

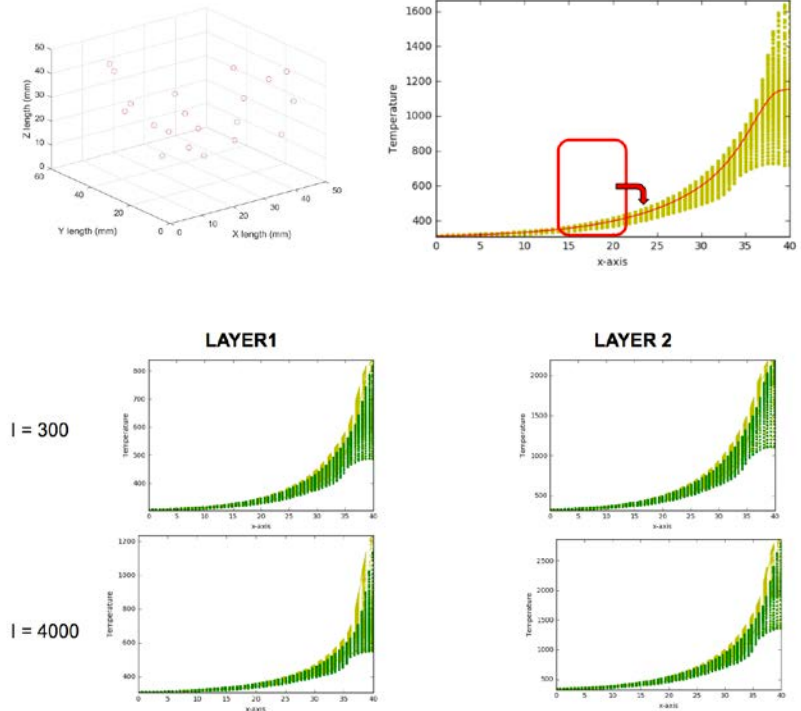
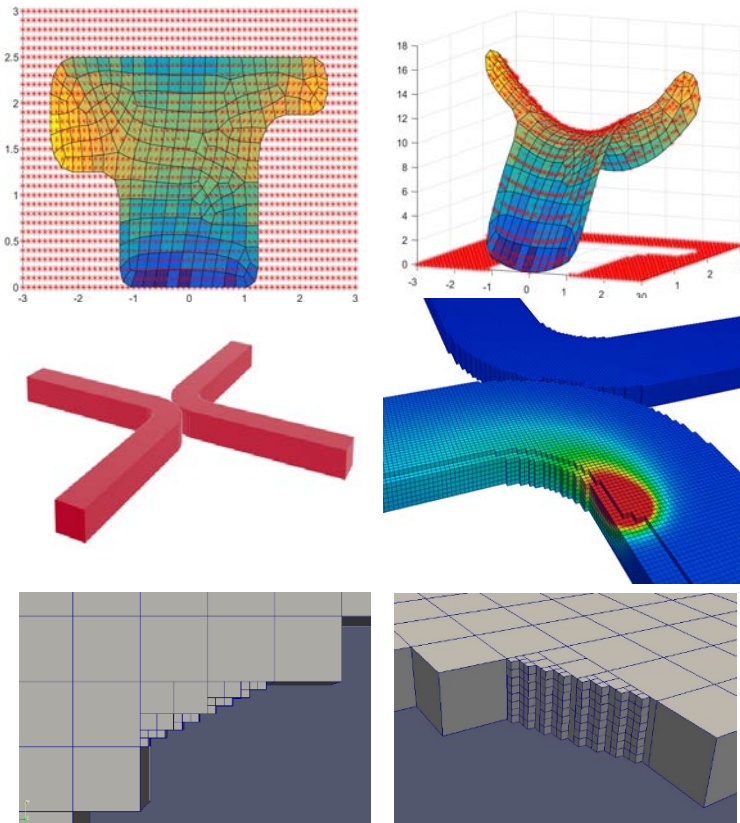
RESEARCH OBJECTIVE

In this project, essential components of a scientific framework for a model-based real-time control system of additive manufacturing is being developed. This framework consists of two major parts. First, a voxel based representation of data is being implemented which enables us to have a quick look-up in a structure comparable with experimental data. Second, a fast predictive model is being developed based on machine learning techniques which can instantaneously give us accurate results in compared to FEM simulation. These two tools in being implemented for DED process and the capability of data structure and predictive system is being demonstrated.

Voxel Data Structure

A voxel data structure is developed capable of direct and instantaneous comparison between experiment and simulation, encompasses different process information, cable of refinement using octree structure

Predictive Model



R^2	mse	mae %
0.79-0.83	0.04-0.05	1.1-1.8