DIAMONDS ON BLACK VELVET

Colonialism's Legacy on Space Science and Space Exploration

Isabel J. Rodriguez

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Dr. Robert Thompson

Abstract

The purpose of this work is twofold. First, it seeks to provide a broad critical overview of the history of space science and space exploration, and the legacy of colonialism and diffusionist ideology that persists in these fields. The analysis is then supplemented with current decolonization efforts that are working towards dispensing with the polarizing "Western versus Indegineous" systems of knowledge narrative to provide a more multifaceted, nuanced, and diverse view of what science, the arts, and our future can be.

To those who choose to move beyond the boundaries of what they are told is possible.

List of Key Terms

Astrofuturism: "[Astrofuturism] envisions outer space as an endless frontier that offers solutions to the economic and political problems that dominate the modern world. Its advocates use the conventions of technological and scientific conquest to consolidate or challenge the racial and gender hierarchies codified in narratives of exploration." [1]

Capitalism (Free market economy): An economic system characterized by the accumulation of wealth by private or corporate entities. (Merriam-Webster, paraphrased)

Colonialism: Beyond the concept of settling and populating an area, colonialism is a process where people are sent to a subjugated area with the goal of establishing control over the indigenous population.

Empire: A common definition of empire is that of initially separate peoples unified under a central authority. A deeper definition, the one that will be used here, involves the subjugation of a formerly sovereign people by an external power.

Imperial/Imperialism: Two sides of the same coin. On one face, imperialism

[1] University of Pennsylvania Press. Retrieved from: http://www.upenn.edu/pennpress/book/13909.html.

is a system through which a country expands its power (through military force, or foreign policy); On the other: it is defined as the loss of sovereignty of a group of people to the empire.

Manifest Destiny: "[The] 19th-century doctrine or belief that the expansion of the US throughout the American continents was both justified and inevitable." (Google dictionary)

Racism: The "...generalized and final assigning of values to real or imaginary differences, to the accuser's benefit and at [their] victim's expense, in order to justify the former's own privileges or aggression." (Rothenburg, 2006) (Modified)

Visionary (Science) Fiction: A term coined by writer, activist, and educator Walidah Imarisha, Visionary Fiction is a literary genre whose stories contain fantastical elements that explore existing power inequalities, allowing for the presentation of a new, just future.

1: Introduction

"The sky calls to us. If we do not destroy ourselves, we will one day venture to the stars."

Carl Sagan

For millennia, the night sky has evoked in us poetry, folklore, dreams. Today, those dreams have manifested as a future of a permanent human presence in space– dreams brought closer to reality by the modern commercial aerospace industry; and our limited capacity to learn and wonder about the universe has been enhanced and deepened by the sophisticated technologies of the space sciences. The poetry that the cosmos inspires can be found on the mind and lips, and especially the writings, of scientists, space enthusiasts, and science fiction authors across generations. But with that poetry, moving as it can be, comes the unintended consequence of veiling a reality that must be reckoned with. It is a reality tethered to a thread of human history that stretches back nearly five hundred years: colonization. The colonization and subsequent imperial rule of various powers in Europe over non-European countries led to the rise and fall of a number of empires, the rise and global dominance of what would come to be known as the United States Empire, and the underdevelopment of what we now consider to be "Third World" countries.

Elements of the ideology and language that accompanied US colonial conquest over more than 1.5 billion acres of indigenous land [2], namely the deeply racist concept of Manifest Destiny, found a home in the arts, (notably American westerns whose tropes are paralleled in science fiction), as well as academic disciplines

[2] Onion, R. and Saunt, C. (2014, Jun. 17). Interactive Time-Lapse Map Shows How the U.S. Took More Than 1.5 Billion Acres From Native Americans. Retrieved from: http://www.slate.com/blogs/the_vault/2014/06/17/interactive_map_loss_of_indian_land.html

including but not limited to history, medicine, and the sciences. Empty land (terra nullius) has been used to justify the violent displacement of Native American tribes, empty life enables the appropriation and patenting of indigenous systems of natural knowledge (Rothenburg, 2006), and a combination of empty space and empty land is what we see when we turn our gaze, and our technologies, skyward.

Talk to a scientist or an engineer, and given the specialized nature of their work, they are likely to assert that their pursuits are "pure", "objective", and "apolitical"– and that the spirit of science is free from religious and commercial interests (Whitt, 2009). Yet, those who rely on government funding (*e.g.*, academics), or who work as part of a government agency such as NASA, recognize that their "pure" science is often at the mercy of political motivation and public opinion– or lack thereof. To further push back on this myth, Whitt reminds us that "science throughout the modern world is recognized as a vital part of industrial and military production". There is a growing community of scientists, however, that is beginning to challenge the single-track, technocratic mindset that dominates STEM culture; they have a more multifaceted understanding identity, power, discrimination, and colonialism, how they have shaped the communities to which they belong, as well as the work they are passionate about.

This work is a broad analysis and critique in which we will explore: the Eurocentric history of astronomy, astronomy across cultures, and how they were impacted by settler colonialism (Section 2); recent case studies of tensions between the indigenous and astronomy communities in the US (Section 3); the politics of science fiction and space exploration (Section 4); as well as a brief commentary on current efforts to decolonize science and astronomy, and to reclaim other forms of knowing (Section 5).

2: Decentering the History of Astronomy

A Common Story

If you're a self-identified science nerd, and/or you grew up with PBS [3] in the 1980s, chances are you're familiar with Carl Sagan's documentary series *Cosmos: A Personal Voyage*. Its episodes took viewers on a historic tour of astronomy, and gave them a place to contemplate the wonders and big questions our universe has to offer. *Cosmos*, considered to be a "watershed moment for science-themed television programming" [4], was watched by hundreds of millions around the globe and nominated for numerous awards. Media and the arts, like science or any other human endeavor, are not independent institutions– they are integral threads woven into the fabric of society. Yet, we are often quick to dismiss the power these endeavors have to move us, to influence not only the individual, but generations. Content censorship placed on television shows by major network corporations notwithstanding, the status of *Cosmos* as popular science canon makes it worthy of a critical take. In particular, its recounting of major historical events in astronomy.

Astronomy is arguably one of the world's oldest sciences, and shares roots with fields such as physics, medicine, mathematics, and philosophy. But much like US and World History, when and if we're taught it at all, the history of astronomy– and of science more broadly– is presented through a Eurocentric lens. Cosmos begins the history lesson with Eratosthenes, a Greek astronomer and mathematician who lived in 3rd century Alexandria, and who with simple tools at his disposal calculated the circumference of the Earth. Through the Library of Alexandria, an

[3] Public Broadcasting System

[4] Itzkoff, D. (2011, Aug.5). 'Family Guy' Creator Part of 'Cosmos' Update. Retrieved from: https://www.nytimes.com/2011/08/05/arts/television/fox-plans-new-cosmos-with-seth-macfarlane-as-a-producer.html

ancient center of knowledge and scholarship, we are introduced to other historical giants including: Euclid, the "father of geometry", Hipparchus, astronomer and mathematician, Ptolemy the astronomer responsible for the "geocentric" view of the universe, and Hypatia, a mathematician and philosopher whose death was more well-documented than her life.

The story doesn't pick up again until the 16th century. Here, we have Tycho Brahe and Johannes Kepler, who helped us understand the nature of planetary motion; Galileo Galilei, the first person to point a telescope skyward, discovering Jupiter's moons, and phases on Venus; and Isaac Newton, who put forth a theory of gravity. We sometimes end here, having laid some of the most formative milestones, though modern astronomy takes off in the 19th century, and *Cosmos* does include a segment on Albert Einstein, who in 1905 and 1915 respectively, established the theory of special relativity and put forth general relativity as an alternative to Newton's theory of gravity.

Eurocentric Diffusionism

Notice how our story had that initial, centuries-long gap? While Europe was in the Dark Ages, Islamic scholarship in astronomy entered a Golden Age, and this period allowed for the birth of modern astronomy. The mathematics necessary for advancing astronomy was invented, the first observatory was built in Baghdad in the 8th century, and the 10th century astronomer Ibn al-Haytham, who became known as "the father of optics", was the first person to figure out how we perceive light. His work would eventually aid the development of the telescope [5]. So why is it that non-European contributions to astronomy are often ignored, or included

[5] Stirone, S. (2017, Feb. 14). How Islamic scholarship birthed modern astronomy. Retireved from: https://astronomy.com/news/2017/02/muslim-contributions-to-astronomy.

as a footnote? A period of colonialism and conquest began at the end of the 15th century with the voyage of Columbus across the Atlantic. Major European imperial powers at that time included Britain, Portugal, Spain, and Holland, and these empires had expanded their reach into Asia, Africa, and the Americas. One idea that made room for the rise and dominance of Europe, (and eventually the United States), began with the idea of Europe as the ordained "fountainhead of history".

"*This belief is the notion that European civilization–"The West"– has had some unique historical advantage, some special quality of race or culture or environment or mind or spirit, which gives this human community a permanent superiority over all other communities, at all times in history and down to the present*" (Blaut, 1993).

That Europe, considered to be the example of progress and modernization, was to be "burdened" with the task of "bestowing" civilization upon non-European civilizations in order to bring them out of savagery (*i.e.*, the white man's burden), is the essence of Eurocentric diffusionism. Science and scientific expeditions, invoking the search for knowledge and truth, was used to justify and enable racial superiority and the profiteering from non-European land and labor. The profits gained by European empires through exploitation and force, not some special inherent quality, where what enabled European scientific endeavors to flourish where others were slowed.

Consequences and Impacts

But if "History is written by the winners", what, then, is the point of challenging this story? Dominant narratives and perspectives, by simple virtue of their dominance, must be questioned. Who benefits from the stories being told? Who

gets erased? What consequences does this have on the way we academics conduct our research? The way we interact with and perceive other cultures? The ways in which we turn our dreams and ambitions into reality (and who we allow to bare the cost)? Centering Europeans as the makers of history led to the distinction between what Blaut calls the Inside (the innovators, "The West/First World") and the Outside (the imitators, "The South/Third World"). Modernity is that thing which flows unidirectionally: from the inside, out. Eurocentric diffusionism perpetuates the myth of Europe's autonomous rise out of their intellectual coma. That our story picks up in the 16th century is not a coincidence. The advances made in Europe beginning in the 15th century were directly linked to colonial and expansionist activities in Africa, Asia, and the Americas through the development of capitalist societies through the exploitation of labor and resource extraction. Since the Outside is synonymous with uncivilized, the land is therefore justifiably Europe's to control, this is done through the concepts of property rights and laws, of which many native peoples had no concept (Sawyer et al., 2012).

From history to science, diffusionism has embedded itself into our scholarship, and Western science has been deemed the one and only true way of knowing the world. Indigenous systems of knowing have either been left unacknowledged, intentionally suppressed and/or erased, or capitalized. There are no voiceless people– only the intentionally unheard, and the permanently silenced.

Astronomy Across Cultures

Astronomy, in all its forms, emerged out of a simple collective human endeavor to understand the sky and its patterns. Understanding the sky enabled access to both time and space– we could, for instance, keep track of the seasons, plan agricultural practices, and navigate across land and sea.

"*It is easy, given how far observational and mathematical astronomy have progressed in recent years, to dismiss the astronomical practices of other ancient cultures, especially when their astronomy was not a precursor to our own*" (Selin, 2000).

Since the goal of an empire is to "mobilize vast amounts of personnel and materials in order to plunder other lands and peoples" (Parenti, 2016), there was little incentive to take a deeper look into the achievements of the colonized, and certainly no interest in considering the value of those achievements. Efforts to do so today brings to the surface "...still with surprise, the fact that other civilizations were doing things right, from a technical point of view, while the conquerors and colonists considered all of their activities magic or witchery." (Bazin, 1993). One example is of the record keeping of time and of the planets' positions in the sky within Mayan and Aztec civilizations, which were at the time more advanced than Europeans had at that time.

Old World science had three main veins: East Asian, which was predominantly Chinese, South Asian, which was predominantly Indian, and Ancient Mediterranian-Islamic-European science, in addition to smaller veins of traditional sciences (Selin, 2000). Cultural astronomy and archeoastronomy are fields that attempt to bring forth reconstructed histories, astronomical practices, and knowledge of people across the globe. From Aborigional Austrailians, considered to be the world's first astronomers, to Ancient Hawaiians and Polynesians, Native Americans and Mesoamericans, Japanese and Korean, as well as the indigenous people of South Saharan Africa. There is a wealth of knowledge that is a product of their unique histories, and includes periods of enrichment from contact with other nations, and of destruction with the rise of colonial regimes (Selin, 2000).

3: (Y)our Land, Our Science: Two Case Studies in Astronomy

> We first crush people to the earth,
> and then claim the right of
> trampling on them forever,
> because they are prostrate.
>
> Lydia Maria Child

The advanced technologies used in ground-based astronomy necessitates the construction of large, complex facilities remote places, far from light pollution and urban traffic and, in the case of optical telescopes, in dry, high-altitude environments to reduce atmospheric events. Such areas are perceived to be deserted, prime real estate to be developed, "...and with no other human interests that could become an obstacle to their objectives." (López, 2018). This logic, López goes on to state, is reminiscent of the capitalistic motivators that drive large corporations to pursue free market interests in other nation states, penetrating and extracting wealth from the land to the detriment of the indigenous population as well as the environment.

Hawaii: Maunakea[6] and the Thirty Meter Telescope (TMT)

In October 2014, protests erupted on the Big Island of Hawaii, halting the construction of the Thirty Meter Telescope (TMT). Native groups had been protesting the construction of telescopes on Maunakea for decades, expressing that the mountain is a sacred part of their cultural beliefs. Not only was construction the desecration of sacred land, it was also seen as the continuation of a painful colonial

[6] "Maunakea" (as opposed to Mauna Kea) is the proper Hawaiian reference.

history that began with the overthrow of the Kingdom of Hawaii in 1893. To the astronomy community, Maunakea's "altitude and isolation in the middle of the Pacific ocean make it an ideal location for astronomical observation" [7], and it was for these reasons that it was the site most favored by the TMT consortium.

In 2015, the International Astronomy Union (IAU) held its general assembly in Hilo, Hawaii, where a majority of astronomers in attendance were encountering the conflict for the first time (López, 2018). One interesting critical event during this assembly that he describes, was the issuing of a letter by the IAU to participants. The letter purported a neutral position on the issue, stating that it "welcomes all technological development and scientific process" while respecting "all cultural traditions around the world", while also failing to make the historical connection between the TMT protest and Hawaiian history. The assembly made no effort to invite the perspective of protesters into that space.

One argument in favor of the telescope's construction highlights the economic and educational benefits specific to the island of Hawaii (as opposed to the state at large), with the TMT pledging to commit one million dollars annually for STEM education [8]. "Fictive Kinship", as López describes it, has also been a rhetorical strategy employed in support of the TMT, creating a supposed link between the ancient astronomical knowledge of Native Hawaiians with the endeavors of modern astronomers. Such language, he argues, serves to legitimize colonial capitalist practices.

[7] Visiting Maunakea. Maunakea Visitor Information Station. Retrieved from: http://www.ifa.hawaii.edu/info/vis/visiting-mauna-kea.html.

[8] Think Fund. (2017). TMT International Observatory. Retrieved from: https://www.tmt.org/page/think-fund.

Arizona: Kitt Peak and VERITAS[9]

VERITAS is a ground-based gamma-ray observatory, currently located on Mt. Hopkins as part of the Fred Lawrence Whipple Observatory. It's construction was originally proposed to be constructed in the late 1990s on the Santa Rita Mountains, but the proposal was rejected by the Tohono O'odham Nation (Mizutani, 2015). As an alternate site, Kitt Peak– a site that like Maunakea is considered to be sacred. The Tohono O'odham peoples and the astronomy community had initially come to an agreement in 1958 that construction of the Kitt Peak Observatory would be allowed so long as "only astronomy research was conducted" [10]. By 1999, the time at which Kitt Peak was being considered for the construction site of VERITAS, there were a total of two dozen telescopes on the mountain.

"*The one thing that keeps bothering me, is that they want to keep building and building and building. They keep desecrating the mountain over and over again.*" Mildred Antone (a member of the Tohono O'odham Nation). [11]

Citing the violations of several acts, the Tohono O'odham Nation attempted to take the matter to court (Mizutani, 2015). The case was eventually dropped, and an agreement was reached: VERITAS would remain as part of the Fred Lawrence Observatory.

Remarks

Often in science, any critical or negative moral evaluation of scientific knowledge "is not allowed to reflect back on, or impede, the acquisition of knowledge."

[9] Very Energetic Radiation Imaging Telescope Array System

[10] The Kitt Peak Virtual Tour: Tohono O'odham. (1999). Retrieved from: https://www.noao.edu/outreach/kptour/kpno_tohono.html.

[11] Na Maka o ka Aina. Astronomy development on another sacred mountain: Kitt Peak. (2019). Retrieved from: http://www.mauna-a-wakea.info/maunakea/H4_astrodev.html.

(Whitt, 2009). When it comes to astronomy, despite trends and movements we're seeing within the community, the question of whether an endeavor, (*i.e.*, the construction of a facility for the purposes of acquiring knowledge about our universe), is for the greater good often trumps the cultural, spiritual, and environmental rights of others. Behind the veil of neutrality in a "pure" and "objective" discipline, "large astronomy consortiums act following the logic of huge extractive industries in the current phase of colonial capitalism" (López, 2018). More than vague and empty calls for diversity, the incorporation of cultural epistemology can play a vital role in helping us to avoid perpetuating an exploitative system in the name of science.

4: Conquering the Sacred Black: An American Empire in Space

> We're in the space exploration business, and the outer solar system is a wild, wooly place. We haven't explored it very well.
>
> Alan Stern

Origin of the US Rocket Program

With the end of World War II came the start of the Cold War, and through this new battle for political, technical, and military superiority, the beginning of the Space Race. The defeat of Germany gave the United States access to coveted German engineers and technology specialists, including those who worked on the V-2 rocket engine. Sixteen hundred of the top Nazi scientists, many of whom were

tied to Nazi war crimes or were themselves Nazis, were recruited by the US during the then-secret Operation Paperclip. Among those individuals was Wernher von Braun, who led the US rocket program. As a classified operation, the truth was kept secret and the version fed to the public was that of beneficence [12]. Space dreams of the 1950s and 60s served as a way to preserve the American way of life, and to expand its horizons. The political reality was also interested in preserving the way of American life, and it had no qualms about using any means necessary.

Wernher von Braun, heralded as a hero and a space visionary, would go on to join science popularizers in their push for sharing those visions, with documentaries in collaboration with Disney. No doubt von Braun believed in his dreams of space, just as scientists, academics, and science fiction writers of the time did. While history may never determine the depths to which he was involved with the Nazi party, nor fully understand his personal belifs, we do know that it was "his technocratic amoriality, his single-minded obsession with his technical dreams that is so disturbing" (Neufeld, 2002). That his rockets while he was in Germany were built using concentration camp labor was of little consequence, so long as it advanced his interests. von Braun's moral failing ought serve as a cautionary tale to all of us: we must be willing to have an awareness of and take political and moral responsibility for our actions.

Manifest Destiny in the Stars

With the flood of technology brought by the Cold War era, the science fiction of the time was beginning to make a transformation from space opera to hard science fiction. Here, as in Westerns, space was a frontier– the final frontier– where

[12] NewsHour, PBS. "When the U.S. Recruited Nazis for 'Operation Paperclip'." YouTube, (2017, Mar. 31). www.youtube.com/watch?v=wDZc-fO8pHc.

humans were often the technically superior race, and the future was by and large a white utopia. If they appeared at all, characters of color often served as a support. Their identities left unexplored, these characters were dispensable, used to ensure the success of the (white) protagonist. In situations where humans had learned tolerance, presumably through contact with alien species, racism was framed as an illness one could recover from given the right kind of environment. More often than not, science fiction functioned to drive a white, western, patriarchal, technocratic narrative whose origins began with the colonization of North America: the "inevitable" march of progress towards civilization. Astrofuturists were devoted to "breaking the limits placed on humanity by the surface of this planet", and astrofuturism forecasted "an escape from terrestrial history"(Kilgore, 2003).

The Free Market Approach to Space

The late 1970s saw the beginning of the end of the space dreams of the 50s. NASA funding began to fizzle out, as it was no longer tied to the same national security interests that had driven the previous generation. In 2019, NASA's budget is just shy of half a percent of the total federal budget– at the height of its funding in the late 1960s, its budget averaged well over four percent. The shuttle program had a thirty year run, though never got us beyond our cosmic backyard, and the definitive fate of the International Space Station (ISS), too expensive for NASA to keep if it wants to consider missions to the Moon and Mars, is unknown. Public opinion fizzled out along with the funding, though a wave of academics, science popularizers, and science fiction visionaries across creative mediums have attempted to keep the astrofuturist spirit alive. In his 1994 book *Pale Blue Dot: A Vision of the Human Future in Space*, Carl Sagan writes,

"*Of course, exploration and settlement ought to be done equitably and transna-*

tionally, by representatives of the entire human species. Our past colonial history is not encouraging in these regards; but this time we are not motivated by gold or spices or slaves...as were the European explorers of the fifteenth and sixteenth centuries."

It could be argued, however, that human expansionist development beyond low earth orbit will have the same imperial motivators, namely economic expansion and continued military dominance. The concept of asteroid mining is essentially resource extraction, in space. Commercial aerospace companies, the two most well known of which are the competitors Space X and Blue Origin, are interested in the privatization of space– the colonization of Mars for Space X [13] and of the Moon for Blue Origin [14]– to the benefit of their customers; and such companies are of great interest to the US military for their ability to put satellites into orbit [15]. One NASA is considering for the ISS is opening it to tourists, and Virgin Galactic aims to provide space tourists suborbital flights.

Where free market reigns, we must push ourselves to ask: Where do the raw materials come from? What environmental, social, and political impacts do these ambition have? Perhaps the dreams of the 50s can be realized, but for whom?

[13] About Space X: https://www.spacex.com/about

[14] Blue Origin's mission: https://www.blueorigin.com/our-mission

[15] Fernholz, T. (2018, Oct. 10). The US Air Force is spending $500 million on Jeff Bezos's New Glenn rocket. Retrieved from: https://qz.com/1420064/the-usaf-awards-500-million-contract-to-jeff-bezos-blue-origin/.

5: Radical Dreaming as Resistance

> "The struggle of people against power is the struggle of memory against forgetting."
>
> Milan Kundera

Creating Visionary Spaces

"*All organizing is science fiction. When organizers imagine a world without poverty, without war, without borders or prisons—that's science fiction. They're moving beyond the boundaries of what is possible or realistic, into the realm of what we are told is impossible. Being able to collectively dream those new worlds means that we can begin to create those new worlds here.*" – Walidah Imarisha

The work of individuals such as Walidah Imarisha, Octavia Butler, and Nishi Shawl, sometimes also categorized as Black science fiction or Afrofuturism, strive to create space for centering the traditionally marginalized (culturally, ethnically, due to ability, etc.). Their works challenge the dominant white, elitist narratives put forth by science fiction genre. Butler, in her seminal work *Parable of the Sower* explores an alternative form to hierarchical leadership in her seminal work; while Imarisha, in collaboration with adrienne maree brown, brought together organizers and activists to create an anthology of short stories, *Octavia's Brood*, that explore the connections between social movements and radical science fiction.

Reclaiming Our Knowledge

The decolonization of western science is going to take efforts as multifaceted as the problem itself. An important first step will be the acknowledgement that

we exist and operate within a dominant culture that has a purpose and agenda, even when we don't necessarily see it in our day-to-day work. Indigenous systems knowledge exist, are valid, and must be considered valuable (worth respecting, learning about, and teaching) beyond the potential for economic gains.

There have been efforts from the K-12 realm (Holbrook et al., 2006) to universities– particularly among graduate physics and astronomy students– to invite conversation and express concerns about developing lessons in ways that don't reproduce existing power structures. Dr. Chanda Prescod-Weinstein, a cosmologist, science writer and activist, put forth and is maintaining a reading list for decolonizing the sciences [16], has written a number of think pieces, delivered numerous talks, and utilizes her Twitter platform to talk about social justice. Even NASA has taken interest in the potential for indigenous knowledge to enhance technologies that address global climate issues (Maynard et al, 2008).

6: Conclusion

> "You may write me down in history with your bitter, twisted lines. You may trod me in the very dirt, but still, like dust, I'll rise."
>
> Maya Angelou

As an astrophysicist, a science fiction nerd, and a space enthusiast, I feel it is important to do the work and consider the hard questions and to face the hard truths– and it is my hope that other scientists take up this task. The technologies

[16] Prescod-Weinstein, C. (2015, Apr. 25) Decolonising Science Reading List: It's The End of Science As You Know It. Retrieved from: https://medium.com/@chanda/decolonising-science-reading-list-339fb773d51f.

utilized and developed for astronomy and aerospace are inextricably linked to the military industrial complex. Astronomy's past and present, as well as our space future are connected to a legacy of colonialism and driven by global capitalism, under which there is no ethical consumption. Who has the right to the sky? Should humans expand their presence into the solar system? What would it take to create a future in which we can ethically and responsibly live both on this world, and others?

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