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## **Abstract**

In this version of the paper, I will be making some grammatical corrections and layout changes throughout the paper. Cleaning up my conclusion, and fixing my introduction, I will establish in my paper a “story” that flows from the introduction to the conclusion. Additionally, inline citations will be fixed, and certain paragraphs will be rearranged to fit the outline of this paper.

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ENG21003-S: Scientific Controversy

Is there life on Mars? That is a question that has baffled the space community for years, ever since the Space Race in the 1960s, and the evolution of space exploration as a result of it. What was once a concept that mostly inhabited science fiction novels and films, has now become a real-life mystery. After the first man landed on the moon, humankind began investing billions and trillions of dollars into space exploration. Astronauts and scientists alike searched and pushed the boundaries of space in order to discover what else is out there in this vast galaxy of ours. Today the fate of humanity has reached crossroads, as the planet is ravaged by climate change and mass population expansion. Technology grew to the point where we pushed the boundaries of how far into space we can explore. When the first rovers were launched to Mars, everything changed for us.

For the last twenty years, scientists in the space community have been arguing back and forth over whether, at some point in time, there was life on Mars, and furthermore whether Mars itself can maintain life on its planet. While some scientists argue that there is life on Mars, others

say that Mars is incapable of ever sustaining life due to its extreme weather conditions. The increased interest of extraterrestrial life and the possibility of life being sustained on other planets has become a controversial topic in the past ten years due to concern over climate change and the possibility of our limited time on Earth. However, in order to further understand how and why the space community has become so fascinated by the topic, the first thing to discuss is how the possibility of extraterrestrial life came to be.

In the last two years NASA has been researching and funding projects into discovering exoplanets. Exoplanets are “any planet that exists beyond our solar system” (NASA). In order to find such planets, large powerful telescopes were launched into space, the most famous being the Hubble and Kepler Telescopes. In fact, it was the Kepler telescope that made the discovery of the first exoplanet that could possibly sustain life outside of our solar system, which became known as Kepler-b.

However, the focus is not on whether there are planets outside our solar system that can sustain life, but rather one particular planet even closer to us that is capable of possibly helping us solve the mystery of extraterrestrial life: Mars. With the discovery of ice during one mission to Mars, and even skeletons of microorganisms, scientists and astronauts alike have been in debate over whether there is the possibility of life on Mars.

For there to be life on any given planet, there are some criteria which must be met beforehand. The first being that temperatures are to be roughly around 0 degree Celsius. The second one is that methane levels are to reach 10 parts per billion, at minimum, for mass amounts of oxygen to be produced to sustain vegetation and animals on the planet (Tung, 1). Based on data gathered by scientists from glacier in the Arctic, while the indication of methane in the atmosphere is a positive sign of organic life existing on Mars, more missions must be

conducted in order to accurately determine the final conclusion over whether life on Mars exist or not.

A strong indicator for organic life, as mentioned above, is the release of methane into the atmosphere. The significance of Curiosity's discovery of methane in the air on Mars has led to more research and excitement over whether such organic life exists on the planet. As noted by Tony Greicius, the detection of methane is “exciting because microbial life is an important source of methane on Earth, but methane can also be created through interactions between rocks and water” (Mars Curiosity). To determine if the levels of methane being given off are from organic sources and organisms, or from natural interactions between minerals and water, NASA and scientists must conduct more missions and research to accurately find whether the original source of methane on Mars is from.

On the other hand, several scientists have also questioned both the validity and accuracy of evidence which astronauts have presented to support the case that there is life on Mars. According to the International Journal of Astrobiology, Dr. Davila, Fairén, and Schulze-Makuch mentions how “the comparison of glacial freeze patterns to that of the ice found on Mars shows little to no correlation over the possibility of there being enough oxygen to sustain life on Mars” (117). In order for there to actually be life on Mars, the planet must maintain oxygen levels that are at or above those of Earth. While the ice is a strong indication that at least there is water and it does contain some oxygen, the levels of oxygen have presented itself as a concern for scientists. Additionally, the lack of nutrients within the soil also provides cause for the lack of life on Mars.

While previous missions have discovered that there are signs of water on the surface of the planet, due to certain conditions such as “low atmospheric pressure and surface

temperatures” (117) it is nearly impossible for liquid water to be sustained on Mars, much less any liquid that exists at the standard room temperature of 25° C. However, the most noted concern is that due to Mars ability to drastically alter and change the environment on its planet, it will be difficult for mass species to be able to adapt to the ever-changing climates on the planet (122). As a result, organisms that can survive the extreme climate changes will be limited to single-cell organisms and non-cellular, such as viruses.

As our closest neighbor in the solar system, Mars is still a world filled with mystery and awaiting discovery. The Kepler and Hubble Telescopes have encouraged us to look closer to home to see if planets such as Mars are capable of sustaining life, and furthermore, if there are any possible signs of life on the planet.

After analyzing both sides of the argument over whether there is life on Mars, and conducting further research, the conclusion has been reached that it is nearly impossible for there to be life on Mars. Due to drastic climate changing throughout the planet’s history, the unknown source of methane expulsion in the planet’s atmosphere, and the likelihood of ice returning to a liquid state on the planet, thorough research and investigation shows and concludes that former living organisms, and current live ones, will be next to impossible to find. While this may deter a number of scientists and space programs to reduce funding for Mars exploration missions, maybe it is possible that there are other planets out there, similar to Mars, but have the possibility of sustaining life, and may have done so in the past at one point.

## **Bibliography**

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