EPSRC supported EngD:
Formulation and in-process characterisation of ceramic systems for aerospace component manufacture.

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Tax free bursary of £28,505 per annum plus fees paid.

Project Description:
A global manufacturer of single-crystal components for gas turbines, Rolls-Royce are continuously improving the capability of their lost-wax investment casting process for future products. A key aspect is formulation improvements of the ceramic systems used to manufacture casting moulds. A hands-on Formulation Engineer is required to work alongside an academic and industrially focussed team based in the High Temperature Research Centre (HTRC); an internationally unique research facility where Rolls-Royce and University of Birmingham staff are collocated with state-of-the-art manufacturing and research equipment.

This EngD will focus on characterising ceramic materials using novel casting methods; evaluating the effect of material properties and mixing on highly filled slurry rheology; and identifying suitable methods of measuring draining behaviour by practical and simulation approaches. This research will lead to the optimisation of ceramic slurry recipes, achieving reliable in process rheological techniques to predict slurry coating thickness, a technical understanding of shell build layer variation and the development of a digital twin to predict coating thickness from measurable slurry properties. This will be assessed by casting complex Turbine components in controlled trials.

The impact of slurry formulation and control on single crystal components will be a major output of this work, improving casting yields for more sustainable use of materials.

Funding Details:
To be eligible for EPSRC funding candidates must have at least a 2(1) in an Engineering or Scientific discipline or a 2(2) plus MSc.

To apply and for more details on the Engineering Doctorate scheme visit the homepage.