

Energy Absorption of 3D Printed Lattice Structures

Carlos Gatti, William Johnston

*College of Engineering
Natural Sciences & Engineering Oral Presentation*

Abstract: 3D printed lattice structures is a rapidly advancing subject in the biomedical and aerospace industries because of its multifunctional properties. In this study, the energy absorption capability of 3D printed lattice structures with inner filaments made of commercially available Polylactic Acid (PLA) were analyzed. Characterization of the PLA filaments was performed through quasi-static tension testing and digital image correlation analysis to evaluate the most ideal printing parameters and its stress-strain behavior. The energy absorption capacity and mechanical properties of the gyroid and diamond structures were obtained through quasi-static compression testing. The results obtained indicated that the filament parameters have a significant effect on the mechanical properties of PLA. The energy absorption capacity of gyroid and diamond structures were increased with the addition of inner filaments, thus establishing a foundation towards multifunctional structures.

Faculty Mentor: *Suresh Raju, Bhisham Sharma*