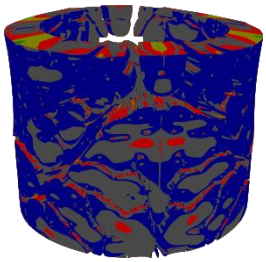


Universidad de Oviedo

PhD post in Computational Mechanics for porous media at the University of Oviedo, Spain

General Description: Applications are invited for a PhD scholarship at the University of Oviedo. The project will involve the use and development of computational tools to model cracking of brittle materials. The student will be based at the Department of Construction and Manufacturing Engineering of the University of Oviedo (Viesques Campus) but the work will be conducted in close collaboration with Imperial College London. Thus, the student will be co-supervised by Prof. Covadonga Betegón (University of Oviedo) and Dr. Emilio Martínez-Pañeda (Imperial College). In addition, the student will work closely with experimentalists from the Mining Engineering School, and some laboratory work may be required.

Project: The civil and mining engineering industries have many energy-intensive processes that involve fragmenting rocks. Great energy saving can be achieved by identifying loading sequences that promote cracking and minimize friction. The project aims at developing a new class of rock fracture models that - by incorporating the underlying physical micromechanisms - can predict cracking patterns as a function of the loading conditions, as given by machine operation. This paradigm-shift from empirical to physically-based models will be facilitated by a highly multi-disciplinary team and cutting-edge experimental and computational capabilities. Relevant industrial partners have been involved to ensure societal impact; fundamental findings will be exploited at industrial scale in a proof-of-concept endeavour that can radically transform excavation practice and technology.

Requirements:

- A degree in engineering, mathematics, physics, materials science, or another closely-related discipline.
- Solid and verifiable background in Mechanics of Materials and Finite Element Analysis
- Good writing and communication skills

In addition, a competitive candidate for this role should demonstrate the following desirable (non-essential) qualifications:

- A high average grade in the undergraduate degree, 7/10 or higher.
- A relevant Masters level degree qualification
- A research or educational background in continuum mechanics
- Familiarity with ABAQUS or similar finite element packages.
- Experience in coding with Fortran, Matlab, Python or other programming languages.
- Knowledge of computational fracture mechanics methods, such as phase field fracture, cohesive zone models or the like.
- Related research experience that has led to high-quality outputs (e.g., publications).

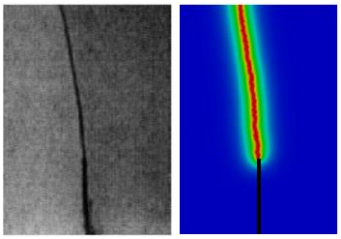
A lack of experience in the above non-essential skills could be compensated by evidence of research potential. Appropriate training will be provided.

Funding: The position is open for both Home (Spain) and International students. A competitive salary is offered (20600€/year; the minimum wage is 9000€/year), as well as resources to buy equipment and attend conferences. The PhD project is expected to last 3 years. The PhD project is part of a 3-year research project funded by the Spanish Ministry of Science and Innovation.

How to apply: Applicants wishing to be considered for this opportunity should send the following application documents to Prof. Covadonga Betegón (cova@uniovi.es) and/or Dr. Emilio Martínez-Pañeda (mail@empaneda.com)

- CV, including average grades and research experience (if any)
- Cover letter, explaining their motivation and suitability
- Contact details of two academic referees

The closing date for applications is **September 7, 2019**. Interviews will be held shortly afterwards, and the PhD student is expected to start in the autumn of 2019: October 1st or a later date of mutual agreement.



For further details, informal discussions and information about the project please contact Prof. Covadonga Betegón (cova@uniovi.es) or Dr. Emilio Martínez-Pañeda (mail@empaneda.com)