

# Application of Molecular Dynamics Simulation to Study Melt Track Size in Powder Bed Fusion

†\*Brian Lee, and Hua Li

School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore

\*Presenting author: blee039@e.ntu.edu.sg

†Corresponding author: blee039@e.ntu.edu.sg

## Abstract

Powder bed fusion is an additive manufacturing method used to build up 3D metal parts by melting or sintering metallic powders on a powder bed layer by layer together. In this work, molecular dynamics simulation using LAMMPS (Large-scale Atomic Molecular Massively Parallel Simulator) software was performed to investigate the solidified melt track size from the laser heating process of metal powders. The model was volumetrically scaled down by 100 million times from the actual size for suitable computation and parameters were adopted from existing experimental work on Selective Laser Melting (SLM) of 6061 Aluminium alloy to conduct the simulation. The melt track size of single scans were observed and compared to experimentally obtained values.

**Keywords:** Simulation; powder bed fusion; molecular dynamics; selective laser melting;