



**Project Title:** Investigating the use of cost-effective metal 3D printing technologies for the production of engineering components

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**Keywords:** Metal Additive Manufacturing; Metal Material Extrusion; Design for AM

**Project Summary:**

Additive Manufacturing (AM) is offering new opportunities in engineering design and manufacture for creating components and products using new technologies. The AM technologies are developing rapidly with new ways to 3D print (3DP) with new materials emerging. Fused Deposition Modelling (FDM) is an established 3DP technology for producing plastic parts. FDM machines can be used using metal infused plastic filament in a process known as Metal Material Extrusion (MME) which can create metal parts after post-processing. This technology is significantly cheaper than high end metal 3DP using Binder Jetting or DMLS/SLM methods and gives the opportunity to realise metal parts from FDM machines. This Research will consider what is achievable using this technology focusing on BASF materials such as 316L Stainless Steel.

This research will characterise the material properties and performance of MME produced components for specific engineering applications in industry i.e. what geometry and structural integrity is achievable with Metal Material Extrusion produced components and materials.

The outcomes from this project will be:

- Validated Design for AM guidelines that will aid the adoption of MME.
- Peer-reviewed journal article (s) and conference papers
- Case -studies

The impact of this project will be to overcome obstacles to adoption of 3d printing of metal parts by exploring the use of low-investment technology and novel metal-polymer composite filaments and developing design guidelines to aid manufacturing industries to adopt such technologies and recognise the possibilities for part creation using the technology.

**Candidate Qualifications/Requirements:**

BEng (Hons) in Mechanical Engineering or related discipline (minimum second class honours)