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## BIOMIMETIC DESIGN FOR SHOCK ABSORPTION ON THE LUNAR SURFACE

**Abstract**

Bio-mimicking has been around for quite some time now. We have already seen some of its applications in Japanese bullet trains, studying prairie dog burrows to build better air ventilation systems, mimicking shark skin to create bacteria-resistant plastic surfaces for hospitals, or arranging wind turbines in the same drag-reducing pattern that schools of fish swim in. There have been comparatively lesser applications of bio-inspired in space engineering. Given the current space exploration scenario, the next step of humanity is most likely to have colonies set up on the moon. Unlike the Earth, the Moon doesn't have a thick atmosphere to burn the meteorite mid-air. Any meteor heading for an impact would be catastrophic to any human settlement on the Moon. This study takes into consideration the danger of a meteorite impact on the lunar surface and presents a case for a novel bio-inspired shock absorbing technique. A comprehensive study of the biomechanics of animals have been conducted and various fracture structural models have been developed. Simulations have been performed to optimize the design for its strength to weight ratio. Principles of origami have also been encapsulated in the design which, though, adds complexity, but also increases the strength of the design. The biomimetic structure has been developed using lunar regolith as a main source of construction material. Comprehensive charts and tables would be given to argue about the survivability of the structure. An idea in terms of the cost would also be given for its implementation on the lunar surface.