Master Thesis – Deep Learning tool to resolve grain size analysis for LPBF H282 (30 credits/20 weeks – 1 student)

This thesis work is initiated through GKN Aerospace Engine Systems in Trollhättan, Sweden. The Trollhättan site employs approximately 2000 people in research and technology, product development, manufacturing, product support of jet engines, and engines for space vehicles. GKN Aerospace is deeply involved in developing and adapting additive manufacturing (AM) technologies for engine parts.

Project Background

Additively Manufactured alloys pose unique opportunities for the materials community. Associated with it is direction dependent challenges as well as characterization. This is critical to relate to mechanical behavior. One such challenge is identification and measurement of grain size, especially in as-built direction. Additionally, for nickel based alloys, such as H282, it is observed that different etchants reveal specific details in the microstructure as well as certain features like twins that might interfere with the measurement. Therefore, the purpose of this study is to investigate etchant independent measurement using EBSD and estimate with multiple etchants. The EBSD measurement would be verified with MIPAR; the effect of different etchants would be investigated with MIPAR analysis with the implementation of deep learning. Microstructures in both as-built and perpendicular direction would be studied. The as built direction is proposed to be investigated in details for average, maximum dimensions and width. These details might help us link anisotropy of mechanical properties based on directionality.

Qualifications

- Master in **Mechanical engineering or Materials engineering or Physics, including courses on materials**
- Interest in Image analysis, metallography and simulation
- GKN would prefer if the student can perform most of the work on site in Trollhättan

Apply by

By sending CV and personal letter to Prajina Bhattacharya (Prajina.Bhattacharya@gknaerospace.com)

Start spring 2022