# WBFL NC

**Because the resolution asks what is just, my value is Justice.**

**The criterion is minimizing suffering. No coherent theory of justice can deny that suffering is morally bad. Each of us knows from our own experiences that suffering is a moral evil, and that other people experience suffering in the same way we do. Therefore, if we regard everyone’s pain as morally equal, we are obligated to minimize the amount of suffering people experience.**

**Moreover, maximizing utility is the only way to affirm equal and unconditional human dignity.**

**Cummiskey ’90 -** David Cummiskey. [Associate Philosophy Professor at Bates College].Kantian Consequentialism. Ethics, Vol. 100, No. 3. 1990. http://www.jstor.org/stable/2381810.

We must not obscure the issue by characterizing this type of case as the sacrifice of individuals for some abstract “social entity.” It is not a question of some persons having to bear the cost for some elusive “overall social good.” Instead, the question is whether some persons must bear the inescapable cost for the sake of other persons. Robert Nozick, for example, argues that “to use a person in this way does not sufficiently respect and take account of the fact that he is a separate person, that his is the only life he has.” But why is this not equally true of all those whom we do not save through our failure to act? **By emphasizing solely the one who must bear the cost if we act, we fail to** sufficiently **respect** and take account of **the many other separate persons**, **each with only one life, who will bear the cost of our inaction.** In such a situation, what would a conscientious Kantian agent, an agent motivated by the unconditional value of rational beings, choose? A morally good agent recognizes that the basis of all particular duties is the principle that “rational nature exists as an end in itself” (GMM 429). Rational nature as such is the supreme objective end of all conduct. **If one** truly **believes** that **all rational beings have** an **equal value**, then **the** rational **solution** to such a dilemma **involves maximally promoting the lives and liberties of as many** rational beings **as possible** (chapter 5). In order to avoid this conclusion, the non-consequentialist Kantian needs to justify agent-centered constraints. As we saw in chapter 1, however, even most Kantian deontologists recognize that agent-centered constraints require a non- value-based rationale. But we have seen that Kant’s normative theory is based on an unconditionally valuable end. How can a concern for the value of rational beings lead to a refusal to sacrifice rational beings even when this would prevent other more extensive losses of rational beings? **If the moral law is based on the value of rational beings and their ends, then what is the rationale for prohibiting a moral agent from maximally promoting these two tiers of value? If I sacrifice some for the sake of others, I do not use them arbitrarily, and I do not deny the unconditional value of rational beings. Persons may have “dignity**, **that** is, an unconditional and incomparable worth” that **transcends** any **market value** (GMM 436), **but persons also have a fundamental equality that dictates that some must sometimes give way for the sake of others** (chapters 5 and 7). The concept of the end-in-itself does not support the view that we may never force another to bear some cost in order to benefit others. If one focuses on the equal value of all rational beings, then equal consideration suggests that one may have to sacrifice some to save many.

### Contention 1: Allowing the private appropriation of outer space is critical to facilitate asteroid mining, which could transform life on Earth and solve an array of huge problems.

**The private sector is essential for asteroid mining – competition is key and government development is not effective, efficient, or cheap enough. Thiessen 21:**

Marc Thiessen, 6-1, 21, Washington Post, Opinion: SpaceX’s success is one small step for man, one giant leap for capitalism, https://www.washingtonpost.com/opinions/2020/06/01/spacexs-success-is-one-small-step-man-one-giant-leap-capitalism/

It was one small step for man, one giant leap for capitalism. Only three countries have ever launched human beings into orbit. This past weekend, SpaceX became the first private company ever to do so, when it sent its Crew Dragon capsule into space aboard its Falcon 9 rocket and docked with the International Space Station. This was accomplished by a company Elon Musk started in 2002 in a California strip mall warehouse with just a dozen employees and a mariachi band. At a time when our nation is debating the merits of socialism, SpaceX has given us an **incredible testament to the power of American free enterprise.** While the left is advocating unprecedented government intervention in almost every sector of the U.S. economy, from health care to energy, **today Americans are celebrating the successful privatization of space travel.** If you want to see the difference between what government and private enterprise can do, consider: It took a private company to give us the first space vehicle with touch-screen controls instead of antiquated knobs and buttons. It took a private company to give us a capsule that can fly entirely autonomously from launch to landing — including docking — without any participation by its human crew. It also took a private company to invent a reusable rocket that can not only take off but land as well. When the Apollo 11 crew reached the moon on July 20, 1969, Neil Armstrong declared “the Eagle has landed.” On Saturday, SpaceX was able to declare that the Falcon had landed when its rocket settled down on a barge in the Atlantic Ocean — ready to be used again. That last development will save the taxpayers incredible amounts of money. The cost to NASA for launching a man into space on the space shuttle orbiter was **$170 million per seat, compared with just $60 million** to $67 million on the Dragon capsule. The cost for the space shuttle to send a kilogram of cargo into to space was $54,500; with the Falcon rocket, the cost is just $2,720 — **a decrease of 95 percent.** And while the space shuttle cost $27.4 billion to develop, the Crew Dragon was designed and built for just $1.7 **billion — making it the lowest-cost spacecraft developed in six decades.** SpaceX did it in six years — far faster than the time it took to develop the space shuttle. ***The private sector does it better, cheaper, faster and more efficiently than government***. **Why? Competition.** Today, SpaceX has to compete with a constellation of private companies — including legacy aerospace firms such as Orbital ATK and United Launch Alliance and innovative start-ups such as Blue Origin (which is designing a Mars lander and whose owner, Jeff Bezos, also owns The Post) and Virgin Orbit (which is developing rockets than can launch satellites into space from the underside of a 747, avoiding the kinds of weather that delayed the Dragon launch). In the race to put the first privately launched man into orbit, upstart SpaceX had to beat aerospace behemoth Boeing and its Starliner capsule to the punch. It did so — for more than $1 billion less than its competitor. **That spirit of competition and innovation will revolutionize space travel in the years ahead.** Indeed, Musk has his sights set far beyond Earth orbit. Already, SpaceX is working on a much larger version of the Falcon 9 reusable rocket called Super Heavy that will carry a deep-space capsule named Starship capable of carrying up to 100 people to the moon and eventually to Mars. Musk’s goal — the reason he founded SpaceX — is to colonize Mars and make humanity a multiplanetary species. He has set a goal of founding a million-person city on Mars by 2050 complete with iron foundries and pizza joints. Can it be done? Who knows. But this much is certain: **Private-sector innovation is opening the door to a new era of space exploration**. Wouldn’t it be ironic if, just as capitalism is allowing us to explore the farthest reaches of our solar system, Americans decided to embrace socialism back here on Earth?

**Space regulation scares investors away and spills over to other space activities. Freeland 05**

Steven Freeland (BCom, LLB, LLM, University of New South Wales; Senior Lecturer in International Law, University of Western Sydney, Australia; and a member of the Paris-based International Institute of Space Law). “Up, Up and … Back: The Emergence of Space Tourism and Its Impact on the International Law of Outer Space.” Chicago Journal of International Law: Vol. 6: No. 1, Article 4. 2005. JDN. <https://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=1269&context=cjil>

V. THE NEED FOR CELESTIAL PROPERTY RIGHTS? ¶ The fundamental principle of "non-appropriation" upon which the international law of outer space is based stems from the desire of the international community to ensure that outer space remains an area beyond the jurisdiction of any state(s). Similar ideals emerge from UNCLOS (in relation to the High Seas) as well as the Antarctic Treaty, 42 although in the case of the latter treaty, it was finalised after a number of claims of sovereignty had already been made by various States and therefore was structured to "postpone" rather than prejudice or renounce those previously asserted claims.43 In the case of outer space, its exploitation and use is expressed in Article I of the Outer Space Treaty to be "the province of all mankind," a term whose meaning is not entirely clear but has been interpreted by most commentators as evincing the desire to ensure that any State is free to engage in space activities without reference to any sovereign claims of other States. This freedom is reinforced by other parts of the same Article and is repeated in the Moon Agreement (which also applies to "other celestial bodies within the solar system, other than the earth")." Even though both the scope for space activities and the number of private participants have expanded significantly since these treaties were finalised, it has still been suggested that the nonappropriation principle constitutes "**an absolute barrier** in the realization of every kind of space activity., 4 ' **The amount of capital expenditure required to research, scope, trial, and implement a new space activity is significant.** To bring this activity to the point where it can represent a viable "stand alone" commercial venture **takes many years and almost limitless funding.** From the perspective of a private enterprise contemplating such an activity, it would quite obviously be an important element in its decision to devote resources to this activity that it is able to secure the highest degree of legal rights in order to protect its investment. **Security** of patent and other intellectual property rights, for example, are vital prerequisites for private enterprise research activity on the ISS, and these rights are specifically addressed by the ISS Agreement between the partners to the project and were applicable to the experiments undertaken by Mark Shuttleworth when he was onboard the ISS.46

**Asteroid mining can happen with private sector innovation and is key to solve climate change, economic decline and asteroid collisions. Taylor 19**

Chris Taylor [journalist], 19 - ("How asteroid mining will save the Earth — and mint trillionaires," Mashable, 2019, accessed 12-13-2021, https://mashable.com/feature/asteroid-mining-space-economy)//ML

How much, exactly? We’re only just beginning to guess. [Asterank](http://www.asterank.com/" \t "_blank), a service that keeps track of some 6,000 asteroids in NASA’s database, prices out the estimated mineral content in each one in the current world market. More than 500 are listed as “>$100 trillion.” The estimated profit on just the top 10 asteroids judged “most cost effective” — that is, the easiest to reach and to mine, subtracting rocket fuel and other operating costs, is around $1.5 trillion.¶ Is it ours for the taking? Well, here’s the thing — we’re taking it already, and have been doing so since we started mining metals thousands of years ago. Asteroid strikes are the only reason rare metals exist in the Earth’s crust; the native ones were all sucked into our planet’s merciless iron core millions of years ago. Why not go to the source?¶ As a side project, space mining can grab water from the rocks and comets — water which, with a little processing makes rocket fuel. Which in turn makes even more currently unimaginable space operations possible, including ones that could give the planet all the energy it needs to avert climate catastrophe. Cislunar space — the bit around us and the moon, the local neighborhood, basically — is about to get very interesting.¶ It’s hard, even for the most asteroid-minded visionaries, to truly believe the full scope of this future space economy right now. Just as hard as it would have been in 1945, when an engineer named Vannevar Bush first proposed [a vast library of shared knowledge that people the world over would access via personal computers](https://en.wikipedia.org/wiki/Memex), to see that mushroom into a global network of streaming movies and grandmas posting photos and trolls and spies who move the needle on presidential elections. ¶ No technology’s pioneer can predict its second-order effects.¶ The space vision thing is particularly difficult in 2019. Not only do we have plenty of urgent problems with democracy and justice to keep us occupied, but the only two companies on the planet to have gone public with asteroid-mining business plans, startups that seemed to be going strong and had launched satellites already, were just bought by larger companies that are, shall we say, less comfortable executing on long-term visions.¶ Planetary Resources was founded in 2012 in a blaze of publicity. Its funding came from, among others, Larry Page, Eric Schmidt, Ross Perot, and the country of Luxembourg. It had inked an orbital launch deal with Virgin Galactic. And it was sold last October to a blockchain software company. (To 21st century readers, this paragraph would look like I’m playing tech world mad libs.)¶ In January, the other company, Deep Space Industries, also partly funded by Luxembourg (way to get in the space race, Luxembourg!), was sold to Bradford Space, owned by a U.S. investment group called the American Industrial Acquisition Corporation. Maybe these new overlords plan on continuing their acquisitions' asteroid mining endeavors rather than stripping the companies for parts. Both companies have been notably silent on the subject. “The asteroid mining bubble has burst,” [declared The Space Review](http://www.thespacereview.com/article/3633/1), one of the few online publications to even pay attention.¶ That’s also to be expected. After all, anyone trying to build Google in 1945 would go bankrupt. Just as the internet needed a half-dozen major leaps forward in computing before it could even exist, space industry needs its launch infrastructure.¶ Currently, the world’s richest person and its most well-known entrepreneur, Jeff Bezos and Elon Musk, respectively, are working on the relatively cheap reusable rockets asteroid pioneers will need. (As I was writing this, Bezos announced in an email blast that one of his New Shepherd rockets had flown to space and back five times like it was nothing, delivering 38 payloads for various customers while remaining entirely intact.) ¶ Meanwhile, quietly, Earth’s scientists are laying the groundwork of research the space economy needs. Japan’s Hayabusa 2 spacecraft has been in orbit around asteroid Ryugu for the last year and a half, learning everything it can. (Ryugu, worth $30 billion according to Asterank, is the website's #1 most cost-effective target.) The craft dropped [tiny hopping robot rovers](https://www.space.com/41941-hayabusa2-asteroid-rovers-hopping-tech.html) and a [small bomb](https://www.space.com/japan-hayabusa2-asteroid-bomb-video.html) on its target; pictures of the small crater that resulted were released afterwards.¶ Officially, the mission is to help us figure out how the solar system formed. Unofficially, it will help us understand whether all those useful metals clump together at the heart of an asteroid, as some theorize. If so, it’s game on for asteroid prospectors. If not, we can still get at the metals with other techniques, such as optical mining (which basically involves sticking an asteroid in a bag and drilling with sunlight; sounds nuts to us, but [NASA has proved it in the lab](https://www.nasa.gov/directorates/spacetech/niac/2017_Phase_I_Phase_II/Sustainable_Human_Exploration/)). It’ll just take more time.¶ Effectively, we’ve just made our first mark at the base of the first space mineshaft. And there’s more to come in 2020 when Hayabusa 2 returns to Earth bearing samples. If its buckets of sand contain a modicum of gold dust, tiny chunks of platinum or pebbles of compressed carbon — aka diamonds — then the Duchy of Luxembourg won’t be the only deep-pocketed investor to sit up and take notice.¶ The possibility of private missions to asteroids, with or without a human crew, is almost here. The next step in the process that takes us from here to where you are? Tell us an inspiring story about it, one that makes people believe, and start to imagine themselves mining in space. How would you explain the world-changing nature of the internet to 1945? How would you persuade them that there was gold to be mined in Vannevar Bush’s idea? You’d let the new economy and its benefits play out in the form of a novel.¶ As Hayabusa dropped a bomb on Ryugu, Daniel Suarez was making the exact same asteroid the target of his fiction. Suarez is a tech consultant and developer turned New York Times bestselling author. His novels thus far have been techno-thrillers: his debut, [Daemon](https://www.amazon.com/dp/B003QP4NPE/ref=dp-kindle-redirect?_encoding=UTF8&btkr=1), a novel of Silicon Valley’s worst nightmare, AI run rampant, made more than a million dollars.¶ So it was a telling shift in cultural mood that Suarez’s latest thriller is also a very in-depth description of — and thinly-disguised advocacy for — asteroid mining. In [Delta-v](https://www.amazon.com/Delta-v-Daniel-Suarez-ebook/dp/B07FLX8V84/ref=sr_1_1?crid=UMNUUSR3NCBX&keywords=delta-v&qid=1556930756&s=digital-text&sprefix=delta-v%2Cdigital-text%2C204&sr=1-1), published in April, a billionaire in the 2030s named Nathan Joyce recruits a team of adventurers who know nothing about space — a world-renowned cave-diver, a world-renowned mountaineer — for the first crewed asteroid mission.¶ Elon Musk fans might expect this to be Joyce’s tale, but he soon fades into the background. The asteroid-nauts are the true heroes of Delta-v. Not only are they offered a massive payday — $6 million each for four years’ work — they also have agency in key decisions in the distant enterprise. Suarez deliberately based them on present-day heroes. The mission is essential, Joyce declares, to save Earth from its major problems. First of all, the fictional billionaire wheels in a fictional Nobel economist to demonstrate the actual truth that the entire global economy is sitting on a [mountain of debt](https://www.washingtonpost.com/opinions/the-247-trillion-global-debt-bomb/2018/07/15/64c5bbaa-86c2-11e8-8f6c-46cb43e3f306_story.html?noredirect=on&utm_term=.5fb3ff1155d9). It has to keep growing or it will implode, so we might as well take the majority of the industrial growth off-world where it can’t do any more harm to the biosphere.¶ Secondly, there’s the climate change fix. Suarez sees asteroid mining as the only way we’re going to build [solar power satellites](https://en.wikipedia.org/wiki/Space-based_solar_power). Which, as you probably know, is a form of uninterrupted solar power collection that is theoretically more effective, inch for inch, than any solar panels on Earth at high noon, but operating 24/7. (In space, basically, it’s always double high noon). ¶ The power collected is beamed back to large receptors on Earth with large, low-power microwaves, which researchers think will be harmless enough to let humans and animals pass through the beam. A space solar power array like [the one China is said to be working on](https://www.forbes.com/sites/scottsnowden/2019/03/12/solar-power-stations-in-space-could-supply-the-world-with-limitless-energy/#2d3f78a54386) could reliably supply 2,000 gigawatts — or over 1,000 times more power than the largest solar farm currently in existence. ¶ “We're looking at a 20-year window to completely replace human civilization's power infrastructure,” Suarez told me, citing the report of the Intergovernmental Panel on Climate Change on the coming catastrophe. Solar satellite technology “has existed since the 1970s. What we were missing is millions of tons of construction materials in orbit. Asteroid mining can place it there.”¶ The Earth-centric early 21st century can’t really wrap its brain around this, but the idea is not to bring all that building material and precious metals down into our gravity well. Far better to create a whole new commodities exchange in space. You mine the useful stuff of asteroids both near to Earth and far, thousands of them taking less energy to reach than the moon. That’s something else we’re still grasping, how relatively easy it is to ship stuff in zero-G environments. ¶ Robot craft can move 10-meter boulders like they’re nothing. You bring it all back to sell to companies that will refine and synthesize it in orbit for a myriad of purposes. Big pharma, to take one controversial industry, would [benefit by taking its manufacturing off-world](https://medium.com/fitch-blog/why-is-big-pharma-interested-in-the-space-economy-c078ac1bf67c). The molecular structure of many chemicals grows better in microgravity.¶ The expectation is that a lot of these space businesses — and all the orbital infrastructure designed to support them — will be automated, controlled remotely via telepresence, and monitored by AI. But Suarez is adamant that thousands if not millions of actual human workers will thrive in the space economy, even as robots take their jobs in old industries back on Earth.¶ “Our initial expansion into space will most likely be unsettled and experimental. Human beings excel in such environments,” he says. “Humans can improvise and figure things out as we go. Robots must be purpose-built, and it's going to take time and experience for us to design and build them.”¶ Which is another way startups back on Earth will get rich in the new economy: designing and building those robots, the nearest thing to selling picks and shovels to prospectors in the space gold rush. Thousands of humans in space at any one time will also require the design and construction of stations that spin to create artificial gravity. Again, this isn’t a great stretch: Using centrifugal force to simulate gravity in space was first proposed by scientists in the 19th century. NASA has had workable designs for spinning cislunar habitats called [O’Neill cylinders](https://en.wikipedia.org/wiki/O%27Neill_cylinder) since the 1970s. We just haven’t funded them. ¶ But the trillionaires clearly will.¶ In short, Suarez has carefully laid out a vision of the orbital economy that offers something for everyone in our divided society. For Green New Deal Millennials, there’s the prospect of removing our reliance on fossil fuels at a stroke and literally lifting dirty industries off the face of the planet. For libertarians and other rugged individualists, there’s a whole new frontier to be developed, largely beyond the reach of government. ¶ For those who worry about asteroids that could wipe out civilization — though luckily, [this isn't likely to happen any time soon](https://mashable.com/article/armageddon-asteroid-threat) — here is a way for humanity to get proficient in moving them out of the way, fast. Indeed, the National Space Society has offered [a proposal](https://space.nss.org/technologies-for-asteroid-capture-into-earth-orbit/) to capture the asteroid Aphosis (which is set to miss Earth in the year 2029, but [not by a very comfortable margin](https://www.space.com/asteroid-apophis-2029-flyby-planetary-defense.html)), keep it in orbit, and turn it into 150 small solar-power satellites, as a proof of concept. ¶ For the woke folks who care about the bloody history of diamond production, there’s the likelihood that space mining would wipe out Earth’s entire diamond industry. “They will be found in quantities unattainable on Earth,” claims Suarez, with good reason. We are starting to discover that there is more crystalized carbon in the cosmos than we ever suspected. Astronomers have identified one [distant planet made entirely of diamond](https://www.nationalgeographic.com/science/phenomena/2014/06/24/diamond-the-size-of-earth/); there may be more, but they are, ironically, hard to see. ¶ We don’t have diamond planets in our solar system (and we can’t do interstellar missions), but we do have diamond-studded asteroids. Mine them for long enough and you will wear diamonds on the soles of your shoes.¶ For investors and entrepreneurs, there is the thrill of racing to be the first member of the four-comma club. ([Neil deGrasse Tyson believes that the first trillionaire will be an asteroid mining mogul](https://www.nbcnews.com/science/space/neil-degrasse-tyson-says-space-ventures-will-spawn-first-trillionaire-n352271); Suarez isn’t sure whether they’ll be the first, but he suspects that asteroid mining “will mint more trillionaires than any industry in history.”) ¶ For the regular guy or gal with a 401K, there’ll be a fast-rising stock market — inflated not by financial shenanigans this time, but an actual increase in what the world counts as wealth.¶ For workers, there is the promise of sharing in the untold riches, both legally and otherwise. It would be hard to stop miners attaining mineral wealth beyond their paycheck, under the table, when your bosses are millions of miles away. Then there’s the likelihood of rapid advancement in this new economy, where the miners fast gain the knowledge necessary to become moguls.¶ “After several tours in space working for others, perhaps on six-month or year-long contracts, it's likely that some workers will partner to set up their own businesses there,” says Suarez. “Either serving the needs of increasing numbers of workers and businesses in space, marketing services to Earth, or launching asteroid mining startups themselves.” All in all, it’s starting to sound a damn sight more beneficial to the human race than the internet economy is. Not a moment too soon. I’ve written encouragingly about asteroid mining several times before, each time touting the massive potential wealth that seems likely to be made. And each time there’s been a sense of disquiet among my readers, a sense that we’re taking our rapacious capitalist ways and exploiting space.¶ Whereas the truth is, this is exactly the version of capitalism humanity has needed all along: the kind where there is no ecosystem to destroy, no marginalized group to make miserable. A safe, dead space where capitalism’s most enthusiastic pioneers can go nuts to their hearts’ content, so long as they clean up their space junk. ¶ ([Space junk](https://mashable.com/category/space-junk) is a real problem in orbital space because it has thousands of vulnerable satellites clustered closely together around our little blue rock. The vast emptiness of cislunar space, not so much.)¶ And because they’re up there making all the wealth on their commodities market, we down here on Earth can certainly afford to focus less on growing our stock market. Maybe even, whisper it low, we can afford a fully functioning social safety net, plus free healthcare and free education for everyone on the planet.¶ It’s also clearly the area where we should have focused space exploration all along. If we settle on Mars, we may disturb as-yet-undiscovered native bacteria — and as the character Nathan Joyce shouts at a group of “Mars-obsessed” entrepreneurs in Delta-V, Mars is basically filled with toxic sand and is thus looking increasingly impossible to colonize. (Sorry, Mark Watney from The Martian, those potatoes would probably kill you.)

**Contention 2: Private companies in outer space provide critical information needed to solve climate change.**

**Empirical evidence proves that private space development is the only way to make sustainable energy feasible. Autry 19:**

Greg Autry {the director of the Southern California Commercial Spaceflight Initiative at the University of Southern California, vice president at the National Space Society, and chair of the International Space Development Conference, }, 19 - ("Space Research Can Save the Planet—Again," Foreign Policy, 7-20-2019, <https://foreignpolicy.com/2019/07/20/space-research-can-save-the-planet-again-climate-change-environment/)//marlborough-wr/>

Today conservationists and other critics are more likely to see space programs as militaristic splurges that squander billions of dollars better applied to solving problems on Earth. These well-meaning complaints are misguided, however. Earth’s problems—most urgently, climate change—**can be solved only from space.** That’s where the tools and data already being used to tackle these issues were forged and where the solutions of the future will be too. Space research has already been critical in averting one major environmental disaster. It was NASA satellite data that revealed a frightening and growing **hole in the ozone layer** over the South Pole, galvanizing public concern that, in 1987, produced the Montreal Protocol: **the first international agreement addressing a global environmental problem.** Since then, thanks to worldwide restrictions on damaging chlorofluorocarbons, the ozone situation has stabilized, and a full planetary recovery is expected. As this case showed, space can provide the vital information needed to understand a problem—and a surprising range of **ways to solve it.** **Climate change is a poster child for the critical role of space data.** Trekking across the globe to measure ice sheets with drills and gauge sea temperatures from the sides of ships is an **expensive, slow, and insufficient** way to assay the state of the planet. Satellites operated by NASA, the U.S. National Oceanic and Atmospheric Administration, and an increasing number of commercial firms provide a plethora of multispectral imaging and radar measurements of developments such as coral reef degradation, harmful plankton blooms, and polar bears negotiating thinning ice. Much of the technology involved in observing the Earth today was initially developed for probes sent to explore other planets in our solar system. Indeed, understanding the evolution of other planets’ climates is essential for modeling possible outcomes on Earth. NASA probes revealed how, roughly 4 billion years ago, a runaway greenhouse gas syndrome turned Venus into a hot, hellish, and uninhabitable planet of acid rain. Orbiters, landers, and rovers continue to unravel the processes that transformed a once warm and wet Mars into a frigid, dry dust ball—and scientists even to conceive of future scenarios that might terraform it back into a livable planet. Discovering other worlds’ history and imagining their future offers important visions for climate change mitigation strategies on Earth, such as mining helium from the moon itself for future clean energy. Spinoff technologies from space research, from GPS to semiconductor solar cells, are already helping to **reduce emissions**; the efficiency gains of GPS-guided navigation shrink fuel expenditures on sea, land, and air by between 15 and 21 percent—**a greater reduction than better engines or fuel changes** have so far provided. Modern solar photovoltaic power also owes its existence to space. The first real customer for solar energy was the U.S. space program; applications such as the giant solar wings that power the International Space Station have continually driven improvements in solar cell performance, and NASA first demonstrated the value of the sun for powering communities on Earth by using solar in its own facilities. Promisingly, **space-based solar power stations** could overcome the inconvenient truth that wind and solar will never get us anywhere near zero emissions because their output is inherently intermittent and there is, so far, no environmentally acceptable way to store their power at a global scale, even for one night. Orbital solar power stations, on the other hand, would continually face the sun, **beaming clean power back through targeted radiation to Earth day or night, regardless of weather.** They would also be free from clouds and atmospheric interference and therefore operate with **many times the efficiency of current solar technology**. Moving solar power generation away from Earth**—already possible but held back by** **the** current **steep costs** of lifting the materials into space—would preserve land and cultural resources from the blight of huge panel farms and save landfills from the growing problem of discarded old solar panels. Sustainable energy advocates in the U.S. military and the Chinese government are actively pursuing space-based solar power, but just making solar cells damages the environment due to the caustic chemicals employed. Space technology offers the possibility of freeing the Earth’s fragile biosphere and culturally important sites from the otherwise unavoidable damage caused by manufacturing and mining. The U.S. start-up Made in Space is currently taking the first steps toward manufacturing in orbit. The company’s fiber-optic cable, produced by machinery on the International Space Station, **is orders of magnitude more efficient than anything made on Earth**, where the heavy gravity creates tiny flaws in the material. Made in Space and others are eventually planning to build large structures, such as solar power stations, in space. As these technologies develop, they will augment each other, bringing costs down dramatically; space manufacturing, for instance, slashes the cost of solar installations in space. Eventually, firms will be able to supply endeavors in space with materials from the moon and asteroids, avoiding the cost and environmental impact of lifting them into orbit. Mining the solar system comes with its own potential impacts, but **extracting resources from distant and lifeless worlds is clearly preferable to the continued degradation of the Earth.**

**Global warming can lead to extinction, which outweighs all the affirmative impacts.**

**Miller-McDonald, 18** – (Samuel, Master of Environmental Management at Yale University studying energy politics and grassroots innovations in the US. 5-2-2018. "Extinction vs. Collapse." Resilience. https://www.resilience.org/stories/2018-05-02/extinction-vs-collapse/)

Climate twitter – the **most fun twitter** – has recently been reigniting the debate between **human extinction** and mere **civilizational collapse**, between doom and gloom, despair and (kind of) hope. It was sparked by an interview in The Guardian with acclaimed scientist Mayer Hillman. He argues that we’re probably doomed, and confronting the likelihood that we’re rushing toward collective death may be necessary to save us. The headline alone provoked a lot of reactions, many angered by the ostensible defeatism embedded in Hillman’s comments. His stated view represents one defined camp that is mostly convinced of looming human extinction. It stands in contrast to another group that believes human extinction is highly unlikely, maybe impossible, and certainly will not occur due to climate change in our lifetimes. Collapse maybe, but not extinction. Who’s more right? Let’s take a closer look. First, the question of human extinction is **totally bounded by uncertainty**. There’s uncertainty in climate data, uncertainty in models and projections, and even more uncertainty in the behavior of human systems. We don’t know how we’ll respond to the myriad impacts climate change is beginning to spark, and we don’t know how sensitive industrial civilization will be to those impacts. We don’t really know if humans are like **other** apex predators **highly** sensitive to ecological collapse, or are among the **most adaptable** mammals to ever walk the earth. One may be **inclined** to lean toward the **latter** given that humans have colonized every ecological niche on the planet except Antarctica. That bands of people can survive in and around deserts as well as the Arctic as well as equatorial rainforests speaks to the resilience of small social groups. It’s why The Road is so disturbingly plausible; there could be a scenario in which basically everything is dead but people, lingering in the last grey waste of the world. On the other hand, we’ve **never lived outside of** the **very favorable conditions** of the Holocene, and past civilizational and population collapses suggest humans are in fact **quite sensitive** to climatic shifts. Famed climate scientist James Hansen has discussed the possibility of **“Venus syndrome,”** for instance, which sits at the **far end** of **worst case scenarios**. While a frightening thought experiment, it is easily dismissed as it’s based on so many uncertainties and doesn’t carry the weight of anything near consensus. What’s more frightening than potentially implausible uncertainties are the **currently existing certainties**. For example: Ecology + The atmosphere has proven more sensitive to GHG emissions than predicted by mainstream science, and we have a high chance of hitting 2oC of warming this century. Could hit 1.5C in the 2020s. **Worst-case** warming scenarios are probably the **most likely**. + Massive **marine death** is happening far faster than anyone predicted and we could be on the edge of an anoxic event. + **Ice melt** is happening far faster than mainstream predictions. Greenland’s ice sheet is threatening to collapse and already slowing ocean currents, which too could collapse. + Which also means predictions of **sea level rise** have **doubled** for this century. + **Industrial agriculture** is driving **massive habitat loss** and **extinction.** The **insect collapse** – population declines of 75% to 80% have been seen in some areas – is something no one predicted would happen so fast, and portends an ecological sensitivity **beyond our fears**. This is causing an unexpected and unprecedented **bird collapse** (1/8 of bird species are threatened) in Europe. + **Forests**, vital **carbon sinks**, are proving **sensitive** to climate impacts. + We’re living in the **6th mass extinction event**, losing potentially dozens of species per day. We don’t know how this will impact us and our ability to feed ourselves. Energy + Energy transition is essential to mitigating 1.5+C warming. Energy is the single greatest contributor to anthro-GHG. And, by some estimates, transition is happening 400 years too slowly to avoid catastrophic warming. + Incumbent energy industries (that is, oil & gas) dominate governments all over the world. We live in an oil oligarchy – a petrostate, but for the globe. Every facet of the global economy is dependent on fossil fuels, and every sector – from construction to supply chains to transport to electricity to extraction to agriculture and on and on – is built around FF consumption. There’s good reason to believe FF will remain subsidized by governments beholden to their interests even if they become less economically viable than renewables, and so will maintain their dominance. + We are living in history’s largest oil & gas boom. + Kilocalorie to kilocalorie, FF is extremely dense and extremely cheap. Despite reports about solar getting cheaper than FF in some places, non-hydro/-carbon renewables are still a tiny minority (~2%) of global energy consumption and will simply always, by their nature, be less dense kcal to kcal than FF, and so will always be calorically more expensive. + Energy demand probably has to decrease globally to avoid 1.5C, and it’s projected to dramatically increase. Getting people to consume less is practically impossible, and efficiency measures have almost always resulted in increased consumption. + We’re still setting FF emissions records. Politics + Conditions today resemble those prior to the 20th century’s world wars: extreme wealth inequality, rampant economic insecurity, growing fascist parties/sentiment, and precarious geopolitical relations, and the Thucydides trap suggests war between Western hegemons and a rising China could be likely. These two factors could disrupt any kind of global cooperation on decarbonization and, to the contrary, will probably mean increased emissions (the US military is one of the world’s single largest consumers/emitters of FF). + Neoliberal ideology is so thoroughly embedded in our academic, political, and cultural institutions, and so endemic to discourse today, that the idea of degrowth – probably necessary to avoid collapse – and solidarity economics isn’t even close to discussion, much less realization, and, for self-evident reasons, probably never will be. + Living in a neoliberal culture also means we’ve all been trained not to sacrifice for the common good. But solving climate change, like paying more to achieve energy transition or voluntarily consuming less, will all entail sacrificing for the greater good. Humans sometimes are great at that; but the market fundamentalist ideology that pervades all social, commercial, and even self relations today stands against acting for the common good or in collective action. + There’s basically no government in the world today taking climate change seriously. There are many governments posturing and pretending to take it seriously, but none have substantially committed to a full decarbonization of their economies. (Iceland may be an exception, but Iceland is about 24 times smaller than NYC, so…) + Twenty-five years of governments knowing about climate change has resulted in essentially nothing being done about it, no emissions reductions, no substantive moves to decarbonize the economy. Politics have proven too strong for common sense, and there’s no good reason to suspect this will change anytime soon. + Wealth inequality is embedded in our economy so thoroughly – and so indigenously to FF economies – that it will probably continue either causing perpetual strife, as it has so far, or eventually cement a permanent underclass ruled by a small elite, similar to agrarian serfdom. There is a prominent view in left politics that greater wealth equality, some kind of ecosocialism, is a necessary ingredient in averting the kind of ecological collapse the economy is currently driving, given that global FF capitalism by its nature consumes beyond carrying capacities. At least according to one Nasa-funded study, the combination of inequality and ecological collapse is a likely cause for civilizational collapse. Even with **this perfect storm** of issues, it’s **impossible to know** how likely extinction is, and it’s impossible to judge how likely or extensive civilizational collapse may be. We just can’t predict how human beings and human systems will respond to the shocks that are already underway. We can make some good **guesses** based on **history**, but they’re **no more than guesses**. Maybe there’s a miracle energy source lurking in a hangar somewhere waiting to accelerate non-carbon transition. Maybe there’s a swelling political movement brewing under the surface that will soon build a more just, ecologically sane order into the world. Community energy programs are one reason to retain a shred of optimism; but also they’re still a tiny fraction of energy production and they are not growing fast, but they could accelerate any moment. We just don’t know how fast energy transition can happen, and we just don’t know how fast the world could descend into climate-driven chaos – either by human strife or physical storms. What we **do know** is that, given everything above, we are living through a confluence of events that will **shake the foundations of civilization**, and jeopardize our capacity to sustain **large populations of humans.** There is **enough certainty** around these issues to justify being **existentially alarmed**. At this point, whether we go **extinct** or **all but a thousand** of us go extinct (again), maybe that shouldn’t make much difference. Maybe the destruction of a few billion or 5 billion people is morally equivalent to the destruction of all 7 billion of us, and so should provoke equal degrees of urgency. Maybe this debate about whether we’ll go completely extinct rather than just mostly extinct is absurd. Or maybe not. I don’t know. **What I do know is that, regardless of the answer, there’s no excuse to stop fighting for a world that sustains life.**

#### Failure to colonize outer space guarantees extinction, so private appropriation of space is just because private companies are attempting to reach beyond Earth.

Munevar '19 [Gonzalo; 4/19/19; Professor at Lawrence Technical University; "Deflecting Existential Risk with Space Colonization," https://filling--space.com/2019/04/19/deflecting--existential--risk--with--space--colonization/]

Why do you argue that “failure to move into the cosmos would condemn us to oblivion”?

By having a significant presence in the solar system in the next few thousands of years and beyond, we will be in a better position to deflect asteroids and comets that might bring the end of humanity, and much other Earth life, in a horrible collision. And if perchance one such catastrophe proves inevitable (e.g. a rogue planet passing through the solar system), humanity would still survive by having colonized Mars and other bodies, as well as by having built artificial space colonies of the type advocated by Gerard O’Neill.

Once the sun begins to turn into a red giant in a few billion years, we must have long moved into the outer solar system. In the very long run, we have to move into other solar systems. Relativistic--speed starships would be nice, but they are not necessary for the task of moving humanity to the stars. We can reach them, slowly but surely, by propelling some of our space colonies away from the sun, carrying perhaps millions of human beings. They would take advantage of the many resources to be found in the Oort Cloud, and then of equivalent clouds in other solar systems. Even interstellar space has resources to offer. Nuclear energy, probably fusion, would likely be required. It may take us tens of thousands of years, but in the cosmic time scale, that is but a blink in the eye.

What are these catastrophic threats? Are there any records of catastrophic events happening before humans appeared on Earth?

I have already mentioned collisions with asteroids and comets. Although the active geology of our planet tends to erase the record of many collisions, we can find a well--preserved record on the Moon and Venus, the two closest bodies to Earth. On the 600--million--years--old Venusian surface, the spacecraft Magellan discovered about one thousand impact craters at least twice the diameter of meteor craters on Earth. This impact record makes it reasonable to estimate a catastrophic impact on Earth every half a million years or so. Collisions with bodies of 5 km across would happen, on the average, every 20 million years. Apart from the Alvarez asteroid (crater near Yucatan) that led to the extinction of the dinosaurs and the majority of species on Earth 65 million years ago, there have been at least two more impacts by asteroids 10 km or larger in the last 300 million years.