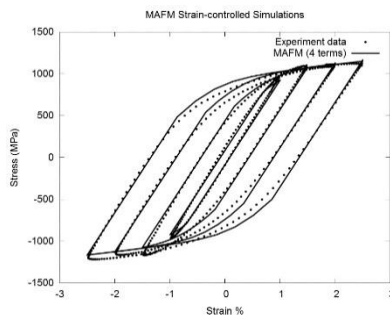


PhD Studentship (4 years)

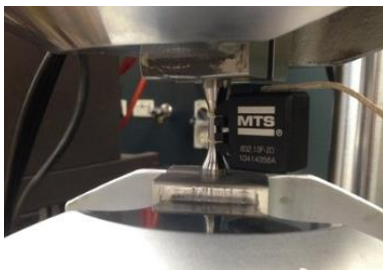
Cyclic Plasticity of Additively Manufactured (AM) Metals: Experimental Investigation & Constitutive Modelling

Background & Research Objectives

To date, most of the published research work on the mechanical properties of additively manufactured (AM) metals has been on the observed monotonic and fatigue performance. Very limited attention has been placed on the cyclic elastoplastic response of this class of metals, despite the significance of this area for many aerospace and mechanical engineering applications.



Further investigation in this area can assist in characterising the AM metals' macroscopic mechanical behaviour (e.g. stress and strain hardening), as well as assess the influence of microscopic characteristics (microstructure) and manufacturing parameters (e.g. built orientation) on their mechanical behaviour, including low and high cycle fatigue.



This 4 year research project, conducted in partnership with the [South Eastern Applied Materials \(SEAM\) Research Centre](#), will investigate experimentally the elastoplastic behaviour of metallic materials produced via commonly used AM methods (e.g. selective laser sintering, selective laser melting), under cyclic loading, in the ultra-low, low and high cycle fatigue regime. The study will cover an array of different materials, loading cases and histories, both in the uniaxial and multiaxial

stress space. Moreover, the experimental results obtained will be utilised to develop and validate constitutive plasticity models capable to predict the cyclic elastoplastic behaviour and performance of the various AM metals, under ultra-low, low and high cycle fatigue loading.

Employability and Career Prospects

The manufacturing industry in Ireland and the EU is experiencing significant expansion in the additive manufacturing (AM) domain, especially in



the aerospace and biomedical engineering areas. This PhD shall equip the graduate with skills highly sought by the EU manufacturing industry.

Studentship Terms and Conditions

- Four (4) years Full Time study (start: September 2016) in the [Structured PhD in Engineering](#) of the University of Limerick (UL) [Department of Mechanical, Aeronautical & Biomedical Engineering](#);
- Tax free stipend of €16,000 per year and EU Tuition Fees Waiver;

Joint Supervisors

[Dr Kyriakos I. Kourousis](#) [Professor Noel O'Dowd Senior Lecturer](#)

Selection Criteria

- Meet EU Tuition Fees [classification criteria](#) (citizenship and residency);
- Entry Requirements applicable to the UL Structured PhD in Engineering.

Application Material & Process

- Full Curriculum Vitae (CV), including research publications, accompanied by a Cover Letter;
- Research Proposal (2 pages maximum), including the following headings: 1) Background; 2) Objectives; 3) Work to be done; 4) Methods to be used; 5) Novel aspects; 6) Engineering theoretical issues addressed;
- Applications should be submitted via email to Dr Kourousis by the **17th of June 2016**
Email: kyriakos.kourousis@ul.ie