

In the coming decade, humans will likely become an interplanetary species by creating permanent settlements on the moon and Mars. This endeavor, fueled by spacefaring corporations such as Elon Musk's SpaceX and Jeff Bezos's Blue Origin, clearly reproduces a terrible colonial and imperialist legacy that shamelessly speaks—to use their own terminology—of martian “colonies” and a new generation of space “pioneers.” To challenge these environmentally disastrous space missions and the neocolonial, imperialist models they plan to export into the cosmos, we terrestrial beings need to alter the very foundations of our exo-ecologies in the making.

In Greek, “*exo*” (εξω) means “outside,” “outer,” or “external.” Thus, by “exo-ecologies” I describe those ecologies that reach beyond the earth's atmosphere, and that have been shaped by earth-based life-forms that have ventured into space. Not just human cosmonauts and astronauts but also the abducted nonhuman animals and plants that—as test subjects for the effects of space travel on living beings—laid the foundation for earth-based communities to begin the process of becoming interplanetary. The violence imposed on them is the same that is now reproduced in visions of twenty-first century space imperialism. In contrast, to become *inter*-planetary in a meaningful, collective way, we need to begin with *intra*-planetary reparations. In other words, to launch into the outer cosmos without reproducing terrestrial models of violence, we must first launch deep into the earth's inner cosmos: the interdependent web of life that can barely sustain life-forms of the present and future.¹

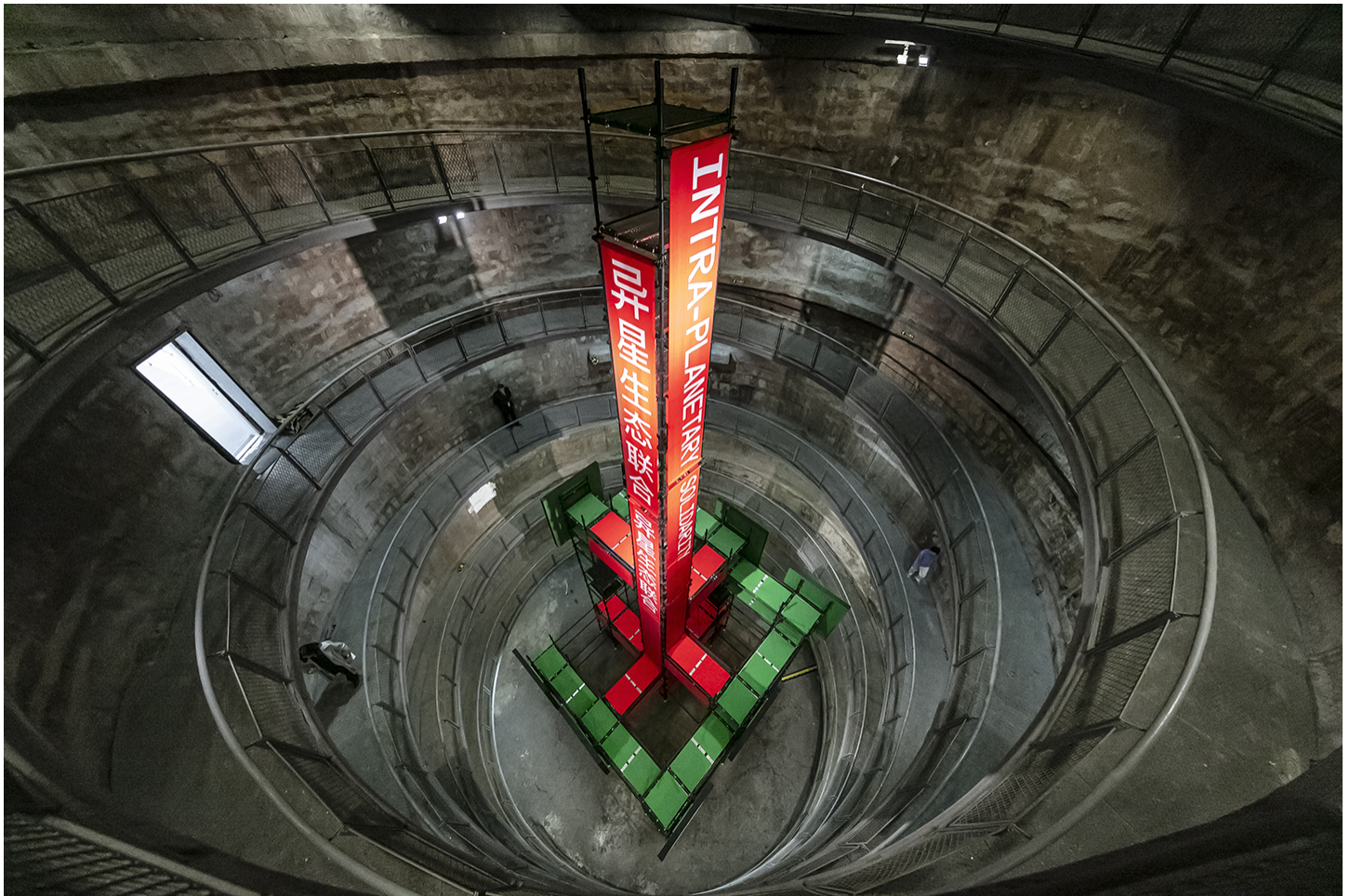
As the People's Republic of China expands its space program—including the successful Chang'e-3, Chang'e-4, Chang'e-5, Tianwen-1, and Tiangong Space Station missions—it is an important moment to ask what model of being we, humans, are exporting into outer space. My contribution to this question is a large-scale installation titled *Exo-Ecologies*, which takes form in the 165-meter chimney of the former Nanshi Power Plant in Shanghai. Across this eco-constructivist launch tower, circular lightboxes are displayed with portraits of the first earth-based life-forms to enter outer space.

1. Monument for a Fruit Fly

Dominant historical narratives state that Soviet cosmonaut Yuri Alexievich Gagarin was the first human to enter space. By this phrase, we mean that he was the first human animal to physically move out of the earth's atmosphere, aboard the Vostok 1 on April 12, 1961. However, this seemingly matter-of-fact statement invites us to ask what exactly we mean by “enter space.” Throughout history, many different human and nonhuman animals have engaged the cosmos without leaving the earth's atmosphere: indeed, the idea that this is the only way to become a cosmonaut might be a sign of ideological impoverishment. And the priority given to the “first

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Exo-Ecologies: Notes on Intra-planetary and Inter-planetary Becomings



Jonas Staal, *Exo-Ecologies*, 2023, Power Station of Art, Shanghai. Produced by the 14th Shanghai Biennale: Cosmos Cinema. Photo: Jimmy Hu.

human” to enter space is a further example of patriarchal speciesism, denying the work and sacrifice of the many nonhuman animals that preceded and accompanied Gagarin’s endeavor.

The priority given to “the first human in space” is patriarchal because the first humans have historically been the first men: it is more common, for instance, to hear Gagarin described as “the first man in space.” This is consistent with how the term “mankind” universalizes men and the linguistic operation that placed “his” into “history” (the word derives from the Greek *στῶρ* meaning “wise man”). We might substitute for this herstory, or for that matter ourstory, or possibly theirstory. And the statement is speciesist because, as mentioned, many nonhuman animals preceded Gagarin as the first earth workers to enter outer space: earth workers being all living beings whose interdependent lives and labor maintain a common biosphere.²

In fact, fruit flies were the first earth workers to materially leave the atmosphere, on February 20, 1947. A rhesus macaque named Albert II followed in 1949 but died on



History of the first nonhuman cosmonauts to leave earth’s atmosphere, starting with fruit flies on February 20, 1947. Jonas Staal, *Exo-Ecologies*, 2023. Image: Tom Estrera III and Jonas Staal.

impact when he returned to earth. An unnamed mouse followed in 1950. All flew in US-made V2 rockets, until the



A.P. Faidysh-Krandievsky, A.N. Kolchin, and M.O. Barshch, Monument to the Conquerors of Space, 1964. Moscow, Russia. Photo: BACU.



Hogs were used in crash applications in both the aviation and automobile industries. The sign "Project Barbecue, Run #22, 5 August 1952" referred to the fact that—following investigative autopsies—these nonhuman cosmonauts were cooked and eaten. Photo: USAF, Courtesy New Mexico Museum of Space History.



Photo tweeted by NASA astrogardener Tim Kopra from the International Space Station (ISS), January 31, 2016.

balance of the space race tilted in favor of the Soviet Union. All of the earth workers to venture into outer space from that point until Gagarin's voyage flew in Soviet spacecraft: the stray dogs Dezik and Tsygan in 1951, the rabbit Marfusha (Little Martha) in 1959, two rats named No. 12 and No. 18 in 1960, and unnamed guinea pigs and frogs in March 1961 (the latter species flew just one

month before Gagarin joined these exo-ecologies in the making).

This fourteen-year history of nonhuman cosmonauts is not only eclipsed in the popular imagination by Gagarin's status as "first man," but is itself subject to deep structural hierarchies. A famous example is Laika, the stray Moscow dog who was the first cosmonaut to orbit the earth's atmosphere in the Sputnik 2 capsule on November 3, 1957, before dying of overheating. Her planned death (the mission never included a safe return) made her a martyr. Although Dezik, one of the first two dogs in space, also died during a separate 1951 mission—along with his comrade dog Lisa, when their parachute failed—it is Laika whose name is known around the world and who is honored with monuments in Izhevsk and Moscow.

Of the first fruit fly cosmonauts, not even an image can be

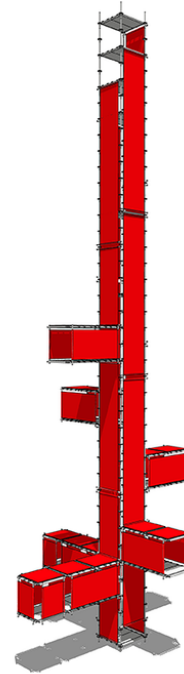
found. They are hardly remembered at all as founders of the first exo-ecology with earth origins. Think of the *Monument to the Conquerors of Space* in Moscow: a 107-meter-tall titanium sculpture, erected in 1964, which depicts a smooth curve of smoke leading to a rocket-shaped top. At its base is a relief depicting the “conquerors” of space. The only nonhuman earth worker present is Laika; not a fruit fly in sight.

2. Proletarian Plant Blindness

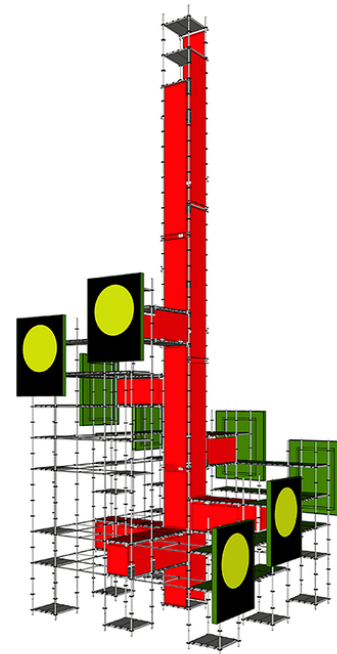
Such speciesist hierarchies and historical narrative preferences describe a pyramid with human animals at the top (itself stratified by brutal internal class, racial, and gender divides), followed below by mammals, amphibians, arthropods, plants, mycelia, and bacteria at the base. Corn seeds were among the first plant-based organic beings to enter outer space, on the same journey as the fruit flies, when astrobotany was emerging as a distinct field. Yet what is known as “plant blindness”—the persistent human prejudice that plants are inferior to other forms of life—continues to haunt our understanding of plant workers and their cosmonautic labor.³

This relates not just to the widespread inability to recognize the impact of plants in daily human life, but also to the lack of scientific understanding of an estimated one-fifth of all existing plant species. (This does not include algae, which is even more problematic given that certain algae are among those rare species that thrive amidst climate catastrophe and will dominate ecosystems of the near future.) Plant blindness mirrors proletariat blindness: the fact that dominant history records the emperors and titans but not the workers forced to build their empires. Nonhuman proletarians are subjected to the same fate, performing the brunt of the labor necessary to maintain our shared biosphere. Class oppression and speciesism are deeply interrelated.

In 2021 Jeff Bezos, having just returned from an eleven-minute trip to the outer atmosphere in a penis-shaped rocket, held a press conference. Dressed in a blue space uniform and a cowboy hat—to emphasize his new status as a space pioneer—he stated to the assembled press: “I want to thank every Amazon employee and every Amazon customer because you guys paid for all of this.”⁴ And work for it they did: without benefits or regular hours, banned from unionizing, forced to pee in bottles and wear diapers to meet production targets in windowless warehouses—all so their CEO could leave earth without them. But again, the monstrosity that is Amazon also relies on massive unrecognized *nonhuman* proletarian labor, including millions of years of earth labor in the form of the minerals used in tech gadgets, the forests perpetually sacrificed to manufacture everything from paper to furniture, and the never-ending supply of



Jonas Staal, *Exo-Ecologies, Study* (2023). Image: Paul Kuipers and Jonas Staal. Produced by the 14th Shanghai Biennale: Cosmos Cinema.



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animals to produce and test countless consumer products. All things are made from something else: animal, plant, and mineral work. Animal, plant, and mineral bodies. Human and nonhuman earth workers are



Detail from a history of the first nonhuman cosmonauts to leave earth's atmosphere, starting with fruit flies on February 20, 1947. Jonas Staal, *Exo-Ecologies*, 2023. Image: Tom Estrera III and Jonas Staal.



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expected to provide their work and their lives, but history—with an emphasis on *his*—mentions only the

multibillionaire.

Nonhuman animals have been forced to provide labor and life throughout the history of space travel, first and foremost as living crash test dummies to determine the impacts of extreme gravity and high speed. In the US, the remains of living hogs used as crash test dummies were famously barbecued afterwards by the operating crew.⁵ These abducted and exploited nonhuman animals live as ghosts in the space machine. Fruit fly, monkey, mouse, dog, rabbit, rat, guinea pig, frog: these are the founders of an exo-ecology—the extraplanetary ecological network—that has enabled us to become an interplanetary species. But this role was not chosen. This is why they deserve to be not just recognized but mourned. Such recognition means confronting the conditions that made them cosmonauts in the first place. It means dismantling the system, narratives, and mentality that created the colonial climate catastrophe on earth and that are bound to replicate this same catastrophe on other living worlds throughout the cosmos.

Musk argues that either “we stay on Earth forever and then there will be an inevitable extinction event” or “become a spacefaring civilization, and a multi-planetary species.”⁶ But this is a false representation of the facts. Musk himself is a chief cause of the extinction event from which *he* is fleeing. One could even say that extinction is a marketing tool to pitch new electric cars,

geoengineering industries, and martian settlement projects. In other words, this extractive model *is* the extinction event, a culmination of the slow violence manifesting across five hundred years of colonial extermination and empire-building on earth, and now beyond.⁷ This means that to alter the conditions of our exo-ecology we have to establish intra-planetary solidarity among human and nonhuman earth workers. *Intra-planetary*, rather than *inter-planetary*, aims to deepen earthbound social and ecological relations. Only the recognition and dismantling of the colonial and imperialist mindset and the infrastructures that are driving climate collapse on earth can lay the foundation for becoming interplanetary in a meaningful way—not as “colonists” and “pioneers,” but as *guests* and comrades.⁸ Travel not to “discover” but to *encounter*.

In my installation *Exo-Ecologies*, discussed at the beginning of this essay, circular portraits operate like time portals: nonhuman cosmonauts from the past look back at us in the present, a transhistorical ecology of the beings that shaped our becoming interplanetary. The reversed timeline—the earliest cosmonauts are stationed at the top of the tower and the most recent at the base—expresses the proposition that we must become *intra-planetary* before becoming *inter-planetary*: visitors move *towards* earth through the depictions of those who left its atmosphere. Two slogans appear on the side of the tower: “INTRA-PLANETARY SOLIDARITY” and “EXO-ECOLOGIES UNITE.” The first slogan relates to the necessity for earth reparations, which will make a meaningful interplanetary possible, so that—in the second slogan—exo-ecologies originating from earth can unite with other exo-ecologies yet unknown to us.

The shape of the launch tower refers both to rocket launch installations and to a constructivist artistic inheritance, which Radha D’Souza and I have extended with the idea of “eco-constructivism.” Where the constructivists primarily considered humans as “constructors” of a new reality, eco-constructivism considers nonhumans as creative beings as well, and understands ecosystems to be the result of the collective work of human and nonhuman earth workers.⁹

Although *Exo-Ecologies* challenges the colonial and imperialist mindset underlying the current corporate space race, it does not let go of the possibility that becoming interplanetary can be a collective intra- and interplanetary project of emancipation. This hope has been central to more than a century of political and emancipatory science (fiction) writing, from the work of Nikolai Fedorov, who laid the foundation for the twentieth-century cosmist movement, to Alexander Bogdanov’s novel *Red Star* (1908), from the cosmic Afrofuturist philosophy of Sun Ra to Octavia Butler’s *Xenogenesis Trilogy* (1987–89).

Even though corporate enterprise has hijacked the

emancipatory ideals of becoming interplanetary, this is no reason not to reclaim them. That the *Exo-Ecologies* installation takes the form of a launch site should be taken literally, not metaphorically. It aims to launch an alternative set of ideas for how we might become intra-planetary and inter-planetary simultaneously, to propagate exo-ecologies and deep futures for all.



Jonas Staal, *Exo-Ecologies*, 2023. Photo: Power Station of Art.

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Jonas Staal is a visual artist whose work deals with the relation between art, propaganda, and democracy. His most recent book is *Propaganda Art in the 21st Century* (MIT Press, 2019).

1
The term “web of life” is proposed by Jason W. Moore. See *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*, ed. J. W. Moore (PM Press, 2016).

2
“Earth workers” is a term I developed with Radha D’Souza in *Court for Intergenerational Climate Crimes* (Framer Framed, 2023).

3
William Allen, “Plant Blindness,” *BioScience*, no. 53 (2003): 926. He writes that plant blindness is “the inability to see or notice the plants in one’s own environment,” resulting in “the inability to recognize the importance of plants in the biosphere and in human affairs.”

4
Neil Vigdor, “Bezos Thanks Amazon Workers and Customers for his Vast Wealth, Prompting Backlash,” *New York Times*, July 20, 2021 <https://www.nytimes.com/2021/07/20/science/bezos-amazon.html>.

5
Colin Burgess, *Animals in Space: From Research Rockets to the Space Shuttle* (Springer, 2007).

6
Nicky Woolf, “SpaceX Founder Elon Musk Plans to Get Humans to Mars in Six Years,” *The Guardian*, September 28, 2016 <https://www.theguardian.com/technology/2016/sep/27/elon-musk-spacex-mars-colony>.

7
Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Harvard University Press, 2011).

8
See Jonas Staal, “Comrades in Deep Future,” *e-flux journal*, no. 102 (September 2019) <https://www.e-flux.com/journal/102/283568/comrades-in-deep-future/>.

9
Eco-constructivism builds on the constructivist notion of the object as comrade, expanded here to the nonhuman comrade and worker. See Christina Kiaer, *Imagine No Possessions: The Socialist Objects of Russian Constructivism* (MIT Press, 2005).