



Title: Internship on the post-processing and visualisation of large statistical models

Duration: 12 months

Location: Manchester - University of Manchester

Start date: July / September 2016

Context: The EDF Energy Generation team is currently working on the extension of the life expectancy of their nuclear power plants. One critical point is the integrity of the graphite cores, which is experiencing significant modifications with ageing due to oxidation and irradiation. Late in the core's operating life, graphite components are likely to crack. In that context, a better understanding of the behaviour of the core with ageing graphite bricks is essential as well as the study of the influence of cracked bricks.

A whole core model under seismic loading has been developed using the finite element code Code\_Aster, containing thousands of independent bodies. This model can take into account different input parameters account for the variation of geometry and material properties of the core as well as the distribution of cracked bricks. The influence of these parameters is closely looked at. The quantity of data produced being very important, it is of highest interest to develop a methodology allowing to efficiently post process the results and visualise them.

Description: The intern will investigate on the possibilities available in the current post-processing tool of the SalomeMeca platform (ParaVIS) to efficiently visualise the deformation of the core and identify the critical zones. Some statistical tools will be tested. The intern may develop other methodologies using basic programming skills. The intern will also use a powerful statistical software (OpenTurns) that will enable to emulate the results, reducing the uncertainties on the output parameters without having to launch any further finite element analysis: in order to do that, the intern will develop a methodology to correlate the distribution of cracked bricks with the probability of failure of the core.

Required skills: The applicant must be in a master's programme, have a good knowledge in programming, statistics and mathematics. Knowledge in mechanical modelling and finite elements would be a plus. The applicant must be fluent in English.

Salary: ~£15 000/per year.

Contact: [philippe.martinuzzi@edfenergy.com](mailto:philippe.martinuzzi@edfenergy.com)