

# QUEST

THE HISTORY OF SPACEFLIGHT QUARTERLY

## SPECIAL ISSUE

*Scholars Look at Space Exploration  
in the 21st Century*



### FEATURES

- 4 **Planetary Exploration in the Early 21st Century**  
By Michael J. Neufeld
- 11 **Commercial Lunar Landers and the Promise of Sustainable Exploration**  
By Matthew Shindell
- 16 **The Rise of the Belters: Asteroid Research and Exploration in the First Half of the 21st Century**  
By Andrew B. Godefroy
- 21 **Safety and Reliability in the Human Spaceflight Program**  
By Michael L. Ciancone, Roger D. Launius, and Howard E. McCurdy
- 29 **Do Human Beings Deserve Another Planet? Notes on the Space Industry's Omnipresent Eschatological Enthymeme**  
By Mary-Jane Rubenstein
- 37 **Bored to Death: Human Spaceflight in 2050**  
By Matthew H. Hersch
- 42 **Here Comes the Robots: The Last 25 and Next 25 Years of Robotic Space Exploration**  
By Janet Vertesi

- 45 **To Queerly Go: Queer Studies, Space Histories, and Space Futures**  
By Eleanor S. Armstrong and Lisa Ruth Rand
- 52 **The Great Reconfiguration: Politics and Diplomacy in the Space World, 2000–2050**  
By Brian Harvey

### ORAL HISTORY

- 59 **Interview with Charlie Walker: The First Industrial Astronaut**  
By Leonard David

### BOOK REVIEWS

- 73 **The Six: The Untold Story of Americas' First Women Astronauts**  
Book by Loren Grush  
Review by Jennifer Levasseur
- 74 **The Rocket Lab: Maurice Zucrow, Purdue University, and America's Race to Space**  
Book by Michael G. Smith  
Review by David Christopher Arnold
- 75 **The End of Astronauts: Why Robots Are the Future of Exploration**  
Book by Donald Goldsmith and Martin Rees  
Review by Jonathan Coopersmith

#### FRONT COVER CAPTION

An artist rendering of what a resilient microgrid for a lunar base might look like. Sandia engineers are working with NASA to design the systems controller for the microgrid. Illustration by Eric Lundrin.

Credit: Sandia National Laboratories

#### ISSN 1065-7738

The editorial office of *Quest: The History of Spaceflight Quarterly* (ISSN 1065-7738) is located at the SPACE 3.0 Foundation Inc., 6615 Hillandale Road, Chevy Chase, MD 20815-6424 USA. E-mail [quest@spacehistory101.com](mailto:quest@spacehistory101.com) for information regarding submission of articles or letters to the editor.

*Quest* is published quarterly, four times per year by SPACE 3.0, a 501(c)(3) charitable foundation. Periodical postage paid at Bethesda, Maryland, and additional offices.

Postmaster: Send all inquiries, letters, and address changes to *Quest*, PO Box 5752, Bethesda, MD 20824 USA.

©2024 The SPACE 3.0 Foundation Inc. All rights reserved. Reproduction in whole or in part without permission is prohibited. Printed in the United States of America.

# Do Human Beings Deserve Another Planet?

## Notes on the Space Industry's Omnipresent Eschatological Enthymeme

BY MARY-JANE RUBENSTEIN

**T**his article offers a critical examination of an argument common among space enthusiasts: that since we are doomed to extinction on Earth, human beings must colonize outer space. The article first brings to light the argument's minor premise, namely, that human beings should not go extinct. It then goes on to analyze the most promising arguments against and for human survival in outer space, concluding that "humanity" only "deserves" another planet on the condition that it inhabit space under a radically different paradigm from profiteering and conquest.



### I. Salvation in the Stars

During a recent webinar, former NASA Historian Roger Launius located the connection between religion and space exploration in the concept of *salvation*: We are headed to outer space to get humanity saved.<sup>1</sup> Launius said it offhandedly and never mentioned it again, as though the insight were commonplace.

To be fair, his audience had probably heard this argument before, most likely without the reference to

religion. For the last decade of his life, Stephen Hawking warned that humanity must "abandon Earth" within the next two hundred years "or face extinction."<sup>2</sup> Former NASA Administrator Charles F. Bolden has likewise said that a mission to Mars is the key to the "survival of the human race."<sup>3</sup> And of course there is Elon Musk, who reasons that since homo sapiens will eventually be destroyed by something—an asteroid, nuclear war, generative AI—humanity needs to become "a multi-planetary species."<sup>4</sup>

In terms of its content, philosophers of religion would classify this argument as *eschatological* because it concerns the end of the world and the salvation of a small subset of humanity. In terms of its structure, they would classify it as a *syllogism*. Beginning with a "major" premise—a basic assumption on which most reasonable people can be said to agree—a syllogism then adds a "minor" premise and uses the relationship between them to draw a conclusion. There are numerous subcategories of syllogism, but the one advanced by Hawking, Bolden, Musk, and a host of other space enthusiasts would be called an *enthymeme*, that is, a syllogism whose minor premise is

implied, rather than stated explicitly. Because it moves so quickly, leaping directly from premise to conclusion, an enthymeme is particularly rhetorically powerful, leaving the listener with a sense of urgent inevitability.

Reduced to its driest philosophical structure, here is the eschatological enthymeme in favor of colonizing space:

- Major premise: *Something will eventually wipe out humanity;*
- Conclusion: *Therefore, we have to go to space.*

If this reasoning seems a bit sleek—if it leaves you asking, "Wait, how did we get here? Why do I have to go to space?"—it is because there is at least one missing step in the argument. The syllogism contains other, unstated premises that would explicitly justify moving from the stated, major premise to its startling conclusion. Technically speaking, the unstated premise is that outer space will, in fact, save the species that's facing an untimely end on Earth. Considering the excruciating difficulty of keeping human beings alive in space, this assumption is far from self-evident; but I will leave it to the

astrophysicists, engineers, and investors to scrutinize it.<sup>5</sup>

The unstated minor premise that centers the present reflection is not so much technical as it is ethical. This premise is that the wiping out of humanity would be a bad thing; that is, that humans are *worthy* of indefinite survival. When aspirational space colonizers leap from impending disaster on Earth to eternal salvation in the stars, they assume that humans deserve such survival in the first place. With this omitted ethical premise stated explicitly, the eschatological argument for colonizing outer space becomes more robust; namely:

- Major premise: *Something will eventually wipe out humanity;*
- Minor premise (implied): *Humanity ought not to be wiped out;*
- Conclusion: *Therefore, we have to go to space.*

This conclusion—“we have to go to space”—gains further specificity when the philosopher in question is Elon Musk or his aeronautic mentor Robert Zubrin, who insist that the *best* place in space for humanity to live is Mars.<sup>6</sup> And for these aspirational Martians, the most reliable way to get to the Red Planet will be to shift the locus of power from nation-states to private corporations,<sup>7</sup> to keep the space industry free from environmental regulation or political oversight,<sup>8</sup> to turn the Moon into a cosmic gas station,<sup>9</sup> and finally to “warm up” the planet by hitting it with something on the order of ten thousand nuclear warheads.<sup>10</sup>

With each of its implications spelled out, then, the syllogism underwriting much of the public conversation about human space exploration looks like this:

- Major premise: *Something will eventually wipe out humanity;*
- Minor premise: *Humanity ought not to be wiped out;*
- Conclusion: *Therefore, we have to corporatize, conquer, and colonize outer space, beginning with Mars.*

My chief frustration with this line of reasoning is that it presents us with a stark either/or. Either we go extinct, or we engage in capitalist conquest of the galaxy. Such zero-sumness makes it very hard to criticize the proposal at hand. In fact, the moment scholars or activists raise questions about it—by asking, for example, whether the model of “conquest” is an appropriate one, or whether corporate capital should be leading our priorities in space, or what Indigenous and colonized people think about these plans to colonize the cosmos—they are accused of promoting “wokeism,” “extinctionism,” “postmodern mysticism,” and the end of science.<sup>11</sup> The moment one asks whether anyone might mind if the Moon were turned into a gas station, or whether nuking Mars is a good idea, or whether there might be some global oversight over corporate and American activities in space, one is accused of supporting genocide at the level of the entire species.<sup>12</sup> Either you’re with the space conquistadors, or you’re against humanity itself.

In this article, I would like to loosen up other possibilities for human futures by analyzing the implied minor premise of this omnipresent, extraterrestrial-eschatological enthymeme. As we have seen, space enthusiasts often leap from the threat of impending disaster (“something will eventually wipe out humanity”) to the promise of extraterrestrial salvation (“therefore we need to move to space”) without justifying the mediating technical assumption (that humanity can, and

can only, be saved in outer space) or the mediating ethical assumption (that human extinction would be a bad thing.) But at the risk of incurring more opprobrium, I’d like to take on the second of these assumptions and ask: do we all agree that human survival is a moral imperative? And if so, why?

I will admit that it seems a little obscene even to ask this question. Isn’t it clear that human survival is a moral imperative? What am I, some sort of self-loathing homo sapien? Let me say from the outset that I not only like, but love human beings. I love people, their high and low art, their bizarre social practices, their scientific wonder, and their theological precision so much it sends me into wordless amazement. But I am not sure we always know what we mean when we champion the abstract “survival” of an abstract “humanity.”

Considering the excruciatingly difficult conditions humans will face in deep space, is survival at all costs desirable, much less imperative? What if survival in outer space means living for 10 or 20 generations in an underground Martian bunker? What if it means living for centuries in a state of suspended animation? What if it means effective enslavement to a corporation that controls human access to water and air? Under certain circumstances, at least, might it not be ethically preferable to allow a species to live and die on its home planet than to consign it to an eternity of suffering and struggle?<sup>13</sup>

Even if extraterrestrial survival is both possible and desirable, does the “humanity” slated for extraterrestrial salvation really mean all of humanity? Or does it mean the astronomically wealthy, predominantly White, and exclusively young, reproductive, and able-bodied subset of the species that

will be able to afford extraterrestrial survival—or to “earn” it through some sort of cosmic fitness test? After all, as Sylvia Wynter has shown, the concept of “humanity” has functioned from the beginning as a false universal, serving the interests of Europeans and their descendants as they have sought to “save” other peoples by conquering them.<sup>14</sup> In this new chapter of the Space Age, the same alleged humanitarianism that justified the seizure of the “New World” is doing literally universal work, as Musk proclaims, for example, that it is his mission to “spread the light of consciousness to the stars.”<sup>15</sup> Just as Christian conversion justified the European conquest of the Americas, Africa, Australia, such billionaire humanitarianism is now justifying the decimation not only of the Moon, Mars, and asteroids, but also of the Earth itself, in the name, again, of the abstract salvation of an abstract humanity.

With both “survival” and “humanity” provisionally decentered, we can continue to investigate that perennially overlooked ethical minor premise within the space enthusiast’s eschatological enthymeme—that is, the premise that human beings ought not to be wiped out. Even if we grant that the space industry is speaking on behalf of all humanity, and even if we grant that space will both enable our survival and enable a survival worth surviving, does that mean we’re entitled to it? *Do human beings deserve another planet?*

## II. Salvation in Question

Strictly speaking, there are two possible answers to this question: yes and no. If we are going to be philosophically rigorous, a successful argument in favor of either position will require a refutation of the other. So if we want to be able to affirm that human beings do, in fact, deserve another planet, we

will need to begin by considering the possibility that human beings do not, in fact, deserve another planet. This means that the only way to reach a possible “yes” is to start, like the old Scholastic philosophers, by considering the “no.”

### A. *No*

There are, I propose, two major ways to make the argument that human beings do not deserve another planet. The first, one might call *existential*. Such an argument might begin from the premise that the word “human” is etymologically linked to *humus*: soil, dirt, earth. As *humus*, humans are constitutively bound up with the animals, vegetables, minerals, bacteria, and fungi that constitute us. To put the existential argument in syllogistic form:

- Major premise: *Humanity is earthly;*
- Minor premise: *Everything earthly goes extinct;*
- Conclusion: *Humanity will—and should—go extinct.*

By setting forth this existential argument against the colonization of other planets, one might fall out of step with a good deal of contemporary opinion, which might judge such a position pessimistic, “depressive,” or even, in the word of one flustered colleague, “emo.” But we would be perfectly in line with ancient Stoic and Epicurean philosophers who taught that, just as individuals live and die, so do species, and even whole worlds.<sup>16</sup> For these philosophers, the goal of human life is to live in accordance with “nature,” and living in accordance with nature means accepting the eventual death of everything that lives. Taking up such an argument would also put the philosopher in line with the ultimate aim of Buddhist practice: to escape the

painful cycle of incarnation and reincarnation.<sup>17</sup> The point of these admittedly quick comparisons is simply to show that struggling for the indefinite endurance of the human species is not a universal “good.” In fact, according to many schools of thought, such struggling is the very root of unhappiness and suffering.

The second argument against the human inhabitation of other worlds would be *functional*. Rather than asking about the nature of human beings, it would ask about our function in the world. Aiming to argue that humans do not deserve another planet, such an argument might begin by enumerating the disasters humans have unleashed on their home—from the depleted ozone layer to the polluted skies to the clear-cut forests to the plasticine waters, nuclear wastelands, and trashed orbital pathways. It might continue to explain that this destruction has been wrought, not by all of humanity, but rather by the wealthy inheritors of imperial and economic greed.<sup>18</sup> It might go on to reason that, considering the damage such “humans” have done to this particular planet, it is overwhelmingly likely they will go on to ransack and destroy everything they land on. Therefore, the people who most obstreperously claim the category of “humanity” do not deserve to escape the disasters they’ve created in the first place. Rendered in syllogistic form:

- Major premise: *Humanity has wrecked this planet;*
- Minor premise: *Planets ought not to be wrecked;*
- Conclusion: *Humanity should go extinct rather than wreck another world.*

I should note that an argument would stop just short of the position

---

Kelly Smith, Clemson University Professor of Philosophy and Biological Sciences, calls “eco-nihilism,” which actively advances the cause of human extinction for the sake of the rest of the biosphere.<sup>19</sup> Rather than hastening such an end, the functional argument (much like the existential one) would simply consent to it when it comes.

Given such objections to the human inhabitation of other worlds, we might now ask whether there might be a way to refute them. How might one take on the existential and functional arguments to propose that human beings do, in fact, deserve another planet?

### B. Yes

The most common way to contest the existential argument is to reject its major premise; that is, the notion that humanity is irreducibly *earthly*. Either explicitly or implicitly, space enthusiasts will assert that human beings are not inherently Earth-bound because they are not akin to anything else on this planet.<sup>20</sup> After all, human beings possess consciousness, or some refined version of it (self-consciousness, ethics, etc.), that allegedly makes them uniquely worthy of salvation. Moreover, human beings have developed the technology that makes extraterrestrial living possible in the first place. In short, unlike anything else on this planet, humanity has the means of escaping it (the dinosaurs went extinct, the thinking goes, because they didn't have rocket ships). So, even though we began as Earthlings, humans don't need to share in their fate. As the astronaut-turned-reluctant-farmer Cooper puts it in *Interstellar*, “Mankind was born on Earth. It was never meant to die here.”<sup>21</sup> Those who are attuned to such things might note the destinal, even religious language of being *meant* to do something. By whom? By what?

As is doubtless evident, I don't find this line of counter-argumentation to be particularly promising. Animal studies have shown us that all sorts of other creatures have consciousness, reason, and even ethical capacities; botanists have shown us that trees and fungi communicate, and microbiologists have revealed the creative and even technological agency of bacteria.<sup>22</sup> So, neither consciousness nor morality nor language nor the capacity to make and use tools can clearly distinguish humanity from the rest of the Earth. To be sure, one could argue that human beings alone have manufactured rockets. But of course, we haven't done so “alone”; we've done so by means of minerals, plants, and water, and of fuels made from the remnants of animal life. And perhaps most important, having the technological means of doing something does not amount to having an imperative or even the permission to do it. Just because we might be *able* to escape the Earth doesn't mean we *should*.

Insofar as it is undeniable that human beings are bound up with the Earth and its creatures, a more promising approach toward refuting the existential argument would be to affirm its major and minor premises in order to come to a different conclusion. In this vein, one might agree that humanity is inextricably bound up with everything earthly *and* that everything earthly goes extinct. But at this point, precisely where the anthropocentrists want to assert the singular importance of *humanity*, our speaker might argue for the singular importance of *the biosphere*. After all, we have been looking for a really long time, and so far we haven't found any planet or moon whose conditions seem hospitable to anything like rainforests, swamps, or savannahs. So it's possible our biosphere isn't *unique*, but it's certainly *exceedingly rare*.<sup>23</sup>

In light of eventual disaster on the one hand and the significance, not of “humanity” but of the whole ecosystem on the other, one could therefore conclude it is humanity's job, not to create a back-up planet for *itself*, but rather to export the whole ecosystem beyond Earth. Global Catastrophic Risk Specialist Andrea Owe calls this argument the “ecocentric” case for space settlement. As she explains, “an ecocentric vision of space expansion...contrasts with the ideas of safeguarding the human species alone, of escaping the ‘Earth cradle’...and in the process fleeing from our destruction of Earth.”<sup>24</sup> The first task, then, would be to secure the health and integrity of the biosphere. Considering Earth will eventually become uninhabitable, the next and ultimate task would be to create a kind of cosmic Noah's ark<sup>25</sup> and export the entire framework of habitability—that is, the ecosphere itself—out to other natural and artificial bodies in space, eventually creating “a universe of myriad flourishing Earth-inspired worlds.”<sup>26</sup> By insisting that the whole Earth would have to accompany any “humanity” that might try to live beyond Earth,<sup>27</sup> ecocentrism reroutes the existential argument from mere human survival to biospheric proliferation. The insistence is that *the whole Earth* would have to accompany any “humanity” that might try to live beyond this planet.

To take on the functional argument against space colonization, I suppose one could try to deny that (certain) human beings have decimated the ecosystem, but the whole Earth cries in protest against such an approach. The alternative would be to concede the truth of such decimation, but to insist as a counter-premise that humanity's artistic, scientific, and ethical contributions to the cosmos are sufficient reason to justify its survival elsewhere. The conclusion

would be that, if for no other reason, humanity deserves another planet to preserve the magnificent archive of human production, which is to say everything from Richard Wright to Frank Lloyd Wright, from Egyptian mythology to Buddhist cosmology, from Socrates to Greta Thunberg, from Hildegard von Bingen to Janis Joplin and Nina Simone. The problem with this argument is that it relies on an impossible calculation—that is, the qualitative or even just quantitative superiority of human production over human destruction. How could we ever prove that the good humanity has done outweighs the damage it has wrought? Or that the actions humans have performed on Earth (our music, our stories, our calculations) are more significant than the Earth itself?

A modified approach to refuting the functional argument might therefore begin by acknowledging the destruction *and* creativity of the human species. It might then insist that the latter doesn't so much outweigh as redirect the former. That is, the argument could appeal in particular to those artists, scientists, philosophers, and activists who have taught human beings to understand the havoc they have wrought, and those poets, inventors, and dreamers who dare to imagine other ways to live. Rather than insisting that human beings *deserve* another planet, this argument would effectively be throwing itself on the mercy of the cosmos and asking for another chance. We might call such an approach the "Hail Mary" argument. It sets forth not so much a refutation of the functional argument as a (very) long-shot aspiration in the face of it.

### III. Salvation through Transformation

In the preceding section, we worked through two arguments against

human space settlement in order to produce two arguments in favor of it. If the "no" arguments seem more compelling—if human beings are not entitled either ontologically or ethically to another planet—then humans have no right to expand into space. This would mean that, rather than dreaming of off-world colonies, the planetary scientists, sci-fi authors, entrepreneurs, space agencies, and citizen scientists among us might throw their efforts into rewilding, reforestation, and Earth systems science to give our world and its inhabitants as much time as possible. Rockets could send robots into low Earth orbit to map the damage to and healing of the planet, but along this particular way of thinking, human beings themselves should not board those rockets to land their boots on the extraterrestrial ground. Rather, the existential argument leaves human beings tied to the planet to which they belong, while the functional argument leaves them to reap what they've sown on a broiling, postnuclear planet.

If, on the other hand, the "yes" arguments successfully unsettle their existential and functional counterparts, then human beings may indeed have the right to expand beyond Earth. But at this point we should note that, in their successful forms, *neither* of these arguments endorses the current model of cosmic exploitation by means of corporate capital, political jockeying, intensified extraction, and military threat. Rather, both arguments hinge their conclusions on the ethical and ecological awakening of anyone who might hope to settle outer space. As we have seen, the key to either the ecocentric or the Hail Mary argument would be, not to secure the salvation of a few wealthy humans, or even "humanity" itself, at the expense of the rest of the Earth, but rather to nurture the whole

animal-vegetable-mineral world so fully, so energetically, that we could imagine living elsewhere, together.

So it seems our punchy question actually has three possible answers: yes, no, and maybe. As the arguments and counter-arguments show, interplanetary expansion might be justifiable, but only on the condition that the humans involved in such an escapade *do things differently*. Among other things, such "difference" would mean working with the extraterrestrial land in question, rather than against it. It would mean refraining from nuking Mars—or anything else, for that matter. It would mean prioritizing relationships between living and non-living beings over profit. It would mean figuring out a way to clean up the mess we've made in the oceans, the skies, and our orbits. And perhaps most important, it would mean allowing the people who know how to live peaceably with the land, and who have shouldered the burden of ecosystemic destruction, to set our space-faring priorities. Crucially, this does not mean adding a White woman and a Black man to the Artemis mission and then proceeding to conquer the cosmos.<sup>28</sup> Rather, it would mean letting the priorities be set by our Black, Indigenous, and colonized forest defenders, labor organizers, and water protectors, who know how to live peaceably with the land, and who have overwhelmingly shouldered the burden of "humanity's" ecosystemic destruction. With these reorientations in mind, I would therefore suggest that the most convincing form of the argument in favor of extraterrestrial eschatology would be as follows:

- Major premise: *Something will eventually wipe out humanity;*
- Minor premise: *Humanity, and the ecosystem that constitutes it, should not be wiped out;*

- Conclusion: *Therefore, humans need to approach the rewilding of Earth and the settlement of space holistically, compassionately, scientifically, ecosystemically, and ethically.*

Note that none of this otherwise-thinking amounts to “hating humanity.” Rather, to return to the argument under consideration, it is possible to affirm the integrity and significance of the human species while rejecting the conclusion that this species needs to conquer the universe. After all, corporate capital and ecosystemic exploitation have produced the problem that our cosmic conquistadors are trying to escape by means of corporate capital and ecosystemic exploitation. The best this strategy can do is to kick the apocalyptic can up the spaceways, and the worst it can do is to hasten the end of the Earth. If it is actual salvation we’re after, then the solution is going to have to be something radically different from the system that’s produced the problem.

The good news is, there are people throughout this heaving, beautiful Earth who know how to do things differently. They are precisely those people whose “humanity” has often been in question, but whose labors make their species worth saving in the first place: the artists, writers, scientists, spiritual leaders, and keepers of traditional knowledge who can teach our space enthusiasts, not to conquer the universe, but to dwell peacefully as part of it.<sup>29</sup>

More often than not, these are the humans who have learned to listen to the more-than-human world, a kind of thinking often encapsulated as Traditional Ecological Knowledge, or TEK. As Potawatomi Biologist Robin Wall Kimmerer explains, “In Native ways of knowing, human people are often referred to as ‘the

younger brothers of Creation.’ We say that humans have the least experience with how to live and thus the most to learn—we must look to our teachers among the other species for guidance.”<sup>30</sup> Teachers like plants, who know how to make food from the Sun. Or mushrooms, that know how to send messages between trees. Or geese, that know how to fly from Canada to North Carolina without a GPS; or my dearly departed, half-blind, six-pound cat, who once managed to keep himself alive outside for three weeks without human-made shelter or factory-farmed food.

As TEK insists, the more-than-human world can teach us how to live in relation to land without destroying or even owning it. And crucially, this sort of learning would amount, not to a refusal of technology, as if Indigenous wisdom were confined to some perpetual past, but to a redefinition of technology itself. In the words of Diné [editor note: Navaho word meaning “The People”] futurist Lou Cornum, “Advanced technologies are not finely tuned mechanisms of endless destruction. *Advanced* technologies should foster and improve human relationships with the nonhuman world.”<sup>31</sup> And it’s precisely these sorts of technologies that might open a truly different future in space, rather than the same old extraction and land grabbing, extended out to the whole cosmos. As Cornum explains, “Instead of imagining a future in bleak cities made from steel and glass teeming with alienated white masses shuffling under an inescapable electronic glow, *indigenous* futurists think of Earthen spacecrafts helmed by black and brown women with advanced knowledge of lands, plants, and language.” What if our approach to space were guided, not by conquest, warmaking, ownership, and profit, but by kinship, caretaking, knowledge, and listening?

The billionaire utopians constantly drown out such counter-imperial teachers by calling them wokeist, or impractical, intoning the frankly religious conviction that humanity can only survive if “we” colonize space, we can only colonize space if we privatize space, and we can only privatize space if we mine it and monetize it. But if the space conquistadors would slow down and re-read their favorite books, they might remember their own patron saint Carl Sagan, asking us to realize that the cosmos is within us,<sup>32</sup> just as we are within the cosmos. Begging us to treat our pale blue dot and the universe it’s made of with care and respect—from the loftiest mountain to the measliest microbe to the seemingly emptiest of planets. After all, those dead rocks are made of the same starstuff as everything we know, everything we love, and everything we might still become.



## Acknowledgments

With thanks to Lindy Elkins-Tanton, Jessica Rousset, and Taryn Struck at Arizona State University’s Interplanetary Initiative for hosting a first iteration of this material; to Claire Sagan, Jonathon Kahn, and their colleagues and students at Vassar College for helping me refine these arguments; and to Lori Gruen and Evan Berry for reading and improving drafts.

## About the Author

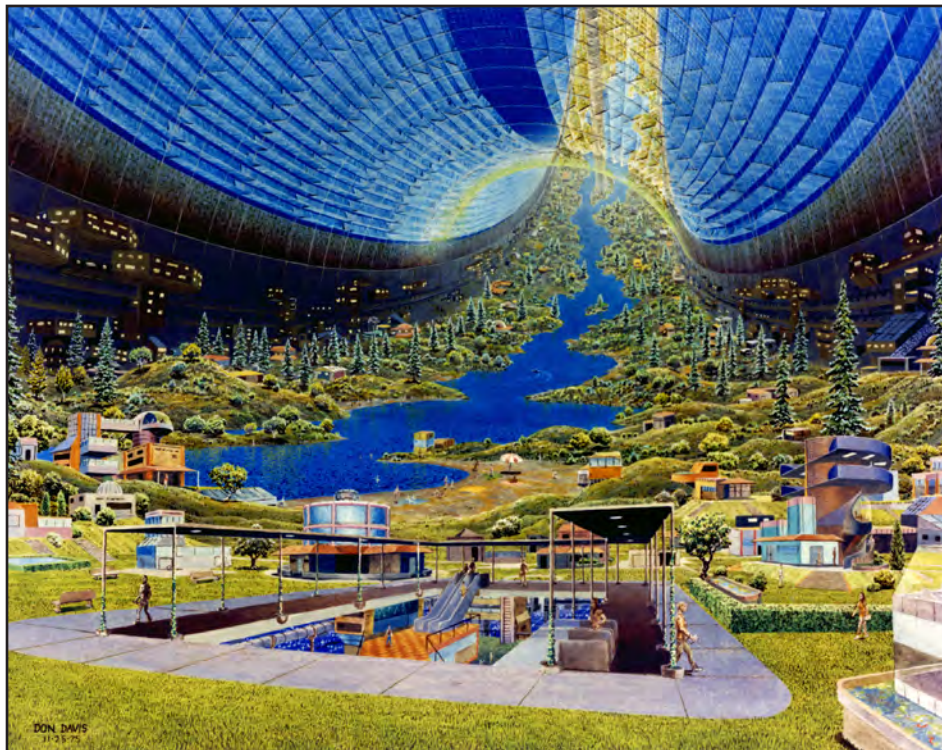
Mary-Jane Rubenstein is Professor of Religion and Science in Society at Wesleyan University whose research deals with the philosophies and histories of religion and science, especially in relation to cosmology, ecology, and space travel. Her most recent book is *Astrotopia: The Dangerous Religion of the Corporate Space Race* (2022).



## Notes

- 1 “Sacred Space Symposium: How Has Religion Influenced Space Exploration?” ASU Interplanetary Initiative (2 March 2023): <https://www.youtube.com/watch?v=9jb-V0N96KTg&t=16s>. With thanks to Lance Gharavi for the year of shared work that produced this project.
- 2 “Abandon Earth—Or Face Extinction: An Interview with Stephen Hawking,” *Big Think*, <https://cdn.jwplayer.com/previews/a80Gftf5>
- 3 “Humans 2 Mars Summit,” George Washington University, <https://time.com/76178/nasa-chief-humanitys-future-depends-on-mission-to-mars/>
- 4 Musk, Elon. “Making Humans a Multi-Planetary Species.” *New Space* 5, no. 2 (2017): 46–61.
- 5 See Donald Goldsmith and Martin Rees, *The End of Astronauts: Why Robots are the Future of Exploration* (Cambridge, MA: Belknap Press, 2022).
- 6 Musk, “Multiplanetary,” 46.
- 7 Ronan Farrow, “Elon Musk’s Shadow Rule,” *The New Yorker* (21 August 2023): <https://www.newyorker.com/magazine/2023/08/28/elon-musk-shadow-rule>
- 8 Michael Sheetz and Laura Kolodny, “SpaceX Set to Join FAA to Fight Environmental Lawsuit That Could Delay Starship Work.” *CNBC* (22 May 2023) <https://www.cnbc.com/2023/05/22/spacex-joining-faa-to-fight-environmental-lawsuit-over-starship.html>; Zubrin, Robert. “NASA’s Next 50 Years.” *The New Atlantis*, Summer 2019. <https://www.thenewatlantis.com/publications/nasas-next-50-years>
- 9 Ceridwen Dovey, “Mining the Moon,” *The Monthly* (July 2019): <https://www.themonthly.com.au/issue/2019/july/1561989600/ceridwen-dovey/mining-moon>
- 10 Mary-Jane Rubenstein, *Astrotopia: The Dangerous Religion of the Corporate Space Race* (University of Chicago Press, 2022).
- 11 See, for example, Frank Tavares, et al., “Ethical Exploration and the Role of Planetary Protection” (15 October 2020): <https://arxiv.org/abs/2010.08344>; Ferreira, Becky. “SpaceX’s Satellite Megaconstellations Are Astrocolonialism, Indigenous Advocates Say,” *Vice* (5 October 2021): <https://www.vice.com/en/article/k78mnz/spacex-satellite-megaconstellations-are-astrocolonialism-in-indigenous-advocates-say>; Zubrin, Robert, “Wokeists Assault Space Exploration,” *National Review* (14 November 2020): <https://www.nationalreview.com/2020/11/wokeists-assault-space-exploration/>; and The, Cheryl, “Elon Musk Says He’s Wading into Politics to Stop the ‘Woke Mind Virus’ from Destroying Civilization,” *Business Insider* (20 May 2022): <https://www.businessinsider.com/elon-musk-says-wading-into-politics-stop-woke-mind-virus-2022-5>
- 12 Zubrin, Robert, “A Declaration of Decadence,” *Quillette* (30 May 2023): <https://quillette.com/2023/05/30/a-declaration-of-decadence/>.
- 13 See Adam Potthast, “Alien Attacks, Hell Gerbils, and Assisted Dying: Arguments against Saving Mere Humanity,” *Futures* 110 (2019): 41-3.
- 14 Sylvia Wynter, “The Pope Must Have Been Drunk, the King of Castile a Madman: Culture as Actuality, and the Caribbean Rethinking Modernity,” in *Reordering of Culture: Latin America, the Caribbean and Canada in the Hood*, ed. Alvina Ruprecht and Cecilia Taiana (Carleton University Press, 1995).
- 15 Anthony Cuthbertson, “Elon Musk Says He is ‘Accumulating Resources to Extend the Light of Consciousness to the Stars,’” *The Independent* (22 March 2021): <https://www.independent.co.uk/space/elon-musk-net-worth-space-b1820466.html>
- 16 See Mary-Jane Rubenstein, *Worlds without End: The Many Lives of the Multiverse* (Columbia University Press, 2014), chapter 2.
- 17 See Walpola Rahula, *What the Buddha Taught* (New York: Grove Press, 1974), chapter 4.
- 18 See Jason W. Moore, “Introduction,” in *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*, ed. Jason W. Moore (Oakland, CA: PM Press, 2016).
- 19 Smith, Kelly C., “Homo reductio: Eco-Nihilism and Human Colonization of Other Worlds,” *Futures* 110 (2019): 31-4.
- 20 See, for example, Robert Zubrin, “Why We Humans Should Colonize Mars!,” *Theology and Science* 17, no. 3 (2019).
- 21 Christopher Nolan, *Interstellar*, (Hollywood, CA: Warner Bros. Entertainment and Paramount Pictures, 2015).
- 22 See Lori Gruen, *Ethics and Animals: An Introduction* (Cambridge University Press, 2011); Lori Gruen, *Entangled Empathy: An Alternative Ethic for Our Relationships with Animals* (New York: Lantern Books, 2014); Arthur S. Reber, *The First Minds: Caterpillars, Karyotes, and Consciousness*, (Oxford University Press 2018); Philip Goff, *Consciousness and Fundamental Reality* (Oxford University Press, 2017); Matthew Hall, “Talk among the Trees: Animist Plant Ontologies and Ethics,” in *The Handbook of Contemporary Animism*, ed. Graham Harvey (Routledge, 2015); Peter Wohlleben, *The Hidden Life of Trees: What They Feel, How They Communicate* (Vancouver: Greystone Books, 2016); Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teaching of Plants* (Minneapolis, MN: Milkweed, 2013); André Geremia Parise, Monica Gagliano, and Gustavo M. Souza, “Extended Cogni-

- tion in Plants: Is It Possible?,” *Plant Signaling & Behavior* 15, no. 2 (2020); Paco Calvo et al., “Plants Are Intelligent, Here’s How,” *Annals of Botany* 125, no. 1 (2020); Lynn Margulis, *Symbiotic Planet: A New Look at Evolution* (Basic Books, 1998); Myra J. Hird, “Naturally Queer,” *Feminist Theory* 5(2004).
- 23 See David Grinspoon, *Lonely Planets: The Natural Philosophy of Alien Life* (Harper Collins, 2009).
- 24 Andrea Owe, “Greening the Universe: The Case for Ecocentric Space Expansion,” in *Reclaiming Space: Progressive and Multicultural Visions of Space Exploration*, ed. James S. J. Schwartz, Linda Billings, and Erika Nesvold (Oxford University Press, 2023), 328.
- 25 See Jeffrey J. Cohen and Julian Yates, *Noah’s Arkive* (University of Minnesota Press, 2023).
- 26 Owe, “Greening the Universe: The Case for Ecocentric Space Expansion,” 333.
- 27 For fictional explorations of the cosmic entanglement of humanity with the whole biosphere, see Ursula K. Le Guin, “Newton’s Sleep,” in *A Fisherman of the Inland Sea: Stories* (New York: Harper Perennial, 2005); Cixin Liu, *The Wandering Earth*, trans. Ken Liu, et al. (London: Head of Zeus, 2017).
- 28 Jonathan Amos, “Nasa Names First Woman and Black Man on Moon Mission,” *BBC News* <https://www.bbc.com/news/science-environment-65165845> (3 April 2023).
- 29 For some counter-colonial models of space exploration, see James S. J. Schwartz, Linda Billings, and Erika Nesvold, eds., *Reclaiming Space*; Frank Tavares, et al., “Ethical Exploration and the Role of Planetary Protection,” *arXiv* <https://arxiv.org/abs/2010.08344> (15 October 2020); Danielle Wood, “On Indigenous People’s Day, Let’s Commit to an Anticolonial Mindset on Earth and in Space,” (13 October 2020); Mary-Jane Rubenstein, *Astrotopia*, chapter 7; James S. J. Schwartz, *The Value of Science in Space Exploration* (Oxford University Press, 2020).
- 30 Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teaching of Plants*, 9.
- 31 Lou Cornum, “The Space NDN’s Star Map,” *The New Inquiry* (26 January 2015): <https://thenewinquiry.com/the-space-ndns-star-map>
- 32 Carl Sagan, *Cosmos: A Personal Voyage*, Episode 1.



Stanford Torus, a NASA design for a space habitat, 1975.

Credit: Don Davis/NASA Ames Research Center