Imperial College London
Department of Mechanical Engineering

PhD Studentship in Numerical and Experimental Fracture Mechanics approach to crack initiation and growth under primary and secondary loading in advanced steels.

Applications are invited for a research studentship in the field of Numerical and Experimental Fracture Mechanics leading to the award of a PhD degree. The post is supported by a bursary and fees (at the UK/EU student rate) provided by the EDF Energy High Temperature Centre.

With the development of more complex computational models and advanced assessment methodologies for short/long term, creep brittle/ductile crack initiation and growth there is now the need to revaluate the testing, analysis using different correlating parameters and computational methods in fracture mechanics to improve, optimise and reduce conservatism in the assessment of results. The critical area of crack initiation under secondary loading in ductile and brittle material will therefore need to be quantified in as received, ex-service and pre-compressed 316H steel as well as Essehete steel samples. Testing will be carried out using pre-compressed material as this has already helped identify bounds for creep brittle/ductile behaviour under primary and secondary loading and may be a key route to developing a validated accelerated testing method. Collaboration will be with EDF Energy High Temperature Centre Partners (Bristol, Manchester, Oxford and Open Universities) in the modelling, stress analysis and appropriate choice of correlating parameters. The areas that will be addressed are the varying effects of the primary/secondary levels on crack initiation and growth and the effect of creep ductile/brittle effects on relaxation and plasticity in long/short term testing. Derivation of the correct fracture mechanic parameters K and C* for these novel specimens under secondary and combined loading especially at the initial transition period will need to be evaluated more rigorously as this has a profound effect on the accuracy of any component life assessment that is undertaken in plant. The project will also develop the area for alternative approaches for fracture mechanics analysis and the appropriate correlating parameters. In particular by considering reference stress, sigmaD, C(t) and TFAD and any other parameter that may improve correlation of the early stages of life with the view to predict the long term initiation/transition times predictions.

You will be an enthusiastic and self-motivated person who meets the academic requirements for enrolment for the PhD degree at Imperial College London. You will have a 1st class honours degree in mechanical engineering or a related subject.

For information on how to apply, go to: http://www3.imperial.ac.uk/mechanicalengineering/study/pgresearch/opportunities

For further details of the post contact Prof Kamran Nikbin k.nikbin@imperial.ac.uk +44 (0)20 7594 7133. Interested applicants should send an up-to-date curriculum vitae to Prof Nikbin. Suitable candidates will be required to complete an electronic application form at Imperial College London in order for their qualifications to be addressed by College Registry.

Closing date: 31st Dec 2016

Imperial Managers lead by example.

Committed to equality and valuing diversity. We are also an Athena SWAN Silver Award winner, a Stonewall Diversity Champion, a Two Ticks Employer, and are working in partnership with GIRES to promote respect for trans people.