International Centre for Numerical Methods in Engineering

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ANNOUNCEMENT FOR PROVISION OF THE WORKPLACE

VAC-2023-12 – Postdoc position in High Performance Computing for MagnetoHydroDynamics

Number of places: 1

Category: Post Doc

Workplace: Barcelona

Salary (gross): In accordance to the qualifications and experience of the candidate, and the salary categories of the centre.

Weekly working hours: 40h

Functions to be developed:

The position is funded by the project AMBBOS, Advanced computational Mathematics for Breeding Blanket Optimal deSign, a 3-year Spanish project focused on the development of numerical methods for the optimal design of breading blankets (BB) in fusion reactors, a key component of fusion reactors. Because experiments are difficult to perform, especially in real operating conditions, computational methods for BB design are urgently needed.

The methods to be developed during the project need to address a robust shape optimization problem that involves a magnetohydrodynamic flow, possibly with thermal instabilties. There are several computational challenges that will be address, including solving large systems of equations for implicit time integration, using embedded methods for the description of the geometry, perform validation and verification of the models against available data (which may require machine learning methods) and wrapping the model in a robust optimization loop with the computation of shape sensitivites.

The developed methods will be implemented in the Julia programming language, using the Gridap ecosystem as a basis (https://github.com/gridap) and will exploit high performance computing resources.

Centre Internacional de Mètodes Numèrics a l'Enginyeria ® Q5850006G

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Required skills:

- A PhD in applied mathematics or engineering related to the fields of computational mechanics, computational mathematics, optimization or statistics.
- Programming experience in scientific computing.
- Writing and communication skills (oriented towards the production of scientific articles and presentations).

Other valued skills (not mandatory):

- Advanced programming skills, e.g. distributed parallel programming, object-oriented and/or functional programming.
- Experience in finite element modelling, uncertainty quantification, optimization, adjoint solvers, automatic differentiation, machine learning, (non)linear multilevel solvers.

Qualification system:

The requisites and merits will be evaluated with a maximum note of 100 points. Such maximal note will be obtained summing up the following points:

- Publication and career track: 10%
- Previous research and academic experience in the field of the position: 10%
- Programming skills: 10%
- Language/communication skills: 10%
- Interview: 60%

Candidates must complete the "Application Form" form on our website, indicating the reference of the vacancy and attaching the required documents.

The deadline for registration to the offer is the **25th April at 12 noon.**

The preselected candidates may be requested to send the documentation required in the "Requirements" and "Merits" sections, duly scanned, and may be called to go through selection tests (which might be of eliminatory nature) and / or personal interviews.