

Fully Funded EPSRC PhD Case studentship.

Project Title: Defining and evaluating geometric dimensioning and tolerances for topology optimised additive manufactured components

Additive manufacturing (AM) has the potential to produce topology optimised components that harness the capability of computer software to design complex structures based on defined loads, space constraints and boundary conditions with the goal of maximising the performance. While the use of such structures has clear advantages in a number of different industries inspection poses new challenges in terms of evaluating the components dimensional features and tolerances as well as integrity (porosity). Topology optimised components generally include non uniform geometry that is critical to the components performance, therefore it must be defined and inspected. The components performance is more susceptible to manufacturing defects due to the optimised shape.

This PhD project will look at evaluating and adapting current approaches to GD&T to create best practice guidelines in terms of both defining and inspecting topology optimised components. Given the complex structure of such components X-ray computed tomography will be used to capture both dimensional and porosity information for evaluation. Case studies will be used to validate proposed methodologies and assess that the design intent has been met through linking the design and analysis stage with inspection and verification to ensure that the manufacturing process is capable of producing the required designs.

Eligibility: The student must have a high-grade qualification, at least the equivalent of a UK 1st or 2:1 class degree or MSc with distinction in Physics, Engineering or related disciplines. The student must be proficient in both written and spoken English, and possess excellent presentation and communication skills.

Salary: £15,285 (2020/21 EPSRC Standard)

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