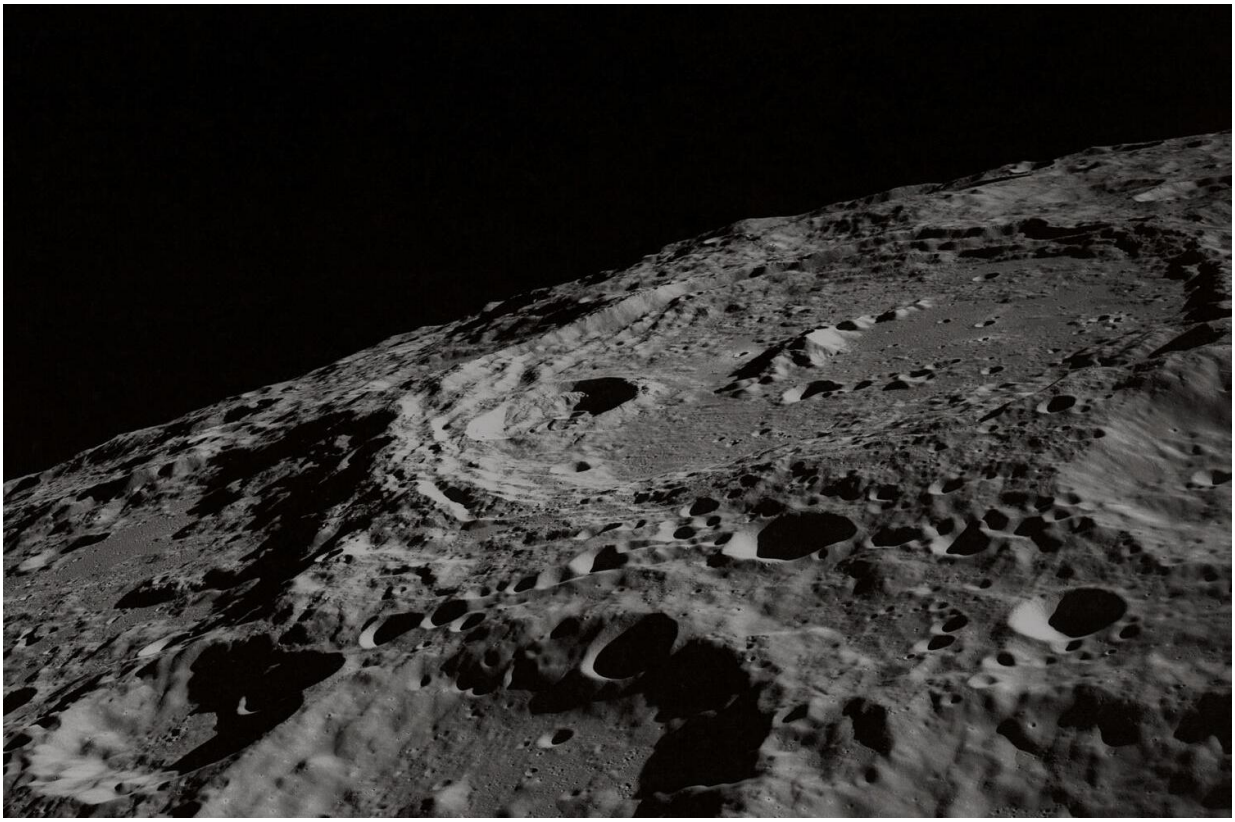
Extraterrestrial mining would emulate 'tears of wine' phenomenon

April 20 2022



Credit: CC0 Public Domain

Tears of wine is a phenomenon frequently observed as a ring of wine formed near the top of the glass generates droplets that fall back into the wine. This phenomenon can be explained by the Marangoni effect

driven by the surface tension created via gradients on concentration and temperature along the interface between two phases.

In a paper published in *Advances in Space Research*, Jonathan Whitlow, an associate professor in biomedical and chemical engineering and sciences, and co-authors propose an extraterrestrial all-in-one mining process in which the Marangoni effect would allow non-mechanical transportation of the extraterrestrial mineral to feed an also in-situ pyrolysis-based refinery unit.

The researchers seek to establish that the Marangoni effect, which is crucial for welding metals, manufacturing integrated circuits and growing crystals, has the potential to be important for supporting lunar habitats and other extraterrestrial endeavors. They contend that vacuum and reduced gravity are expected to augment the Marangoni effect on extraterrestrial molten soil leading to sustainable extraterrestrial in-situ resources utilization.

More information: J.A. Dominguez et al, Marangoni effect and its potential utilization in supporting lunar habitats and other extraterrestrial endeavors, *Advances in Space Research* (2021). DOI: 10.1016/j.asr.2021.12.023

Provided by Florida Institute of Technology