1154-35-2456 **Rachel A. Neville*** (raneville@math.arizona.edu), Dept. of Mathematics, PO Box 210089, Tucson, AZ 85721. *Topological Methods for Characterizing Snow Surface Roughness.* Preliminary report.

Snowpack is at the interface of between the Earth and the atmosphere, influencing the movement of air. The geometry of the snow surface can undergo dramatic changes at various length scales due to snow accumulation, terrain features, and wind. The result is a surface pattern that exhibits multi-scale roughness that is spatio-temporal complexity. As the snowpack surface evolves, albedo, wind resistance, energy exchange, and meltwater production are affected. Characteristics of the snowpack surface are important input variables in snow-hydrologic and climate models, therefore accurate estimates of these parameters are needed.

Leveraging tools from topological data analysis, we develop an estimate of the surface roughness of snowpack in mountainous terrain. This method captures multi-scale roughness as well as directionality of roughness characteristics. This is applied to LIDAR data collected from several snowfields outside of Boulder, CO. We draw comparisons to other estimates. (Received September 17, 2019)