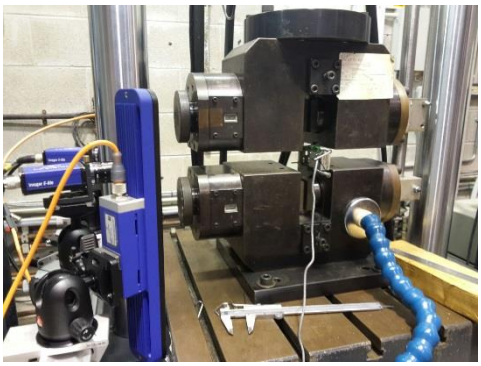
UNIVERSITY of LIMERICK
OLLSCOIL LUIMNIGH

SEAM

3-year PhD Studentship

Cyclic Plasticity of Additively Manufactured Maraging Steel 300

PhD Project Description



To date, most of the published research work on the mechanical properties of additively manufactured Maraging Steel (MS) 300 has been on the observed monotonic and fatigue performance. Limited attention has been placed on the cyclic elastoplastic response of this metal, despite the significance it has for engineering applications. A 3-year joint research project with the **School of Engineering of the University of Limerick (UL)** (http://www.ul.ie/) and the **Waterford Institute of Technology (WIT) South Eastern Applied Materials (SEAM) Research Centre** (http://www.seam.ie/) has been established to explore the cyclic elastoplastic behaviour of MS 300 produced via Direct Metal Laser Sintering (DMLS). This PhD project aims to investigate experimentally the cyclic behaviour under cyclic loading, in the ultra-low, low and high cycle fatigue regime. This investigation will enable the characterisation of the macroscopic mechanical behaviour of DMLS MS 300 in relation to the influence of the microstructure, manufacturing parameters (e.g. built orientation) and post-processing. The experimental results shall be utilised to develop and validate constitutive plasticity models capable to predict the cyclic elastoplastic performance of DMLS MS 300. The Project is supervised by:

- **Dr Kyriakos I. Kourousis, CEng | Senior Lecturer** - School of Engineering University of Limerick
- **Dr Ramesh Raghavendra | Director** – WIT SEAM Centre

Required Qualifications and Experience

Highly motivated engineers possessing the following qualifications and experience are invited to apply:

1. Bachelor Hons Degree (or equivalent) in mechanical/aeronautical/manufacturing/materials engineering, with a good academic standing;
2. Master's Degree in materials engineering/solid mechanics or other relevant field;
3. Experience in material mechanical testing/mathematical modelling/computer coding;
4. English language proficiency (meet the University of Limerick English language requirements).

PhD Studentship Terms and Conditions

The successful applicant will be awarded a **UL Science & Engineering Faculty PhD Studentship** for a period of three (3) years, offering:

- **Tax-free stipend of €16,000 per year;**
- EU or International* **Tuition Fees waiver** (*for highly qualified non-EU students).

Application Process

Applications will be reviewed on a rolling basis, until a suitable candidate is identified. Applicants must submit through email the following documents in PDF file format to Dr Kourousis (kyriakos.kourousis@ul.ie):

1. **Cover Letter** stating the reasons and motivation for undertaking this project;
2. Full **Academic Curriculum Vitae** (CV);
3. Copies of of the BSc and Master's Degree **Academic Transcripts**;
4. Copies of the BSc and Master's **Degree Theses**;
5. A 2-page/1,500 word **Research Proposal**, structured under 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; 7) References;
6. Two (2) **academic reference letters** (at least one has to be from the Bachelor's or Master's Thesis primary academic supervisor).