Project proposal

Project title	Multimodal Imaging and Analysis for Characterisation of the Properties of Solid Materials
First Supervisor	Dr Ted Donchev
Second Supervisor	Prof David Wertheim
School	Civil Engineering and Construction
Other member of supervisory team (no more than three KU supervisors in total)	Prof Gavin Gillmore Prof Mukesh Limbachiya
Specific requirements beyond 2:1 degree	

Project summary

(max 4,000 characters)

MSc by research

Material surface and internal structures such as porosity and crystal boundaries are important features and can be examined using different imaging modalities. For example the surface and internal structure of geological and construction materials can be imaged using microscopy. This multidisciplinary project builds on successfully completed research studies including confocal microscopy of particle tracks (in collaboration with the National Physical Laboratory) as well as concrete and composite material imaging.
Samples of geological and construction materials will be obtained. In order to understand pores and crystal structure in a thick sample of material, a series of sections will be imaged. 3D visualisation will be used to study such sections and to develop models to predict structural features from the images; in addition the effects of porosity on moisture ingress / resistance, heat transfer and adhesion properties will be studied by measurements and comparing with modelling using finite element analysis.
Successful outcome of this project will assist in establishing the direction of inter-disciplinary research in this field and strengthen ongoing research activities in the Faculty.