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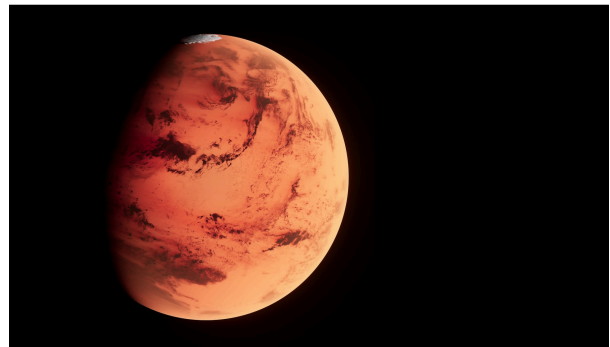
Let's Not Use Mars as a Backup Planet

By Lucianne Walkowicz
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Lucianne Walkowicz is an American astronomer known for their research on determining a planet's ability to support life. In their TED Talk, "Let's Not Use Mars as a Backup Planet," they explain why preserving Earth while exploring the possibility of living on another planet is humanity's best course of action. As you read, take notes on why the author feels humans should preserve Earth's environment.

- [1] We're at a tipping point in human history, a species poised between gaining the stars and losing the planet we call home.

Even in just the past few years, we've greatly expanded our knowledge of how Earth fits within the context¹ of our universe. NASA's Kepler mission has discovered thousands of potential planets around other stars, indicating that Earth is but one of billions of planets in our galaxy. Kepler is a space telescope that measures the subtle dimming of stars as planets pass in front of them, blocking just a little bit of that light from reaching us. Kepler's data reveals planets' sizes as well as their distance from their parent star.² Together, this helps us understand whether these planets are small and rocky, like the terrestrial³ planets in our own Solar System, and also how much light they receive from their parent sun. In turn, this provides clues as to whether these planets that we discover might be habitable⁴ or not.



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Unfortunately, at the same time as we're discovering this treasure trove⁵ of potentially habitable worlds, our own planet is sagging under the weight of humanity. 2014 was the hottest year on record. Glaciers and sea ice that have been with us for millennia⁶ are now disappearing in a matter of decades. These planetary-scale environmental changes that we have set in motion are rapidly outpacing our ability to alter their course.

But I'm not a climate scientist, I'm an astronomer. I study planetary habitability as influenced by stars with the hopes of finding the places in the universe where we might discover life beyond our own planet. You could say

1. **Context (noun)** the connected conditions in which something exists
2. A star that produces a planet's heat and light and typically shares the planet's origin. Earth's parent star is the Sun.
3. belonging to a class of planets similar to Earth in make up and formation
4. **Habitable (adjective)** good enough to live in
5. **Trove (noun)** a collection of valuable or delightful things
6. A millennium is a period of a thousand years. Millennia is the plural form of millennium.

that I look for choice alien real estate.

- [5] Now, as somebody who is deeply embedded⁷ in the search for life in the universe, I can tell you that the more you look for planets like Earth, the more you appreciate our own planet itself. Each one of these new worlds invites a comparison between the newly discovered planet and the planets we know best: those of our own Solar System.

Consider our neighbor, Mars. Mars is small and rocky, and though it's a bit far from the Sun, it might be considered a potentially habitable world if found by a mission like Kepler. Indeed, it's possible that Mars was habitable in the past, and in part, this is why we study Mars so much. Our rovers, like Curiosity, crawl across its surface, scratching for clues as to the origins of life as we know it. Orbiters like the MAVEN mission sample the Martian atmosphere, trying to understand how Mars might have lost its past habitability. Private spaceflight companies now offer not just a short trip to near space but the tantalizing⁸ possibility of living our lives on Mars.

But though these Martian vistas⁹ resemble the deserts of our own home world, places that are tied in our imagination to ideas about pioneering and frontiers,¹⁰ compared to Earth Mars is a pretty terrible place to live. Consider the extent to which we have not colonized¹¹ the deserts of our own planet, places that are lush¹² by comparison with Mars. Even in the driest, highest places on Earth, the air is sweet and thick with oxygen exhaled from thousands of miles away by our rainforests.

I worry — I worry that this excitement about colonizing Mars and other planets carries with it a long, dark shadow: the implication¹³ and belief by some that Mars will be there to save us from the self-inflicted¹⁴ destruction of the only truly habitable planet we know of, the Earth. As much as I love interplanetary¹⁵ exploration, I deeply disagree with this idea. There are many excellent reasons to go to Mars, but for anyone to tell you that Mars will be there to back up humanity is like the captain of the Titanic telling you that the real party is happening later on the lifeboats. (Laughter) (Applause).

Thank you.

- [10] But the goals of interplanetary exploration and planetary preservation are not opposed to one another. No, they're in fact two sides of the same goal: to understand, preserve and improve life into the future. The extreme environments of our own world are alien vistas. They're just closer to home. If we can understand how to create and maintain habitable spaces out of hostile, inhospitable spaces here on Earth, perhaps we can meet the

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7. surrounded by; attached on all sides
 8. **Tantalizing** (*adjective*) creating desire or interest, but usually beyond reach
 9. a pleasing view, especially one seen through a long, narrow opening
 10. a reference to a period in U.S. history when European settlers were exploring lands that they had not explored before
 11. Colonization is the process of sending a group of people to establish a space in a new land, eventually taking control of it.
 12. full of plant growth and vegetation
 13. **Implication** (*noun*) the conclusion that can be drawn from something although not directly stated
 14. harm caused to oneself
 15. situated or traveling between planets

needs of both preserving our own environment and moving beyond it.

I leave you with a final thought experiment: Fermi's paradox.¹⁶ Many years ago, the physicist¹⁷ Enrico Fermi asked that, given the fact that our universe has been around for a very long time and we expect that there are many planets within it, we should have found evidence for alien life by now. So where are they? Well, one possible solution to Fermi's paradox is that, as civilizations become technologically advanced enough to consider living amongst the stars, they lose sight of how important it is to safeguard the home worlds that fostered that advancement to begin with. It is hubris¹⁸ to believe that interplanetary colonization alone will save us from ourselves, but planetary preservation and interplanetary exploration can work together.

If we truly believe in our ability to bend the hostile environments of Mars for human habitation, then we should be able to surmount¹⁹ the far easier task of preserving the habitability of the Earth.

Thank you.

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16. a seemingly absurd statement that when investigated or explained may prove to be true
 17. an expert in physics, the science concerned with matter and energy
 18. excessive pride or self-confidence
 19. **Surmount** (*verb*) to overcome

Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. What is the central idea of the speech?
 - A. Humans have not discovered proof of alien life because aliens destroyed their home planet trying to find new planets to inhabit.
 - B. Because living on Mars will be impossible, the search to discover a planet that can support human life is very important.
 - C. While exploring the possibility of living on other planets is important, preserving Earth should also be a priority.
 - D. Mars should be humans' first, not second, choice as a home because Earth will be uninhabitable within fifty years.

2. Which detail best supports the author's belief that colonizing Mars is not the solution to environmental problems on Earth?
 - A. "We're at a tipping point in human history, a species poised between gaining the stars and losing the planet we call home." (Paragraph 1)
 - B. "I study planetary habitability as influenced by stars with the hopes of finding the places in the universe where we might discover life beyond our own planet." (Paragraph 4)
 - C. "Mars is small and rocky, and though it's a bit far from the Sun, it might be considered a potentially habitable world if found by a mission like Kepler." (Paragraph 6)
 - D. "It is hubris to believe that interplanetary colonization alone will save us from ourselves, but planetary preservation and interplanetary exploration can work together." (Paragraph 11)

3. How do Earth's deserts help us understand Mars' environment?
 - A. Earth's deserts teach humans that, because Mars' environment is similar, humans would need to make a few changes to live there.
 - B. Earth's deserts highlight the difficulty humans have living in dry environments, like Mars, even when oxygen is present.
 - C. Earth's deserts prove that humans can easily live in dry environments similar to Mars, regardless of whether there is oxygen.
 - D. Earth's deserts establish that humans can easily adapt to many different environments and would thrive on Mars.

4. Which sentence best supports the key concept that preservation is as important as exploration?
- A. "NASA's Kepler mission has discovered thousands of potential planets around other stars, indicating that Earth is but one of billions of planets in our galaxy." (Paragraph 2)
 - B. "I study planetary habitability as influenced by stars with the hopes of finding the places in the universe where we might discover life beyond our own planet." (Paragraph 4)
 - C. "Indeed, it's possible that Mars was habitable in the past, and in part, this is why we study Mars so much." (Paragraph 6)
 - D. "If we truly believe in our ability to bend the hostile environments of Mars for human habitation, then we should be able to surmount the far easier task of preserving the habitability of the Earth." (Paragraph 12)

5. How does Fermi's Paradox contribute to the central idea of the speech? Use details from the speech to support your answer.
