Name: Pablo ARAN
Grant: Lewis and Clark Field Scholars in Astrobiology.
Title: **Investigating microbial habitability of a high-altitude volcano in the Atacama Desert as a Mars analog**

Volcanic habitats represent important analogues for astrobiological inquiry. For this, the Andean volcanoes in the Atacama Desert, where their soils are considered some of the most Mars-like on Earth, represent a key location to characterize microbial life with extreme metabolic capacity that may be expected to exist beyond our planet. In this region, extreme conditions include high diel temperature fluctuation, low oxygen pressure, high radiation, limited or absent organic C and N, a thin atmosphere, high metal abundance, and, perhaps most critically, extreme resource limitation due to low nutrients and very little liquid water. Studies of the microbial communities in this type of environment could give us clues to what life was like on Mars or other off-planet environments. To obtain such clues, we studied soils in the Atacama, on the Llullaillaco Volcano (6739 masl; **Fig. A1**), the second-highest active volcano in the world, located in Antofagasta, Chile. We took samples from 3000masl to 5200masl in a transect of about ~79 kilometers (**Fig. 2**). In total, we collected 90 soil samples that will be analyzed to investigate what organisms are there and what metabolic functions they realize (DNA ready for sequencing). Due to the harsh weather conditions (strong winds, snowstorms, and fog.), we had to complete the work early, after 5 days (our sampling campaign was originally intended to be 7 days). Finally, one of our members kindly made a video: https://www.youtube.com/watch?v=NHXLzdoRRMA&ab_channel=ChungungoAngler. It is in Spanish but feel free to use it if required.

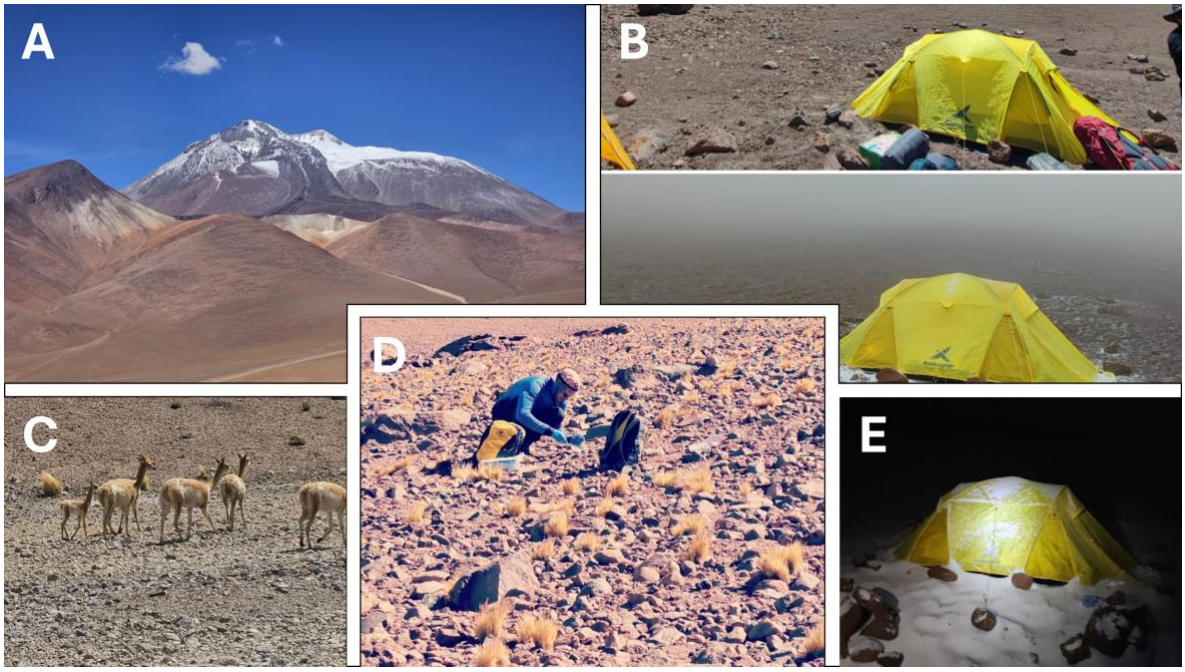

Fig 1. A) Llullaillaco volcano, Located at Llullaillaco National Park, Antofagasta, Chile (-24.719863, -68.536852). B) Basecamp at 5000 masl before and during the all-day snowstorm. C) Vicuna, a typical camelid from the Atacama Desert. D) Pablo Aran (grantee) sampling soils. E) Basecamp during the snowstorm at night. Photos: Pablo Aran, Jonathan Garcia, Sebastian Rodriguez-Beltran.

Name: Pablo Aran, University of Arizona, Tucson, AZ Final report rcvd. 5.7.24

Grant: Lewis and Clark Field Scholars in Astrobiology.
Amount: $5,000, awarded in 2023
Title: **Investigating microbial habitability of a high-altitude volcano in the Atacama Desert as a Mars analog**

Fig. 2. Sampling Route. The yellow line indicates the transect of the samples we collected on this (Yellow diamonds) trip. Purple stars represent the sampling sites in 2022. Green points correspond to samples taken in 2020. The total transect was ~79km.