

Faculty of Engineering

Summer Research Program 2022-2023

Project Title: Benchmarking part-level process modelling for 3D printing

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Objective

Benchmark and compare commercially available software for modelling of the selective laser melting process.

Project Details

Part-level modelling is essential for 3D printing to ensure printability and dimensional accuracy for especially industry-level complex components. The models can predict various critical phenomena during and after the 3D printing process, including thermal stress, risk of overheating, distortion, heat treatment effect etc. Several commercial software such as 3Dxprt, SimuFact and Ansys Additive can perform part-level modelling, but the effectiveness and limitations are not yet systematically studied.

In this research, the student will have the opportunity to use and compare several state-of-the-art commercial 3D printing modelling platforms available in Monash Centre for Additive Manufacturing and MAE. Through benchmark components, the sensitivity of the software to component size and geometry, process parameter, material parameters and numerical configurations will be systematically examined. These results will also be validated against physical measurements of sample 3D printed at MCAM.

This research aims to identify the strength and weakness in different 3D printing modelling platforms, and establishing a standard procedure for modelling and calibration.

Prerequisites

Familiarity with FEA and CAD, ideally have completed MAE3426/MEC4426

Additional Information

Part of a family of projects planned at MCAM to drive understanding and advancement of additive manufacturing technologies.