. The capacity to have pleasure is part of being healthy and may even extend life, especially if linked to optimism as a dopaminergic response [42]. Psychiatric illness often includes symptoms of an abnormal inability to experience pleasure, referred to as anhedonia. A negative feeling state is called dysphoria, which can consist of many emotions such as pain, depression, anxiety, fear, and disgust. Previously many scientists used animal research to uncover the complex mechanisms of pleasure, liking, motivation and even emotions like panic and fear, as discussed above [43]. However, as a significant amount of related research about the specific brain regions of pleasure/reward circuitry has been derived from invasive studies of animals, these cannot be directly compared with subjective states experienced by humans. In an attempt to resolve the controversy regarding the causal contributions of mesolimbic dopamine systems to reward, we have previously evaluated the three-main competing explanatory categories: “liking,” “learning,” and “wanting” [3]. That is, dopamine may mediate (a) liking: the hedonic impact of reward, (b) learning: learned predictions about rewarding effects, or (c) wanting: the pursuit of rewards by attributing incentive salience to reward-related stimuli [44]. We have evaluated these hypotheses, especially as they relate to the RDS, and we find that the incentive salience or “wanting” hypothesis of dopaminergic functioning is supported by a majority of the scientific evidence. Various neuroimaging studies have shown that anticipated behaviors such as sex and gaming, delicious foods and drugs of abuse all affect brain regions associated with reward networks, and may not be unidirectional. Drugs of abuse enhance dopamine signaling which sensitizes mesolimbic brain mechanisms that apparently evolved explicitly to attribute incentive salience to various rewards [45]. Addictive substances are voluntarily self-administered, and they enhance (directly or indirectly) dopaminergic synaptic function in the NAc. This activation of the brain reward networks (producing the ecstatic “high” that users seek). Although these circuits were initially thought to encode a set point of hedonic tone, it is now being considered to be far more complicated in function, also encoding attention, reward expectancy, disconfirmation of reward expectancy, and incentive motivation [46]. The argument about addiction as a disease may be confused with a predisposition to substance and nonsubstance rewards relative to the extreme effect of drugs of abuse on brain neurochemistry. The former sets up an individual to be at high risk through both genetic polymorphisms in reward genes as well as harmful epigenetic insult. Some Psychologists, even with all the data, still infer that addiction is not a disease [47]. Elevated stress levels, together with polymorphisms (genetic variations) of various dopaminergic genes and the genes related to other neurotransmitters (and their genetic variants), and may have an additive effect on vulnerability to various addictions [48]. In this regard, Vanyukov, et al. [48] suggested based on review that whereas the gateway hypothesis does not specify mechanistic connections between “stages,” and does not extend to the risks for addictions the concept of common liability to addictions may be more parsimonious. The latter theory is grounded in genetic theory and supported by data identifying common sources of variation in the risk for specific addictions (e.g., RDS). This commonality has identifiable neurobiological substrate and plausible evolutionary explanations. Over many years the controversy of dopamine involvement in especially “pleasure” has led to confusion concerning separating motivation from actual pleasure (wanting versus liking) [49]. We take the position that animal studies cannot provide real clinical information as described by self-reports in humans. As mentioned earlier and in the abstract, on November 23rd, 2017, evidence for our concerns was discovered [50] In essence, although nonhuman primate brains are similar to our own, the disparity between other primates and those of human cognitive abilities tells us that surface similarity is not the whole story. Sousa et al. [50] small case found various differentially expressed genes, to associate with pleasure related systems. Furthermore, the dopaminergic interneurons located in the human neocortex were absent from the neocortex of nonhuman African apes. Such differences in neuronal transcriptional programs may underlie a variety of neurodevelopmental disorders. In simpler terms, the system controls the production of dopamine, a chemical messenger that plays a significant role in pleasure and rewards. The senior author, Dr. Nenad Sestan from Yale, stated: “Humans have evolved a dopamine system that is different than the one in chimpanzees.” This may explain why the behavior of humans is so unique from that of non-human primates, even though our brains are so surprisingly similar, Sestan said: “It might also shed light on why people are vulnerable to mental disorders such as autism (possibly even addiction).” Remarkably, this research finding emerged from an extensive, multicenter collaboration to compare the brains across several species. These researchers examined 247 specimens of neural tissue from six humans, five chimpanzees, and five macaque monkeys. Moreover, these investigators analyzed which genes were turned on or off in 16 regions of the brain. While the differences among species were subtle, **there was** a **remarkable contrast in** the **neocortices**, specifically in an area of the brain that is much more developed in humans than in chimpanzees. In fact, these researchers found that a gene called tyrosine hydroxylase (TH) for the enzyme, responsible for the production of dopamine, was expressed in the neocortex of humans, but not chimpanzees. As discussed earlier, dopamine is best known for its essential role within the brain’s reward system; the very system that responds to everything from sex, to gambling, to food, and to addictive drugs. However, dopamine also assists in regulating emotional responses, memory, and movement. Notably, abnormal dopamine levels have been linked to disorders including Parkinson’s, schizophrenia and spectrum disorders such as autism and addiction or RDS. Nora Volkow, the director of NIDA, pointed out that one alluring possibility is that the neurotransmitter dopamine plays a substantial role in humans’ ability to pursue various rewards that are perhaps months or even years away in the future. This same idea has been suggested by Dr. Robert Sapolsky, a professor of biology and neurology at Stanford University. Dr. Sapolsky cited evidence that dopamine levels rise dramatically in humans when we anticipate potential rewards that are uncertain and even far off in our futures, such as retirement or even the possible alterlife. This may explain what often motivates people to work for things that have no apparent short-term benefit [51]. In similar work, Volkow and Bale [52] proposed a model in which dopamine can favor NOW processes through phasic signaling in reward circuits or LATER processes through tonic signaling in control circuits. Specifically, they suggest that through its modulation of the orbitofrontal cortex, which processes salience attribution, dopamine also enables shilting from NOW to LATER, while its modulation of the insula, which processes interoceptive information, influences the probability of selecting NOW versus LATER actions based on an individual’s physiological state. This hypothesis further supports the concept that disruptions along these circuits contribute to diverse pathologies, including obesity and addiction or RDS.

### Extinction First

#### Existential threats outweigh:

#### [a] Moral uncertainty – if you aren’t 100% sure their arg is true, keep future generations alive to figure things out

#### [b] The future quantitatively outweighs – we have an ethical obligation to preserve future value

Todd ’17 [Benjamin, Ben managed 80,000 Hours while it grew from a lecture, to a student society, to the organisation it is today. Before 80,000 Hours, he was the first undergraduate to intern as an analyst at a top investment fund. He has a 1st from Oxford in Physics and Philosophy, has published in Climate Physics, once kick-boxed for Oxford, and speaks Chinese, badly, “Future generations and their moral significance”, October 2017, https://80000hours.org/articles/future-generations/]//pranav

In almost all of these cases, there’s potentially a lot more of it to come in the future: The Earth could remain habitable for 600-800 million years,1 so there could be about 21 million future generations,2 and they could lead great lives, whatever you think “great” consists of. Even if you don’t think future generations matter as much as the present generation, since there could be so many of them, they could still be our key concern. Civilization could also eventually reach other planets — there are 100 billion planets in the Milky Way alone.3 So, even if there’s only a small chance of this happening, there could also be dramatically more people per generation than there are today. By reaching other planets, civilization could also last even longer than if we stay on the Earth.If you think it’s good for people to live happier and more flourishing lives, there’s a possibility that technology and social progress will let people have much better and longer lives in the future (including those in the present generation). So, putting these first three points together, there could be many more generations, with far more people, living much better lives. The three dimensions multiply together to give the potential scale of the future. If what you value is justice and virtue, then the future could be far more just and virtuous than the world today.4 If what you value is artistic and intellectual achievement, a far wealthier and bigger civilization could have far greater achievements than our own. And so on. This suggests that, insofar as you care about making the world a better place, your key concern should be to increase the chance that the future goes well rather than badly. This isn’t to deny that you have special obligations to your friends and family, and an interest in your own life going well. We’re only talking about what matters insofar as you care about helping others in general. Philosophers often say what matters “from the point of view of the universe” or according to “impartial altruism”. We think everyone should care about the lives of other people to some degree, even though it might not be your only goal. People often assume the long-term value thesis is especially about the possibility of there being lots of people in the future, and so only of interest to a narrow range of ethical views (especially utilitarian totalism), but as we can see in the list above, it’s actually much broader. It just rests on the idea that if something is of value, it’s better to have more of what’s valuable rather than less, and that it’s possible to have much more of it in the future. This might include non-welfare values, such as beauty or knowledge. The arguments are also not about humans; rather, they concern whatever agents in the future might have moral value, including other species. People also often think that the long-term value thesis assumes the future will have positive rather than negative value. Quite the opposite is true — the future could also contain far more suffering than the present, and this implies even more concern for how it unfolds. It’s important to reduce the probability of bad futures as well as increase the probability of good ones.

#### [c] Turns suffering – Extinction creates more violence for the world

#### [d] Forecloses future improvement – can’t improve society if everyone is dead, which means even if the 1AC’s structural problem is true now you should preserve life to change it

#### [e] Apocalyptic images challenge power structures to create futures of social justice

Jessica Hurley 17, Assistant Professor in the Humanities at the University of Chicago, “Impossible Futures: Fictions of Risk in the Longue Durée”, Duke University Press, https://read.dukeupress.edu/american-literature/article/89/4/761/132823/Impossible-Futures-Fictions-of-Risk-in-the-Longue

If contemporary ecocriticism has a shared premise about environmental risk it is that genre is the key to both perceiving and, possibly, correcting ecological crisis. Frederick Buell’s 2003 From Apocalypse to Way of Life: Environmental Crisis in the American Century has established one of the most central oppositions of this paradigm. As his title suggests, Buell tells the story of a discourse that began in the apocalyptic mode in the 1960s and 70s, when discussions of “the immanent end of nature” most commonly took the form of “prophecy, revelation, climax, and extermination” before turning away from apocalypse when the prophesied ends failed to arrive (112, 78). Buell offers his suggestion for the appropriate literary mode for life lived within a crisis that is both unceasing and inescapable: new voices, “if wise enough….will abandon apocalypse for a sadder realism that looks closely at social and environmental changes in process and recognizes crisis as a place where people dwell” (202-3). In a world of threat, Buell demands a realism that might help us see risks more clearly and aid our survival.¶ Buell’s argument has become a broadly held view in contemporary risk theory and ecocriticism, overlapping fields in the social sciences and humanities that address the foundational question of second modernity: “how do you live when you are at such risk?” (Woodward 2009, 205).1 Such an assertion, however, assumes both that realism is a neutral descriptive practice and that apocalypse is not something that is happening now in places that we might not see, or cannot hear. This essay argues for the continuing importance of apocalyptic narrative forms in representations of environmental risk to disrupt conservative realisms that maintain the status quo. Taking the ecological disaster of nuclear waste as my case study, I examine two fictional treatments of nuclear waste dumps that create different temporal structures within which the colonial history of the United States plays out. The first, a set of Department of Energy documents that use statistical modeling and fictional description to predict a set of realistic futures for the site of the Waste Isolation Pilot Plant in New Mexico (1991), creates a present that is fully knowable and a future that is fully predictable. Such an approach, I suggest, perpetuates the state logics of implausibility that have long undergirded settler colonialism in the United States. In contrast, Leslie Marmon Silko’s contemporaneous novel Almanac of the Dead (1991) uses its apocalyptic form to deconstruct the claims to verisimilitude that undergird state realism, transforming nuclear waste into a prophecy of the end of the United States rather than a means for imagining its continuation. In Almanac of the Dead, the presence of nuclear waste introjects a deep-time perspective into contemporary America, transforming the present into a speculative space where environmental catastrophe produces not only unevenly distributed damage but also revolutionary forms of social justice that insist on a truth that probability modeling cannot contain: that the future will be unimaginably different from the present, while the present, too, might yet be utterly different from the real that we think we know.¶ Nuclear waste is rarely treated in ecocriticism or risk theory, for several reasons: it is too manmade to be ecological; its catastrophes are ongoing, intentionally produced situations rather than sudden disasters; and it does not support the narrative that subtends ecocritical accounts of risk perception in which the nuclear threat gives rise to an awareness of other kinds of threat before reaching the end of its relevance at the end of the Cold War.2 In what follows, I argue that the failure of nuclear waste to fit into the critical frames created by ecocriticism and risk theory to date offers an opportunity to expand those frames and overcome some of their limitations, especially the impulse towards a paranoid, totalizing realism that Peter van Wyck (2005) has described as central to ecocriticism in the risk society. Nuclear waste has durational forms that dwarf the human. It therefore dwells less in the economy of risk as it is currently conceptualized and more in the blown-out realm of deep time. Inhabiting the temporal scale that has recently been christened the Anthropocene, the geological era defined by the impact of human activities on the world’s geology and climate, nuclear waste unsettles any attempt at realist description, unveiling the limits of human imagination at every turn.3 By analyzing risk society through a heuristic of nuclear waste, this essay offers a critique of nuclear colonialism and environmental racism. At the same time, it shows how the apocalyptic mode in deep time allows narratives of environmental harm and danger to move beyond the paranoid logic of risk. In the world of deep time, all that might come to pass will come to pass, sooner or later. The endless maybes of risk become certainties. The impossibilities of our own deaths and the deaths of everything else will come. But so too will other impossibilities: talking macaws and alien visitors; the end of the colonial occupation of North America, perhaps, or a sudden human determination to let the world live. The end of capitalism may yet become more thinkable than the end of the world. Just wait long enough. Stranger things will happen.¶

#### [f] Use expected value – magnitude times probability. Ignoring threats of nuclear war makes it exponentially more likely – students are key.

Harris & Bender 17 (John, Politico editor-in-chief, & Bryan, Politico national security editor. "Bill Perry Is Terrified. Why Aren't You?". Interview with Bill Perry, mathematician, engineer, businessman and former Secretary of Defense. Currently the Michael and Barbara Berberian Professor (emeritus) at Stanford University, with a joint appointment at the Freeman Spogli Institute for International Studies and the School of Engineering. He is also a senior fellow at Stanford University's Hoover Institution. He serves as director of the Preventive Defense Project. He is an expert in U.S. foreign policy, national security and arms control. In 2013 he founded the William J Perry Project (http://www.wjperryproject.org/), a non-profit effort to educate the public on the current dangers of nuclear weapons. [www.politico.com/magazine/story/2017/01/william-perry-nuclear-weapons-proliferation-214604](http://www.politico.com/magazine/story/2017/01/william-perry-nuclear-weapons-proliferation-214604))

At this naked moment in the American experiment, when many people perceive civilization on the verge of blowing up in some metaphorical sense, there is an elderly man in California hoping to seize your attention about another possibility. It is that civilization is on the verge of blowing up in a non-metaphorical sense. William J. Perry is 89 now, at the tail end of one of his generation’s most illustrious careers in national security. By all rights, the former U.S. secretary of Defense, a trained mathematician who served or advised nearly every administration since Eisenhower, should be filling out the remainder of his years in quiet reflection on his achievements. Instead, he has set out on an urgent pilgrimage. Bill Perry has become, he says with a rueful smile, “a prophet of doom.” His life’s work, most of it highly classified, was nuclear weapons—how to maximize the fearsome deterrent power of the U.S. arsenal, how to minimize the possibility that the old Soviet arsenal would obliterate the United States and much of the planet along the way. Perry played a supporting role in the Cuban Missile Crisis, during which he went back to his Washington hotel room each night, fearing he had only hours left to live. He later founded his own successful defense firm, helped revolutionize the American way of high-tech war, and honed his diplomatic skills seeking common ground on security issues with the Soviets and Chinese—all culminating as head of the Pentagon in the early years after the end of the Cold War. Nuclear bombs are an area of expertise Perry had assumed would be largely obsolete by now, seven decades after Hiroshima, a quarter-century after the fall of the Soviet Union, and in the flickering light of his own life. Instead, nukes are suddenly—insanely, by Perry’s estimate—once again a contemporary nightmare, and an emphatically ascendant one. At the dawn of 2017, there is a Russian president making bellicose boasts about his modernized arsenal. There is an American president-elect who breezily free-associates on Twitter about starting a new nuclear arms race. Decades of cooperation between the two nations on arms control is nearly at a standstill. And, unlike the original Cold War, this time there is a world of busy fanatics excited by the prospect of a planet with more bombs—people who have already demonstrated the desire to slaughter many thousands of people in an instant, and are zealously pursuing ever more deadly means to do so. And there’s one other difference from the Cold War: Americans no longer think about the threat every day. Nuclear war isn’t the subtext of popular movies, or novels; disarmament has fallen far from the top of the policy priority list. The largest upcoming generation, the millennials, were raised in a time when the problem felt largely solved, and it’s easy for them to imagine it’s still quietly fading into history. The problem is, it’s no longer fading. “Today, the danger of some sort of a nuclear catastrophe is greater than it was during the Cold War,” Perry said in an interview in his Stanford office, “and most people are blissfully unaware of this danger.” It is a turn of events that has an old man newly obsessed with a question: Why isn’t everyone as terrified as he is? Perry’s hypothesis for the disconnect is that much of the population, especially that rising portion with no clear memories of the first Cold War, is suffering from a deficit of comprehension. Even a single nuclear explosion in a major city would represent an abrupt and possibly irreversible turn in modern life, upending the global economy, forcing every open society to suspend traditional liberties and remake itself into a security state. “The political, economic and social consequences are beyond what people understand,” Perry says. And yet many people place this scenario in roughly the same category as the meteor strike that supposedly wiped out the dinosaurs—frightening, to be sure, but something of an abstraction. So Perry regards his last great contribution of a 65-year career as a crusade to stimulate the public imagination—to share the vivid details of his own nightmares. He is doing so in a recent memoir, in a busy public speaking schedule, in half-empty hearing rooms on Capitol Hill, and increasingly with an online presence aimed especially at young people. He has enlisted the help of his 28-year-old granddaughter to figure out how to engage a new generation, including through a series of virtual lectures known as a MOOC, or massive open online course. He is eagerly signing up for “Ask Me Anything” chats on Reddit, in which some people still confuse him with William “The Refrigerator” Perry of NFL fame. He posts his ruminations on YouTube, where they give Katy Perry no run for her money, even as the most popular are closing in on 100,000 views. One of the nightmare scenarios Perry invokes most often is designed to roust policymakers who live and work in the nation’s capital. The terrorists would need enriched uranium. Due to the elaborate and highly industrial nature of production, hard to conceal from surveillance, fissile material is still hard to come by—but, alas, far from impossible. Once it is procured, with help from conspirators in a poorly secured overseas commercial power centrifuge facility, the rest of the plot as Perry imagines it is no great technological or logistical feat. The mechanics of building a crude nuclear device are easily within the reach of well-educated and well-funded militants. The crate would arrive at Dulles International Airport, disguised as agricultural freight. The truck bomb that detonates on Pennsylvania Avenue between the White House and Capitol instantly kills the president, vice president, House speaker, and 80,000 others. Where exactly is your office? Your house? And then, as Perry spins it forward, how credible would you find the warnings, soon delivered to news networks, that five more bombs are set to explode in unnamed U.S. cities, once a week for the next month, unless all U.S. military personnel overseas are withdrawn immediately? If this particular scenario does not resonate with you, Perry can easily rattle off a long roster of others—a regional war that escalates into a nuclear exchange, a miscalculation between Moscow and Washington, a computer glitch at the exact wrong moment. They are all ilks of the same theme—the dimly understood threat that the science of the 20th century is set to collide with the destructive passions of the 21st. “We’re going back to the kind of dangers we had during the Cold War,” Perry said. “I really thought in 1990, 1991, 1992, that we left those behind us. We’re starting to re-invent them. We and the Russians and others don’t understand that what we’re doing is re-creating those dangers—or maybe they don’t remember the dangers. For younger people, they didn’t live through those dangers. But when you live through a Cuban Missile Crisis up close and you live through a false alarm up close, you do understand how dangerous it is, and you believe you should do everything you could possibly do to [avoid] going back.” For people who follow the national security priesthood, the dire scenarios are all the more alarming for who is delivering them. Through his long years in government Perry invariably impressed colleagues as the calmest person in the room, relentlessly rational, such that people who did not know him well—his love of music and literature and travel—regarded his as a purely analytical mind, emotion subordinated to logic and duty. Starting in the 1950s as a technology executive and entrepreneur in some of the most secretive precincts of the defense industry, he gradually took on a series of high-level government assignments that gave him one of the most quietly influential careers of the Cold War and its aftermath. Fifteen years before serving as Bill Clinton’s secretary of defense, Perry was the Pentagon official in charge of weapons research during the Carter administration. It was from this perch that he may have had his most far-reaching impact, and left him in some circles as a legendary figure. He used his office to give an essential push to two ideas that transformed warfare over the next generation decisively to American advantage. One idea was stealth technology, which allowed U.S. warplanes to fly over enemy territory undetected. The other was precision-guided munitions, which allowed U.S. bombs to land with near-perfect accuracy. During the Clinton years, Perry so prized his privacy that he initially turned down the job of Defense secretary—changing his mind only after Clinton and Al Gore pleaded with him that the news media scrutiny wouldn’t be so bad. The reputation he built over a life in the public sphere is starkly at odds with this latest highly impassioned chapter of Perry’s career. Harold Brown, who also is 89, first recruited Perry into government, and was Perry’s boss while serving as Defense secretary in the Carter years. “No one would have thought of Bill Perry as a crusader,” he says. “But he is on a crusade.” Lee Perry, his wife of nearly 70 years, is living in an elder care facility, her once buoyant presence now lost to dementia. Perry himself, lucid as ever, has seen his physical frame become frail and stooped. Rather than slowing his schedule, he has accelerated his travels to plead with people to awaken to the danger. A trip to Washington includes a dinner with national security reporters and testimony on Capitol Hill. Back home in California, he’s at the Google campus to prod engineers to contemplate that their world may not last long enough for their dreams of technology riches to come true. He’s created an advocacy group, the William J. Perry project, devoted to public education about nuclear weapons. He’s enlisted both his granddaughter and his 64-year-old daughter, Robin Perry, in the cause. But if his profile is rising, his style is essentially unchanged. He is a man known for self-effacement, trying to shape an era known for relentless self-promotion, a voice of quiet precision in a time of devil-take-the-hindmost bombast. The rational approach to problem-solving that propelled his career and won him adherents and friends in both political parties and even among some of America’s erstwhile enemies remains his guide—in this case, by endeavoring to calculate the possibilities and probabilities of a terrorist attack, regional nuclear war, or horrible miscalculation with Russia. “I want to be very clear,” he said. “I do not think it is a probability this year or next year or anytime in the foreseeable future. But the consequence is so great, we have to take it seriously. And there are things to greatly lower those possibilities that we’re simply not doing.” \*\*\* Perry really did not expect he would have to write this chapter of his public life. His official career closed with what seemed then an unambiguous sense of mission accomplished. By the time he arrived in the Pentagon’s top job in 1994, the Cold War was over, and the main item on the nuclear agenda seemed to be cleaning up no-longer-needed arsenals. As defense secretary, Perry stood with his Russian counterpart, Pavel Grachev, as they jointly blew up missile silos in the former Soviet Union and tilled sunflower seeds in the dirt. “I finally thought by the end of the ‘80s we lived through this horrible experience and it’s behind us,” Perry said. “When I was secretary, I fully believed it was behind us.” After leaving the Pentagon, he accepted an assignment from Clinton to negotiate an end to North Korea’s nuclear development program—and seemed agonizingly close to a breakthrough as the last days of the president’s term expired. Now, he sees his grandchildren inheriting a planet possibly more dangerous than it was during his public career. No one could doubt that the Sept. 11 terrorists would have gladly used nuclear bombs instead of airplanes if they had had them, and it seems only a matter of time until they try. Instead of a retreating threat in North Korea, that fanatical regime now possesses as many as eight nuclear bombs, and is just one member of a growing nuclear club. Far from a new partnership with Russia, Vladimir Putin has given old antagonisms a malevolent new face. American policymakers talk of spending up to $1 trillion to modernize the nuclear arsenal. And now comes Donald Trump with a long trail of statements effectively shrugging his shoulders about a world newly bristling with bombs and people with reasons to use them. Perry knew Hillary Clinton well professionally, and says he admired both her and Bill Clinton for their professional judgment though he was never a personal intimate of either. He was prescient before the election in expressing skepticism about how voters would respond to the dynastic premise of the Clinton campaign—a healthy democracy should grow new voices—but was as surprised as everyone else on Election Day. Donald Trump was not the voice he was looking for, to put it mildly, but he has responded to the Trump cyclone with modulated restraint. Perry said he assumes his most truculent rhetoric isn’t serious, the utterances of a man who assumed his words were for political effect only and had no real consequences. Now that they do, Perry is hoping to serve as a kind of ambassador to rationality. He said he is hoping for audiences soon, with Trump if the incoming president will see him, and certainly Trump’s national security team, which includes several people Perry knows, including Defense Secretary nominee James Mattis. There is little doubt the message if the meeting comes. “We are starting a new Cold War,” he says. “We seem to be sleepwalking into this new nuclear arms race. … We and the Russians and others don’t understand what we are doing.” “I am not suggesting that this Cold War and this arms race is identical to the old one,” Perry added. “But in many ways, it is just as bad, just as dangerous. And totally unnecessary.” \*\*\* Perry had been brooding over the question for a year. It was in the early 1950s, he was still in his 20s, and the subject was partial differential equations—the topic of his Ph.D. thesis. A particular problem had been absorbing him, day in and day out, hours and hours on end. Then, out of nowhere, a light came on. “I woke up in the middle of the night, and it was all there,” Perry recalled. “It was all there, and I got out of bed and sat down. The next two or three hours, I wrote my thesis, and from the first word I wrote down, I never doubted what the last word was going to be: It was a magic moment.” The story is a reminder of something definitional about Bill Perry. Before he became in recent years an apostle of disarmament, before he sat atop the nation’s war-making apparatus in the 1990s, before he was the executive of a defense contractor specializing in the most complex arenas of Cold War surveillance in the 1960s, he was a young man in love with mathematics. In those days, Perry had planned on a career as a math professor. His attraction to math was not merely practical, in the way that engineers or architects rely on math. The appeal was just as much aesthetic, in ways that people who are not numbers people—political life tends to be dominated by word people—cannot easily comprehend. To Perry’s mind, there was a purity to math, a beauty to the patterns and relationships, that was not unlike music. Math for Perry represented analytical discipline, a way of achieving mastery not only over numerical problems but any hard problem, by breaking it down into essential parts, distilling complexity into simplicity. This trait was why Pentagon reporters in the 1990s liked spending time around Perry. When most public officials are asked a question, one studies the transcript later to decipher a succession of starts and stalls, sentence fragments and ellipses, that cumulatively convey an impressionistic sense of mind but no clear fixed meaning. Perry’s sentences, by contrast, always cut with surgical precision. It was one reason Clinton White House officials often held their breath when he gave interviews—Perry might make news by being clear on subjects, such as ethnic warfare in the Balkans or a nuclear showdown in North Korea, that the West Wing preferred to try to fog over. “I’ve never been able to attack a policy problem with a mathematical formula,” he recalled, “but I have always believed that the rigorous way of thinking about a problem was good. It separated the fact from the bullshit, and that’s very important sometimes, to separate what you can from what you would hope you can do.” Perry wishes more people were familiar with the concept of “expected value.” That is a statistical way of understanding events of very large magnitude that have a low probability. The large magnitude event could be something good, like winning a lottery ticket. Or it could be something bad, like a nuclear bomb exploding. Because the odds of winning the lottery are so low, the rational thing is to save your money and not buy the ticket. As for a nuclear explosion, by Perry’s lights, the consequences are so grave that the rational thing would be for people in the United States and everywhere to be in a state of peak alarm about their vulnerability, and for political debate to be dominated by discussion of how to reduce the risk. And just how high is the risk? The answer of course is ultimately unknowable. Perry’s point, though, is that it’s a hell of a lot higher than you think. Perry invites his listeners to consider all the various scenarios that might lead to a nuclear event. “Mathematically speaking, you add those all together in one year it is still just a possibility, not a probability,” he reckons. “But then you go out ten, twenty years and each time this possibility repeats itself, and then it starts to become a probability. How much time we have to get those possibility numbers lower, I don’t know. But sooner or later the odds are going to get us, I am afraid.” \*\*\* Almost uniquely among living Americans, Bill Perry has actually faced down the prospect of nuclear war before—twice. In the fall of 1962, Bill Perry was 35, father of five young children, living in the Bay Area and serving as director of Sylvania’s Electronic Defense Laboratories—driving his station wagon to recitals in between studying missile trajectories and the radius of nuclear detonations. Where he resided was not then called Silicon Valley, but the exuberance and spirit of creative possibility we now associate with the region was already evident. The giants then were Bill Hewlett and David Packard, men Perry deeply admired and wished to emulate in his own business career. The innovation engine at that time, however, was not consumer technology; it was the government’s appetite for advantage in a mortal struggle against a powerful Soviet foe. Perry was known as a star in the highly complex field of weapons surveillance and interpretation. So it was not a surprise, one bright October day, for Perry to get a call from Albert “Bud” Wheelon, a friend at the Central Intelligence Agency. Wheelon said he wanted Perry in Washington for a consultation. Perry said he’d juggle his schedule and be there the next week. “No,” Wheelon responded. “I need to see you right away.” Perry caught the red-eye from San Francisco, and went straight to the CIA, where he was handed photographs whose meaning was instantly clear to him. They were of Soviet missiles stationed in Cuba. For the next couple weeks, Perry would stay up past midnight each evening poring over the latest reconnaissance photos and help write the analysis that senior officials would present the next morning to President Kennedy. Perry experienced the crisis partly as ordinary citizen, hearing Kennedy on television draw an unambiguous line against Soviet missiles in this hemisphere and promising that any attack would be met with “a full retaliatory response.” But he possessed context, about the capabilities of weapons and the daily state of play in the crisis, that gave him a vantage point superior to that of all but perhaps a few dozen people. “I was part of a small team—six or eight people,” he recounted of those days 54 years earlier. “Half of them technical experts, half of them intelligence analysts, or photo interpreters. It was a minor role but I was seeing all the information coming in. I thought every day when I went back to the hotel it was the last day of my life because I knew exactly what nuclear weapons could do. I knew it was not just a lot of people getting killed. It was the end of civilization and I thought it was about to happen.” It was years later that Perry, like other more senior participants in the crisis, learned how right that appraisal was. Nuclear bombs weren’t only heading toward Cuba on Soviet ships, as Kennedy believed and announced to Americans at the time. Some of them were already there, and local commanders had been given authority to use them if Americans launched a preemptive raid on Cuba, as Kennedy was being urged, goaded even, by Air Force Gen. Curtis LeMay and other military commanders. At the same time, Soviet submarines were armed and one commander had been on the verge of launching them until other officers on the vessel talked him out of it. Either event would have in turn sent U.S. missiles flying. The Cuban Missile Crisis recounting is one of the dramatic peaks in “My Journey on the Nuclear Brink,” the memoir Perry published last fall. It is a book laced with other close calls—like November 9, 1979, when Perry was awakened in the middle of the night by a watch officer at the North American Aerospace and Defense Command (NORAD) reporting that his computers showed 200 Soviet missiles in flight toward the United States. For a frozen moment, Perry thought: This is it—This is how it ends. The watch officer soon set him at ease. It was a computer error, and he was calling to see whether Perry, the technology expert, had any explanation. It took a couple days to discover the low-tech answer: Someone had carelessly left a crisis-simulation training tape in the computer. All was well. But what if this blunder had happened in the middle of a real crisis, with leaders in Washington and Moscow already on high alert? The inescapable conclusion was the same as it was in 1962: The world skirting nuclear Armageddon as much by good luck as by skilled crisis management. Perry is part of a distinct cohort in American history, one that didn’t come home with the large-living ethos of the World War II generation, but took responsibility for cleaning up the world that the war bequeathed. He was a 14-year-old in Butler, Pennsylvania when he heard the news of the Pearl Harbor attack in a friend’s living room, and had the disappointed realization that the war might be over by the time he was old enough to fight in it. That turned out to be true—he was just shy of 18 at war’s end—a fact that places Perry in what demographers have called the “Silent Generation,” too young for one war but already middle-aged by the time college campuses erupted over Vietnam. Like many in his generation, Perry was not so much silent as deeply dutiful, with an understated style that served as a genial, dry-witted exterior to a life in which success was defined by how faithfully one met his responsibilities. Perry said he became aware, first gradually and over time profoundly, of the surreal contradictions of his professional life. His work—first at Sylvania and then at ESL, a highly successful defense contracting firm he co-founded in 1963—was relentlessly logical, analyzing Soviet threats and intentions and coming up with rational responses to deter them. But each rational move was part of a supremely irrational dynamic—“mutually assured destruction”—that placed the threat of massive casualties at the heart of America’s basic strategic thinking. It was the kind of framework in which policymakers could accept that a mere 25 million people dead was good news. Also the kind that in one year alone led the United States to produce 8,000 nuclear bombs. By the end, the Cold War left the planet with about 70,000 bombs (a total that is now down to about 15,500). “I think probably everybody who was involved in nuclear weapons in those days would see the two sides of it,” Perry recalls, “the logic of deterrence and the madness of deterrence, and there was no mistake, I think, that the acronym was MAD.” \*\*\* Perry has been at the forefront of a movement that he considers the sane and only alternative, and he has joined forces with other leading Cold Warriors who in another era would likely have derided their vision as naïve. In January 2007, he was a co-author of a remarkable commentary that ran on the op-ed page of the Wall Street Journal. It was signed also by two former secretaries of state, George Schulz and Henry Kissinger and by Sam Nunn, a former chairman of the Senate Armed Services Committee—all leading military hawks and foreign policy realists who came together to argue for something radical: that the goal of U.S. policy should be not merely the reduction and control of atomic arms, it should be the ultimate elimination of all nuclear weapons. This sounded like gauzy utopianism, especially bizarre coming from supremely pragmatic men. But Perry and the others always made clear they were describing a long-term ideal, one that would only be achieved through a series of more incremental steps. The vision was stirring enough that it was endorsed by President Obama in his opening weeks in office, in a March 2009 address in Prague. In retrospect, Obama’s speech may have been the high point for the vision of abolition. “A huge amount of progress was made,” recalled Shultz, now 93. “Now it is going in the other direction.” “We have less danger of an all-out war with Russia,” in Nunn’s view. “But we have more danger of some type of accident, miscalculation, cyber interference, a terrorist group getting a nuclear weapon. It requires a lot more attention than world leaders are giving it.” Perry’s goal now is much more defensive than it was just a few years ago—halting what has become inexorable momentum toward reviving Cold War assumptions about the central role of nukes in national security. More recently he’s added yet another recruit to his cause: California Governor Jerry Brown. Brown, now 78, met Perry a year ago, after deciding that he wanted to devote his remaining time in public service mainly to what he sees as civilization’s two existential issues, climate change and nuclear weapons. Brown said he became fixated on spreading Perry’s message after reading his memoir: He recently gave a copy to President Obama and is trying to bend the ear of others with influence in Washington. If Bill Perry has a gift for understatement, Brown has a gift for the theatrical. In an interview at the governor’s mansion in Sacramento, he wonders why everyone is not paying attention to his new friend and his warnings for mankind. “He is at the brink! At the brink! Not WAS at the brink—IS at the brink,” Brown exclaimed. “But no one else is.” A California governor can have more influence, at least indirectly, than one might think, due to the state’s outsized role in policy debates and the fact that the University of California’s Board of Regents helps manage some of the nation’s top weapons laboratories, which study and design nuclear weapons. Brown, who was a vocal critic in the 1980s of what he called America's "nuclear addiction," reviewed Perry's recent memoir in the New York Review of Books, and said he is determined to help his new friend spread his message. “Everybody is, 'we are not at the brink,' and we have this guy Perry who says we are. It is the thesis that is being ignored." Even if more influential people wake up to Perry’s message—a nuclear event is more likely and will be more terrible than you realize—a hard questions remains: Now what? This is where Perry’s pragmatism comes back into play. The smartest move, he thinks, is to eliminate the riskiest part of the system. If we can’t eliminate all nukes, Perry argues, we could at least eliminate one leg of the so-called nuclear triad, intercontinental ballistic missiles. These are especially prone to an accidental nuclear war, if they are launched by accident or due to miscalculation by a leader operating with only minutes to spare. Nuclear weapons carried by submarines beneath the sea or aboard bomber planes, he argues, are logically more than enough to deter Russia. The problem, he knows, is that logic is not necessarily the prevailing force in political debates. Psychology is, and this seems to be dictating not merely that we deter a Russian military force that is modernizing its weapons but that we have a force that is self-evidently superior to them. It is an argument that strikes Perry as drearily familiar to the old days. Which leads him the conclusion that the only long-term way out is to persuade a younger generation to make a different choice. His granddaughter, Lisa Perry, is precisely in the cohort he needs to reach. At first she had some uncomfortable news for her grandfather: Not many in her generation thought much about the issue. “The more I learned from him about nuclear weapons the more concerned I was that my generation had this massive and dangerous blind spot in our understanding of the world,” she said in an interview. “Nuclear weapons are the biggest public health issue I can think of.” But she has not lost hope that their efforts can make a difference, and today she has put her graduate studies in public health on hold to work full time for the Perry Project as its social media and web manager. “It can be easy to get discouraged about being able to do anything to change our course,” she said. “But the good news is that nuclear weapons are actually something that we as humans can control...but first we need to start the conversation.” It was with her help that Perry went on Reddit to field questions ranging from how his PhD in mathematics prepared him to what young people need to understand. “As a 90s baby I never lived in the Cold War era,” wrote one participant, with the Reddit username BobinForApples. “What is one thing today's generations will never understand about life during the Cold War?” Perry’s answered, as SecDef19: “Because you were born in the 1990s, you did not experience the daily terror of ‘duck and cover’ drills as my children did. Therefore the appropriate fear of nuclear weapons is not part of your heritage, but the danger is just as real now as it was then. It will be up to your generation to develop the policies to deal with the deadly nuclear legacy that is still very much with us.” For the former defense secretary, the task now is to finally—belatedly—prove Einstein wrong. The physicist said in 1946: “The unleashed power of the atom has changed everything save our modes of thinking and we thus drift toward unparalleled catastrophe.” In Perry’s view the only way to avoid it is by directly contemplating catastrophe—and doing so face to face with the world’s largest nuclear power, Russia, as he recently did in a forum in Luxembourg with several like-minded Russians he says are brave enough to speak out about nuclear dangers in the era of Putin. “We could solve it,” he said. “When you’re a prophet of doom, what keeps you going is not just prophesizing doom but saying there are things we do to avoid that doom. That’s where the optimism is.”

#### [g] Psychological bias is proven by social science – large risks are under-estimated in speeches.

Wiener 16 Jonathan B. Wiener, Law Prof @ Duke, former President of the Society for Risk Analysis, member of Scientific and Technical Council of International Risk Governance Council [The Tragedy of the Uncommons: On the Politics of Apocalypse, Global Policy 7(S1), Special Issue: Too Big to Handle: Interdisciplinary Perspectives on the Question of Why Societies Ignore Looming Disasters, May 2016, 67-80]//BPS

2 The tragedy of neglect Tragedies of the commons arise when multiple rational actors, perceiving their options and individual payoffs, choose actions that are collectively undesirable (Hardin, 1968, p. 1244; Barrett, 2007). Tragedies of the uncommons, by contrast, can arise when even one actor neglects to appreciate a looming risk or mass damage, and mismanages the risk. Research in psychology and political economy indicates several reasons why extreme mega‐catastrophic risks are systematically neglected. Here I seek to bring greater clarity to the causes of rare catastrophic uncommons risks by identifying three main sources. Unavailability One important source of the neglect of uncommons risks is their very rare or ultra‐low‐frequency character. Extensive research shows that people exhibit heightened concern about risks that are ‘available’ to the mind, both in the sense of awareness and affect – the ability to envision and feel the importance of the event. These are often recent, visible, salient events that trigger strong visual images (Kahneman, Slovic and Tversky, 1982; Kuran and Sunstein, 1999; Weber, 2006; Pinker, 2011, p. 220). Such ‘available’ risks are then seen as more worrisome for the future. The ‘availability heuristic’ helps explain why so much regulation is crisis‐driven, adopted only after a crisis event spurs public outcry and mobilizes collective political action to overcome interest group opposition (Percival, 1998; Kuran and Sunstein, 1999; Birkland, 2006; Repetto, 2006; Wiener and Richman, 2010; Wuthnow, 2010; Barrett, 2016; Balleisen et al., 2016). A standard depiction of this phenomenon is that the public is more concerned about unusual dramatic risks, and less concerned about familiar routine risks, than are experts who take a quantitative approach combining likelihood and consequence (Breyer, 1993; Sunstein, 2005). This relationship is illustrated conceptually in Figure 1. The ‘availability heuristic’ helps explain why people appear to express greater concern about airplane accidents than automobile accidents, even though the statistical risk of airplane accidents (per km traveled, and possibly per trip) is lower: airplane accidents are shocking and dramatic and make news headlines, while automobile accidents are routine and familiar and become ordinary.2 Similarly, public concern may be greater regarding coal mining accidents than the (larger) public health risks from coal combustion air pollution, and regarding ebola than the (larger) toll from malaria. Figure 1 Open in figure viewerPowerPoint ‘Availability’ in expert vs public perceptions of riskNote: The graph is illustrative and hand‐drawn by the author. This difference in perspectives, depicted in Figure 1, also corresponds to many debates over the proper role of expert vs public appraisal of risk. Early studies showed significant differences between public vs expert appraisals of risk (Slovic, 1987; EPA, 1987; EPA, 1990). Some argued that these differences occur because the public makes errors about risks, such as exaggerating concern over unusual risks, while experts are more accurate, and that therefore policy should be based more on experts’ views in order to avoid overregulating small (but unusual) risks while underregulating large (but routine) risks (Breyer, 1993). Others argued that public appraisals were based not on factual errors but on value choices, such as preferring to avoid involuntary risks, which should govern public policy (Shrader‐Frechette, 1991). Still others argued that public values about risk might reflect prejudice and bias and should not necessarily be the direct basis for public policy (Cross, 1997). A typical assumption in these debates was that the public favored more regulation (at least of unusual risks) and the experts favored less. Thus this relationship might suggest that the public would also be more worried than experts about rare ‘uncommons’ risks. Indeed, some commenters have suggested that the public exhibits exaggerated paranoia about remote risks, overstating the likelihood and calling for precautionary policies that would be (in experts’ views) an overreaction (Efron, 1984; Wildavsky, 1997; Mazur, 2004). This may be the case for unusual but experienced events that are ‘available’ in the public mind and induce strong feelings such as dread; in response to experienced calamities, people are often highly motivated to take action, even if that action is ineffective or excessively costly (Wuthnow, 2010). For example, public reactions to the tragic 9/11 terrorist attacks included shifting from flying to driving with potentially greater injury risk (Deonandan and Backwell, 2011; Gaissmaier and Gigerenzer, 2012), and supporting two wars that were costly in money and lives (Stern and Wiener, 2008; Wuthnow, 2010). But with regard to ultra‐low‐frequency catastrophic risks, events that perhaps only occur once in eons, and hence are not experienced, it is not the case that the public is calling for overreaction while experts urge calm (Weber, 2006). Rather, it is experts, applying their quantitative methods, who are warning about future rare extreme risks such as abrupt climate change, artificial intelligence and large asteroid collisions (Posner, 2004; Bostrom and Cirkovic, 2008; Weitzman, 2009), while the public seems less interested if it takes these extreme risks seriously at all. My conjecture, supported by the evidence cited above (but worth further study and refinement), is that ‘tragedies of the uncommons’ add a twist to the typical debate about public vs expert risk appraisal. Adding ultra‐low‐frequency (not experienced) risks to the picture shows that it is not the case that the public always favors more regulation and experts less. For both routine risks and ultra‐rare risks, it is often experts who favor more regulation than the public. My conjecture of this twist in relative concern is depicted conceptually in Figure 2. Here, public concern is higher than experts’ concern for unusual and experienced (hence available) risks, in the middle region of the frequency dimension; but public concern is lower than experts’ concern both for routine familiar risks, and for ultra‐low‐frequency rare extreme risks. Figure 2 Open in figure viewerPowerPoint ‘Unavailability’ of extreme risks in expert vs public perceptions of risk Note: The graph is illustrative and hand‐drawn by the author. The reason for this reversal in relative appraisal at the very low end of the frequency spectrum is again related to the ‘availability’ heuristic. It predicts that people become concerned about recent, visible, salient events that trigger strong feelings. But the rare mega‐catastrophic risks are not recent, visible or salient. They have not been experienced, so the trigger for mental availability is lacking (Weber, 2006). Describing such rare risks, such as in a speech or in an opinion survey, is less effective in stimulating public reaction than an experienced risk (Weber, 2006). Relatedly, a longer time interval without experiencing a recurrence of a damaging event can lead to complacency (neglect due to unavailability) and increased vulnerability to a recurrence (which can then trigger new availability and alarm) (Turner, 1976). Although people may envision humans going extinct at some point centuries in the future (Tonn, 2009), and express pessimism about the future direction of humanity (Randle and Eckersley, 2015), that viewpoint may not translate into concern about specific risks warranting policy responses in the present (nor did these studies compare public with expert perceptions). Movies depicting rare unexperienced risks (e.g. the large asteroid collision in Deep Impact or Armageddon; alien pathogens in The Andromeda Strain; the rise of the machines in The Matrix) may be viewed as humorous entertainment and even elicit laughter – though perhaps that is nervous laughter rather than neglect. There is some evidence that those who watched the film The Day After Tomorrow were more concerned about climate change afterward (Leiserowitz, 2004), though the audience was not randomly selected and may have been more concerned going in. It is unclear whether films can effectively ‘synthesize availability’; perhaps new techniques of virtual reality can do better, but they still may not call public attention to the most important uncommons risks, nor to the best policy responses. The role of experience in triggering the availability heuristic, and raising concern about available events in public appraisals of future risks, may be rooted in the ways the brain processes information. Humans process immediate risk stimuli in part through the amygdala, which manages fear and the instant choice to flee or fight (Ledoux, 2007). At the same time, using the prefrontal cortex, humans are able to envision hypothetical future scenarios and analyze choices among them (Gilbert and Wilson, 2007). These two neural pathways are sometimes dubbed ‘system 1’ and ‘system 2’ (Kahneman, 2011). One possibility is that the faster processing of system 1 is generating fear before the slower processing of system 2 can develop a more analytic appraisal; but the two systems may also be interacting, and system 2 can also generate fear after its analysis. Even if system 2 analysis is applied, the prefrontal cortex, when it envisions hypothetical scenarios of the future, appears to draw on experienced events (from the brain's memory centers) in order to construct a collage or pastiche of the future – a ‘prospection’ (Gilbert and Wilson, 2007; Schachter et al., 2008). Thus the human brain typically relies on ‘available’ experienced events even for its analytic prospection about future scenarios.3 If so, the ‘unavailability’ of rare extreme risks contributes importantly to their being neglected in public concern. A mid‐level example is the increase in parents seeking exemptions from vaccines for their children: past success in controlling a disease may create unavailability and neglect (though subsequent disease outbreaks may revive concern). A more extreme example is that a very large asteroid (> 10 km diameter) has not hit the earth for about 65 million years (Reinhardt et al., 2016), evidently causing the demise of the dinosaurs and about 75 per cent of all life on earth (a 15 km asteroid hit Chicxulub, off the Yucatan peninsula of Mexico, and another dubbed Shiva may have hit near the Indian land mass about 40,000 years later (Lerbekmo, 2014)). Smaller objects hit the earth frequently, and regional damage was caused by the impacts at Tunguska (1908) and Chelyabinsk (2013) (about 19 m in diameter, see Borovicka et al., 2013). The Chelyabinsk impact prompted calls for increased detection efforts. Early detection enables a longer lead time to devise new deflection methods. Improved probabilistic analysis indicates that rare asteroid impacts, even < 1000 m diameter, may be more risky than commonly thought (Reinhardt et al., 2016). The neglect of rare uncommons risks in public psychology may in turn yield neglect in politics. This is a distinct additional factor on top of others that may also contribute to such neglect, such as free‐riding (if the problem is also a ‘commons’ problem requiring collective action by multiple actors); short‐term costs vs long‐term benefits (if the risk would occur in the long‐term future) mismatched with the short‐term election cycles; inattention to the plight of people far away in other countries and cultures; and others. Individual neglect of rare global catastrophic risk may be compounded by societal disdain for such warnings; despite the prevalence of apocalyptic scenarios in religion and literature (Lisboa, 2011), the person warning that ‘the end is near’ is often viewed as insane (and might be). That most doomsday stories are unfounded, though, does not mean that all rare catastrophic risks are illusory. To be sure, the public may have good reasons to focus on present needs. And experts may make mistakes too. Ideally, experts and the public would communicate with each other to improve both kinds of understanding (e.g. Tetlock and Gardner, 2015). Moreover, neither ‘the public’ nor ‘experts’ is a homogeneous group; views vary among the public and among experts. Public opinion about catastrophic risks may vary with cultural identity (Kahan, 2010). Some subgroups may worry about global catastrophe, while others welcome the ‘end times’ and others dismiss alarmism. Further research could assess the influence of the ‘unavailability’ across these varying subgroups. Mass numbing A second source of the neglect of uncommons risks is their large magnitude of impact. It might seem that larger impacts should prompt more, not less, concern. For experts applying quantitative analytic methods, this appears to be the case. But for the general public, a surprising finding of recent psychology research is that a large or ‘mass’ impact yields ‘numbing’ (Slovic, 2007; Slovic et al., 2013). In these studies, people are asked in opinion polls (stated preference surveys) their willingness to pay (WTP) to save different numbers of other people from some risk. One might expect people to offer more money to save more people (a linear relationship, with each life valued the same), or even an increasing amount to reflect the greater value of averting a catastrophe (supra‐linear). Or, one might expect people to offer amounts that rise but at a declining rate, such as if willingness to pay (WTP) reaches some plateau when the risk becomes large (diminishing marginal value of life saving). (In stated preference surveys, ability to pay may not be a strong constraint on responses.) These relationships are illustrated in Figure 3. Figure 3 Open in figure viewerPowerPoint ‘Mass numbing’ in valuation of risk Note: The graph is illustrative and hand‐drawn by the author. Surprisingly, Slovic recounts several studies finding that none of these depicts public attitudes; rather, in these studies, willingness to pay rises at first, but then as the number of people at risk grows, willingness to pay declines – not just marginally (as in the plateau relationship) but absolutely, to levels below the amount people were willing to pay to save one or two individuals. And the number of people at which the stated willingness to pay peaks and begins to decline is not very high – sometimes fewer than ten people at risk. Slovic (2007) terms this ‘psychic numbing’ or ‘mass numbing’, and argues that it helps explain public neglect of genocide and other mass calamities (for further evidence, see Rheinberger and Treich, 2015). There is also evidence that it occurs for valuing nonhuman life (environmental conservation) (Markowitz et al., 2013). Hence the mass catastrophic impacts of uncommons risks may face undervaluation. One reason for this response may be feelings of personal inefficacy (Vastfjall et al., 2015): as the number of lives rises, respondents may feel overwhelmed and doubt that their contribution can really make a difference to such a large problem. The ‘end of the world’ may be too much for people to act on; it may feel disabling rather than mobilizing. Relatedly, people may have a limited capacity to worry (Weber, 2006), and thus may deflect problems so large that they would consume all of that capacity. A second reason for mass numbing may be the stronger public response to an identified individual – such as an identified victim or an identified villain. The public may be eager to save the baby who fell down the well, or the refugee child drowned on the beach, or the three whales stuck in the ice, but less willing to save a large and unidentified population of victims (Kogut and Ritov, 2005; Small and Loewenstein, 2005; Small, Loewenstein and Slovic, 2007). Kogut and Ritov (2005) and Slovic (2007) report that WTP to save a single victim also increases if the victim is described in more detail, and even more if the victim is given a face. Vastfjall et al. (2014) find that compassion is highest for a single child, and may decline after just one. Slovic (2007, p.79) quotes Mother Teresa: ‘If I look at the mass I will never act. If I look at the one, I will.’ These studies explain why charitable organizations try to feature a ‘poster child’ for a broader cause. But extreme mega‐catastrophic risks typically lack a single identified individual, unless rendered in fiction (e.g. a movie). The public may also be more eager to combat an identified villain than a faceless natural disaster or a ubiquitous social problem (Sunstein, 2007, p. 63, on the ‘Goldstein effect’). This may help explain public outcry at villains highlighted in the news media, such as Osama Bin Laden and Saddam Hussein, compared with the apparently lesser public outcry regarding tsunamis (Indian Ocean 2006, killing 200,000 people; Japan 2011, killing 20,000 people), global climate change harming large populations, or large asteroids hitting the earth.

#### [h] Extinction priority – low probability existential risks forces us to deal with low lying issues – even if the impacts are improbable it’s still valuable to debate the feasibility of the scenario – global warming was discounted for decades but debating about it brought attention of it to the fore.

#### [i] Objectivity - body count is the most objective way to calculate impacts because comparing suffering is unethical

## 2

### 1NC – PIC – Solar Energy

#### CP Text: The appropriation of outer space by private entities is unjust except for the appropriation of the sun for Solar Energy.

#### Space-solar tech coming now, private entities are key – it’s impossible to be weaponized

Snowden 19 (Mar 12, 2019,01:29pm EDT|48,669 views Solar Power Stations In Space Could Supply The World With Limitless Energy Scott Snowden Scott SnowdenContributor Sustainability, Forbes, <https://www.forbes.com/sites/scottsnowden/2019/03/12/solar-power-stations-in-space-could-supply-the-world-with-limitless-energy/?sh=229b778b4386)//ww> pbj

While on the surface of the Earth, society still struggles to adopt solar energy solutions, many scientists maintain that giant, space-based solar farms could provide an environmentally-friendly answer to the world's energy crisis. Only last week, we reported that China was planning to build the world's first solar power station to be positioned in Earth's orbit. Because the sun always shines in space, an orbital solar power station is seen as an inexhaustible source of clean energy. "Above the Earth, there's no day and night cycle and no clouds or weather or anything else that might obstruct the sun's ray, so a constant power source is available," said Ali Hajimiri, professor of electrical engineering at the California Institute of Technology and co-director of the university’s Space Solar Power Project. The multi-rotary SPS (MR-SPS) concept is one with multiple independent solar sub-arrays used to... [+] point to the sun. The multi-rotary SPS (MR-SPS) concept is one with multiple independent solar sub-arrays used to... [+] NASA Collecting solar power in space and wirelessly transmitting was first described by Isaac Asimov in 1941 in his short story Reason. In 1968, American aerospace engineer Peter Glaser published the first technical article on the concept – Power From The Sun: Its Future in the journal Science. Space-based solar power attracted considerable attention in the 1970s as the necessary individual technical components – in essence, photovoltaic cells, satellite technology and wireless power transmission – were developed. Despite the concept being technically feasible, it was considered economically unrealistic at the time and research ultimately stalled. “The idea seems to be going through a resurgence and it’s probably because the technology exists to make it happen,” said John Mankins, a former NASA scientist who was at the forefront of this field in the 1990s, before it was abandoned. Aerospace engineer Peter Glaser first wrote about the idea in 1968. Aerospace engineer Peter Glaser first wrote about the idea in 1968. SCIENCE MAGAZINE Global energy demands are only going to grow, says Hajimiri. The global population is expected to reach a staggering 9.6 billion by 2050, according to a United Nations report, so methods of generating large quantities of clean energy must be found. A space-based solar power system could provide energy to everyone, even in places that don't receive sunlight all year round, like northern Europe and Russia. In April of 2015, a research agreement between Northrop Grumman and Caltech provided up to $17.5m for the development of innovations necessary to enable a space solar power system. Three Caltech professors head up the project: joining Hajimiri were Harry Atwater and Sergio Pellegrino. Caltech is just one institution working on developing this technology. We know that scientists at the Chongqing Collaborative Innovation Research Institute for Civil-Military Integration in China are constructing a facility to test the theoretical viability of the concept and plans to develop an orbital photovoltaic array were announced in Japan some time ago. One of the biggest issues to overcome is that of getting an array of solar panels large enough to make the project viable into orbit. Early concept designs in the 1970s featured giant arrays that would've proved very difficult to actually get into orbit. "The systems of the 70s for solar power satellites, the cost estimates suggested, at that time, that it might be as much as a trillion dollars to get to the first kilowatt hour because of the way the designs worked. Essentially a single satellite, a platform, an integrated, monolithic platform about the size of Manhattan," said Mankins. However, with SpaceX and Blue Origin slowly driving the cost of orbital delivery down, suddenly the concept seems a little closer to reality. "Going to modular systems to allow mass production, I believe was the answer to how to get solar power satellite costs down to something more reasonable," said Mankins. Proposed space solar array SPS-ALPHA, image and concept courtesy John C. Mankins. Proposed space solar array SPS-ALPHA, image and concept courtesy John C. Mankins. JOHN C. MANKINS Details of China's proposed plans have not been made public, but most concept designs that exist today are based around an idea that the photovoltaic array is composed of a lightweight, deployable structure made of many smaller "solar satellites" that could easily connect together in space to form much larger array and "harvest sunlight." Equally, this approach also makes assembly, maintenance and repair considerably easier. "I've seen a presentation on what they [China] are presumably doing. I can't guarantee that's actually it, but it was by them, about the space solar system. What I've seen appears to be a conventional approach, which is similar to what people are currently contemplating," said Hajimiri. This completed array would orbit about 22,000 miles above the Earth and "beam" the energy back down to the surface. The photovoltaic array converts the sunlight into electricity, which in turn is converted into RF electrical power (microwaves) that are beamed wirelessly to ground-based receivers. These would take the form of giant wire nets measuring up to four miles across that could be installed across deserts or farmland or even over lakes. A solar facility like this could generate a constant flow of 2,000 gigawatts of power, Mankins estimates, compared to the largest solar farm that exists today in Aswan, southern Egypt, that only generates in the region of 1.8 gigawatts. It's unlikely the solar array could be weaponized into a "death ray" like the one seen in Diamonds... [+] Are Forever. It's unlikely the solar array could be weaponized into a "death ray" like the one seen in Diamonds... [+] MGM/UNITED ARTISTS An orbiting solar array, collecting and storing massive amounts of energy that's beamed to the surface... You'd be forgiven for thinking this could be the plot of a James Bond movie, if this array was somehow weaponized. Thankfully, that's not how it works. "The energy densities will not exceed what you normally would get. It would definitely not exceed what you get from the sun," said Hajimiri. The microwaves that transmit the energy to the surface would be at the so-called non-ionizing radiation frequency. "What that means is that the frequencies are such that unlike x-rays, these are the frequencies at which their photons don't have enough energy to induce chemical change, like that ultraviolet or x-rays do," said Hajimiri. "I've been working on wireless power transmitters that would operate in the microwave frequency range, between about 2 gigahertz and 8 gigahertz, roughly. Wavelengths on the order of 10 to 2 inches. Those wavelengths of electromagnetic radiation can pass through the Earth's atmosphere, including clouds and weather, without interruption, without interference." However, Mankins expects there might still be some problems. "There's always the geopolitics issue. Because when you're at an equatorial orbit, geostationary Earth orbit, you can see a great deal of the Earth below you. For me, it's challenging to envision how there would ever be agreement to allow such a thing." The team at Caltech have successfully tested their proof of concept on the ground, their photovoltaic prototypes demonstrated they can collect and wirelessly transmit 10 gigahertz of power, so the next step is to perform scaled down experiments in space. The biggest challenge is to reduce the mass as much as possible without sacrificing efficiency. Of course, that would also help reduce cost, which is probably still the biggest hurdle. "Hopefully, we'll be able to test it in space within a couple of years," said Hajimiri. "Space solar power would transform our future in space and could provide a new source of virtually limitless and sustainable energy to markets across the world," said Mankins. "Why wouldn't we pursue it?"

#### Space renewable shift is inevitable and good – squo energy habits are unsustainable, only space-solar energy solves

Crawford 10/5 (Mark Crawford is an engineering and technology writer in Corrales, N.M. Space-Based Solar Power Offers Out-of-This World Challenges Oct 5, 2021, ASME, <https://www.asme.org/topics-resources/content/space-based-solar-power-offers-out-of-this-world-challenges)//ww> pbj

Fossil fuels comprise over three-quarters of the world’s energy consumption. These dwindling resources can only support our transportation and energy needs for another 50 to 100 years. In addition, the energy sector is the world’s greatest polluter, releasing nearly one-third of global greenhouse gas emissions, according to the Center for Climate and Energy Solutions. Depletion of oil, gas, and coal reserves will eventually force the world to shift to clean, renewable resources, especially solar energy, which is plentiful. However, solar panels have a maximum efficiency of about 22 percent and are further impacted by external factors, such as limited daylight hours or bad weather. During winter in Europe, for example, as little as three percent of sunlight reaches the earth. These limitations on solar efficiency would be removed by using satellites to collect solar energy in space and beam it to collection sites on Earth. Space-based solar panels can generate 2,000 GW of power constantly, or about 40 times more energy than a solar panel would generate on Earth, according to the National Space Society. More for You: Infographic: Floating Solar Rides the Waves To make space-based solar power (SBSP) feasible on a global scale, several main systems are required: Low-cost, reusable launch vehicles to get materials into space Very large, lightweight, advanced satellite solar panels for in-orbit construction Microwave-transmitting satellites and laser-transmitting satellites, equipped with solar collectors, reflectors, and transmitters Receiving centers built on Earth to receive and distribute this energy. “There are many technical challenges to overcome to ensure that these systems are practical and affordable such as safety, cost, and durability,” states Karen L. Jones, senior project leader and technology strategist with the Center for Space Policy and Strategy. “For example, when beaming power down to Earth, the power densities of microwave beams must be low enough to avoid any real or perceived health and safety concerns.” Other challenges include figuring out how to launch such large solar collection systems into orbit in an affordable way. Solar panels on the International Space Station cover about 2,500 square meters; SBSP solar reflectors could stretch to three kilometers. Space-based solar energy innovators and operators will also need to design their systems to withstand the harsh space environment and offer reliable energy. Key mechanical engineering challenges include robotics and on-orbit assembly and modularity. “Modularity will be essential for assembling lightweight structures that are large enough to capture solar rays in a heliostat reflector array,” said Jones. “These building blocks must be both interoperable and have some level of autonomy. So we need standards in key areas that enable on-orbit assembly, for example, mechanical, electrical, power, thermal, and data interfaces. ASME has been a key player in standards development and should consider a role in standards development as space-based solar power continues to mature.” The U.S. Naval Research Laboratory launched an orbital SPS experiment on the X-37B space plane in May 2020 to test the viability of space-based solar power systems, including converting sunlight to microwaves and analyzing the antenna’s energy conversion process and resulting thermal performance. The U.S. Air Force Laboratory has partnered with Northrop Grumman and others to develop advanced SBSP technologies. For example, the University of Toledo is developing photovoltaic energy sheets that would harvest solar energy and transmit the power wirelessly to Earth. These flexible solar cell sheets would be assembled and interconnected into much larger structures that could include tens of millions of sheets and extend to sizes as large as a square mile. China also plans to use a new super heavy-lift rocket to construct a large space-based solar gigawatt-level power station by 2050. One way to create such a large system is by launching tens of thousands of “solar satellites” covered with photovoltaic panels that are programmed to connect in space to form an enormous cone-shaped collection and transmission system. The solar energy would be beamed wirelessly to ground-based receivers of large wire nets measuring up to four miles across. Researchers at the Japan Aerospace Exploration Agency continue to work on using microwaves to transmit energy, based on their successful experiments in 2015 that successfully used microwaves to transmit electric power. The team was able to deliver 1.8 kW of power through the air with pinpoint accuracy to a receiver about 170 feet away, proving that the technology is viable. The target market for space-based solar power, at least in its early operational stages, could be discrete applications rather than broad commercial opportunities with utility-scale terrestrial facilities that supply power grids. Jones, who recently wrote Space-Based Solar Power: A Near Term Investment Decision wrote with co-author James Vedda, notes that emerging markets for space-based solar power could include on-demand power-beaming for for forward-deployed military bases. "These bases have relied on very dangerous caravans to deliver fuel to the troops," she said. "Nearly two-thirds of coaltion deaths in Iraq and Afghanistan were related to fuel-transporation activities." Similar opportunities may include other terrestrial applications where agile and on-deman beaming capabilities are needed for disaster zones and other types of remote and isolated communities, and powering untethered remote assets such as drones and distributed infrastructure and Internet of Things devices. "Regardless of how we envision the future," said Jones, "there will be surprises regarding future applications for wireless power transmission."

**Warming causes extinction & turns every impact – no adaptation & each degree is worse**

**Krosofsky ’21** [Andrew, Green Matters Journalist, “How Global Warming May Eventually Lead to Global Extinction”, Green Matters, 03-11-2021, https://www.greenmatters.com/p/will-global-warming-cause-extinction]//pranav

Eventually, yes. **Global warming will invariably result in the mass extinction of millions of different species,** humankind included. In fact, **the Center for Biological Diversity says that global warming is currently the greatest threat to life on this planet**. **Global warming causes a number of detrimental effects on the environment that many species won’t be able to handle long-term**. Extreme weather patterns are shifting climates across the globe, eliminating habitats and altering the landscape. **As a result, food and fresh water sources are being drastically reduced**. Then, of course, **there are the rising global temperatures themselves, which many species are physically unable to contend with**. Formerly frozen arctic and antarctic regions are melting, increasing sea levels and temperatures. Eventually, **these effects will create a perfect storm of extinction conditions**. The melting glaciers of the arctic and the searing, **unmanageable heat indexes being seen along the Equator are just the tip of the iceberg, so to speak.** **The species that live in these climate zones have already been affected by the changes caused by global warming.** Take polar bears for example, whose habitats and food sources have been so greatly diminished that they have been forced to range further and further south. **Increased carbon dioxide levels in the atmosphere and oceans have already led to ocean acidification**. **This has caused many species of crustaceans to either adapt or perish and has led to the mass bleaching of more than 50 percent of Australia’s Great Barrier Reef**, according to National Geographic. According to the Center for Biological Diversity, the current trajectory of global warming predicts that more than 30 percent of Earth’s plant and animal species will face extinction by 2050. By the end of the century, that number could be as high as 70 percent. We won’t try and sugarcoat things, humanity’s own prospects aren’t looking that great either. According to The Conversation, **our species has just under a decade left to get our CO₂ emissions under control. If we don’t cut those emissions by half before 2030, temperatures will rise to potentially catastrophic levels. It may only seem like a degree or so, but the worldwide ramifications are immense.** The human species is resilient. We will survive for a while longer, even if these grim global warming predictions come to pass, **but it will mean less food, less water, and increased hardship across the world — especially in low-income areas and developing countries. This increase will also mean more pandemics, devastating storms, and uncontrollable wildfires**.

## 3

#### Updated reconciliation bill passes now – new Manchin agenda funds climate fully, gets Sinema on board, and progressives give in because of midterms pressure

Everett & Wu 3/2 [Burgess Everett - co-congressional bureau chief for POLITICO, specializing in the Senate since 2013, Nicholas Wu - congressional reporter at POLITICO, “Dems agonize over Manchin's wish list: Taxes, prescription drugs, climate cash”, 03-02-2022, Politico, https://www.politico.com/news/2022/03/02/joe-manchin-democrat-bill-taxes-00013246]//pranav

Joe Manchin is once again setting the agenda for Democrats and says he’s willing to make a deal. They’re listening — cautiously.

Hours after President Joe Biden laid out what he hoped to salvage from Democrats’ defunct “Build Back Better” social spending plan, Joe Manchin quickly assembled a counteroffer. It might amount to deja vu for Democrats, many of whom still feel burned from last year’s debacle, yet many in the party are willing to entertain any shot they have to unify while they still have control of Congress.

“Here’s the thing. I’ve always been open to talking to people okay? But they just don’t want to hear,” Manchin said in a Wednesday interview.

The West Virginia centrist laid out a basic party-line package that could win his vote in the interview, to lower the deficit and enact some new programs — provided they are permanently funded. It may be Democrats’ best and last chance to get at least some of their major domestic priorities done before the midterm election, even as some leading liberals acknowledged any potential deal would not come close to the $1.7 trillion package Manchin spurned in December.

Manchin said that if Democrats want to cut a deal on a party-line bill using the budget process to circumvent a Republican filibuster, they need to start with prescription drug savings and tax reform. He envisions whatever revenue they can wring out of that as split evenly between reducing the federal deficit and inflation, on the one hand, and enacting new climate and social programs, on the other — “to the point where it’s sustainable.”

“If you do that, the revenue producing [measures] would be taxes and drugs. The spending is going to be climate,” Manchin said.

“And the social issues, we basically have to deal with those” with any money that’s left, he added. As far as whether he thinks his party finally understands his parameters for joining the talks, he said that Democrats “know where I am. They just basically think that I’m going to change.”

Negotiating with Manchin isn’t exactly Democrats’ favorite topic after nearly a year of back and forth. Asked about whether he can envision a passable deal, Sen. Mark Warner (D-Va.) responded: “I was hoping you would were going to, like, ask me to expound about Ukraine.”

“I’ve got a lot of respect for him. And hope springs eternal,” Warner said. The two are often aligned in centrist deal-making groups.

Manchin, who also chairs the Senate Energy Committee, said that the climate portion of any theoretical bill will look different now that Russia is invading Ukraine. He’s calling for the U.S. to ban oil imports from Russia and ramp up domestic energy production, including fossil fuels. He would support big clean energy investments in a potential deal, he said, but wants domestic oil, gas and coal production to still be a big part of the mix.

“You want to be able to defend your people, have reliable, dependable and affordable power? You have to use ‘all of the above,’” Manchin said, defending his support for clean energy investments. “They say ‘Manchin doesn’t care … he’s killing the environment.’ I’m not killing anything.”

Though he prefers everything in Congress to be bipartisan, Manchin said he has “come to that conclusion” that changing the tax code to make the rich and corporations pay their fair share can only be done with Democratic votes. To enact Manchin’s vision, Democrats would also have to bargain with Sen. Kyrsten Sinema (D-Ariz.) who last year steered the party toward surtaxes and corporate minimum taxes — and away from raising individual and corporate tax rates.

Sinema said Wednesday that the tax package negotiated last year, which shied away from raising those rates, would more than pay for what Manchin is talking about.

“Any new, narrow proposal — including deficit reduction — already has enough tax reform options to pay for it. These reforms are supported by the White House, target tax avoidance, and ensure corporations pay taxes, while not increasing costs on small businesses or everyday Americans already hurting from inflation,” said Hannah Hurley, a spokesperson for Sinema.

Progressives might take a while to warm to it. Asked about Manchin’s hopes of diverting new revenues to deficit reduction and inflation, Sen. Bernie Sanders (I-Vt.) griped: “I don’t care what he wants. We’re talking about what the American people want. He doesn’t like it, he can vote against it, that’s his business.”

And Rep. Barbara Lee (D-Calif.) scoffed, saying it would not satisfy many of the House’s frustrated liberals. She seemed more interested in still trying to change Manchin’s mind on the expanded child tax credit and other domestic programs than in accepting his blueprint.

“I would hope he would reconsider, and realize how many people are being left behind,” Lee said. “We’ve got to keep going and try to get everything that we can get.”

Despite some lawmakers’ aggravation with Manchin, other progressives were willing to entertain just about whatever they could get through with only 50 Senate Democrats and a slim House majority. After all, the midterms are now eight months away; recreating the momentum to put a big bill on the floor may take months.

Sen. Elizabeth Warren (D-Mass.) put it this way: “There’s so much that we all agree on, that we ought to be able to get a deal.” And Rep. Katie Porter (D-Calif.), the deputy chair of the Progressive Caucus, said she’s “open” to Manchin’s energy proposal provided “it’s paired with a real meaningful commitment, and actual movement.”

#### Private space exploration has united democratic support – the plan causes backlash – SPACE act proves

Smith ’18 [Lamar, American politician and lobbyist who served in the United States House of Representatives for Texas's 21st congressional district for 16 terms, a district including most of the wealthier sections of San Antonio and Austin, as well as some of the Texas Hill Country, “Lamar Smith: Space commercialization is the future”, Austin-American Statesman, https://amp.statesman.com/amp/10154753007]//pranav

As part of Innovation Week in the House of Representatives, I joined House Majority Leader Kevin McCarthy in passing the Spurring Private Aerospace Competitiveness and Entrepreneurship Act of 2015, or SPACE Act. Almost 50 Democrats joined Republicans in easily passing our bill with broad bipartisan support.

This legislation gives space companies the stability and certainty they need to operate successfully, safely and competitively in a global market. It’s one of several bills the Science Committee I chair has produced this year to support our nation’s leadership in space.

Space commercialization is the future of space. The SPACE Act encourages private sector companies to launch rockets, take risks and shoot for the heavens.

We live in exciting times. In addition to the work being done at NASA Johnson Space Center, this new generation of private space companies is making its mark on the Lone Star State. SpaceX, which is building a launch facility near Brownsville, is working in partnership with NASA to once more launch American astronauts on American rockets from American soil. And Amazon-founder Jeff Bezos’ Blue Origin just completed its first successful test of its New Shepard vehicle in West Texas. XCOR Aerospace, whose development and manufacturing operations are located in Midland, is currently putting the finishing touches on its Lynx vehicle that will take civilians on 30-minute rides into suborbital space.

These are just a few of the Texas success stories that the American commercial space industry is making possible. Many more companies across the country are launching satellites that support our technology economy, developing rocket engines and designing new vehicles for space transport and travel.

The best is yet to come — but only if we support our American space partners. Other countries like China and India are aggressively expanding their space programs and we risk losing the space leadership we’ve had for more than 50 years. Private space companies are working to end our reliance on Russia. We currently pay $70 million per seat per flight for Russia to take our astronauts to the International Space Station.

#### Manchin’s climate proposal is still a massive investment – their ev underestimates it.

Davenport ‘21 [Coral, covers energy and environmental policy, with a focus on climate change, from The Times's Washington bureau, “This Powerful Democrat Linked to Fossil Fuels Will Craft the U.S. Climate Plan”, 09-19-2021 (UPDATED ON 10/08/2021), New York Times, https://www.nytimes.com/2021/09/19/climate/manchin-climate-biden.html]//pranav

“There is no question that climate change is real or that human activities are driving much of it,” he co-wrote in a 2019 opinion article in the Washington Post with Senator Lisa Murkowski, Republican of Alaska. But Mr. Manchin has also made clear that he does not support legislation that would eliminate the burning of those fossil fuels — particularly coal and natural gas. Now, Mr. Manchin is preparing to write the climate portion of the budget bill in a way that would keep natural gas flowing to power plants, according to people familiar with his thinking. The sources spoke on the condition of anonymity because they were not authorized to publicly discuss it. Mr. Manchin does support some climate measures proposed by Mr. Biden, but is working to ensure they protect and extend the use of coal and natural gas. He agrees with the president that communities dependent on fossil fuels deserve financial support as the country transitions to green energy. And he is a booster of carbon capture sequestration, a nascent technology that collects carbon emissions from smokestacks and buries them in the ground. If it were to become commercially viable, that technology could allow industries to continue to burn coal, oil and gas. But the most powerful climate mechanism in the budget bill — and the one that Mr. Manchin intends to reshape — is a $150 billion program designed to replace most of the nation’s coal- and gas-fired power plants with wind, solar and nuclear power over the next decade. Known as the Clean Electricity Performance Program, it would pay utilities to ratchet up the amount of power they produce from zero-emissions sources, and fine those that don’t. As envisioned by the White House and House Democrats, the carrot-and-stick approach could transform the nation’s electricity sector, the second-largest source of greenhouse pollution after transportation. The policy is crucial to Mr. Biden’s goal of producing 80 percent of electricity from zero-carbon sources by 2030 and 100 percent clean electricity by 2035, analysts say. It could also help lower pollution from automobiles since electric cars and trucks would be drawing power from a grid powered by clean energy. Fossil fuel lobbyists, utility executives and West Virginia business leaders have been meeting, calling and emailing Mr. Manchin and his staff in an effort to shape the bill. Several said in recent interviews that they expect that Mr. Manchin’s plan will reward companies that increase their supply of clean energy — but the incentives will be smaller and require less. Under the version supported by the White House and House Democrats, companies would qualify for payments if they increase the amount of clean electricity they supply to customers by 4 percent a year through 2030. Mr. Manchin is likely to lower that requirement to 3 percent a year or less, said two people familiar with the matter. That would still be an improvement over business as usual: American electric utilities increased their use of zero-carbon power sources by roughly 1.4 percentage points a year over the last five years. That use increased about 2.3 percentage points in 2020. “While this will fall far short of what President Biden wants, it could still be the largest action Congress has ever taken on climate change,” Mr. Aldy, the former Obama climate adviser, said.

**Warming causes extinction & turns every impact – no adaptation & each degree is worse**

**Krosofsky ’21** [Andrew, Green Matters Journalist, “How Global Warming May Eventually Lead to Global Extinction”, Green Matters, 03-11-2021, https://www.greenmatters.com/p/will-global-warming-cause-extinction]//pranav

#### C/A the krosofsky 21 evidence from the pic

## Case

### C1

**Outer Space Laws are unclear – private corporations are still capable of escaping due to loopholes in the plan.**

**Green and Stark 17** [Christopher and Eda, “Outer Space Treaty and Beyond: Do Existing Space Laws Put an Astronomical Barrier to Private IP Rights in Space?”, JDSUPRA. 8 September 2020 https://www.jdsupra.com/legalnews/outer-space-treaty-beyond-do-existing-44028/] //DebateDrills LC

Our **limited body of space law provides little guidance**. The first international treaty, the “Outer Space Treaty,” was signed by the U.S., Russia, and the U.K. in 1967, quickly followed by the Rescue Agreement. Over the next two decades, three other treaties—the Liability Convention, the Registration Convention, and the Moon Agreement—were also signed by these nations, with most countries following in their footsteps.[3] But after that rapid succession of international treaties, there have since been few others. These five documents form the basis of the international space law we have today, but **none address the issue of**[**intellectual property rights in space**](https://www.fr.com/fish-litigation/ip-rights-outer-space/). Rather, upon inspection, it appears that **the stated purpose of these treaties may be antithetical to intellectual property protection.**

The “Outer Space Treaty” espouses communal themes in characterizing space as the “province of all mankind,” the “common heritage of mankind” and to the “benefit of all countries.”[4] Unsurprisingly, Article II of the Outer Space Treaty prohibits any appropriation of areas in space, keeping in line with its principle of communal property.[5] On the other hand, **patents are fundamentally territorial and grant monopoly rights for a period of time. Applied to space, it is unclear just what is open for patent protections.**

For example, **can private companies patent orbital patterns of satellites**? Currently, companies may patent the technology or design of satellites that stay in a particular orbit, even if not the orbital pattern itself.[6] The practical implications of this are significant, especially with the advent of satellite constellations. If particular satellite technologies, and, indirectly, their orbital patterns, are patentable, then a significant portion of space may be occupied by one satellite constellation, i.e. one company alone.[7] Does this private apportionment of space run counter to our notions of sharing space? Some argue that **the Outer Space Treaty only bans sovereign appropriation and does not limit private entities from exerting claims**. Others counter that private property rights flow from sovereign property claims, so the former is meaningless without the latter.[8] So the question remains, **can the stated goals of sharing outer space be reconciled with the proprietary nature of patents**?

**Our current corpus of space treaties comes from a period of history when space exploration was undertaken primarily by governments** rather than private actors. The cooperative goals were likely a reaction to the time, as the world was coming out of a charged space race. **The silence of these space treaties on intellectual property rights presents an opportunity for modern-day agreements to provide patent protections for private companies**. Without robust international agreement on patents for space, we may even see less international cooperation as companies refuse to divulge their discoveries.[9] Now, as more and more private companies enter space exploration and carry the torch of innovation, **it is more important than ever to strike a balance between sharing our “common heritage” and providing patent protections that incentivize invention.**[10]

**The affirmative has no enforcement mechanism – private corporations can just circumvent since they have the funding to launch rockets on their own.**

**Sheetz 21** [Michael, “Elon Musk’s SpaceX raised about $850 million, jumping valuation to about $74 billion”, CNBC. 16 February 2021. https://www.cnbc.com/2021/02/16/elon-musks-spacex-raised-850-million-at-419point99-a-share.html] //DebateDrills LC

**SpaceX completed another monster equity funding round of $850 million last week**, people familiar with the financing told CNBC, sending **the company’s valuation skyrocketing to about $74 billion.**

**The company raised the new funds at $419.99 a share**, those people said — or just 1 cent below the $420 price that [Elon Musk](https://www.cnbc.com/elon-musk/) [made infamous in 2018](https://www.cnbc.com/2018/09/28/sec-says-elon-musk-at-tesla-chose-420-price-as-pot-reference.html) when he declared **he had “funding secured” to take**[**Tesla**](https://www.cnbc.com/quotes/TSLA)**private** at that price.

The latest round also represents **a jump of about 60% in the company’s valuation** from its previous round in August, when [S**paceX raised near $2 billion at a $46 billion valuation**](https://www.cnbc.com/2020/10/14/tesla-investor-ron-baron-spacex-has-a-chance-to-be-just-as-large.html).

SpaceX did not immediately respond to CNBC’s request for comment. In addition to SpaceX further building a war chest for its ambitious plans, **company insiders and existing investors were able to sell $750 million in a secondary transaction**, one of the people said.

The people spoke on condition of anonymity because SpaceX is not a publicly traded company and the fundraising talks were private. SpaceX raised only a portion of the funding available in the marketplace, with one person telling CNBC that **the company received “insane demand” of about $6 billion in offers over the course of just three days**.

**Presumption – there’s zero legal basis or enforcement mechanism for space as a “commons”**

**Herzfeld et al 15** [(Dr. Henry, Research Professor of Space Policy and International Affairs at George Washington University) “How Simple Terms Mislead Us: The Pitfalls of Thinking about Outer Space as a Commons,” Secure World Foundation, 2015] JL

Furthermore, there is a **logical contradiction** in this discussion about outer space being treated as a commons. If a commons needs a sovereign government to grant the open territory to the use of all people, it is that government that has to oversee, regulate, and enforce that charter. Art. II of the OST prohibits national sovereignty in outer space. Thus, it is an area without a government. Even if all nations regard outer space as a “commons,” it is a very different concept from any commons that has been established in the past. There is **no real legal precedent**, **no true means of oversight or enforcement**, and therefore should not be confused with any of the many ways that concept has been applied to the territory or oceans of the Earth. Thinking about space as a global commons may be a laudatory ideal, and one that perhaps can be regarded as a very long-term goal for society. But, it is hardly a practical solution or goal for the problems we face today, witnessed by at least a thousand years of precedent in law and practice coupled with radically different technologies, exponential world population growth from 500 million people (at most) in Roman times and the Middle Ages to over 7 billion people today,38 and other radical political and social changes.

### C2

#### Space colonization is good and possible – new developing tech and adaptation solves civil war, extinction, civilization collapse, and exploration defense doesn’t apply.

Kennedy ’19 [Fred, “To Colonize Space Or Not To Colonize: That Is The Question (For All Of Us)”, 12-18-2019, Forbes, https://www.forbes.com/sites/fredkennedy/2019/12/18/to-colonize-or-not-to-colonize--that-is-the-question-for-all-of-us/?sh=65a8d2702367]//pranav

It’s important to distinguish between colonize and explore. Exploration already enjoys broad approval here in America. In June, 77% of U.S. respondents told Gallup pollsters that NASA’s budget should either be maintained or increased – undeniable evidence of support for the American space program (as it’s currently constituted). By any measure, we’ve done an admirable job of surveying the solar system over the past 60 years – an essential first step in any comprehensive program of exploration. Unmanned probes developed and launched by the United States and the Soviet Union conducted flybys of the Moon and the terrestrial planets not long after we reached Earth orbit, and since then, we’ve flown by the outer planets. Multiple nations have placed increasingly sophisticated robotic emissaries on the surfaces of the Moon, Mars, Venus and Saturn’s largest moon, Titan. Most stunningly, in a tour de force of technology and Cold War chutzpah, the U.S. dispatched humans to set foot on another world, just 50 years and a few months ago. But after only six such visits, we never returned. Moon habitats in lava tubes, crops under glass domes, ice mining at the south pole? No. NASA’s Artemis program may place a man and a woman on the Moon again in 2024. But that’s hardly colonization. For perspective, let’s look closer to home. Sailors from an American vessel may have landed on Antarctica as early as 1821 – the claim is unverified – but no scientific expeditions “wintered” there for another 75 years. The first two of these, one Belgian and one British, endured extreme cold and privation – one inadvertently, the other by design. And yet, 200 years after the first explorer set foot on the continent, there are no permanent settlements (partially as a result of a political consensus reached in the late 1950s, but in no small part due to the difficulty of extracting resources such as ore or fossil fuels through kilometers of ice). Less than 5,000 international researchers and support staff comprise the “summer population” at the bottom of the world. That number dwindles to just 1,100 during the harsh Antarctic winter, requiring millions of tons of supplies and fuel to be delivered every year – none of which can be produced locally. To suggest that Antarctica is colonized would be far overstating the sustainability of human presence there. If Antarctica is hard, the Moon, Mars, asteroids, and interplanetary space will be punishingly difficult. Writing in Gizmodo this past July, George Dvorsky describes the challenges to a human colony posed by low gravity, radiation, lack of air and water, and the psychological effects of long-term confinement and isolation inside artificial structures, in space or on planetary surfaces. Add to this the economic uncertainties of such a venture – where the modern analog of a Dutch or British East India Company would face enormous skepticism from investors regarding the profitability of shipping any good or finished product between colonial ports of call – and it becomes clear why nation states and mega-corporations alike have so far resisted the temptation to set up camp beyond geosynchronous orbit. Perhaps, many argue, we should focus our limited resources on unresolved problems here at home? Yet a wave of interest in pursuing solar system colonization is building, whether its initial focus is the Moon, Mars, or O’Neill-style space habitats. Jeff Bezos has argued eloquently for moving heavy industry off the home planet, preserving Earth as a nature reserve, and building the space-based infrastructure that will lower barriers and create opportunities for vast economic and cultural growth (similar to how the Internet and a revolution in microelectronics has allowed Amazon and numerous other companies to achieve spectacular wealth). Elon Musk and Stephen Hawking both suggested the need for a “hedge” population of humans on Mars to allow human civilization to reboot itself in the event of a catastrophe on Earth – an eggs-in-several-baskets approach which actually complements the arguments made by Bezos. And while both are valid reasons for pursuing colonization, there’s a stronger, overarching rationale that clinches it. I’ll assert that a fundamental truth – repeatedly borne out by history – is that expanding, outwardly-focused civilizations are far less likely to turn on themselves, and far more likely to expend their fecundity on growing habitations, conducting important research and creating wealth for their citizens. A civilization that turns away from discovery and growth stagnates – a point made by NASA’s Chief Historian Steven Dick as well as Mars exploration advocate Robert Zubrin. As a species, we have yet to resolve problems of extreme political polarization (both internal to nation states as well as among them), inequalities in wealth distribution, deficiencies in civil liberties, environmental depredations and war. Forgoing opportunities to expand our presence into the cosmos to achieve better outcomes here at home hasn’t eliminated these scourges. What’s more, the “cabin fever” often decried by opponents of colonization (when applied to small, isolated outposts far from Earth) turns out to be a potential problem for our own planet. Without a relief valve for ideological pilgrims or staunch individualists who might just prefer to be on their own despite the inevitable hardships, we may well run the risk of exacerbating the polarization and internecine strife we strive so hard to quell. Focusing humanity’s attention and imagination on a grand project may well give us the running room we need to address these problems. But the decision cannot be made by one country, or one company, or one segment of the human population. If we do this, it will of necessity be a truly international endeavor, a cross-sector endeavor (with all commercial, civil, and defense interests engaged and cooperating). The good news: Critical technologies such as propulsion and power generation systems will improve over time. Transit durations between celestial destinations will shorten (in the same way sailing vessels gave way to steam ships and then to airliners and perhaps, one day, to point-to-point ballistic reusable rockets). Methods for obtaining critical resources on other planets will be refined and enhanced. Genetic engineering may be used to better adapt humans, their crops and other biota to life in space or on other planetary surfaces – to withstand the effects of low or micro-gravity, radiation, and the psychological effects of long-duration spaceflight.

#### Space exploration key to scientific innovation

Keusen 21 [Kuesen, Tanya, "Space Exploration and Innovation," United Nations Office for Outer Affairs, <https://www.unoosa.org/oosa/en/ourwork/topics/space-exploration-and-innovation.html>] //akhileshp

Since the beginning of time, exploring the Universe has been a dream of humankind. Human curiosity has fuelled interest in exploring and discovering new worlds, pushing the boundaries of the known, and expanding scientific and technical knowledge. States and [space agencies](https://www.unoosa.org/oosa/en/ourwork/space-agencies-OLD.html) have been engaging in space exploration since the first space launch. The first space launch led to the first human space flight, which led to the first moonwalk. Nowadays focus has shifted to joint human and robotic missions, near-Earth asteroids, Mars and destinations beyond our own solar system. Space exploration and the innovation it entails are essential drivers for opening up new domains in space science and technology. They trigger new partnerships and develop capabilities that create new opportunities for addressing global challenges. Space exploration also motivates young people to pursue education and careers in science, technology, engineering and mathematics (the STEM disciplines). Though the precise nature of future benefits from space exploration is not easily predefined, current trends suggest that significant advantage may be found in areas such as new materials, health and medicine, transportation and computer technology. As the benefits of space exploration and innovation become better known, increasingly more countries and non-governmental entities are interested in engaging in exploration and innovation. Recent COPUOS and UNOOSA Efforts In 2016, seven thematic priorities were endorsed by the Committee on the Peaceful Uses of Outer Space in the context of preparations for the fiftieth anniversary of the United Nations Conference on the Exploration and Use of Outer Space (UNISPACE+50), the first of which was global partnership in space exploration and innovation. The Committee established an action team as the mechanism to drive the topic. Twenty-two States and seven permanent observer organizations joined the [Action Team on Exploration and Innovation](https://www.unoosa.org/res/oosadoc/data/documents/2018/aac_105c_12018crp/aac_105c_12018crp_3_0_html/AC105_C1_2018_CRP03E.pdf), producing a report including a series of recommendations ( [A/AC.105/1168)](https://www.unoosa.org/oosa/en/oosadoc/data/documents/2018/aac.105/aac.1051168_0.html). The Action Team Co-Chairs underscored the significance of the report, "which represented the first time the United Nations had examined, in a comprehensive way, human and robotic exploration beyond low-Earth orbit, and provided a basis for further consideration of how the United Nations system may contribute to a new era in the peaceful exploration and use of outer space". In 2018, on the basis of the Action Team recommendation, the Committee added "Space exploration and innovation" as an item on its agenda ( [A/73/20](https://www.unoosa.org/oosa/en/oosadoc/data/documents/2018/a/a7320_0.html), para. 364). Under this agenda item, first considered at the Committee session in 2019, States share information on, among other things: research and development activities; astronaut programmes; a space exploration innovation hub centre; the planned establishment of a Mars scientific city; activities in connection with the International Space Station and the China Space Station; the use of a satellite as a multi-wavelength observatory; various missions to the Moon, Mars, Venus, Jupiter and asteroids; the planned Lunar Orbital Platform-Gateway; a new spacecraft that has the potential to be utilized as a deep-space logistics carrier to the cis-lunar region; a dedicated solar mission with a focus on studying the inner solar corona; a tracker of electromagnetic counterparts of binary neutron star merger events; a mission to examine the atmospheric composition of exoplanets; and satellites launched for the purpose of deep space exploration. Much of this information is available in [technical presentations](https://www.unoosa.org/oosa/en/ourwork/copuos/technical-presentations.html).

#### Space col key to innovation, space tourism, and heg

West 20 [Darrell M. West, 8-18-2020, "Five reasons to explore Mars," Brookings, <https://www.brookings.edu/blog/techtank/2020/08/18/five-reasons-to-explore-mars/>] //akhileshp

The recent launch of the Mars rover Perseverance is the latest U.S. space mission seeking to understand our solar system. Its [expected arrival at the Red Planet in mid-February](https://www.nytimes.com/2020/07/30/science/nasa-mars-launch.html) 2021 has a number of objectives linked to science and innovation. The rover is equipped with sophisticated instruments designed to search for the remains of ancient microbial life, take pictures and videos of rocks, drill for soil and rock samples, and use a small helicopter to fly around the [Jezero Crater landing spot](https://mars.nasa.gov/resources/22474/jezero-crater-mars-2020s-landing-site/). Mars is a valuable place for exploration because it can be reached in 6 ½ months, is a major opportunity for scientific exploration, and has been mapped and studied for several decades. The mission represents the first step in a long-term effort to bring Martian samples back to Earth, where they can be analyzed for residues of microbial life. Beyond the study of life itself, there are a number of different benefits of Mars exploration. UNDERSTAND THE ORIGINS AND UBIQUITY OF LIFE The site where Perseverance is expected to land is the place where experts believe 3.5 billion years ago held a lake filled with water and flowing rivers. It is an ideal place to search for the residues of microbial life, test new technologies, and lay the groundwork for human exploration down the road. The mission plans to investigate whether microbial life existed on Mars billions of years ago and therefore that life is not unique to Planet Earth. As noted by Chris McKay, a research scientist at NASA’s Ames Research Science Center, that would be an extraordinary discovery. “Right here in our solar system, [if life started twice](https://www.space.com/9329-earth-unique-life-common-universe.html), that tells us some amazing things about our universe,” he pointed out. “It means the universe is full of life. Life becomes a natural feature of the universe, not just a quirk of this odd little planet around this star.” The question of the origins of life and its ubiquity around the universe is central to science, religion, and philosophy. For much of our existence, humans have assumed that even primitive life was unique to Planet Earth and not present in the rest of the solar system, let alone the universe. We have constructed elaborate religious and philosophical narratives around this assumption and built our identity along the notion that life is unique to Earth. If, as many scientists expect, future space missions cast doubt on that assumption or outright disprove it by finding remnants of microbial life on other planets, it will be both invigorating and illusion-shattering. It will force humans to confront their own myths and consider alternative narratives about the universe and the place of Earth in the overall scheme of things. As noted in my Brookings book, [Megachange](https://www.brookings.edu/book/megachange-economic-disruption-political-upheaval-and-social-strife-in-the-21st-century/), given the centrality of these issues for fundamental questions about human existence and the meaning of life, it would represent a far-reaching shift in existing human paradigms. As argued by scientist McKay, discovering evidence of ancient microbial life on Mars would lead experts to conclude that life likely is ubiquitous around the universe and not limited to Planet Earth. Humans would have to construct new theories about ourselves and our place in the universe. DEVELOP NEW TECHNOLOGIES The U.S. space program has been an extraordinary [catalyst for technology innovation](https://www.jpl.nasa.gov/infographics/infographic.view.php?id=11358). Everything from Global Positioning Systems and medical diagnostic tools to wireless technology and camera phones owe at least part of their creation to the space program. Space exploration required the National Aeronautics and Space Administration to learn how to communicate across wide distances, develop precise navigational tools, store, transmit, and process large amounts of data, deal with health issues through digital imaging and telemedicine, and develop collaborative tools that link scientists around the world. The space program has pioneered the miniaturization of scientific equipment and helped engineers figure out how to land and maneuver a rover from millions of miles away. Going to Mars requires similar inventiveness. Scientists have had to figure out how to search for life in ancient rocks, drill for rock samples, take high resolution videos, develop flying machines in a place with gravity that is 40 percent lower than on Earth, send detailed information back to Earth in a timely manner, and take off from another planet. In the future, we should expect large payoffs in commercial developments from Mars exploration and advances that bring new conveniences and inventions to people. ENCOURAGE SPACE TOURISM In the not too distant future, wealthy tourists likely will take trips around the Earth, visit space stations, orbit the Moon, and perhaps even take trips around Mars. For a substantial fee, they can experience weightlessness, take in the views of the entire planet, see the stars from outside the Earth’s atmosphere, and witness the wonders of other celestial bodies. The Mars program will help with space tourism by improving engineering expertise with space docking, launches, and reentry and providing additional experience about the impact of space travel on the human body. Figuring out how weightlessness and low gravity situations alter human performance and how space radiation affects people represent just a couple areas where there are likely to be positive by-products for future travel. The advent of space tourism will [broaden human horizons](https://unitedearth.us/religion-and-spirituality/does-seeing-earth-from-space-alter-your-perspective/) in the same way international travel has exposed people to other lands and perspectives. It will show them that the Earth has a delicate ecosystem that deserves protecting and why it is important for people of differing countries to work together to solve global problems. Astronauts who have had this experience say it has altered their viewpoints and had a profound impact on their way of thinking. FACILITATE SPACE MINING Many objects around the solar system are made of similar minerals and chemical compounds that exist on Earth. That means that some asteroids, moons, and planets could be rich in minerals and rare elements. Figuring out how to [harvest those materials](https://www.sciencefocus.com/space/space-mining-the-new-goldrush/) in a safe and responsible manner and bring them back to Earth represents a possible benefit of space exploration. Elements that are rare on Earth may exist elsewhere, and that could open new avenues for manufacturing, product design, and resource distribution. This mission could help resource utilization through advances gained with its Mars Oxygen Experiment (MOXIE) equipment that converts Martian carbon dioxide into oxygen. If MOXIE works as intended, it would help humans live and work on the Red Planet. ADVANCE SCIENCE One of the most crucial features of humanity is our curiosity about the life, the universe, and how things operate. Exploring space provides a means to satisfy our thirst for knowledge and improve our understanding of ourselves and our place in the universe. Space travel already has exploded centuries-old myths and promises to continue to confront our long-held assumptions about who we are and where we come from. The next decade promises to be an exciting period as scientists mine new data from space telescopes, space travel, and robotic exploration. Ten or twenty years from now, we may have [answers to basic questions](https://www.brookings.edu/book/turning-point/) that have eluded humans for centuries, such as how ubiquitous life is outside of Earth, whether it is possible for humans to survive on other planets, and how planets evolve over time.

#### Space innovation solves extinction – generates ecological survival mechanisms.

Sadedin 17 [(Suzanne, PhD in Evolutionary Biology, 10-9, "Will Human Innovation Save Us From Future Extinction?," Forbes, [https://www.forbes.com/sites/quora/2017/10/09/will-human-innovation-save-us-from-future-extinction/?sh=773a4f276c65)]//](https://www.forbes.com/sites/quora/2017/10/09/will-human-innovation-save-us-from-future-extinction/?sh=773a4f276c65)%5d//) akhileshp

Does the human ability to innovate suggest an immunity to total extinction? Yes and no. Currently, innovation reduces our chance of extinction in some ways, and increases it in others. But if we innovate cleverly, we could become just about immune to extinction. The species that survive mass extinctions tend to share three characteristics. They're widespread. This means local disasters don't wipe out the entire species, and some small areas, called refugia, tend to be unaffected by global disasters. If you're widespread, it's more likely that you have a population that happens to live in a refugium. They're ecological generalists. They can cope with widely varying physical conditions, and they're not fussy about food. They're r-selected. This means that they breed fast and have short generation times, which allows them to rapidly grow their populations and adapt genetically to new conditions. Innovation gives humans the ability to be widespread ecological generalists. With technology, we can live in more diverse conditions and places than any other species. And while we can't (currently) grow our populations rapidly like an r-selected species, innovation does allow us to adapt quickly at the cultural level. Technology also increases our connections to one another and connectivity is a two-edged sword. Many species consist of a network of small, local populations, each of which is somewhat isolated from the others. We call this a metapopulation. The local populations often go extinct, but they are later re-seeded by others, so the metapopulation as a whole survives. Humans used to be a metapopulation, but thanks to innovation, we're now globally connected. Archaeologists believe that many past civilizations, such as the Easter Islanders, fell because of unsustainable ecological and cultural innovations. The impact of these disasters was limited because these civilizations were small and disconnected from other such civilizations. These days, a useful innovation can spread around the world in weeks. So can a lethal one. With many of the technologies and chemicals we're currently inventing, we can't be certain about their long-term effects; human biology is complex enough that we often can't be absolutely certain something won't kill us in a decade until we've waited a decade to see. We try to be careful and test things before they're released, and the probability that any particular invention could kill us all is tiny, but since we're constantly innovating, it's a real possibility. Pandemics pose the same problem for a well-connected species. There are certain possibilities where species extinction is really hard to avoid; fortunately, they're also very unlikely, but we are definitely not immune from this. The most likely cause of our extinction, in my opinion, is innovation in machine learning/AI. This could destroy the planet, but even if it doesn't, humans will be ultimately redundant to the dominant systems. They might keep us alive in a zoo somewhere, but I doubt it. A happier scenario (to me at least) is transhumanism, where humans become extinct in a sense because we've managed to liberate ourselves from biology. So how could innovation prevent our extinction? We seed the galaxy with independently evolving human populations to create a new metapopulation. These local populations would hopefully be sufficiently isolated that some would survive an innovation or disaster that wipes out the rest. They would, of course, evolve in response to local conditions, perhaps creating several new species. So you could say this is still extinction, but it's as close as we'll come to persistence in our ever-changing universe.

#### 2] Argument quality: [a] plan text disclosure discourages cheap shot aff’s with fringe authors and shoddy solvency. They had a month to prep – the neg is entitled to some research time to make sure the AFF is inherent, topical, and controversial. Otherwise bad AFF’s can win on purely surprise factor, which is a bad model b/c it encourages finding the most fringe surprising case possible instead of a well researched and defensible aff. [b] Link turns critical thinking – having time to prep against the specificity of the aff leads to the best, most fleshed out responses – otherwise we’re pigeonholed into generic Ks that don’t answer the aff. Thinking on your feet doesn’t solve – we can’t cut good evidence against the aff in 6 minutes and the aff always beats us on that evidence debate.

#### 3] Inclusion – new affs are a huge source of anxiety since debaters have less than 10 minutes to generate an entire 1NC – uniquely harms disabled debaters who suffer from anxiety or processing disorders. Outweighs on specificity – you actively harmed a disabled person this round. Inclusion outweighs – debate had to be inclusive for you to debate.