Phd position in Numerical Methods for Seismic surveys

In the Numerical Analysis and Scientific Computing team of the Department of Mathematics and Statistics of the University of Strathclyde, Glasgow (United Kingdom) we are looking to fill a fully funded 3-year PhD position. The candidate must be UK/European citizen in order to be eligible for funding.

Imaging subsurface structures, e.g. concrete tanks, pipes, cavities, is carried out using mainly non-intrusive techniques. Such techniques have the ability to gather information across an entire area but their detecting ability is often restricted due to unfavourable on-site conditions. In addition, the estimation of the location of any structure is based on
simplistic velocity models for the subsurface and thus introducing big uncertainties in the final solution. More complicated models would require the design of numerical algorithms for large-scale accurate simulations, something that has not been applied in seismic surveys or in Seismology before.

One of the objectives should be the development of new methods for the elastodynamics equations in frequency regime. This systems is indefinite in nature, with highly heterogeneous coefficients and multiple spatial scales. Moreover, since the properties of the medium are very often unknown, this implies the solution of inverse problems, which lead to repeatedly solve large and complex linear systems, whose size could attain millions of unknowns in the high frequency regime. This project will contribute by large scale numerical simulation of partial differential equations based models in an in-depth knowledge of different aspects of mathematical models from geophysics and geology.

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