

Fully Funded EPSRC PhD Case studentship.

Project Title: Development of a virtual integrated ultra-precision manufacturing and metrology system for advanced freeform surfaces

To achieve accurate transformation of optical functions to surface geometrical specifications, and the dynamic conditions encountered in machining process must be predicated and well controlled. This PhD project will work on the development of a virtual integrated manufacturing system for freeform surfaces based on our current freeform CAD/CAM framework. The virtual system will be developed with functional modules covering surface generation, toolpath planning, machining stability analysis and surface profile predication. The focus of the research is on the development of core data analysis modules for the surface characterisation of advanced freeform and micro/nano-structured surfaces. It will also include the integration of current operation methods and algorithms for decomposition, association, filtration, texture mapping and numerical parameterisation and characterisation into the metrology module of the system. The developed system will be evaluated against agreed partner-led case studies on creating complex and multiple freeform surfaces.

This is a highly industrially relevant project with great scientific interest. Success in this project will allow freeform designers to consider foreseeable machining errors at the design stage and provide recommendations to engineers in selecting the appropriate process parameters to achieve specified surface quality. It will offer the candidate the possibility to establish successful industrial and academic collaborations.

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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