

ANNOUNCEMENT FOR PROVISION OF THE WORKPLACE

VAC-2023-20 – PhD position MSCA-DN-GECKO. DC3- Application of IBRA-type discretizations in implicit contact mechanics

Number of places: 1

Category: PHD1 – PhD Student

Workplace: Barcelona, Spain

Salary (gross): 2.863,63€/month. According to MSCA- Work Programme 2021-2022 an extra family allowance could be eligible when applicable.

Weekly working hours: 40

Contract type: PhD Contract

Duration: 36

This contract is funded by the European Union's Horizon Europe research and innovation programme under the MSCA DN project GECKO (GA No 101073106)

The main objective of the GECKO project is to bridge the existing gap between the CAD and the computational models (CAE) and integrate them within the industrial workflow. This will imply collaborating with industries in enhancing the adoption of the technology within commercial solvers and adapting existing open source frameworks so that they can hook into the industrial practice and thus remain relevant in the foreseeable future. In the practice, this implies ensuring that open-source solvers, developed in the academia for both solid and fluid dynamics, are able to use as an input domain any CAD geometry, even in cases in which the geometrical definition is not optimal, i.e. poorly defined or "dirty" geometries with no additional operations nor user intervention.

Functions to be developed:

The use of smooth CAD discretizations in contact mechanics is known to be beneficial. The role of the candidate is to explore the use of IGA & IBRA technology in the context of implicit contact mechanics, typically

less explored due to the inherent difficulties. Possible applications are in the field of shell forming (particularly for spring back analysis) or in the context of tyre modelling. All these implementations will be performed inside the open-source Kratos-Multiphysics code.

Expected results:

- Development of IBRA-discretization methods applied to implicit computational contact mechanics.
- Combination of the developed contact methodology with non-linear constitutive models for solids.
- Application of industrial related problems in forming and tyre modelling.

According to WP 2021-2022 the candidates must comply the MSCA-DN eligibility criteria:

- Not have resided or carried out her/his main activity (work, studies, etc.) in the recruitment country for more than 12 months in the 36 months immediately before the expected recruitment date.
- Not being in possession of a doctoral degree at the date of the recruitment.
- To be in position to be enrolled in a Spanish PhD programme at the date of recruitment.

Required skills:

- The candidate must hold (or be close to completion of) a Master degree (or equivalent) in Civil Engineering, Mechanical Engineering, Industrial Engineering, Computational Mechanics or closely related fields.
- Excellent written and oral communication skills in English
- Strong background and knowledge of the Finite Element Method or any other relevant numerical methodology.

Other valued skills (not mandatory):

- Authorship or co-authorship of journal publications and/or contributions to international conferences will be positively evaluated.
- Training in recognized universities and research centres as well as participation to research projects will be positively evaluated. International experience will be a plus.
- Knowledge of programming languages like Python and/or C++.
- Knowledge on nonlinear constitutive modelling of solids (damage, plasticity, etc).
- Knowledge in explicit and/or implicit contact simulations.
- Experience using GitHub and/or GitLab environments.
- Previous participation in competitive scientific projects will be a plus.

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:

- Academic education: 20%
- Previous research and academic experience in the field of the position: 5%
- Programming skills: 25%
- Language skills: 15%
- Selective tests and interview: 35%

This is an equal employment opportunity. Candidates are selected exclusively on merit and potential on the basis of submitted application material. No restrictions of persons with disabilities, citizenship or gender apply to the position.

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 ends on July 4th, 2023 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.