#### Rhetoric and advocacy for space ‘colonization’ is inseparable from ideology---current U.S. space policy and the international race to space with Russia and China enforce a dominant narrative of humanity’s inevitable march toward progress through the settlement and exploitation of other worlds. This dominant narrative works to exclude those who disagree and obfuscate its own role in maintaining the social control of the already-powerful. Against this, our affirmative calls for an interruption so that ethical reflection on advocacy for space exploration can produce a new counter-narrative that draws from visions of a future in space to inspire work towards a better world here and now

Linda Billings 17, Ph.D., social scientist and consultant to NASA’s Astrobiology Program and Planetary Defense Coordination Office, August 2017, “Should Humans Colonize Other Planets? No,” Theology & Science, Vol. 15, No. 3, p. 1-12

Annie Proulx’s novel Barkskins documents the real-life, systematic deforestation of North America from the 17th through the 20th centuries. Charlie Duke Breitsprecher, descendent of a long line of men and women who grew rich by exploiting the natural resources of the continent, including its native people, looks back at the devastation his ancestors have wrought and decides to change direction, dedicating himself to environmental preservation.

Though Breitsprecher is a fictional character, his words resonate in the current cultural environment. Is it possible that humankind is evolving into “a terrible new species,” one more destructive than ever before? And should a species like ours spread itself to other planetary environments that can be exploited for human gain?

At a workshop in September 2016 on social and conceptual issues in astrobiology, the author and other participants considered these (among other) questions: “Should humans seek to exploit and/or colonize space? If so, how should this be done?” The author’s position is no. It should not be done. This article is an attempt to explain why.

Ideologies of conquest and exploitation

The foundations of U.S. space policy are the 1958 National Aeronautics and Space Act and the 1967 United Nations Treaty on the Peaceful Uses of Outer Space. The NASA Act states that “it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind,”3 and the 1967 Treaty establishes that outer space is a domain to be used for the benefit of all humankind, preserved for peaceful purposes, and protected from sovereign claims.4

These foundational laws are devoid of references to frontier conquest, colonization, and exploitation. Yet these themes are dominant in American space exploration rhetoric and in public discourse about the human future in space. With U.S. government officials as well as space enthusiasts advocating for colonizing the solar system and mining the asteroids, it is useful to consider not only the practical but also the moral and ethical aspects of such endeavors.

The idea of colonizing another planet likely appeals to a small fraction of humankind and suggests an inevitably elitist enterprise. Would it be ethical to enable people with enough money to buy a ticket to leave our troubled Earth behind? Would it be ethical for government(s) to subsidize such an enterprise?

As space policy analyst Marcia Smith has observed, billionaire space businessman “Elon Musk has made no secret of his passion to make humanity a multiplanetary species by creating a self-sustaining society on Mars as a backup plan in case Earth is destroyed in a cataclysmic event.” Last year Musk said he intends to take colonists to Mars for “a price of $200,000 per person initially, dropping to half that over time. His spacecraft would transport 100-200 people at a time, with the Mars population growing to 1 million residents over 40100 years.”5 The Mars One enterprise, headed by businessman Bas Lansdorp, is also planning to take colonists on a one-way trip to Mars.6 Mars One is not discussing costs.

Given the technical challenges of such missions and the astronomical cost of meeting them, it is not likely that either Musk or Lansdorp will be able to execute their plans in the foreseeable future. Nonetheless, such proposals prompt this author to wonder how many poverty-stricken Bangladeshis, how many sub-Saharan Africans, how many permanently displaced Syrian refugees, how many disabled and unemployable workers could come up with $200,000 – or $2,000, for that matter – to move to another planet and start a new life. What are the ethics of giving the rich yet another advantage over the poor?

In 2015, then-NASA Administrator Charlie Bolden addressed the President’s Council of Advisors on Science and Technology (PCAST) about plans for human exploration of the solar system: “We are going farther into the solar system, except this time we’re going to stay. This is not about sending a man to a body and bringing them safely back to Earth. This is about moving humanity farther into the solar system and establishing a foothold where we can remain…. It is the story of the journey West, you know, of the early pilgrims and other people landing on the shores of the United States, but then just not being satisfied and continually moving west and exploring, and so, we’re now trying to get off this planet and farther out.”7 Garrett Reisman, director of crew operations at Musk’s rocket company SpaceX, told PCAST, “Mars, as Charlie mentioned, is the ultimate goal of the agency, [and] also is the ultimate goal of our company. Really, [SpaceX] was founded to make humans a multi-planetary species.”

Examining the history of the U.S. space program reveals an underlying ideology of space exploration that has at its core a rationale for conquest and exploitation. This ideology is deeply rooted in a durable American cultural narrative of frontier pioneering, free enterprise, rugged individualism, and a right to life without limits.8 It is a pastiche of many ideologies, drawing on American exceptionalism, neoliberalism (and its more extremist cousin, libertarianism), the doctrine of manifest destiny, the belief in the necessity of “progress,” and even Russian cosmism.9

A fundamental goal of U.S. space policy since the establishment of NASA in 1958 has been to establish, maintain, and strengthen U.S. leadership in space exploration and the global space community, and the influence of the narrative of American exceptionalism has remained strong in official space rhetoric into the 21st century, promoting the message that USA must be Number 1.

The rhetoric of U.S. space policy and advocacy advances a conception of outer space as a place of wide-open spaces and limitless resources – a space frontier. Though the contemporary cultural environment is vastly different from that of the Cold-War era in which human space flight began, the 21st century narrative of U.S. human space exploration to date is still intimately intertwined with what feminist critic Susan Faludi has called “security myth” and “nationalist fantasy,” a story of cowboys on the space frontier.10

In the early 21st century, the trend in the U.S. space community, energized during Ronald Reagan’s administration and reinvigorated during the George W. Bush administration, has been to view the solar system as an environment to exploit, as we have done with our own planetary environment. From this “dominionist” or “manifest destiny” perspective, our home planet, and our home solar system, are seen as resources here for humans to use as they like. The Obama administration embraced this way of thinking and advanced the cause of colonization and exploitation. Though at this writing the Trump administration has not issued any official guidance on the future of human exploration, it is reasonable to assume we will see no change in ideological direction.

Does this American image of the wild west extended to off-Earth locations justify cowboy colonization of other planets? My answer is negative.

American exceptionalism at blast off

As to American exceptionalism, political scientist Seymour Martin Lipset wrote, “The United States is a country organized around an ideology which includes a set of dogmas about the nature of a good society. Americanism…is an ideology in the same way that communism or fascism or liberalism are isms…. The nation’s ideology can be described in five words: liberty, egalitarianism, individualism, populism, and laissezfaire.” With the exception of the former Soviet Union, he noted, “other countries define themselves by a common history as birthright communities, not by ideology.” 11

The idea of American exceptionalism as it appears in space exploration rhetoric looks bright and shiny on the surface – it’s about the U.S. leading in space exploration for the benefit of humankind. Beneath that shiny surface, though, lies neoliberal/libertarian ideology, an embrace of space as a wide-open frontier, open to exploitation and colonization, ripe for so-called commercialization unfettered by government oversight. It promotes capitalism and development, whenever and wherever possible, according to the principle that those who get there first get the most.

Economist Milton Friedman, an inspiration to the Reagan administration, was a leading ideologue of 20th century American liberalism, which inspires today’s economic neoliberals and their more extreme libertarian cousins. Friedman, author of Capitalism and Freedom, among other things, dismissed the idea that businesses have any responsibilities other than making money: “In a freeenterprise, private-property system, a corporate executive is an employee of the owners of the business. He has direct responsibility to [them]…to conduct the business in accordance with their desires, which generally will be to make as much money as possible…. The doctrine of ‘social responsibility’ involves the acceptance of the socialist view that political mechanisms, not market mechanisms, are the appropriate way to determine the allocation of scarce resources to alternative uses.”12

Anthropologist David Harvey observes that “neoliberalism has…become hegemonic as a mode of discourse” in the global political economy…. It has pervasive effects on ways of thought to the point where it has become incorporated into the common-sense way many of us interpret, live in, and understand the world…. The process of neoliberalization” – deregulation, privatization, and withdrawal of the state from many areas of social provision – “has, however, entailed much ‘creative destruction’…of prior institutional frameworks and powers….”13

Does belief in American exceptionalism provide sufficient justification for off-Earth colonization? My answer is negative.

Manifest destiny: from religious belief to political ideology

Behind today's American exceptionalism lies a specific religious vision of manifest destiny.

Historian Anders Stephanson has explored the premise that the idea of manifest destiny, which he calls an “institutionally embedded” ideology, “is of signal importance in the way the United States came to understand itself in the world and still does.” He writes, “The world as God’s ‘manifestation’ and history as predetermined ‘destiny’ had been ideological staples of the strongly providentialist period in England between 1620 and 1660,” the period when English Puritans migrated to North America, bringing their beliefs with them. The related belief in “right” – that is, that white Europeans had been “chosen by the finger of God to possess (America)” – is at least as old. These beliefs came to underlay a U.S. national narrative of “prophecy, messianism, and historical transcendence.”14 Political journalist John O’Sullivan, who is said to have coined the term “manifest destiny,” wrote in 1845 that the United States of America had “the right of our manifest destiny to overspread and to possess the whole continent which providence has given us for the development of the great experiment of liberty and federated self-government.”15

Is this near three centuries old version of manifest destiny propelling the present generation to colonize other planets? If so, does manifest destiny provide sufficient justification? My answer is negative.

Progress and necessity

Historian J.B. Bury said progress is movement “in a desirable direction” – but he also noted that “it cannot be proved that the unknown destination towards which man is advancing is desirable.”16 In their histories of the idea of progress, both Bury and political scientist Robert Nisbet called progress a dogma. Historian Christopher Lasch contrasted the premodern, Christian idea of progress – “the promise of a secular utopia that would bring history to a happy ending” – with the modern idea – “the promise of steady improvement with no foreseeable ending.”17 Nisbet traced the roots of the idea of progress to ancient Greek and Roman philosophy and documented how it evolved to take on the qualities of destiny and “historical necessity.”18 Nisbet credited 19th century natural philosopher Herbert Spencer with melding the ideas of progress and freedom, in declarations of “the rights of life and personal liberty,” “the right to use the Earth,” “the right of property,” and “the right to ignore the state” – declarations that align with libertarian thinking.

From the 17th through the 20th century, the Western scientific worldview – itself a cultural narrative of sorts – “elevated technological progress…to the level of moral imperative.”19 Science and technology became the means of American progress, and conquest and exploitation became the morally imperative end. Ultimately the accumulation of material wealth became a measure of progress in the Western world.

Coming from the East, some threads of Russian cosmist philosophy are also woven into the web of beliefs propagated by advocates of space colonies – the belief that humans are destined to conquer the planets and the stars, to populate the universe, to evolve to a higher form in space.20 While Russian Orthodox cosmist philosopher Nikolai Fedorov (1828-1903) is not often cited by space colonization advocates, his disciple Konstantin Tsiolkovsky (1857-1935) often is, especially for his avowal that while Earth is the cradle of humanity, humans can’t stay in their cradle forever.

Is this near three centuries old version of progress propelling the present generation to colonize other planets? If so, does progress provide sufficient justification? My answer is negative.

Ideology in action: the advocates

The rhetoric of advocacy for colonizing other planets and exploiting extraterrestrial resources does not vary much from group to group. This article will highlight two representative groups.

The Mars Society21 is an advocacy group dedicated to promoting the human colonization of Mars. Its founding declaration, adopted in 1998, offers reasons why “we must go” to Mars:

• “For the challenge. Civilizations, like people, thrive on challenge and decay without it. The time is past for human societies to use war as a driving stress for technological progress. As the world moves towards unity, we must join together, not in mutual passivity, but in common enterprise, facing outward to embrace a greater and nobler challenge than that which we previously posed to each other. Pioneering Mars will provide such a challenge.”

• “For the opportunity. The settling of the Martian New World is an opportunity for a noble experiment in which humanity has another chance to shed old baggage and begin the world anew; carrying forward as much of the best of our heritage as possible and leaving the worst behind.”

• “For the future. Mars…[possesses] all the elements that are needed to support not only life, but technological society. It is a New World, filled with history waiting to be made by a new and youthful branch of human civilization that is waiting to be born. We must go to Mars to make that potential a reality. We must go, not for us, but for a people who are yet to be.”

Mars Society founder and leader Robert Zubrin has written extensively about we “we must go” to Mars, which he calls “America’s new frontier.”22

Lutheran bishop James Heiser, a co-founder of the society and a member of its steering committee, has also written extensively about the necessity of colonizing this new frontier.23 According to the society, Bishop Heiser “was ordained into the ministry in 1996 and has served in central Texas since 1998. In 2006 he was called to serve in his current capacity as Bishop of the Evangelical Lutheran Diocese of North America. Bishop Heiser’s other responsibilities include holding the office of President of the Center for the Study of Lutheran Orthodoxy and Dean of Missions of The Augustana Ministerium.” Though his name no longer appears there, Heiser was recently listed as a speaker on the web site of the John Birch Society, whose mission is “to bring about less government, more responsibility, and — with God’s help — a better world by providing leadership, education, and organized volunteer action in accordance with moral and Constitutional principles,” by “preserving individual rights & national, independence” and “restoring the

Constitution.”

The Space Frontier Foundation24 is another advocacy group promoting colonization of the planets and exploitation of extraterrestrial resources. The foundation’s “credo” states: “Our purpose is to unleash the power of free enterprise and lead a united humanity permanently into the Solar System.” Its “frontier enabling test” is this: “Our definition of a “frontier enabling” technology or policy is one which has as its effect the acceleration of the creation of low cost access to the space frontier for private citizens and companies, enables or accelerates our use of space resources, and/or accelerates the rate at which wealth can be generated in space. In other words, is the project or policy going to provide a return on the national investment, if we define “return” to be the economically sustainable human habitation of space?”

The Mars Society and the Space Frontier Foundation are members of an alliance of space advocacy groups formed in 2015. This Alliance for Space Development25 claims to be “advocating a citizens’ space agenda in Washington, D.C.”26 A “pioneering space declaration” issued after the alliance’s 2015 “pioneering space national summit”27 asserts that “the long term goal of the human spaceflight and exploration program of the United States is to expand permanent human presence beyond low-Earth orbit and to do so in a way that will enable human settlement and a thriving space economy.” A stated objective of the alliance is “incorporation of space development and settlement into the NASA Space Act.”

Lest readers might think these advocacy groups are operating on the fringes of the space community, it should be noted that NASA and other U.S. government officials use their meetings as platforms for promoting human space flight28 and that the U.S. aerospace industry sponsors many of their activities.29

Does the exuberant excitement generated by the Mars Society or the Space Frontier Foundation justify space colonization? My answer is negative.

Religious beliefs and views about the human future in space

Theologian Ted Peters has identified the human colonization of Mars as one of a number of “ethical issues prompted by space exploration within our solar ghetto.”30 How much do we actually know about how people’s religious beliefs intersect with their thinking about space colonization? Two small studies have been published in recent years that shed a little light on the matter.

Mark M. Gray, editor of a research blog for Georgetown University’s Center for Applied Research in the Apostolate (CARA), recently wrote about the results of a public opinion survey conducted for CARA by the polling firm GfK Custom Research.31 Respondents (about 2,000 U.S. adults) were asked:

1) “Do you believe the Earth’s demise is ultimately something we can understand and predict scientifically, or something in God’s hands and therefore unpredictable?”

2) “Do you believe that the destiny of human life is somewhere other than Earth or here on Earth?” 3) “How important, if at all, do you believe human exploration of space will be in the future?”

Gray reported that more than six in ten respondents said they believe Earth’s future “is in God’s hands.” He also noted “a big divide in opinion between Christians and those of other religious affiliations or no affiliation.” Six percent of evangelical Christians, 34 percent of Catholics, and 82 percent of those with no religious affiliation said they believe Earth’s end is something science can understand and predict.

As to question #2, it came with some background:

““Scientists believe that in 4.5 billion years the Sun’s lifecycle will come to an end. Much earlier, in about 1 billion years, the sun will have become hotter and increased Earth’s temperature beyond a level where life, as we know it, is possible. Therefore, the long-term survival of humans may depend on space exploration and colonization. Do you believe that the destiny of human life is somewhere other than Earth or here on Earth?” Gray reported that 28 percent of respondents said they believe human destiny is on Earth, 27 percent said it’s in space, and 45 percent said they don’t know.

The author’s opinion is that survey results are, at best, indicators – not measures – of public opinion. That said, the results of this survey, for those who place weight on such things, don’t provide any credible evidence that the U.S. citizenry is in favor of the human colonization of space.32

University of Dayton political scientist Joshua Ambrosius has also studied “religious influences on public support for U.S. space exploration policy,” producing findings similar to Gray’s work. According to Ambrosius, evangelical Protestants in the United States, “who account for one-quarter of the U.S. population, are the least knowledgeable, interested and supportive of space exploration, while Jews and members of Eastern traditions were most attentive and supportive…. Among Catholics, there is more openness to space exploration.” 33

Again, and with no intent to discount this work, it does not provide any evidence that the U.S. citizenry is in favor of space colonization.

Where does this leave us? It leaves us with a responsibility to explore more deeply how taxpayers think and feel about the prospect of human colonies on other planets and the cost of inevitable taxpayer subsidies of such enterprises. (While Elon Musk may claim that his plan to take people to Mars will be privately financed, it must be noted that Musk built his space business on direct and indirect government subsidies and that government contracts now constitute more than $1 billion of his company’s annual revenue.34

Conclusion

The belief system perpetuated by the rhetoric of advocacy for colonizing other planets and exploiting extraterrestrial resources, as described here, is a variant of nationalist ideology--an American spirituality or even American orthodoxy--which excludes or rejects as unenlightened those who do not agree.35 In this sense, space advocacy can be viewed as a cultural ritual, performed for the purpose of maintaining social order, with its lopsided distribution of power and resources, perpetuating the values of those in control of that order – in this case, primarily the military-industrial complex. In short, economic injustice is tied to space colonization proposals.

In order to survive as a cultural institution, space exploration needs an ideology. It needs to have some connection to widely held beliefs. It needs a role in a cultural narrative. But a new narrative is warranted to replace the outdated and counterproductive nationalistic expansionist story.

Some broader perspectives have been offered over the years. In 1965, the visionary economist Kenneth Boulding said our planet had already “become a space ship, not only in our imagination but also in the hard realities of the social, biological, and physical system in which [humans are] enmeshed…. Man is finally going to have to face the fact that he is a biological system living in an ecological system, and that his survival power is going to depend on his developing symbiotic relationships of a closed-cycle character with all the other elements and populations of the world of ecological systems…. It is clear,” he concluded, “that much human behavior and many human institutions…are entirely inappropriate to a small closed space ship. We cannot have cowboys and Indians…or even a cowboy ethic….”36

Rhetorical critic Janice Hocker Rushing once made the case that the post-Apollo-era focus of space exploration on the search for evidence of extraterrestrial life was a product of a widespread understanding that humankind exists in a universe, not only on planet Earth. The narrative of space exploration thus might better reflect this understanding by telling a story of “a spiritual humbling of self” rather than “an imperialistic grabbing of territory.”37

And cultural studies scholar Constance Penley has observed that while “the WASP space cowboy version of spaceflight” has persisted from the Apollo era into the present, at the same time NASA “is still the most popular point of reference for utopian ideas of collective progress.” In the popular imagination, she said, “NASA continues to represent…perseverance, cooperation, creativity and vision,” and these meanings embedded in the narrative of space flight “can still be mobilized to rejuvenate the near-moribund idea of a future toward which dedicated people…could work together for the common good.”38

Roman Catholic theologian and self-described “space buff” Rev. Theodore Hesburgh (1917-2015) gave a talk at a “space roundtable” in 1990 in which he hoped that space exploration could lead us to a better human future here on Earth. “I take as our most compelling symbol” pictures of Earth taken from space, he said. What do these images “say to us?” First, they show no differences or divisions among nations or people. “Is not this vision laden with other philosophical and theological implications: that, like Planet Earth, humankind is one and potentially more beautiful than our past history has indicated; that we survive together or we perish together in this unitary habitat, sharing the same hospitable climate, the air, the water, the land, and, more significantly, those spiritual yearnings for knowledge, freedom, peace, development, a civilization marked by justice, not the wars that injustice spawns?”

“The challenge here,” he said, “is to create a human spiritual unity of understanding and a justice that matches the physical beauty of this planet that is a pure gift to us, and to use it together and not to abuse it separately.”

Other space-faring nations capable of sending humans into space – that is, China and Russia – are also believed to be advancing plans for further human exploration and exploitation of the solar system. There is every reason to assume that Russia and China are intent on keeping up with the United States in claiming territories and resources.

For hundreds (if not thousands) of years, human societies have tried and failed to create “new worlds” on Earth, beginning “anew” and “leaving the worst behind.” The current state of human societies gives no indication that we are any better equipped today than they were 500 years ago to accomplish such goals. In its current state of moral development, the author finds humankind unfit to engage in the colonization of other planets and the exploitation of outerspace resources. Rhetoric aside, advocates of colonization and exploitation present no evidence for their claims that human societies will be able “start anew” off Earth, free of the problems we’ve created for ourselves and others here on Earth. The idea that only a select few, who can afford to pay a high price, will be able to escape the nest we’ve fouled on Earth, leaving the poor and disadvantaged to live in the mess, is morally and ethically suspect.

Except for the threads of Russian cosmism, the ideology of space colonization and exploitation is largely Western, and Christian, as noted above. It appears to be some interpretation of Christian dominion, or dominionist, theology that drives colonization advocates to declare that humans are destined to fill the universe, that humans “must” colonize Mars, that outer space resources are there for the taking.

The author identifies as a humanistic Unitarian Universalist and, as such, affirm and promote the seven UU principles as a moral guide. Among the UU principles guiding this critique of the idea of space colonization and exploitation are the inherent dignity and worth and dignity of every person; justice, equity, and compassion in human relations; the goal of world community with peace, liberty, and justice for all; and respect for the interdependent web of all existence of which we are a part.

More than 40 years after Kenneth Boulding told us we had to get the message, space exploration is enabling people on Earth to understand that we are biological systems living in an ecological system. This competing narrative may be a site within which the ideology of space exploration might rejuvenate itself – where the vision of a human future in space becomes a vision of humanity’s collective peaceful existence on Spaceship Earth and the need to work together to preserve life here and look for life out there. This competing narrative coexists with the now-dominant narrative of conquest and exploitation. It remains to be seen how these competing narratives play out in the dominant social order over the next few decades.

#### The impact is colonial totality. Space settlement justified by status quo ideology seeks to extend colonialism throughout the universe---but just as important, it creates a way of organizing society in the here-and-now that reflects divisions between the worthy who contribute to its project and those who don’t. This is colonial totality---a structure of ongoing violence and exclusion that relies on creating the fiction of its own inevitability. The 1AC is about identifying and exploiting the fissures within the colonial structure that presents itself as all-encompassing

Zannah Mae Matson 17, Ph.D. Candidate in Human Geography at the University of Toronto; and Neil Nunn, Ph.D. Candidate in Geography at the University of Toronto, October 2017, “SPACE INFRASTRUCTURE, EMPIRE, AND THE FINAL FRONTIER: WHAT THE MAUNA KEA LAND DEFENDERS TEACH US ABOUT COLONIAL TOTALITY,” https://societyandspace.org/2017/10/03/space-infrastructure-empire-and-the-final-frontier-what-the-mauna-kea-land-defenders-teach-us-about-colonial-totality/

More than just a source of inspiration for the groundswell anti-colonial movements around the world, this story provides a context to better understand ongoing colonial occupation that is reinforced through the constitutive power of space infrastructure. Working from decades of resistance that culminated in the “battle for Mauna Kea,” we engage the notion of colonial totality to conceptualize the resistance to space infrastructure and the ongoing US occupation of Hawaii, reflecting on what this movement provides for better understanding totality and the relationship between space infrastructure and the shifting nature of colonial occupation more broadly. The notion of totality describes the process by which occupied spaces are coded with Western values in the form of normalized cultures, epistemologies, and institutions that produces an “atomistic image of social existence” (Quijano, 2007: 174). The institutions, ideologies and systems that advocate for the construction of space infrastructure exemplify this process.

Astronomers frame the building of the observatory infrastructure as an essential piece in advancing our knowledge of outer space and ultimately achieving ‘universal’ progress. The resistance to development of these infrastructural systems is an invitation to consider the relationship between space as a frontier of discovery and ongoing questions of settler colonialism; the blockade has made visible the inherent relationship between the infrastructure of scientific exploration and the logic of totalizing colonial rationality that enables the development of massive telescopes on occupied land. While these perspectives of colonial totality provide a useful understanding of power and institutions that shape this conflict, we suggest that the Hawaiian land defenders’ refusal of the normalizing force of space infrastructure demonstrates the complexities and conditions relating to the notion of totality and ultimately the inadequacies of the concept.

During a public comment period at 2015 University of Hawai‘i Board of Regents meeting, Dr. Pualani Kanaka’ole Kanahele gestures to both the totalizing colonial discourse that suppresses her cultural beliefs and the importance of fighting back against these systems:

… we believe in the word of our ancestors…they say we are the products of this land and that is our truth…and that is what we are fighting for. This is our way of life. This is not our job. We don’t earn money from doing this. But for generations after generations, we will continue to be doing what we are doing today.

What Dr. Kanahele speaks of goes beyond the physical destruction of the sacred ancestral site, to describe a hegemonic normalization and occupation that actively effaces traditional Hawaiian ways of being in the world. The words and actions of the land defenders challenge totalizing structures that classify space according to a narrow set of beliefs about the world. Working from these acts of resistance, we want to suggest that the Hawaiian sovereignty movement illuminates how systems of scientific thought and the project of space exploration rely on Euro-western values being the standard by which all other values are measured. It is this wide acceptance of these structures and principles of reasoning that serve to justify the construction of infrastructure that at once reproduces and fortifies these myths.

This self-reinforcing relationship between the production of space infrastructure and the logics that justify it speaks to a powerful aspects of colonial totality: the way it gains power by rendering illegible the very elements relied upon to actively produce the other. The generally unquestioned salience of space infrastructure is a powerful example of this. As Quijano (2007: 174) describes, the relationship between colonialism and scientific discourse is a mutually reinforcing and “part of, a power structure that involved the European colonial domination over the rest of the world.” In Hawai’i, we see the settler colonial process of cultural attrition operating through a totalizing force of colonial knowledge systems that extend beyond physical occupation of land to include an erasure of Indigenous Hawaiian ways of knowing.

Although the spatialities and technologies associated with this form of stellar navigation are radically dissimilar, we suggest that on a basic level, this form of space exploration is continuous with a lineage of Euro-western projects of discovery. In short, space as the ‘final frontier’ is not simply a metaphor but speaks to the role of astronomy in upholding the ongoing projection of values onto new territories and extending power and acquisition of territory to those complicit in colonial processes. This extends both to the world’s highest peaks and into the heavens. Space infrastructure is central to this ongoing frontier process that seeks to code ‘new’ territories as knowable according to certain values and, as a result, casts inhabitants who fall outside this paradigm as irrational, less-than-human, and exploitable. However, as Lowe (2015: 2) warns, these abstract promises of human freedoms and rational progress are necessarily discordant with the “global conditions on which they depend.” Which is to say that these atomistic systems dispose of the very relationships and elements of life that make them possible. A belief in respecting the sacredness of the world is just one example of this.

It is also essential to recognize the process of establishing colonial totality is one that imperial forces have worked tirelessly to instill. Recognizing this helps to disrupt an appearance of givenness that colonial occupation relies upon. The land defenders have been vocal about this, reminding of us of the fact that since the arrival of James Cook to the Hawaiian Islands in 1778, settler colonial campaigns have been advancing longstanding patterns of cultural removal, fueled by beliefs in colonial supremacy. Following the coup and overthrow of the Hawaiian monarchy by US-led forces, a colonial oligarchy banned Hawaiian languages from schools and formalized English as the official language for business and government relations (Silva, 2004: 2-3). This legislation eroded language, culture, and sacred practice; and is an example of what Ngũgĩ wa Thiong’o (cited in Silva, 2004: 3) describes as a “cultural bomb” of settler colonialism that serves to “annihilate a people’s belief in their names, in their languages, in their environment, in their heritage of struggle, in their unity, in their capacities and ultimately in themselves.” According to Chickasaw theorist Jodi Byrd, continually reflecting on the historical and ongoing work that maintains the conditions of settler colonialism is essential to resisting the tendency for colonial constraint to appear inevitable, unresolvable, and complete (Byrd, 2011; see also Simpson, 2014). There was nothing, easy, given, or natural about processes of colonial occupation.

While we acknowledge the usefulness of totality for thinking about colonial supremacy, we have concerns about its tendency to inscribe an inaccurate depiction of Euro-western superpower with total ideological control over subjugated Indigenous population. Put differently, we are cautious of the work that the notion of totality does to reinforce a too widely accepted view of Indigenous populations as helplessly dominated, or even anachronistic. The Hawaiian sovereignty movement demonstrates that this is not the case. What the battle at Mauna Kea has shown—akin to other efforts of refusal, such as those at Standing Rock—is that the war against colonialism is ongoing.

At present, it appears the land protectors have been successful in their goals of halting construction, as the development team behind the project has begun considering secondary sites for the telescope. The resistance at Mauna Kea, then, is a powerful symbol of the possibility of rupturing the normative totality of Modernist scientific rationality, but it also underscores the recalcitrance of the structures of control and the challenges of pushing back against colonial occupation. However, despite this rupturing of hegemonic ideas of science and progress through the resistance movement, the dominant response from the scientific community has been largely one of confusion and perplexity. This reaction to the uprising speaks to the power of the narratives that cement the Western framework as ‘truth,’ ‘natural,’ and ‘given.’ For these representatives of state and international institutions, violent control is re-framed as co-existence to achieve Modernist notions of progress, while the claims of Indigenous people are reduced to frivolous demands with primitive and irrational connections to the past. This, of course, exists with little consideration of the irony of how this frenzy to build infrastructure that works to “know” the cosmos may be read as equally irrational.

This essay has sought to consider the relationship between infrastructure and colonialism, emphasizing that even the most futuristic space telescopes have embedded within them a lineage of Euro-western cultural supremacy. It is important to recognize the extant materiality of these infrastructures as a manifestation of hegemonic systems that perpetuate myths of rationality and Euro-western cultural supremacy. The battle for Mauna Kea movement highlights the importance of remembering the long historical processes and extensive exertion of colonial constraint and cultural removal that has been necessary to maintain control of the land. Despite the social processes that naturalize colonial infrastructure, there is nothing essential, necessary, or pre-ordained about enormous telescopes. The success of the land defenders at Mauna Kea, and the support the movement gained around the world, shows us that Euro-western forces and the infrastructure that is central to maintaining their normative influence, are replete with fissures and contradictions worth pushing against. In spite of the hegemonic forces of modernity and rationality behind the construction of the TMT and a continued attempt to assert colonial totality, the battle at Mauna Kea indicates these hegemonic forces have been far from totalizing. The colonial powers do not have the final word. The land defenders at Mauna Kea have demonstrated a powerful vision for disrupting normative ways of occupying land and knowing the cosmos inspiring us to think further on the complexities of mobilizing infrastructure to resist colonialism. It is within these ruptures that we see a potential for a continued learning from the stars and our social existence.

#### Current plans for colonization are organized around a vision of Earth 2.0, framed as both necessary for human survival and as a utopian ideal that elides difference in lived experience while ratifying the white Western Man as the figure of a universal humanity bound for the stars. This vision is not yet hegemonic and therefore open to contestation by counter-narratives. Our affirmative is a critique of the idea that going to space will erase the problems of Earth 1.0---rather than contribute to the drive to utopian progress, we argue for “staying with the trouble” as a method of reframing the conversation over how the harms and benefits of space exploration are inequitably distributed

Micha Rahder 19, independent scholar, previously Assistant Professor in the Department of Geography & Anthropology at Louisiana State University, 2019, “Home and Away: The Politics of Life After Earth,” Environment and Society: Advances in Research, Vol. 10, p. 158-177

Dominating current efforts to expand human life beyond Earth are public-private partnerships, mostly based in the United States, Europe, and the United Arab Emirates. Participants in NewSpace worlds are dominated by older white men from the United States, though are still surprisingly diverse in political and demographic makeup (Valentine 2012). With names like the Lifeboat Foundation, the Space Frontier Foundation, or the Alliance to Rescue Civilization, motivations for these projects range from imperialist nationalisms to profits to new utopian social orders, often mixed together in unexpected configurations. Yet these Earth 2.0 visions are resolutely united by one thing: the centering of the human species as the ontological basis and scale for extraterrestrial futures.

In the United States, amid the inflammatory rhetoric of his presidency, Donald Trump’s proclamations on outer space as the “next great American frontier” have largely been met with derision or relative disregard. He signed executive orders in 2017 and 2018 to reformulate US space policy, including new directives to build public-private partnerships to return to the moon, followed by a Mars mission. In early 2019, he established new extraterrestrial branch of the US military known as the Space Force. Despite relative inattention to these policies in contrast to other executive actions, the 45th president has done much to enliven public attention to space futures in the country, causing what seem to many observers to be uncomfortable or strategic alliances with his bombastic rhetoric (e.g., gleeful circulation of Buzz Aldrin’s pained facial expressions in memes after a joint press conference with the president). While easily dismissed in the face of his violently right-wing proclamations and policy decisions, Trump’s space dreams reinforce the power of his America First doctrine. Although figures like Aldrin proclaim more universalist narratives of international cooperation in space, they continue to line up in support of Trump’s space programming. Rather than an exception in globalist visions of unified humanity, Trump’s (and Trump-like) racisms have been at the heart of liberal democratic projects all along—pre-election events like viral video footage of police shootings of African Americans or Native American protests against the Dakota Access Pipeline reveal how liberal sovereignty rests on the violent exclusion of racialized others (Rosa and Bonilla 2017).

Military and nationalist narratives are easily imported into privatized realms. The tech entrepreneur Elon Musk is a prominent figure in NewSpace, alternately characterized in the press as a techno-futurist hero or a supervillain. Musk’s SpaceX holds launch contracts with NASA and other national space programs and is a leader in the development of space tourism. Musk’s visions for settling Mars are immensely popular and filled with superlative exaggeration, such as referring to his planned technology as the BFR (big fucking rocket) (Pope 2018). Musk (2018) plans to send the first cargo missions to Mars in 2022, with crew missions following two years later, establishing a base from which humans can become a multi-planetary species. Robert Zubrin (2002, 2012, 2019) is another popular leader who has published numerous books advocating for human expansion to Mars. The founder of the Mars Society, Zubrin is a former Lockheed Martin engineer, and a vocal proponent of privatized space futures.

Many private space organizations replicate the worst aspects of late capitalism: securitized property regimes, essentialized identities, and competitive extraction (Genovese 2017a). Language describing space as a “frontier” is common, particularly American “manifest destiny” and Mars as the new US American West (Grinspoon 2004; Wright and Oman-Reagan 2017). Indeed, space has become a resource frontier in the sense defined by Anna Tsing (2003): neither place nor process, but a capitalist imaginary that shapes both. Frontier imaginaries transform the ontological status of extraterrestrial materials into “resources,” whether for capitalist or scientific exploitation. The existence of extraterrestrial resources is then used as justification for expansion: they are out there; therefore, we should use them (e.g., Cockell 2006). Peter Dickens and James Ormrod (2007) thus extend David Harvey’s analysis of capitalism’s expansionist frontiers as a “spatial fix” to an “outer spatial fix,” though endless extraction is rarely the goal in itself.

Instead, through utopias or through the protection of distance, space expansion is widely framed in Earth 2.0 imaginaries as a kind of pressure release for Earth-bound human problems. Among NewSpace proponents, even within the most profit-motivated arenas, most people express unexpected or contradictory utopian visions of new social and political relations enabled by extraterrestrial futures. NewSpace representatives like Musk celebrate an extreme version of neoliberal entrepreneurialism and libertarian socioeconomic ethics, projecting these as necessary steps in the directed evolutionary development of the human species. Rather than short-term profit motivations leading to unpredictable long-term futures, as most critiques of NewSpace would have it, short-term R&D projects are more commonly motivated by long-term visions of extraterrestrial sociality not yet in existence (Valentine 2012). NewSpace utopian visions resonate with, but cannot be explained away by, expansionary profit seeking.

The coexistence of these contradictory visions was established in US cultural narratives through early Apollo mission photographs, which were rooted in the mastering gaze of US military imperialism yet projected an environmentally and politically united Earth (Cosgrove 2003). The unification of a divided humanity is often figured as the result of shared intrinsic values that define the species: curiosity, innovation, and exploration. Zubrin’s Mars Society (1998) argues that space expansion will not just reduce conflict but replace it as a driving force behind innovation:

Civilizations, like people, thrive on challenge and decay without it. The time is past for human societies to use war as a driving stress for technological progress. As the world moves towards unity, we must join together, not in mutual passivity, but in common enterprise, facing outward to embrace a greater and nobler challenge than that which we previously posed to each other. Pioneering Mars will provide such a challenge. A collective leap into space is seen as fulfilling the broken promises of capitalist modernity: equality, liberty, and progress.

These utopian visions are still grounded by earthly concerns. Jacob Haqq-Misra argues for “liberating Mars,” basing future settlement not on an extension of earthly sociopolitics (whether organized in terms of nation-states or corporations) but instead by establishing a new Martian planetary citizenship to create a “test bed for new ideas that could lead to unforeseen epistemic transformations of our values and preferences” (2016: 66). Yet his argument compares this “transformative experience” to a “trust fund child” gaining new values from a wilderness trip (65). “Nature”—whether earthly wilderness or Martian extremity—is called upon as a resource for human cultural transformation, reimagining a modernist dichotomy as the basis for a planetary move beyond modernism.

These narratives frame the search for a new Earth 2.0 as a necessary project for collective human and environmental survival. Deflecting critiques that space programs divert too many resources from earthly problems, Cameron Smith and Evan Davies (2012) claim that “all worthwhile things” (among which they list boats and wedding rings) are worth large expense. Space expansion, framed as a form of long-term insurance for the human species, is moved from the question “Can we afford to go?” to “Can we afford not to?” (Hartmann 1986). This powerful mixture of apocalyptic narratives, new resource frontiers, and utopian schemes combine to create a sense of space expansion as not just inevitable, but a present in which we are behind rather than working toward something yet to come. As Musk argued in a speech at the International Astronautical Congress: “It’s 2017 . . . We should have a lunar base by now.”

This present, beholden to the future, makes strange work of history. Earth 2.0 imaginaries offer the opportunity to start anew; these narratives erase collective responsibility for harms done by colonial projects and seem to “cleanse” history (Redfield 2002: 797). Alternately, history is turned into an “objective” knowledge resource for avoiding repeated mistakes (e.g., HaqqMisra 2016). Most striking is the frequent collapse of timescales, with recent historical and deep evolutionary time brought into new resonances (Codignola et al. 2009). Space expansion is commonly figured as an inevitable step in a conjoined evolutionary-colonial history: “We wriggled onto dry land, ventured out of the African savannah as apes, set sail for new worlds—how could we not expect, someday, to live in colonies on Titan or starships cruising through deep space?” (Austen 2011). This vision places white, Western, masculine techno-capitalist humanity at the pinnacle of evolutionary scales.

The future Earth left behind in Earth 2.0 imaginaries tends to fall into two categories. By far, the most common are visions of an Earth destroyed, uninhabitable to humans if not to all carbon-based life. Other narratives project that we might get off Earth in time to “save” it from ourselves, leaving behind a global park of purified nature (Austen 2011). Both versions resonate with environmentalisms that take an anti-humanist turn, as in visions of humanity as a global pollution or disease, out of balance, or otherwise in need of reduction or eradication (Anker 2005; Dumit 2005). Projections of natural purity resonate in multiple directions, into pasts and futures, and both on and away from Earth. Lisa Messeri (2017a), working with scientists searching for potentially habitable exoplanets, notes that “earthlike” planets are imagined as a kind of new Eden, representing a purification of human industrial histories by way of long-term futures. These futures of Earth 2.0 proliferate both at home and away—a rebooted humanity offered a chance to “do nature better,” to recapture Eden.

Life for Humans, or Humans for Life?

In Earth 2.0 imaginaries, which other life-forms travel with humans? Th e selection of living others for these extraterrestrial futures is centered on human needs and desires: food species, oxygen producers, waste recyclers, and so on. Occasionally, companion animals or aesthetically preferred species are imagined off world, though in short-term scenarios, they are excluded from the engineered calculus of necessity. Microbes play an increasingly prominent role, especially as functional parts of encapsulated life support systems or as potential terraformers. Above all, nonhuman life is reduced to utilitarian function for the maintenance and reproduction of humans. In the same move, human difference is absorbed into species, defined by biological needs. Yet, strangely, many Earth 2.0 imaginaries turn from humans to life in their furthest displacements. Musk, for example, has made multiple statements about his space projects as motivated not by human expansion but by the evolutionary history of planetary life. At once instrumentalized and made the basis for a new intergalactic ethics, life itself is a grounding concern on which space projects can be built. NewSpace expansionary visions are again framed as necessary, or as unassailably good—to spread life is a moral endeavor, full stop.

This places humans in a particular frame: a species united to life by evolutionary history (and not divided by lived difference) but distinguished from all other species by the uniqueness of our extraterrestrial technological capabilities. Some of these narratives begin to open to the agencies of nonhuman life beyond technocentric control narratives, as in Grinspoon’s (2004) suggestion for sciences of “cultivation” or “animation” of Mars rather than colonization or settlement. As human exceptionalism becomes less and less possible to justify bioscientifically, this twist of extraterrestriality reunites humans with Nature while dividing them once again as special: “Alone of the creatures of the Earth, we have the ability to continue the work of creation by bringing life to Mars, and Mars to life. In doing so, we shall make a profound statement as to the precious worth of the human race and every member of it” (Mars Society 1998). This account of the human-as-species unites moralized historical teleologies with the otherwise a-human perspectives of evolutionary time.

Earth 2.0 imaginaries are entangled with proposals for “life-centered ethics,” “panbiotic ethics,” or an “ethics of life,” in which the role of humans in sustaining life itself is brought into relation with discourses of more-than-human intergenerational justice (Ketcham 2016; Kramer 2011; Mautner 2004, 2009, 2014). In these formulations, life’s tendency to self-propagation and expansion is read as an indicator of purpose and therefore of the good (Mautner 2009). Some proposals, with linked astroecological research projects and experiments, have nothing to do with expansion of human life, even as they are offered as a way to give “human endeavors a cosmic purpose” through the seeding of microbial, plant, or other nonhuman life into nearby solar systems (Mautner 2014). These versions of more-than-human ethics, in which “What is best for life?” serves as a central guiding question, continue to enforce singularity of a “best” answer, and rely on ontologically singular definitions of humanity, species, life, and so on.

Full Seed Ahead

Earth 2.0 imaginaries and their partial connections to life-centered ethics hinge on placing the human within the larger category of life while continuing to mark humans as exceptional. Another reading of the same evolutionary histories, found in eco-centric space expansion narratives, marks this hubris as displaced, with questions of intention or moral purpose tossed aside. Lynn Margulis and Dorion Sagan write: “Will we humans, godlike, wave our wand? Do we really think, in our naiveté, that strewing our scientific instrumentation over the red surface of Mars via robots in a geological wink of an eye will produce a New Blue Earth? Far more probably, Mars will be colonized slowly and gradually, and not by humanity but through humanity, facilitated by robots” (1995: 230).

Contrary to apocalyptic environmental discourses that reinstantiate human exceptionalism, earthly life has repeatedly overhauled the planet’s geophysical and chemical realities. Every stage of evolution on Earth, beginning with the first microbial fermenters in the primordial soup, has been characterized by a novel approach to resource use, leading to rapid proliferation and thus to a shortage of resources and accumulation of dangerous “pollution” that threatens those very life-forms that proliferated so wildly. The advent of the oxygenated atmosphere by photosynthesizing bacteria vastly overshadows our carbon contributions. Inevitably, new life-forms arise that harness that “pollution” as a new resource, and the cycle begins again (Margulis and Sagan 1995). Taken in this long view, humans are only the latest, and not the most impactful, in a history of life reshaping the surface of Earth.

Patiently waiting to digest Earth 2.0 imaginaries into their own purposes are eco-centric alternatives that center this long view in post-earthly futures. Work at the intersections of microbial biology, science studies, and evolutionary theory has begun to challenge the species-centric theories of Darwinian evolution, particularly their emphasis on modes of selection acting on individual organisms (Haraway 2008; Helmreich et al. 2016; Hird 2009; Hustak and Myers 2012). Remixing evolutionary narratives with feminist social theory reworks understandings of ecological relations in ways that decenter not only human exceptionalism but also the ontological category of species altogether. Margulis, the biologist most known for her work on the role of symbiosis in evolution, is a central figure in eco-centric space imaginaries. With her biological theories and social beliefs causing controversy throughout her life (Glorfeld 2018; Mann 1991; Teresi 2011), Margulis was deeply critical of dominant space expansion imaginaries yet a prolific proponent of her own versions.

Margulis and others, in contrast to Earth 2.0 imaginaries, argue that space (especially Martian) colonization by way of terraformation is simply unrealistic given our current technological and epistemic limitations. She distinguished “ecopoiesis,” or the creation of ecosystems, from terraformation: the former is about extending life, the latter about replicating Earth. Eco-centric imaginaries of ecopoeitic extraterrestrial futures not only displace human desires, moralities, or futures but also may be explicitly distasteful to humans: “Ecopoiesis would not make Mars into an extraterrestrial paradise, so much as it would transform it into a global cesspool” (Margulis and West 1997: 229). Similarly, these narratives assert that it is life’s drive to expand that will move it beyond Earth; human vectors may not be necessary: “Given time to evolve in the absence of people, the descendants of raccoons—clever, nocturnal mammals with good manual coordination—could start their own space program” (Sagan and Margulis 1997: 237).

Microbes in particular move to the center of these imaginaries. Earth 2.0 visions are met with what Myra Hird (2010) calls “bacterial indifference” to human-centric schemes, material or conceptual, of environmental change or globality. Hird decenters the human in earthly globality by attending to the far more consequential actions of microbiota—including the radical asymmetry in which we depend wholly on microbes for survival and “self,” but not vice versa. Microbial futures—the forms and effects of microbial evolution yet to come—have only recently begun to enter realms of human speculation (Crosby 2009; Helmreich 2009), but attention to these questions is proliferating rapidly. Microbial research, particularly on “extremophiles” in relation to both entrepreneurial bioprospecting futures and post-earthly astrobiology imaginaries, is booming (Salazar 2017).

Eco-centric extraterrestrial imaginaries build on Gaia theory, to which Margulis was a major contributor. Plagued by frequent misrepresentations as “new agey” or even anti-science, Gaia theory frames Earth not as a living organism (because it recycles its own waste) but rather as a living system, the components of which are organisms (Lovelock and Volk 2003; Margulis and West 1997). While the historical development of James Lovelock and Margulis’s Gaia hypothesis began with “Spaceship Earth” discourses, their Gaia differed significantly from many of these earthly visions. Gaia emphasizes the whole of life, rather than technoscientifi cally capable humans, as maintaining the “capsule ecology” of the planet. Gaia theory thus enfolds extraterrestrial narratives into a broader understanding of life as an expanding planetary phenomenon, which could reproduce through “budding” or “seeding” (Margulis and Guerrero 1995).

Humans still appear in eco-centric imaginaries, but in a way that absorbs their behaviors and technologies within the larger category of life without marking exceptionalism (Margulis and West 1997). Strangely, this move already occurs in many concrete extraterrestrial practices, as evidenced by public fascination with the “taboo” necessities of human bodies in space, such as defecation, sex, menstruation, and so on (Genovese 2017b). Bodily needs and desires seem out of place in the technocentric capsules of space because they make us of a kind with other (animal) life, decentering exceptionalism and bringing our reliance on (living and machine) others into the foreground. Th e practical realities of making human bodies work in space requires a radical reworking of the analytical idea of “context,” as things taken for granted on Earth—like the ability to breathe air—are suddenly called into the center of attention (Valentine 2016).

Normative understandings of human bodies shift in space. Valerie Olson (2010) finds that space medicine reconceptualizes the human body from biological to ecological models, emphasizing co-relation and dependence. Similarly, Leah Aronowsky’s (2017) work writes embodied human relations with living and nonliving others back into the techno-progressivist history of US space exploration. Early attempts to ensure human survival in space called upon the ecological sciences, particularly the work of the Odum brothers, in a way that could have led to sciences of interdependency and multispecies extraterrestrial environmental imaginaries, rather than reinstantiations of human-technological control. That the latter path now seems “inevitable” is evidence of the power of dominant sociotechnical imaginaries to set epistemic limits on the proper relations between humans, technologies, and other life on and off the planet Earth.

The role of humans in extraterrestrial eco-centric futures is transformed from Earth 2.0’s when or how to a more open if. This if calls for new ecological ethics, distinguished from life-centered ethics by a move from species to relation as the key to ethical practice, and a corresponding move away from a unitary morality (Gaard 2013; Sagan and Margulis 1997). Relations between human and nonhuman life are transformed into an open political question, and are typically anti-capitalist—Margulis and Sagan (1995), for example, remind their readers that all human “wealth” is ultimately derived from plant-based photosynthesis and will return to Earth. Inklings of these relations already appear in extraterrestrial worlds, as in discourses and practices of mutual care in unequal plant-human relations aboard the International Space Station (Oman-Reagan 2015).

These questions are explored in Octavia Butler’s unfinished black feminist science-fiction Earthseed series, which echoes with the final line of Margulis and Sagan’s (1995: 197) book What Is Life? as the latter projects extraterrestrial futures: “Earth is going to seed.” The fictional Earthseed religion, which now has real followers,1 states: “The Destiny of Earthseed is to take root among the stars.” Reading the two side by side, Butler’s fictional religion and Margulis and Sagan’s theoretical biologies share uncanny resonances. Both books take for granted the inevitability of life expanding into space, but by centering change, process, and ecological relations over the presumed stability of identities and political economic systems of the present human moment, the politics of these imaginaries are vastly different from those of Earth 2.0.

In a final displacement of human mastery narratives, the possibility of humans accidentally spreading life through the universe haunts Earth 2.0 schemes. Despite protocols in space programs to prevent the transport of microbes onto pristine extraterrestrial Edens, known as “planetary protection” measures (McKay 2009; Siefert 2012), this is perhaps one of the most likely scenarios for post-earthly expansion, given historical failures at human attempts to enforce purity through techno-control. Eco-centric imaginaries easily absorb, even celebrate, this possibility (Margulis and West 1997). Ironically, microbial extraterrestriality is figured as the eco-centric future of life even if it is the capitalist extractionists who take us there. Eco-centric imaginaries suggest that it is far more likely that our intricate, fragile, and slow-to-reproduce species will die of unforeseen effects in attempting long-term space colonization, but our relatively simpler, more robust, and much more quickly evolving microbial companions will find ways to go on.

Unequal Earths

Eco-centric imaginaries, in some ways, absorb those of Earth 2.0. But both require material efforts directed toward making these futures come to pass—with uneven distributions of resources, energies, and impacts across lived worlds on Earth. Th is final section explores these political and ecological effects in the present with respect to both imaginaries. While extraterrestrial imaginaries may project a singular humanity, or even a post-human, life-filled universe, they are differently supported or opposed by particular humans in the present. Similarly, even if the environmental impacts of space launches are relatively small in the global scheme of carbon emissions and industrial pollution, there are impacts, including large bursts of emissions required for launch, burning or waste impacts at launch sites, and so on. Launch points and research sites might also offer local jobs or scientific training opportunities, strongly desired in many places. When and where these potential benefits and harms are distributed are intensely political questions.

Humans versus Humanity

“Black girl magic, y’all can’t stand it

Y’all can’t ban it, made out like a bandit

Th ey been trying hard just to make us all vanish

I suggest they put a fl ag on a whole ’nother planet

. . .

We gave you life, we gave you birth

We gave you God, we gave you Earth

We fem the future, don’t make it worse

You want the world? Well, what’s it worth?”

—Janelle Monáe, “Django Jane” (2018)

Both Earth 2.0 and eco-centric imaginaries tend to erase human difference, reducing humans (and other life) to species type. The question is always about human-other relationships, rarely Haudenosaunee-extraterrestrial, Dutch-algal, or Igbo-bacterial relations. But as Jason Wright and Michael Oman-Reagan note, “the universality in Carl Sagan’s vision of Earth as the cradle of humanity is because his Pale Blue Dot is home not just to ‘everyone you ever heard of’ . . . but also everyone you’ve never heard of—the marginalized, oppressed, erased, and forgotten” (2017: 15). The scales of post-earthly imaginaries are incommensurable with those of earthly difference in the now, yet we must somehow contend with both. From calls to “decolonize Mars” (Decolonizing Mars 2019) to Janelle Monáe’s lyrical suggestion that “they put a flag on a whole ’nother planet” and leave life on Earth to a “fem” future built on “black girl magic,” the singularity of humanity in space expansion imaginaries is increasingly challenged. In this section, I follow Redfield’s (2002) call to provincialize outer space, that is, to attend to the multiplicity of spatial and temporal frames embedded in these imaginaries and their intersections with uneven relations of human difference.

William Kramer (2011), in one of the few eco-centric arguments to mention human cultural difference, addresses it as a subcategory to broader ethical considerations: how do we account for cultural values when framing more-than-human ethics? The overall silence in both narratives reflects broader ecological scientific frameworks, which are historically blind to questions of race or cultural difference—particularly after the growth of cybernetic theories in the twentieth century (Rusert 2010). In Environment, Power and Society, the foundational ecologist Howard Odum (1971) “did not use the space capsule as a vague analogy or metaphor, but as an ontological claim about the world. His methodological reductionism of all biological life (including human behavior) to charts of energy circuits became the justification for proposals to manage human society scientifically” (Anker 2005: 246). Despite their commitments to entrepreneurial techno-capitalisms, Earth 2.0 imaginaries are more likely to address human difference, though largely through oversimplified imaginaries of “solutions” to conflict.

Despite universalizing rhetoric about humans’ place in the universe, space cultures have grown from European and North American histories and are dominated by white men. But the mid-twentieth century saw a proliferation of space development in many places, with China now emerging as a third extraterrestrial power (Erickson 2014). Indonesia’s achievement of the first satellite system by a “developing” country solidified political discourses of national unity and progress during the authoritarian regime of Suharto (Barker 2005), and at least 10 African countries have or are developing space programs (Hopkins 2013; Matthews 2016). Yet these programs’ focus on satellite systems for Earth applications reveals that expansion imaginaries in particular remain grounded in the former centers of colonial power.

Afrofuturism, indigenous science fiction, and other counter-narratives can help decolonize terrestrial and extraterrestrial futures (Lempert 2014). Israeli kibbutzes have been proposed as sociological models for extraterrestrial communities, a counter to the implicitly suburban visions of US cultural imaginaries (Ashkenazi 1992). Indigenous futures draw on rich stores of knowledge regarding adaptation not just to changing environments but also to the violence and oppression of colonial capitalist projects (Whyte 2017). Native American critiques of the NASA space program in the 1980s countered imaginaries of a new frontier with their long-held intimate relationships with Father Sky, the Sun, moon, stars, and their inhabitants (Young 1987). More recently, a science-fiction episode of Futurestates, “The 6th World” (2012), showed a dying technocratic mission to Mars rescued by the financial resources, human-maize intimacies, and ceremonial practices of the Navajo Nation (Becker 2012).

Amid these growing counter-hegemonic futures, both the pasts and presents of space projects are shifting. Emerging recognition of the role of marginalized people in the space industry, such as the hugely successful film Hidden Figures (2016) or the popularity of the astrophysicist Neil deGrasse Tyson, can reinforce logics of anticipation that space will fix the broken social contract of modernity. Yet political support for space research in the United States is strongly divided along racial and gendered lines, reflecting the continued overwhelming whiteness and maleness of NASA space programs (McCurdy 2011). Shifting away from the US context reveals similarly complex socio-temporal politics. In French Guiana, Redfield (2002) traces the temporal conflicts over launch facilities, particularly whether these should be framed through abstracted, European-universalist futures or through racist, colonial exploitative pasts.

Efforts to diversify today’s astronauts will similarly have major impacts on future space developments, especially as the question of who will serve as foundational extraterrestrial settlers approaches (Wright and Oman-Reagan 2017). Yet, in Earth 2.0 imaginaries, foundational human settlers are increasingly framed not in terms of earthly categories of race, gender, class, or culture but by their emergent biotechnological genomes engineered for space travel. Genomic editing, microbiome and/or epigenome therapies, and borrowing or transgenically implanting useful genes from other species (ranging from elephants to tardigrades) offer synthetic evolutionary futures for an extraterrestrial humanity. These futures are being materialized in the earthly now, as in the research of George Church, a geneticist and synthetic biologist who has begun working on human genome modification for long-term space flight or settlement.2 Like many versions of transhumanism, eugenic ideals are resuscitated and sanitized as “technological progress” with little attention to social consequences—as in a recent argument that extraterrestrial eugenics are not a problem because nobody would have their reproductive rights taken away in the creation of an altered genetic “race” of astronauts (Pontin 2018). While the synthetic biological alteration of microbes, plants, and other earthly life for space travel is often doubly justified in terms of “solving some of the main agricultural and industrial challenges here on Earth,” (Llorente et al. 2018), the racist ideologies underpinning human genetic modification schemes are carefully excluded from this multidirectional calculus.

Human differences of gender or sexuality are also erased in both imaginaries, which reduce these to a technical question of biological reproduction. Post-earthly human imaginaries rarely include reference to gender as an aspect of reproduction, or to race, except perhaps as a “resource” for maximizing genetic diversity (e.g., Birdsell 1985). But reproduction is always entangled with complex cultural formations of technology, gender, and sexuality. Instead of addressing these issues head-on, most space futures reinscribe heteronormative understandings on (particularly female) astronaut bodies (Casper and Moore 1995). If queerness can be understood as a negation of reproductionist futurity (Edelman 2004), then there appears to be no space for queers in space whatsoever.

Political Ecology of Space on Earth

Finally, the siting of launch points and experiments in extraterrestrial living distributes political and environmental impacts unevenly across Earth. Remote and uninhabited (by humans) locations are preferred for these sites, particularly those that involve launches or potential explosions: “When one is seeking to leave the globe, wasteland becomes valuable, and underdevelopment can appear a virtue” (Redfield 2000: 125). Experimental facilities for living in isolation have been or will be built in the deserts in the United States and the UAE, on a Hawaiian volcano, in a Moscow suburb, and in Antarctica. The “humanization” of extreme environments like the deep oceans, volcanoes, or Arctic or Antarctic research stations serves as proxy for extraterrestrial futures; these involve novel geopolitical experiments and arrangements, often hinged on the presumed universality of modernist techno-science (Helmreich 2009; O’Reilly 2017). These sites, chosen because they were previously beyond direct human interventions, are now slowly but radically reshaped in the name of extraterrestrial futures: they are subjected to a kind of terraforming (DeLoughrey 2014; Salazar 2017).

In some places, local political action can resist the reshaping of Earth in the name of space futures. Resistance to the construction of a Thirty Meter Telescope on Mauna Kea, considered sacred land by Native Hawaiians and as ecologically fragile by allied environmentalists, built on long battles over Hawaiian sovereignty and conflict with the US settler colonial state (Naylor 2017). After years of successful resistance, however, the Supreme Court of Hawaii ruled in late 2018 to allow construction to proceed on the volcano. Neighboring Mauna Loa volcano is home to the Hawaii Space Exploration Analog and Simulation, one of the most prominent Mars simulation training programs. In Brazil, resistance similarly failed to halt the construction of a satellite launch facility in one of the poorest regions of the country, but the futuristic transformative promises of the site were undermined by the displacement of thousands of Afro-Brazilians and intersections with the politics of race and inequality in the country (Mitchell 2017). Finally, in an ironic twist of extraterrestrial alliances in the United States, SpaceX property marked for launch site development in the US-Mexico borderlands poses a barrier to Trump’s border wall plans, setting up a clash between Musk and Trump, two of the most prominent Earth 2.0 figures (Nixon and Ferman 2018).

Finally, though frequently dismissed as “minor” relative to other human activities, rocket launches can lead to air, water, or soil pollution, disturbances to local (human and nonhuman) life, and acoustic or vibrational effects with unknown impacts on living and nonliving environments. These impacts will vary, depending on whether launch sites are sited next to wetlands, tropical forests, or deserts—all locations favored for their “remoteness.” Ultimately, little is known about impacts, as environmental impact assessment protocols are designed for minimal disturbance to technoscientific goals. Downplaying impacts is routine, as in reports surrounding the plans for Spaceport America (2019), the world’s first commercial launch site currently under construction in the New Mexico desert. The project website highlights the planned Leadership in Energy and Environmental Design certification of the facilities, and describes impacts on local ecosystems in a passive and deemphasized manner: “The rural nature of the site reduced the project’s ability to earn a few Sustainable Site credits.” The accompanying technical report neglects ecological aspects of site selection altogether, beyond a lack of locally available water for a project whose water use is anticipated to be “roughly analogous to that of a modern airport” (Jefts and Paz 2019: 7). Notably, the same report’s site history begins with Spanish conquistadors’ encounters with the area, excluding any mention of indigenous presence (before or after).

As a result of technical approaches like these, questions of siting, increased human presence and activity in previously remote areas, and the more extreme impacts of occasional disasters have not been systematically accounted for. Launches have contributed an estimated 1 percent of human-caused ozone depletion, though this proportion is expected to increase as banned chlorofluorocarbons are reduced in the upper atmosphere and as the number of launches increases in coming years (Ross et al. 2009). Though single launches do not produce an exceptional amount of carbon emissions, if private and public ventures follow through on stated plans to start launching more often, and as public and private space programs proliferate around the globe, these impacts could quickly add up. These impacts are primarily coming from the material installations of Earth 2.0 imaginaries, but while eco-centric imaginaries might displace humans in extraterrestrial futures, they continue to move with and through these unaccounted for practices in the present.

Conclusion: As Below, So Above

Earth 2.0 imaginaries motivate investments and downplay impacts in the short term through longer-term visions of evolutionary progress or purpose. Overall, this is the most prominent imaginary in the present and is leading the way into space. Some people, mostly rich white men in or from the United States and Europe, will make exorbitant profits in the short term, no doubt, and others will be tossed aside. But those with the financial and political power to pursue their imaginaries aggressively in the present will likely lose control of their projects as soon as they start coming into reality. Indeed, a Spanish space scientist recently suggested that human activities on Mars might make the Anthropocene the first “first multiplanetary geological period” (Fairén 2019), an indication that the displacements of space science might further rework earthly time and space.

To imagine that humans as a species could engineer our own political, economic, and biological stability while abandoning the life and nonlife on Earth with which we evolved is a dangerous claim. It is true that new social, ecological, and political norms already emerge within the much shorter-term enclosures of space crews and on-Earth experiments in capsule living, so the idea of larger shifts engendered by longer journeys is not entirely far-fetched. The practical but radical rehabituation to space environments (such as living without an up/down reference point of Earth’s gravity, or without reliable atmosphere) may entirely shift definitions of colonialism, humanness, or difference in as yet unanticipated ways (Valentine 2017). But openness to the radically unpredictable changes brought by extraterrestriality is a poor fit with the broader anticipatory temporal regimes of Earth 2.0 imaginaries, as they work in the present through uneven distributions of harms and benefits.

In contrast, an eco-centric Earth going to seed might use humans and our technological ingenuity, but we are made a small part of the bigger living picture. Rather than trying to reassert control or domination, allowing relation, mutuality, and change back into our futuristic imaginations expands the possibilities for life on Earth, and beyond it. Eco-centric imaginaries respond that the outcome of Earth 2.0 projects, if rushed, are “likely to be highly unpredictable—possibly even tragic” (Margulis and West 1997: 230). But their displacements of human exceptionalism can also do away with questions of justice, politics, or difference, lost in the timescales of life on Earth. Ultimately, both imaginaries must do better to address their distributions of harms and benefits, “staying with the trouble,” as Donna Haraway (2016) suggests in studies of life, humanity, science, and earthly politics. Evolutionary ecological changes, like colonial technocratic projects, can and do involve violence, suffering, and death. As both projects work toward their imagined futures in the present, these questions—who or what suffers, when, how much, with what meaning—should remain central rather than dismissing harms as a necessary evil, minor collateral damage in the race toward progress.

#### Against the status quo’s elevation of white Western Man as the figurehead of the drive to colonize space, which risk infinitely extending the spatial and temporal dominance of violent modes of life, what’s needed is a post-colonial IR that’s open to alternative futures and cosmologies. Engagement with the Indigenous and non-Western perspectives written out of current space policy enables an understanding of non-violent modes of being, whether on Earth or elsewhere

Audra Mitchell 19, the Canada Research Chair in Global Political Ecology at Wilfrid Laurier University, 2019, “Can International Relations confront the cosmos?” in Routledge Handbook of Critical International Relations, p. 51-64

Earthly ruptures such as climate change and accelerating patterns of extinction are rocking the foundations of International Relations (IR) and global politics. These phenomena do not simply demand critique: they are modes of critique in themselves. In their diverse eruptions, they manifest and expose enormous gaps between IR and global theory, earth and the broader cosmos. These earthly critiques are framed in a number of ways: for instance, as ‘evidence’ in Western scientific discourses of climate change; or as the expression of broken laws, protocols and relations with many Indigenous knowledge systems (Mitchell, 2018). By making themselves felt in plural ways, they force IR and global theory to confront two profound possibilities: radical finitude and radical infinitude. ‘Radical finitude’ refers to the idea of the total, complete and possibly imminent negation of existence. Meanwhile, ‘radical infinitude’ reflects existences that vastly exceed the temporal horizons of dominant, Western modes of human life – for instance, Ancestral beings that pre-date, co-exist with and will post-date Western time.

Both of these possible conditions place central concepts and assumptions of IR and global theory into question. For instance, as a knowledge system fundamentally invested in sustaining dominant forms and subjects of survival, IR and global theory cannot – or will not – address the radical finitude raised by the possibility of ‘mass extinction’ (Mitchell, 2016). On the contrary, concepts such as ‘security’ and ‘survival’ generate blind spots that maintain IR’s alienation from earthly conditions, and its own role in generating them. On the other hand, some anticipatory responses to the possibility of radical finitude aim to extend these subjects of survival, and particular modes of ‘human agency’ into more spatio-temporal dimensions.

In particular, plans for the colonization of outer space, emerging largely within the private sector, challenge existing understandings of survival, colonial power and sovereignty. In this case, too, these foundational concepts of IR and global theory close the disciplinary imaginary to the possibilities and pitfalls of addressing radical infinitude. In combination, these blockages prop up an IR and global theory that is inarticulate about, and unresponsive to, the conditions that shape the multiple, co-existent presents and possible futures of worlds on earth. This raises an important question for the future of IR and global politics: can they confront radical (in)finitude and respond to critiques raised by earth and the broader cosmos?

By critiquing mainstream responses to radical (in)finitude – or the lack thereof – this chapter questions whether IR’s foundational concepts can address the critiques raised by earth and the broader cosmos, and better attune itself to their conditions. To this end, it engages with several important forms of critique that might shape the future of, and beyond, IR and global theory. First, by framing earthly disruptions as direct, material critiques of abstract frameworks, it calls for future IR theories that are attuned and responsive to their cosmological conditions. Second, by engaging with speculative critique and theory, it opens up space for the imagination of multiple possible futures that transcend foundational concepts such as survival, security, sovereignty and mainstream norms of ‘humanity’. Third, it engages with Indigenous thought, including Indigenous futurisms, which challenge the colonial cosmovisions of mainstream IR by bringing Ancestral knowledge to bear on multiple future modes dwelling in relation to other beings on and off earth. Together, these modes of critique offer radical visions of future IR theories that could open up space for plural modes of coflourishing in the face of profound, earthly disruptions.

Radical finitude and global extinction

Does life on earth have a long-term future? Increasingly influential discourses of ‘existential risk’ argue that states and international institutions need to pay more attention to developments that ‘threaten the existence of our entire species’ (CSER, 2015). They examine a range of possible threats to the survival of homo sapiens, from those raised by emerging technologies such as artificial intelligence, nano-technology and synthetic biology to climate change, global pandemics, nuclear terrorism and even cosmic events such as asteroid strikes and gamma-ray bursts (Bostrom and Cirkovic, 2008). Although the probability of these events varies considerably, they each present a non-zero possibility that homo sapiens might be eliminated. For this reason, existential risk researchers seek to shift the register in which threat and the possibilities of survival are understood and governed globally. As Martin Rees (2013) has suggested, IR, global politics and international policy-making should focus less on the ‘minor hazards of everyday life’, such as car accidents and carcinogens, and more on events that ‘have not yet happened but which, if they occurred even once, could cause worldwide devastation’ (Rees, 2013).

Homo sapiens, however, is not the only life form thought to be facing the possibility of extinction. Since the 1980s, biologists and ecologists have warned that sharply accelerating rates of extinction may mark the beginning of a new ‘mass extinction event’. This term refers to an earth-wide pattern of extinctions – which Western science defines as death of every member of a species – that eliminates 75 percent or more of extant life forms. Unlike the previous five mass extinctions experienced by earth, which had diverse causes such as the emergence of cyanobacteria and an asteroid strike, the potential ‘sixth mass extinction crisis’ is thought to be driven by ‘anthropogenic’ change. In particular, Western scientists identify four main drivers: climate change, habitat destruction, direct killing and the transfer of life forms across the planet. Although these drivers are attributed to the activities of ‘humanity’, they are predominantly associated with Western political formations such as industrialization, colonization and extractive capitalism (Mitchell, forthcoming). In combination, these phenomena have driven the extinction rates of recorded species well above the ‘background rate’, or the presumed standard rate of extinctions before ‘human’ activities became a determinant factor. This has produced significant decreases in the diversity of life forms globally and across all major taxa. For instance, the World Wide Fund for Nature (WWF, 2016) recently reported a 58 percent decrease in species diversity between 1970 and 2012 alone. Anthony Barnosky and his colleagues (2011) claim that current extinction rates could produce – within just three centuries – a magnitude of extinction last seen in the Cretaceous-Tertiary extinction event, which eliminated the dinosaurs (see also Régnier et al., 2015). Several prominent scientists and science journalists working in the area of mass extinction have offered dismal pictures of the implications of these trends for human security. They envision an ‘uninhabitable earth’ (Wallace-Wells, 2017) wracked by global crises in food security, economic collapse (Barnosky, 2014), authoritarian governance, global warfare over dwindling resources (Oreskes and Conway, 2014) and even the forced exile of humans to other planets (Newitz, 2013).

Written in overtly securitizing tones intended to shape international governance and policy, these framings of radical finitude have the potential to shape IR and global theory and discourses in problematic ways. In the style of Western disaster or horror films (Colebrook, 2014), they adopt a position of voyeurism that borders on apocalypse porn: it exposes privileged Western readers to thrilling images of sublime destruction, while masking the inequalities of threat and responsibility, and normalizing the violences, that produce these ruptures (Mitchell and Theriault, 2018). For instance, by framing ‘humanity’ as a unitary subject and future victim of ‘extinction’, these narratives obscure the disproportionate effect of global patterns of extinction on worlds in the global south. Moreover, by imagining the destruction of worlds as a future hypothetical, they ignore the modes of world-ending violence enacted by colonization and survived by Indigenous peoples (Whyte, 2016).

However, these narratives also confront IR and global theory with irruptions of radical negativity (and possibility) with which it is ill-equipped to contend. Specifically, extinction narratives delineate the boundary conditions of IR, a discipline concerned with, and limited by, its specific concepts of survival. Despite its preoccupation with survival, no branch of IR has directly theorized extinction. In the rare cases where the actual term ‘extinction’ appears in IR discourses, it is used solely as a metaphor for the dissolution of states (see Wight, 1960; Morgenthau, 2005) and should not be interpreted literally. Some major concepts in IR and global theory have flirted with the concept of radical finitude raised by extinction narratives. For instance, the idea of ‘nuclear winter’ popularized by Carl Sagan (1983) predicted that a full-scale nuclear war would destroy life on a massive scale, and undermine the conditions for its regeneration. Remaining humans – and of course, other life forms – would face starvation, viral epidemics and a global-scale deluge of deadly toxins and ultraviolet flux (Sagan, 1983: n.p.). In a similar sense, John Somerville’s (2012 [1983]) concept of ‘omnicide’ suggests that nuclear warfare or ecological collapse could threaten the survival of all modes of life on Earth. Both of these concepts suggest the large-scale destruction of life almost to the point of total extinction. Nonetheless, they treat extinction as a non sequitur, and offer no insights on how awareness of radical finitude might reshape IR thinking. More recently, legal activists have proposed a law of ecocide (see Higgins, 2010) which seeks to extend international laws for the prevention and punishment of genocide to include ecological damage that destroys unique ecosystems and forms of human life. However, the concept of ecocide is designed to fit within the constraints of existing international law. As a result, it only applies to instances in which individual culprits can be identified and accused with prosecutable crimes. Although, as mentioned above, they can be attributed predominantly to capitalist modes of organization, accelerating patterns of extinction are driven by the convergence of multiple forces and systemic patterns. As such, a law of ecocide would do little to address them.

Meanwhile, in contemporary security discourses, extinction is understood as a problem of biopolitical management. Over 150 international conventions govern the management of ‘biodiversity’, most notably the Convention on Biological Diversity (1992) which does not even mention the term extinction. Instead, it focuses on means of monitoring and managing the ‘diversity’ of species and mitigating – rather than critiquing, let alone dismantling – the structural political-economic drivers of extinction. Other major treaties, such as the Convention on the International Trade in Endangered Species (CITES) and the World Heritage Convention, contain instruments for managing species and biodiversity, such as restrictions on trade and targets for population numbers. Each of these projects assumes that extinction can be allayed by managing biopolitical economies of birth, reproduction and death. The same assumption underpins contemporary security discourses where they intersect with the threat of extinction. In such discourses, human extinction is often framed as a ‘hyperbole of insecurity’ (Aradau and van Munster, 2011: 3) – that is, as an intensification of existing, governable threats. This has helped to generate modes of biopolitical governance that entrench the structural drivers of extinction while producing ‘resilient’ citizens capable of living in its wreckage (Evans and Reid, 2014). Meanwhile, having framed catastrophe as inevitable, states and other security actors increasingly renege on their responsibilities to act to prevent it (Evans and Reid, 2014).

In these ways, IR and global theory refuses to address the possibility of radical finitude raised by accelerating patterns of extinction. Apocalyptic rhetorics of total destruction may contribute to this issue by inuring Western subjects to the imagery of the destruction, masking the inequalities and violences that generate it, and arresting ethical response through over-exposure to the sublime. At the same time, IR and global theory is rooted in cosmological assumptions that preclude critical engagement with the possibility of radical finitude. Simply put, IR and global theory has made this possible condition unthinkable by suggesting that the extinction of humans is literally beyond human cognition. This form of unthinkability is based on what Quentin Meillassoux (2009) calls ‘correlationism’: the assumption that existence coincides with the presence of human subjects. For many Indigenous thinkers, engagement with Ancestral presences that long pre-date homo sapiens – and who may be long ‘extinct’ or never ‘alive’ in Western terms – is an integral part of daily life and survival, making the notion of correlationism absurd (Sheridan and Longboat, 2006; Benton-Banai, 2010; Borrows, 2010; Povinelli, 2016). Meillassoux points out that it is nonsensical even within a positivist perspective: after all, Western scientists regularly debate the date of the formation of the earth, the lives of dinosaurs and, indeed, the emergence of homo sapiens – all of which preceded and created the conditions for the existence of modern Western subjects. From these perspectives, it is possible – and common – to think beyond the existence of these subjects, and to theorize their extinction.

However, within dominant Western culture, extinction is made unthinkable in a second sense: there is a taboo against discussing it. Such discussions are often understood to be antihuman and misanthropic. As Claire Colebrook (2014) points out, these taboos preclude discussion of whether or not ‘humanity’ – in particular the universalist, exclusive subject of ‘human security’ and ‘humanitarianism’ (Mitchell, 2014) – should exist. This, in turn, entrenches dominant norms of ‘humanity’ as an individualized, rigidly gendered and racialized, economically-motivated being reducible to biological functions and ontologically separate from other beings (Mitchell, 2014). These narratives ignore the existence of, and preclude the emergence of, post- or other-than-human life forms that transcend these boundaries (Braidotti, 2013), or other kinds of human existences, subjectivities and ways of relating to earth (Alfred, 2005). As a result, IR and global theory remains preoccupied with constructing and ensuring the survival of a ‘humanity’ incapable of transformation and exclusive of pluralities. In these conditions, existing IR and global theory’s engagements with radical finitude – constructed as the ultimate threat to this form of survival – are likely to entrench this subject of humanity and the structures that produce it, while ignoring the radical challenges to it raised by the earthly rupture of extinction.

All of this suggests that mainstream IR and global theory, and the global politics it sustains, are not capable of addressing extinction or the condition of radical finitude it foregrounds. On the contrary, they are constructed to be unreceptive to the material, ecological and cosmological critiques of its theories, structures and practices raised by escalating patterns of extinction. An IR and global theory more attuned to the pluralities of expressions of ‘humans’ and other life forms, or for their potential emergence, would loosen the grip of dominant norms and open up space for alternative ideas of survival and flourishing. By rejecting the demand for the survival and security of ‘humanity’ at all costs, this future IR might embrace forms of flourishing and well-being that do not imply or assume permanence but rather embrace fluidity. It might also involve creating space for posthuman futures enabled by the nourishing of links with other life forms or technologies (see Braidotti, 2013; Colebrook, 2014; Evans and Reid, 2014). Moreover, this future IR and global theory might center Indigenous modes of governance rooted in treaties, protocols and other ethical-legal relations with other beings – including other animals, water and earth itself (see, for instance, Atleo, 2011; Simpson, 2011; Kimmerer, 2013).

Each of these possibilities would contribute to an IR and global theory more attuned and responsive to earth, to the structural violences that existing IR and global theory bolster, and to the multiple possible futures that can be imagined against images of radical finitude. Indeed, confronting radical finitude opens up opportunities for creativity. Numerous cosmo-visions suggest that negation is the source of re-creation. For instance, the Kumolipo, the cosmogonic chant of the Kānaka Maoli people of Hawai’i, locates the origins of the universe in what Western science might label as ‘nothingness’ (Oliveira, 2014). Hopi Elder Thomas Banyacya (cited in Mohawk, 2010), relates his peoples’ cosmological history, in which earth has been totally destroyed and regenerated three times in response to the breaking of protocols by humans. Working within Western critical theory, Alain Badiou (2009) suggests that irruptions of ‘the void’ – the field of non-being and total negation – are the source of radical transformation. Each of these perspectives suggests that negation can be a profound source of creativity, and that confronting radical finitude can create opportunities for co-creating plural futures. Future IR theories that take seriously the critiques raised by earthly ruptures such as extinction might relinquish their grip on the survival of a particular model of ‘humanity’ to make space for these futures.

Radical infinitude and cosmic expansionism

Radical finitude, however, is not the only cosmological challenge undermining the foundations of IR and global theory. In fact, it is deeply intertwined with imaginaries of radical infinitude. Some responses to collective fear of finitude have produced movements that aspire to the extension of control, capital and territoriality into spatio-temporal scales that vastly exceed the limits of Western scientific knowledge. They embody an ethos that I will call ‘cosmic expansionism’: the extension of dominant forms of agency, governance and socioeconomic power beyond the specific, Western spatio-scales associated with ‘human’ experience and cognition. This form of expansionism includes techno-scientific and/or capitalist interventions into the nano-sphere; quantum computing; synthetic biology; and large-scale terra-forming or geo-engineering on earth and other planets. It also involves the colonization of other temporalities, including those of Indigenous and other non-Western worlds (Rifkin, 2017) within the linear, unidirectional, homogenization structures of Western secular time. Cosmic expansionism seeks to offer radical infinitude to ‘humanity’ by asserting domination not only over land and living bodies, but also the conditions of matter, time and space that shape and transform cosmos.

One of the most salient expressions of cosmic expansionism is found in movements to colonize and extract resources from outer space. As images of a volatile, irreparably damaged and unsafe earth proliferate – that is, apocalyptic discourses of radical finitude – a new crop of commercial space entrepreneurs (‘NewSpace’) is promising an escape route. They suggest that the colonization of other planets and outer space bodies will create more space for an expanding ‘humanity’, ensuring its indefinite survival. In a 2014 conference address, NASA chief Charles Bolden stated that ‘only a multi-planet species can survive for a long period of time’. Similarly, space entrepreneur Elon Musk warns that ‘either we spread Earth to other planets, or we risk going extinct’ (Kleinman, 2013). Explaining his projects as an ‘insurance policy’ (Carroll, 2013), Musk approaches space colonization as a form of highly profitable yet publicly beneficial speculation against the possible extinction of homo sapiens.

Although the colonization of outer space is often dismissed in public discourses as a science fiction plot, NewSpace entrepreneurs are committing billions of dollars to achieving their goals in a matter of decades. If they succeed, they will not be the first members of homo sapiens to make outer space their dwelling place. Many Indigenous peoples maintain relations with Ancestors, animals, plants and places on other planets and celestial bodies. To offer just three examples, Aboriginal people in Stradbroke Island, Queensland, are related to a man called Mirabooka who dwells in Sky Country in the form of a constellation and looks after the people of the earth (Bhathal, 2006). In Anishinaabe traditions, cosmic bodies including the sun, moon and stars form a family, who are the progenitors of earthly life forms and influence their lives (Benton-Banai, 2010). Similarly, within Haudenosaunee traditions, the first human – Sky Woman – fell to the watery abyss that would become earth from a hole made in the floor of Sky World by the uprooting of a sacred tree (Mohawk, 2010). From within these and other Indigenous cosmo-visions, the area designated as ‘outer space’ by Western science has been continually inhabited by Ancestors, the dead, distinct worlds and non-living beings that command respect in their own right. According to Seneca faithkeeper Oren Lyons (cited in Alfred, 2009) his people have always theorized their worlds in relation to the cosmos. This is exemplified by the Thanksgiving Address, a daily offering of gratitude to all beings. As Lyons relates, ‘you start with the grass and you wind up with the heavens and the universe, so obviously you’re thinking even more than just global, you’re thinking universal’ (Alfred, 2009: 237). Within this cosmo-vision, earth and what Western science calls ‘outer space’ are a continuous field of inhabitation and relation.

Yet despite their rich and widespread presence in Indigenous philosophies and histories, the existence of these inhabitants is erased within mainstream, colonial discourses on outer space, which treat it as a dead, empty terrain with ‘no natives’ awaiting colonization (Reinstein, 1999; Grinspoon, 2004; NASA, 2014). Based on this assumption, Western scientific, military and commercial interests have made significant strides to annex, claim and shape outer space. Attempts to annex outer space within Western regimes of power have a significant history. Practices of remotely observing, mapping and naming the features of celestial bodies have been employed continuously since the 18th century (Lane, 2010), projecting imaginaries of planets and worlds onto these beings (Dittmer, 2007). Since the 1960s, outer space has been shaped by the material culture of the space race and human commerce, including thousands of satellites, rockets, their debris and the signals they beam to the Earth (Gorman, 2005; Collis, 2009). From this perspective, outer space has already been subject to significant material and ideational colonization.

The emergence of the ‘NewSpace’ sector marks a significant intensification of these imaginaries and an amplification of their colonial ambitions. Since the 1980s, this group of primarily US-based entrepreneurs, advocates and scientists have sought to commercialize ‘outer space’ through a diverse range of projects, from asteroid mining to space-based tourism (Valentine, 2012). Emerging almost exclusively from backgrounds in technology and venture capital, NewSpace activists fund technological development by reinvesting profits from past technology ventures or by linking technologists with angel investors (Valentine, 2012). Prominent NewSpace actors include PayPal entrepreneur Elon Musk, founder of Space Exploration Technologies Corporation (SpaceX); entrepreneur Peter Diamandis, a principle in mining company Planetary Resources and tourism firm Space Adventures, and who created the $10 million X-Prize for commercial spaceflight innovation; Amazon owner Jeff Bezos; and serial entrepreneur Richard Branson, who owns space travel company Virgin Galactic. These companies pursue various goals, including the development of reusable, cost-effective launch systems (SpaceX, Blue Horizon); off-Earth mining (Deep Space Industries, Planetary Resources) and space tourism (Virgin Galactic, Space Adventures). Many NewSpace entrepreneurs have expressed the aim of creating human colonies in outer space. For instance, Musk has openly stated his desire to ‘occupy Mars’ by the 2020s (Carroll, 2013), while Deep Space Industries trades on its potential to provide fuel for future space exploration and settlement.

The emergence of a vibrant and lucrative NewSpace sector marks a shift from state-driven outer space activity towards private enterprises, which many US-based NewSpace entrepreneurs attribute to the retraction of state funding after the end of the Cold War. Many of them frame space colonization as a private-public partnership in which ‘the role of government is to provide the infrastructure and investment to establish a viable industry that will then have “benefits for all mankind”’ (Valentine, 2012: 1054). Jason Beery (2012) points out that although major space agencies such as NASA have been contracting with private companies for decades, governments increasingly regard commercial projects such as space ports as part of their core efforts to promote economic growth, stability and the reproduction of the political-economic system (Beery, 2012: 25). Peter Dickens and James Ormrod (2007) use David Harvey’s (2003) account of interlinked circuits of capital to explain this relationship. Space colonization promises to offer direct profit from the development of technologies and the extraction of outer space resources (the primary circuit), while reinvestment of profits and government funding produces a second circuit, and the accumulation of capital for scientific research and development form a third circuit.

Along with this vision of freely-circulating, constantly-expanding capital, NewSpace entrepreneurs also articulate explicit territorial ambitions. Indeed, Virgin Galactic’s (2015, italics mine) slogan, ‘space is Virgin territory’, is surprising literal in its meaning. For many NewSpace advocates, extending capital markets into outer space is a means of gaining exclusive legal control and physical domination over space and resources. In 2015, the Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act passed by the US Congress granted the exclusive right to US companies to exploit minerals, water and other resources (excluding biological life) found in outer space on a first-come, first-served basis. Although the SPACE Act does not technically constitute a claim of sovereignty by the state over any outer space body, it grants sovereignty in the form of property rights to private companies. In so doing, it unilaterally alters the legal status of outer space, which has been recognized as res communis (a global commons) since the ratification of the UN’s Outer Space Treaty in 1969. While the Outer Space Treaty prohibits any state or nation from appropriating outer space bodies, its framers did not anticipate the emergence of private actors with the resources to launch space missions. As a result, its text does not explicitly prevent individuals or private companies from pursuing a policy of ‘first grab’ – a loophole that the SPACE Act openly exploits. The 1979 ‘Moon Treaty’ bans the appropriation of the moon or other space objects by any state or individual (excepting international bodies). However, to date it has gained only 16 signatories, none of which are major ‘space-faring’ countries. Due to these substantial gaps in international law and the difficulty of enforcing law in outer space, this sphere may come to resemble less the American frontier of the 1850s to which is often compared (see Grinspoon, 2004; Planetary Resources, 2014) as modern resource extraction frontiers. That is, it is likely to emerge as a weakly-regulated space shaped by destructive, often violent conflict amongst multiple state, commercial and private actors over lucrative resources circulated on global commodity markets (Tsing, 2005).

Indeed, the outer space envisioned by NewSpace entrepreneurs offers prime sites for mining and other forms of extraction. Aside from the desire to escape the earth, the value of space colonization lies in its perceived potential to provide access to limitless ‘off-earth resources’ (Virgin Galactic, 2014). For instance, Planetary Resources states that a single platinum-rich 500 meter wide asteroid contains approximately 174 times the annual output of platinum, and 1.5 times the known world-reserves of platinum-group metals (ruthenium, rhodium, palladium, osmium, iridium and platinum) (Planetary Resources, 2014). These resources are intended to meet increasing resource demands made by a rising population on Earth, but also to fuel the extension of resource extraction projects beyond the solar system. As Planetary Resources co-founder Eric C. Anderson describes it: ‘we need to use the resources of space to help us colonize space … That’s why Planetary Resources exists’ (Fallows, 2013). Similarly, Deep Space Industries is preparing itself to be ‘the gas station, the oasis for food and water, and the building supply station for the frontier’ (Deep Space Industries, 2014). These claims suggest that the self-sustaining exploitation of outer space resources will make it possible to put a definitive end to resource scarcity, while creating no adverse environmental impacts on Earth. In fact, they bank on the possibility of exporting the externalities of resource extraction ‘safely outside of our delicate biosphere’ (Planetary Resources, 2014). Consider Eric Anderson’s rhetorical question:

Wouldn’t it be great if one day, all of the heavy industries of the Earth – mining and energy production and manufacturing – were done somewhere else, and the Earth could be used for living, keeping it as it should be, which is a bright-blue planet with lots of green?

(quoted in Fallows, 2013)

This quote suggests that NewSpace entrepreneurs and activists view ‘off-earth’ resources not only as a source of profit but also as a means of ensuring the continual cosmic expansion of ‘humanity’.

Indeed, although NewSpace is propelled by the search for profit and economic sovereignty, it is also driven by a form of aspirational, universalizing humanism (Valentine, 2012). As Michael Oman-Reagan’s (2015) work illustrates, this subject is almost exclusively imagined in NewSpace rhetoric and speculative imagery as white, cis-gendered and heterosexual. Indeed, proponents of space colonization promote deeply racialized and gendered images of ideal space colonists who fit the ideal of ‘scientific manliness’ (Lane, 2010) and are assumed to be a ‘superior subset of the larger group from which they spring’ (Dolman, 2001: 27). Meanwhile, opponents of space colonization – including states who fail to fund it – are characterized as neutered, feminized or sexually impotent ‘eunochs’ (Lewis, 1996). Moreover, many NewSpace actors envisage an ‘improved’ form of (post)humanity modified to survive in outer space. These include modifications of lifestyle, culture and perhaps even physique or genetics. As such, while NewSpace entrepreneurs claim to be conquering outer space for ‘humanity’, they are in fact pursuing a particular set of technologically-mediated posthuman futures. Like the issue of extinction, this possibility challenges the bases of existing IR and global theory in a particular notion of ‘humanity’.

NewSpace entrepreneurs interpellate these subjects – and work to design futures for them – through initiatives designed to activate emotional investment. This includes Planetary Resources’ online ‘Asteroid Zoo’,1 an application that encourages members of the online public to ‘hunt mineral-rich asteroids’ using an online application and data from NASA’s Catalina Sky Survey. Similarly, projects such as Google Mars and the World Wide Telescope (funded by Google and Microsoft respectively) enable online users remotely to ‘travel’ across the surfaces of planets’ celestial bodies, compiling their ‘own’ personalized maps based on their aesthetic responses to the data. Strategies like these enable NewSpace actors to frame their efforts as a ‘grand unifying project’ (Dickens and Ormrod, 2007) undertaken in the name of ‘humanity’. Even the resource extraction company Planetary Resources promises that ‘the entire human race will be the beneficiary’ (Planetary Resources, 2014) of its work. These statements give the impression that access to outer space and its resources is, or at least should be, shared across a unified and uniform ‘humanity’. The Outer Space Treaty, the Moon treaty and the European Union’s draft Code of Conduct for Outer Space Activities (2014) all call for the distribution of the profits and benefits of space colonization across ‘humanity’. However, they offer no specific prescriptions for effecting the global structural changes necessary to ensure the fair sharing of space technologies, resources or profits, making these goals little more than aspirational norms. Nor do they acknowledge or address existing relationships, patterns of dwelling and laws pertaining to the lands they annex as ‘outer space’.

Plans for space colonization are a direct response to the possibility of radical infinitude and an expression of the desire to colonize radical infinitude in order to secure the ongoing survival of a specific norm of ‘humanity’. Above, I discussed the co-existence of multiple temporalities, including Ancestral times, cyclical times and discourses of deep time that not only predate and coexist with Western time, but will also persist beyond its boundaries. Cosmic expansionism is a culturally specific response to awareness of this condition. Through techno-scientific, capitalist and overtly colonial modes of intervention, it seeks to extend and assert a particular form of ‘human’ agency beyond a Western concept of time (and space) limited by the conditions of earth. This movement seeks to ensure the infinite domination of a particular (post)human subject by asserting spatio-temporal dominance over other times and dimensions, violating the forms of sovereignty engendered by the distinct worlds they support (Rifkin, 2017).

Indeed, cosmic expansionism puts into question existing accounts of sovereignty rooted in Western scientific beliefs about the limitations and parameters imposed on ‘humanity’ by a recalcitrant earth. Emerging forms of space sovereignty (including the state- and commerciallybased economic sovereignty represented by the SPACE Act) seem to assume that existing statecentric sovereignty can be transferred to space without articulating how this might function. NewSpace entrepreneurs are joined by major state actors such as China and India in the scramble to gain control over ‘off-earth resources’. However, it is entirely unclear how territorial claims or jurisdiction could be determined in the unbounded space of the cosmos – or indeed, what kind of political community might be invested with this power. Current NewSpace projects are crystallizing around corporate structures based on resource extraction, in which communities comprised mostly of workers and some colonists would be sent into outer space at the behest of private companies. It is uncertain whether the citizenship and rights of this (presumably international) workforce would hold on other planets, and whether companies would continue to be regulated by states whose sovereignty is earth-based. The explicit flouting of the Outer Space Treaty by the approval of the SPACE Act (see Mitchell and West, 2016) has set a precedent that international law does not apply to other planets and celestial bodies. Since the jurisdiction of international law is designed to end at the boundaries of the planet, it is unclear whether or not states will respect claims to sovereignty made on outer space bodies. What’s more, even existing international space law ignores, effaces and violates the forms of sovereignty embodied by Indigenous modes of dwelling and laws related to Sky Country or Sky Worlds. Indeed, by declaring ‘outer space’ to be res comunis, the UN effectively annexed this vast place, and the plural worlds it fosters, as terra nullius to be colonized and exploited by ‘humanity’. Future IR and global theories addressing ‘outer space’ should attend to the coexistence of multiple forms of sovereignty rooted in plural spatio-temporalities, cosmovisions and relations.

Indeed, movements towards cosmic expansionism, and space colonization in particular, demand future IR theories that are overtly decolonial in nature. Crucially, these future decolonial IR theories must be attuned to the transformations of colonial logics and structures as they move across spaces, temporalities and material or technological conditions (see Wolfe, 2006). In NewSpace discourses, modes of colonization and settler colonialism responsible for widespread genocides, displacements and oppression across earth are lauded as desirable strategies. As discussed above, proponents of space colonization justify their rhetoric on the apparently commonsense knowledge that there are no Indigenous people or other ethically-relevant beings in outer space. Yet, the examples above show that the place labeled as ‘outer space’ within Western scientific discourses is richly populated with the relations (human and otherthan-human; living, dead and non-living in Western terms) of plural Indigenous peoples. Colonization of outer space bodies, the mining of asteroids or even movement through interplanetary space may damage these beings irreparably, severing their co-constitutive relations with people and other beings on earth. Moreover, given that each of the Indigenous knowledge systems discussed above considers these beings to be kin, the destruction of or trespass onto ‘outer space’ bodies constitutes a harm or transgression in itself. The space industry has a history of displacing Indigenous peoples and polluting their sacred lands on earth (see Redfield, 2000; Gorman, 2005). Plans for space colonization threaten to extend this violent legacy beyond earth, exponentially extending the spatio-temporal reach of settler colonial violence.

In addition, NewSpace promotes colonial cultures based on the transfer of populations to environments to which they are unaccustomed and in which they will be at the mercy of colonial leaders. In this case, access to the technology required to travel to and exit from outer space bodies would remain concentrated in the hands of space entrepreneurs, who would potentially control every aspect of life in the colonies. Given the risk associated with outer space enterprises, and ongoing patterns of migration on earth, it is likely that the first colonizers would be members of economically marginalized and vulnerable groups. This would accentuate inequalities and structural violence currently experienced on earth. Due to the specific conditions of outer space – including distance from the earth and the bounded nature of the economies that would emerge on small, resource-driven space colonies – the power of space entrepreneurs would include almost total control over the social, political and economic aspects of life in the colonies. If the bodies of colonizers require modifications in order to survive in outer space conditions or the ecosystems of particular planets or other bodies, space entrepreneurs may also gain control over the genetic and physical characteristics of colonizers. In this sense, humans travelling to space to join these settlements would simultaneously be colonizers and intensely colonized.

Future decolonial IR and global theory need not rule out the inhabitation of other celestial bodies, but it could envision non-violent modes of life that respect outer space beings. This would involve taking seriously Indigenous and other non-Western ethical-legal systems and kinship relations, and ensuring that any actions within Sky Country/Sky Worlds or other Ancestral territories were respected. What’s more, imaginaries of outer space should include Indigenous and non-Western visions of these forms of dwelling. Morten Klass (2000) notes that existing plans for space colonization envision communities in ‘outer space’ that almost exclusively feature North American and (north) European community and economic structures. As Dickens and Ormrod (2007) suggest, most imaginaries of space colonization are rooted in Western forms of science fiction such as Star Trek, which reinforce images of eminent domain and expansive capitalism. A future decolonial IR and global theory could engage with the emerging genres of Afro-futurism (Nelson, 2000; Womack, 2013) and Indigenous futurisms (see Dillon, 2012) to imagine other futures. Through visual, digital, musical and filmic mediums, many works in these genres imagine futures in which Ancestral knowledges and contemporary realities fuse with emerging technologies to engender nonviolent forms of encounter and co-existence with other beings on earth and elsewhere. A future decolonial IR and global theory could take its cues from these sources – not simply Western science fiction – to imagine plural future forms of flourishing on and off earth.

Conclusion

As earthly ruptures puncture and deflate the globe that underpins IR and global theory (Latour, 2016), these disciplines need to attune themselves to different forms of critique. These ruptures expose profound gaps between existing IR and global theory and the cosmological conditions in which it is embedded. As a result of these gaps, IR and global theory is unable to confront some of the most profound and challenging conditions that face it. The contributions to this book each, in different ways, query the limits of critique in IR, and whether IR can still be meaningfully understood as a discipline. In this chapter, I have foregrounded a form of critique that goes beyond the limits of existing frameworks: the direct critiques asserted through the eruption of planetary crises and cosmic conditions into the frameworks of IR. I have also centred speculative theory and philosophy as a potent mode of critique within, and of, IR and global theory.

To some degree, all of the arguments made in this chapter rely on speculative thought – that is, reasoned thought abstracted from current knowledge about possible future events. This form of critique is not ‘mere (science) fiction’: it involves modes of reason that integrate elements of imagination and the contingency of the unknown. Speculative thought, which has become an important aspect of contemporary philosophy (see Bogost, 2012; Morton, 2013), anthropology, science and technology studies (see Haraway, 2008) and which has for centuries been central to Western science, offers a great deal to scholars interested in the future of earth and the wider cosmos. Indeed, rather than limiting critique and the projection of futures to existing theory, it draws on incipient, emergent patterns (Connolly, 2011) to imagine other possible worlds and configurations of existence.

Finally, I have engaged throughout with Indigenous philosophies and cosmo-visions. In so doing, I have sought to highlight the plurality of worlds that co-exist on earth, and the multiplicity of forms of dwelling, relations with earth and other planets, and possible futures they incubate. This, in turn, performs a critique of the universalizing tendencies of existing Western-centric IR and global theory, whose exclusions and erasures of these worlds have helped to alienate it from the conditions in which it is embedded. These modes of being, dwelling, flourishing and imagining challenge dominant Western, colonial norms of ‘humanity’ and the oppressive, often violent, political and economic structures they engender. In combination, these forms of critique open up possibilities for plural futures – even in the face of radical (in)finitude.

#### Thus, affirm that the United States federal government should initiate cooperative discussion with the People’s Republic of China and the Russian Federation regarding ethical standards required for joint human spaceflight for deep space exploration.

#### The plan establishes a collaborative global forum for debating the ethical implications of plans to explore and settle space already in motion. The foundational commitment is a recognition of ongoing colonial undertones throughout the space industry and the need to ensure that future missions refrain from extending colonial logics into space. The result is a global forum for accountability through which governments and private space actors can be subject to critique and restraint

Monica Vidaurri 19, astrobiologist and policy and ethics specialist consulting for NASA Goddard, et al., 11/12/19, “Absolute Prioritization of Planetary Protection, Safety, and Avoiding Imperialism in All Future Science Missions: A Policy Perspective,” Space Policy, https://doi.org/10.1016/j.spacepol.2019.101345

With Mars2020, Europa Clipper, and the inevitable exploration of other bodies in the solar system such as ocean worlds, regulatory entities such as NASA, UN committees (primarily United Nations Office of Outer Space Affairs [UNOOSA]), the Committee on Space Research (COSPAR), and all other international partners must lead the effort to create and enforce planetary protection standards, cultivate a pathway with delegated authority for crewed and unscrewed space exploration campaigns, including tourism and commercial activities. In addition to setting international norms to be used in space law, all leaders and participants in space exploration must also adopt anticolonization standards and protocol in the form of agency-wide and government-wide guidelines to ensure equal and fair participation in space. Creating the norm of fair and ethical participation in space from the scientist level, as well as the adoption of ethical guidelines on the agency and government level, will allow for purely peaceful scientific purposes for exploration while ensuring minimal contamination.

Given the importance of planetary protection and new standards of safety with respect to technological and scientific advancement, it is vital to the international space community to work to improve international law and space policy. By actively implementing strict safety customs from the individual level, the proper chain of command via the respective government can ensure enforcement of standards simultaneously in the form of an independent and strengthened planetary protection office (PPO). In other words, a domestic PPO, remaining as part of an agency and coordinating internationally, would act as an advisory and authoritative body. In conjunction, collaboration between PPOs and the astrosciences is equally important in improving microbial detection and decontamination technologies.

2. Strengthening the framework—areas of consideration

Universalization of planetary protection, safety, and ethical standards is crucial for all future space exploration directives and missions. In this case, universalization of standards is heavily reliant upon building and maintaining a regulatory and communicative global infrastructure. Delegated roles are assigned vertically to provide adequate checks and continuous risk assessment starting after mission conception and throughout the lifetime of the mission. Simultaneously, individuals and mission management are encouraged to establish the practicing norms of voluntarily coordinating and collaborating with PPOs and ethics specialists. Implementing this infrastructure from both government policy and individual practice of norms of good faith would bridge the regulatory gap between private and public sectors. Delegation of safety procedures and anticolonization would be best executed by a PPO, ethics committees, active ad-hoc committees, and other representatives involved in mission communication and enforcement. In addition, without the implementation of practicing norms and customs from the individual level (mission management), any formal establishment of law, from the agency level to international level, will not have a solid practical foundation. Consequently, laws will be established with no prior background of how these norms can be improved and how they help.

2.1. Bridging the regulatory gap and the role of the space agency

The Outer Space Treaty (OST) places the responsibility of understanding and adhering to exploration safety and bioethical standards for non-government entities on the respective government(s) and relative agencies representing the entity [3]. For example, to establish the norm of proactive safety and ethics standards, NASA can take it upon themselves to outline and communicate with Congress its full planetary protection and bioethics strategies at the approval of every science mission. Meanwhile, strategies continue to remain compliant with UNOOSA standards including astronaut safety, contamination, non-militarization and anticolonization, and transparency of technology. Therefore, actions must be taken by governments ultimately responsible for these exploratory actions to allow the authority of the agency to constantly monitor, communicate, and enforce safety and protectionary regulations including private sector partnerships. These actions will effectively ensure enforcement of standards in addition to those stated in NASA Procedural Requirements (NPR) 8020.12D, outlining the use of NASA (agency) funding from non-NASA entities only at the demonstration of adherence to policies regarding planetary protection [4].

While NPR 8020.12D was superseded by NASA Interim Directive (NID) 8020.109A, the importance of stating and creating the framework for interagency communication and adhesion to updated planetary protection and ethics policies is of the utmost importance. Language from NPR 8020.12D most accurately aligns with the suggestions of this paper and will be referenced. Section 2.3. of NPR 8020.12D requires non-NASA entities to submit future protectionary procedural outlines to the NASA PPO. In the proposed framework, submissions are approved by the agency and the PPO and enforced accordingly. Protectionary procedure reports would be submitted to the PPO and must include planetary protection procedures outlined by the agency and highlight any extra items set forth by the non-agency entity. For this reason, it would benefit every agency to have a communicative and transparent PPO (a function of the agency) or equivalent entity to follow and modify these procedures as needed over the course of a mission, while remaining compliant with and communicating the concerns of ethical committees and liaisons. Compliance with ethics officials can be started by two simultaneous fronts: mission management practicing the norm of willing cooperation with ethics officials, and governments adopting language similar to NPR 8020.12D that requires ethical review of a mission and mission processes.

Furthermore, Section 2.4 of NPR 8020.12D states that, at the request of the PPO, mission management shall make arrangements to allow PPO representatives to be present during transport, decontamination, hardware and environment assessments, and writing of documentation relative to safety and protection [4]. To strengthen this with regard to the proposed framework, the PPO and any relevant ethics and safety committees should be present from conception (which includes mission categorization) through mission completion, with the PPO scheduling regular assessments of decontamination procedure, adherence to standards, hardware, documentation, and any other mission detail falling under the jurisdiction of the PPO. Similar to ethical review, this practice can be implemented simultaneously by norms established by scientists, willingly subjected to regular PPO inspection, and government adaptation of guidelines enforcing this practice. Communication and enforcement/improvement of standards can be achieved with ad-hoc committees or representatives established within a mission team as a direct line to a PPO for the purposes of upholding strict protectionary standards and norms.

2.2. Reactive to proactive safety procedures and their jurisdiction

With the establishment of PPO as a domestic authoritative body within the agency, as well as governmental adaptations of legislation that requires compliance with PPOs, ethics, and safety officials, the proposed standards can be accomplished. In conjunction with a PPO, any existing ethical and safety committees or liaisons sharing this authority and necessary responsibilities throughout the mission may take more protective roles. This includes advising and assessing implications a mission poses to the future of planetary protection, ethics, global societies, and safety, while reporting these implications to the representative government and UNOOSA. The applicability, combined with language changes enforcing the role of the PPO and relevant committees/liaisons as objective and mandatory in all exploration missions—agency/government and non-agency—proves the reinstatement of relative language in NPR 8020.12D as procedural standard and international custom would benefit the progression of these standards. Moving forward, reinstatement of this procedural requirement, or the creation of a new requirement including language applicable to crewed and low Earth orbit (LEO) missions, is needed.

Two NASA policies prove adequate procedural foundation for international agreement in safety and decontamination standards for spacecraft and crewed spaceflight. NASA Policy Directive (NPD) 8020.7G, which accounts for the contamination control of both outbound and inbound spacecraft [2] and NASA Policy Instruction (NPI) 8020.7, accounting for proactive approach to safety and contamination with human exploration [5]. To illustrate, both policies provide the foundation for executable language and delegation of authority similar to that laid out in the previous section and ultimately prove useful for international law and domestic policy applications. Reinstatement of NPD 8020.7G after expiration, stressing the importance of improving safety and decontamination measures and instrumentation becomes more sophisticated, and applying the guidelines of human exploration stated in NPI 8020.7 to fit all human exploration missions would also prove useful in this sense as the space science community progresses further into robotic and human exploration.

Furthermore, having an interagency framework with respect to the safety and biothreat control of spacefaring missions can prove to be another method of obtaining and maintaining a proactive safety policy, as opposed to the current reactive system. For example, in the United States, partnership with the Department of Energy, the National Institutes of Health, and relevant agencies on comprehensive study and assessment of microbiome survivability in closed systems such as the ISS not only helps relieve NASA of studying these effects alone but also helps build an intellectual framework that is transparent and sharing in nature that all parties can benefit from and that can be used for other matters, such as the United States National Biodefense Strategy or future space tourism safety procedures. Because space travel is becoming more inclusive to not just astronauts and their space agencies, it is important that interagency and intergovernmental partnerships are established to prevent the use of space as a frontier for bioterrorism, in addition to researching the effects of non-Earth environments on human travelers, and updating medical procedures suited for these new environments. The subsequent discoveries and technologies, developed by interagency and intergovernmental scientists and engineers, will already be highly communicated and transparent, and ready for use.

2.3. Ethics and interstellar communication

An extension of the planetary protection framework could also apply to the consideration of sending messages that are intended to be received by other civilizations (often referred to as Messages to Extraterrestrial Intelligent life or METI). The discovery of exoplanets with orbital and size/mass properties that could allow globally habitable conditions and plans being submitted to decadal surveys to construct telescopes that could confirm the habitability of such worlds and search them for signs of life and increase the relevance of METI. The age of exoplanets has further motivated renewed efforts at the Search for Extraterrestrial Intelligence (or SETI) by searching stellar systems for anomalous radio or optical signals. Some organizations also explicitly advocate for METI as an effort to increase the likelihood of discovering extraterrestrial intelligent life. Various scholars have voiced opposition to any attempts at METI by citing ethical concerns, such as the negative consequences of initiating such contact or the inability to readily decide a spokesperson or message representative of Earth as a whole [[6], [7], [8]]. Others have pointed out that low-cost and low-power METI could provide beneficial preparation for the future, while any actual contact with extraterrestrials could also be immensely positive or wholly neutral, in addition to negative [7,8].

Past METI efforts and discussions have also expressed the potential positive benefits from constructing a message that represents humanity. They acknowledge that any message sent by Earth should be representative of the diversity of life on Earth. As a result, even research into what kinds of messages would be sent can be diverse, inclusive, and multicultural. Such efforts—if connected to broader topics and related careers—could lead to more inclusivity and diversity in exoplanets and astrophysics. However, any benefits from such an effort will only be realized if the message construction is intrinsically inclusive. Further, the daunting ethical issue remains of how to weigh the multitude of voices on Earth in the context of socioeconomic inequalities. Thus, UNOOSA, in consultation with global experts from relevant fields, will be critical in facilitating these future discussions, ensuring all relevant global communities have a say.

All of this demands ethical and moral infrastructure and that they be implemented as a fundamental part of any SETI or METI project.

2.4. Antiimperialism

“Seeking to prevent a new form of colonial competition” was the very premise to the OST [3]. As such, the creation of a norm and/or resolution barring non-scientific human settlement any celestial body is encouraged to be established and adopted as custom—at least for a period of time with which humanity can properly study forward and backward contamination, ensure a majority of the area explored remains for science, and until proper governance and methods of human settlement are discussed and adopted internationally with all global communities that do not explicitly represent the will of one government or community. It is critical that international law adopts a custom of good faith in antiimperialism, similar to militarization, with the presentation of these customs from a majority of each state and agency participating in space exploration, as well as the establishment of explicit antiimperialism as a clause of the OST [9]. It is important for space-faring nations to note that colonization is not just an act. Rather, is a structure; an institutionalized virtue stemming from exploitation of (often native) populations to preserve a central selfish ideal of preserving the way of life as seen by the colonizing nation, reliant upon imperialism. In addition, states party to and responsible for elements of scientific stations should uphold respective jurisdiction over their contributions, utilization, and liability rights of facilities, equipment, technologies, personnel, and territories.

It is paramount that the astro community not only recognize the institutions of colonialism and imperialism in the premise of settling other planets/celestial bodies and their orbits but also works together to prevent further colonialism and imperialism in the name of science on Earth. A proper check to colonialism from the astro community takes the example of the Thirty Meter Telescope (TMT), as well as the other telescopes that have been built on Native lands in Mauna Kea, Hawaii [10]. Management of the current set of telescopes in Mauna Kea have established the norms of paying rent, creating a work pipeline for the Native people, creating education outreach programs for Native youth, and actively facilitating communication with Native tribes and businesses, thus gaining the trust and approval of the Native people to build all current telescope operations. However, the continued controversy around Mauna Kea and the TMT should serve as a new regulatory area of consideration: one that includes “no further development, creating a community-based management authority including environmentalists, native Hawaiians, regulatory agencies, and collect[ing] rent.” [11] Ground-based observing, as well as other astroscience–related developments, cannot and should not take precedence over lands belonging to Native populations, or areas where telescope development is potentially harmful toward native ecosystems and the environment.

Thus, it is imperative that antiimperialist standards and methods of thinking begin in the early stages of mission conception, along with safety and ethics, and from the PI/individual level through the agency/global level, which can be facilitated and held accountable by the creation/utilization of ethics committees and liaisons. Similar to planetary protection framework suggestions stated above, establishing practices of good faith from scientists, hopefully simultaneous to implementation of mandatory ethical review guidelines from governments and agencies, will accomplish this.

In addition, antimilitarization articles and clauses of space allow for the existence of war facilitators1 in space, but no scientific justification can be made for the operation of such war facilitators for peaceful purposes on other celestial bodies. Therefore, anticolonization is to include antiestablishment of all military-like installments on celestial objects, including those with potential war facilitators. This clause shall exclude mining equipment put forth and approved by a PPO and UNOOSA, along with specific uses that a mission must adhere to where the use of mining and other potential war-facilitating science equipment for purposes other than those stated in the mission is met with discipline as understood by an international space community.

3. Ensuring the framework—norms and strategies

3.1. Lobbying

To preserve and uphold a more future-oriented, safe, and comprehensive interactive legal framework between the public and private sectors and international partners, it would benefit governments to not allow lobbying efforts to streamline certifications, permits, and renewals of legal documentation allowing access to LEO and other celestial bodies/orbits to pass. Though transparency of technologies used by the private sector is critical, it is not needed with the correct framework and agency technology, planetary protection, and ethics officers maintaining constant communication and regular assessments. In addition, private sector advisory committees or delegates (permanent or ad hoc/per mission) within an agency would greatly benefit the ability to properly assess status of projects, recommendations from the private entity. Committees and delegates may also serve to advise on potential legal protectionary standards and to uphold high standards of transparent communication between agency, government, international partners, and private entity.

3.2. Terra nullius and environmental law

The language used by governments and their respective agencies regarding a state presence in space currently reflects terra nullius law. However, at the emerging importance of regarding space as a human environment with needed protection, environmental law will also prove useful in adaptation and facilitation of standards of use. Rather than protecting state interests in space, space is to be protected by all states in collaboration for peaceful exploration and scientific advancement. However, states must also be ready to exercise the full extent of their jurisdiction on their space items, including debris and debris cleanup technologies and methods [9]. In this light, states and their agencies must also adopt a stricter practice of mission review to adhere to the assessment of a mission launch or other space activities. This takes the example of requesting consultation by other international space agencies or ethical committees/liaisons. The issue of space debris marks another aspect of space exploration where interagency and intergovernmental collaborations can work to ensure safe removal of debris.

3.3. International custom and norms

Like most jurisdiction reached by international courts on the matters of high seas, the environment, terra nullius, and resource use, the laws created regarding these matters are largely based off of established norms and practices from individuals (PIs), entities (agencies), and governments, including bilateral treaties and agreements. Establishing clear good faith relations, both in practice and in treaty, will set the international framework needed to create strict and preventative protectionary, ethical, and anticolonization methods for all future science missions. In this light, all levels of every science mission are encouraged to actively participate in effectively creating the norm of checks and balances so as to not abuse the presence of different entities, both private and public, in space. These checks may include but are not limited to voluntarily establishing regular mandatory assessments by PPOs throughout the entirety of a mission starting from concept as well as regular mandatory assessments from international law specialists, clear and transparent international/industry partner lines of communication and delegation of authority if applicable, establishing a clear chain of command and representatives from agencies working with private industries to ensure and enforce progressive safety procedures on the private entity, strict committee/delegate presence within the private industry to communicate needs to and from the agency, and any other behavioral suggestion laid out in this article.

Because space exploration is an extremely large, global, and mostly unified effort that is increasingly supported by private companies, governments will find that defining their responsibility of nongovernmental actors operating in space is in urgent need of review by passing laws to regulate such actors. In light of this, policies and customs with language and practices set to be implemented at the international level, coupled with high transparency and liaisons/infrastructure via active regional authoritative bodies in place for communicating new standards and concerns, are believed to be successful in defining the relationship between government and private entity. As the world progresses in technological and scientific advancement, policy and safety standards must also remain transparent and adequately communicated across all agencies and governments. In this case, it would benefit states party to the OST to have a diplomatic office based in their country that would report directly to the UNOOSA with matters regarding updates in biosecurity, exploration ethics, and norms and customs, continuously monitoring the government-company relationship, and allowing UNOOSA and OST party states to object when a potentially exclusive custom or act is about to take place. Active and immediate reports to the UN from states party to the OST would strengthen international custom regarding the issues expressed in this article. In addition, any possible infringement on UNOOSA/OST standards or any critique raised by a space-faring nation in response to another exploration effort would be able to be brought to the attention of the deploying nation, essentially acting as an international system of checks and balances to ensure that the priorities stated in international space law are abided by on all levels.

The private sector can help advance public science in a way that science has never seen before. However, it is important that international checks as well as government regulations are in place to ensure progress does not precede ethics in the form of exclusion and contamination.

3.4. Utilizing the goals of the astrosciences in collaboration

There are countless proposed and in-development instruments and missions intended to challenge our understanding of how life may exist on other worlds. The planetary protection strategy for these missions would benefit from committees made up of representatives from all potential mission stakeholders: planetary protection officers, mission astrobiologists, scientific investigators, and commercial engineers and executives. If people at every level of the mission proposal and execution process actively execute the norms laid out in this article with facilitation by committees, updated and strictly heeded standards with regard to ethics, planetary protection, and communication at every phase of the mission would be much more successful and effectively become custom for future missions. These committees would benefit from planetary protection and astrobiological research well within our current capabilities, such as investigations of closed-system microbial communities on closed facilities (e.g., the ISS) and advancements in detection of organic molecules. Mission safety can also be improved by research on potentially hazardous environmental concerns, such as quantifying and mitigating radiation exposure during long-period spaceflight, the effects of planetary regolith on mechanical systems and human health, potential in-situ equipment failures, and more. Given the recent Artemis and Moon-to-Mars program announcements, as well as NASA's selection of the next New Frontiers mission, Dragonfly, these concerns only grow more time-critical.

However, such collaboration between members of the space science community and the private sector are not limited to future planetary missions. Current commercial activity could also benefit from interdisciplinary advisory and regulatory action. The recent launch of SpaceX's Starlink internet satellite constellation raised concerns among the astronomy community because of the effects of a large artificial orbiting constellation on astronomical observing, as well as its impact on storm and climate monitoring satellites. The lack of a proactive effort to communicate with the astronomy community is detrimental to the future of a proactive space policy and open cooperation between public and private efforts. The public outcry could have been avoided with an ethical/communicative oversight body working from mission conception to not only mitigate the constellation's effects on observing efforts but to assess the impact of any constellation satellite array on all stakeholders. In this case, cooperative bodies made up of representatives from government agencies, academic institutions, and commercial interests can be empowered to provide effective and regular reviews of proposed commercial space activities so that any potential impacts to scientific activity (or the integrity of other ground- and space-based environments) can be minimized. This would allow for innovation and competition from the private sector to continue to flourish while holding private science to the standards used by government agencies and public science. This recognizes that public science adheres to strict safety and ethical practice, and “red tape” in the context of privatized ventures into space is necessary. Private industry must also recognize the necessity of transparent technological standards and technology sharing [12], as projects like constellation satellites and other space-based communications infrastructure are inherently justified by global use. These technologies put forth by the private industry with global needs in mind, though they have the ability to benefit communities worldwide, must also recognize that in the mind of one private entity, “global good” may not be an inherent “good” in the eyes of all communities worldwide. Thus, global efforts would have to go through global vetting. With these concerns in mind, we reiterate that commercial and scientific activity must avoid harm to both terrestrial and space environments, with particular emphasis on maintaining pristine environments and Native lands [12].

3.5. The suggested framework

Suggestions laid out in this article regarding ethical implications, safety assurances, contamination control and planetary protection, communication, and accountability standards would ideally fall within the earliest stages of the science traceability matrix. Policy guidelines ensuring continued and mandatory assessments of these standards throughout the mission must also be coupled with early traceability to ensure that these ideals remain throughout entire mission timeline starting shortly after mission conception and throughout all aspects of the mission. This way, a consistent watch on ethics, communication, planetary protection, and other policy and social concerns via committees and liaisons catches any possible infringements as the mission develops and pushes the international communities to adopt more updated and proactive standards. Running parallel to internal and transparent monitoring of ethics and communication is the internationally communicative component, capable of acting as a “check” on international relations and any actions taken by mission management, private contractors, and their government, thus turning reactive international policy into proactive and constantly updated policies that can be used by a variety of agencies and nations. Though this article uses the example of NASA and the United States Government, the framework of transparent and proactive standards that are open to critique and custom-setting can be applied to all governments, institutions, and missions.

#### Debates on space exploration should foreground not just our impact on other worlds, but other worlds’ impact on us---interrupting the status quo’s drive towards progress at all costs allows reflection on the prerequisites to ethical space exploration, like remedying structural injustice on Earth before we set off into space. The 1AC refashions space exploration away from a narrative of exclusion, towards becoming a tool with which to dismantle oppressive structures in the here-and-now

Monica Vidaurri 19, astrobiologist and policy and ethics specialist consulting for NASA Goddard, 10/21/19, “What happens when you leave empty seats at the table?,” https://www.thespacereview.com/article/3817/1

The drafters of the Outer Space Treaty could not have predicted artificial constellations that hinder astronomical observing and storm tracking, actors shooting down space debris, and tardigrades unknowingly placed on a lunar lander and subsequently spilled on the Moon. This is, of course, to say nothing of human survivability in non-Earth environments. A critical component of assessing our impact on other worlds is assessing other worlds’ impact on us, both physically and socioeconomically. Physically, neither space agencies nor private spaceflight companies have conducted sufficient research regarding human survivability in space, in terms of radiation exposures, differences in gravity, psychological complications, and many other factors.

However, the most pressing of these untouched and necessary impacts of our future in space are the impacts it will have on all communities of Earth. Behind all of the policy, law, regulations, and even science behind human expansion into space is the human condition: our individual attitudes towards what we think we should do in and with our cosmic backyard. These individual attitudes are influenced in no small part by our surroundings and social groups that we voluntarily or involuntarily find ourselves in. Given the examples of “act first, ask questions later” that is already shaping in space, it is clear that the on-Earth socioeconomic implications of our actions are not being discussed and acted upon nearly as much as they should. Space exploration is nothing if not dangerous and risky. However, we have the ability to at least attempt to mitigate forwards and backwards contamination, update safety procedures, and bring in native and diverse voices to think about the ethical implications of our science. Not doing so is simply unethical.

Now, define “good”…

This is not to say that all progress should come to a halt. In truth, the rise of the spaceflight sector and space philosophy signals the coming of a new age of technological and scientific progress for humanity, and it is nothing if not exciting. However, at this point in human history we are all painfully aware of the legacy and the cycle that humanity falls into over and over again. Modern examples include communities that are disturbed for their resources (the Dakota Access Pipeline), for their location (Mauna Kea versus its twin location in Spain), and projects that, while argued as being “for the good of humanity”, greatly impact public science and weather tracking (5G networks.) The exclusionary rhetoric surrounding “democracy” and “American domination/exceptionalism in space” displays an open disregard of all other nations that participate in space, and a disregard for the right that all nations and people reserve for science and exploration. And, of course, colonizing other worlds comes with an astronomical burden to resolve: who will be able to do the colonizing, who is going to set this in motion, and why?

What each of these instances comes down to is the exact same dynamic that has shaped all international relations: to the victor, to the richest, the quickest, and to those who plow ahead with their ideals without first reviewing ethical and socioeconomic implications of their work, go the spoils. Is this just? Is this sustainable? Is this equitable? Is this setting a good precedent? Is this the future that all humans consent to create—even those that could not be reached to consent?

Use of the word colonization gives rise to both enthusiasm and criticism in the space community. To some, colonization is thought of as a purely historical and completed act, something that humanity has since learned from. For proponents of permanent human presence on other celestial bodies, we have therefore redefined colonization. To them, a long-term presence in space represents valor and dignity, spreading life to the lifeless. To soften the blow of the word colonization, they now use the term “settlement.” However, in remembering its historical legacy, the term colonization carries enough historical baggage that we fear that humanity will once again find itself falling back into the exploitative tactics of historical colonizers.

Opposers believe that even though we have yet to colonize other worlds, colonization is not just a historical act. Rather, it is a deeply-rooted institution, whose values are still very much alive and practiced in modern institutions. In this case, “colonization,” “settling,” or whatever it will be called, will do nothing to change the path that humanity has gone down time and time again, where we will once again find ourselves placing scientific progress above the right of communities to exist without exploitation and erasure. We don’t even have to have settled another world for the institution of colonization to have seeped into space exploration. The stark contrast of the voices supporting and those opposing is undeniable evidence. One thing is certain: humanity’s near-term future in space will set the tone and pace for science, technology, and ethics for generations to come; it will be how humanity is remembered.

The conversation still looks the same

In this light, ethical exploration and a responsible approach to fair play in space is going to require a serious and uncomfortable assessment surrounding the goals that both public and private sectors have in space, a humbling assessment our technological readiness, and an even more uncomfortable assessment of who the proponents for colonization/settling historically have been and currently are, and why they view colonization as our right. A small population of humans currently hold the ability to push their own will on other worlds, and even on communities that share the Earth with us. Whether the hopes of these particular humans are seen as potentially destructive or constructive of an otherwise mostly even playing field in space, and whether humans are seen as creators or destroyers, does, in fact, depend on factors such as race and gender, and as we see in the space sector, age. The current conversation, and consequently those that will be determining humanity’s next steps in space, is not diverse, just like the STEAM (science, technology, engineering, arts, and mathematics) fields that represent space science, exploration, and commercialization. The lack of diversity and ethical review in these conversations is in and of itself a warning sign that humanity is bound to the same paths we have traveled; what we continue to facilitate on Earth will naturally travel with us into space, assuming that the institutions of outdated institutions of racial inequality, gender inequality, exploitation, and yes, colonization, are not recognized in their modern forms and discussed.

If those who are privileged enough to lead the charge back into space truly cannot see the destructive, exploitative, and imperialist tendencies of historical victors, then there are already voices that are being silenced; no colony on the Moon required. The attitude of “mistakes first, policy later” does more harm to other communities that take part in space in the long run than good to the actors that carried out the mistake for instant gratification. While we don’t know what we don’t know, having a system of accountability and ethical practices in place will help to prevent careless—or purposefully selfish Â±—mistakes. Thus, acknowledging and tearing down institutions of inequality, diversifying the conversation around colonization, and shifting the focus from “what we can do” to “what we should do,” becomes a critical part of ensuring space is truly for all.

Science first, ethics later?

Today, we have the ability to combine public and private partnerships in a way that can progress humanity forward in a way that has never been seen before. And, for the first time in human history, we have the opportunity to ensure that our next giant leap as humans is truly fair and ethical. Maintaining the belief that ethics will slowly follow science is a blatant vehicle for the institution of colonization, and specifically the United States’ own institution of capitalism, that will ensure future space economies continue the pattern of exploitation of Earth economies.

Ethics following science will ensure that less powerful and less wealthy communities that participate in space and science will have their voices silenced before the exploration even happens. Ethics following science ensures that science gets enjoyed by only certain groups; though many powerful nations have an affinity for competition and capitalism, other nations that have just as much of a right to participate in space may not share the same ideals.

Ethics following science means not developing even the slightest of safety procedures to mitigate any potential backwards contamination to astronauts. Those that go swimming in large public pools or use a public gym know that they’ll encounter contamination, but rules against glass, large-scale contamination such as spilling chemicals, and social norms of good faith (e.g., wiping equipment), supported by enforcement, ensure that these spaces may remain, truly, for all. These rules and norms do not prevent those people from having their birthday party or breaking a personal record—they prevent others from ruining that space and encroaching upon those rights.

For the first time in history we have the ability to ensure that we take our first steps to rid ourselves of colonization and exploitation for good. Whether human expansion into space is seen as a divine right or an uneasy privilege, we at least owe it to ourselves, to the next generations of explorers, and to underrepresented interests to begin working on eliminating ugly historical inheritances and tendencies, and create a safe and collaborative future. Our return to the heavens can not only usher in a new age of scientific and technological progress, but for the first time, create an age of progress that is ethical and inclusive.