

Signs of Life in Yellowknife Bay Gale Crater

Zachary McNeely

Department of Engineering Science

Jefferson Community College, Watertown

The NASA L'SPACE (Lucy Student Pipeline Accelerator and Competency Enabler) academy allows undergraduate students of STEM programs the opportunity to investigate whether there once was, or currently is life on Mars by investigating potential sites that show great potential of it. After finding an ideal landing site to investigate, the team of students were required to construct a rover based on the science objective of finding life as well as the given constraints which were to build a probe that would fit within a 30cm cube with a total mass of 500g as well as being deployed from a height of nine meters from a balloon. Two scientific tools that would assist in the task for the search for life would be a core sample tool, as well as a miniaturized mass spectrometer. The core sample tool would work excellent in the clay of Yellowknife Bay of Gale crater, allowing the probe to pull out samples which could contain past or present microbial life as well as being well preserved due to the clay of the landing site. The mass spectrometer would use the core samples to determine signs of life as well as past or current life. Mars Science Laboratory (MSL) rover Curiosity landed on Mars within the North Western section of Gale crater with four goals, one of them being investigating for signs of life. MSL showed markers of potential past life due to it finding elements required for life to exist such as carbon, oxygen, nitrogen and sulfur all of which were found within the clay from Yellowknife Bay, and would be great indicators of past microbial life. Hydrous minerals within Yellowknife Bay also supports one of the main keys for life which is water. Returning to Yellowknife with a probe equipped with the scientific tools as mentioned earlier would have a more desirable prospect at finding life. With the data from MSL it allows the new probe to narrow down the search zone and further the search for life on Mars