Introduction: A fundamental goal of Mars science is to determine the nature of aeolian processes in order to better interpret sedimentary strata and surface features that archive past and present environments [1]. Our ability to determine the conditions under which wind-blown sedimentary strata formed, and the timescales over which wind-blown landscapes and surface features such as wind streaks, ventifacts, yardangs, ripples, and dunes form depends on how well we can determine rates of aeolian resurfacing. The Planetary Aeolian Laboratory at NASA Ames offers a wind tunnel capable simulating and observing aeolian transport processes at Earth and Martian atmospheric conditions to better these processes. The purpose of this presentation is to demonstrate the use of the MARSWIT to simulate aeolian processes on Earth and Mars and promote its use in the aeolian community.

The MARtian Surface Wind Tunnel (MARSWIT) is an 1.3 x 1.3 x 13 m open-circuit boundary layer wind tunnel equipped with instrumentation to observe freestream and internal boundary layer velocities, density, temperature, pressure, and relative humidity among other atmospheric parameters. The wind tunnel is outfitted with a roughness plate, sand feeder, remote video cameras, and a removable test section floor. The tower is capable of reducing pressure from standard atmospheric to 5 mbar with the freedom to sample processes at any pressure within this range. This facility can accommodate additional instrumentation and data acquisition systems that can be cabled through sealed bulkheads. Video and signal acquisition can be displayed from the control when the tower chamber is evacuated to Mars pressure. Please refer to the 47th LPSC abstract by Williams and Smith (2016) [2] for a more complete description of the MARSWIT.

The most recent experiments conducted in the MARSWIT observed the threshold of motion for aeolian transport at Earth and Mars atmospheric conditions. Several instruments were added to the MARSWIT suite of observations. These additional observations included a velocity and saltation profiles, modes of transport via bedload and saltation traps, HD video of transport at Earth pressure and infrared video of aeolian transport at Mars pressure. Walnut shells were utilized in this study to account for the gravity difference between Earth and Mars. The results of this study have allowed the authors to observe fluid flow and the resulting aeolian transport under simulated Martian conditions.