1 ERC POST-DOC POSITION IN "MULTISCALE NUMERICAL MODELING OF EARTHQUAKE FAULTS"
(GEM LABORATORY, ECOLE CENTRALE DE NANTES, FRANCE)

AVAILABLE POSITION

The appointment forms part of the ERC-StG project "CoQuake" (Controlling earthQuakes, http://coquake.eu/), funded by the European Research Council (ERC, https://erc.europa.eu/). The position offers the possibility of working on a challenging and stimulating research topic. The knowledge, innovation and skills to be developed will open perspectives for career development.

RESEARCH CONTEXT

Earthquakes are responsible for more than half of the total human losses due to natural disasters (see CRED). CoQuake explores an alternative, ground-breaking approach for exploring the possibility of avoiding earthquakes in the future by inducing them at a lower energy level and mitigating seismic risk.

For more details: https://cordis.europa.eu/project/rcn/212726_en.html
https://coquake.eu/index.php/publications/

DESCRIPTION

The research topic is on "*Multiscale numerical modeling of earthquake faults"*.

The complex behaviour of faults is studied through the development of physics-based, robust numerical models that take into account the various Thermo-Hydro-Chemo-Mechanical couplings and the dominant length- and time-scales that the earthquake phenomenon involves. Particular emphasis is given on earthquake nucleation and on the development of advanced numerical multiscale tools (FEMxFEM/DEM) that will enable large-scale, physics-based numerical simulations of fault systems, which are not based on phenomenological or empirical constitutive laws. Thermodynamically based Machine Learning methods will be used to accelerate the multiscale calculations.

REQUIREMENTS

Successful candidates are expected to have strong scientific skills and high motivation. Fluency in spoken and written English is highly advantageous. French is not required, but is appreciated.

The candidates will carry out research, develop tools and write scientific articles in close collaboration with the project's PI, Pr. Ioannis Stefanou, and the members of CoQuake group at the Ecole Centrale de Nantes (GeM laboratory).

The candidate is expected to have:
- A strong background in computational and continuum mechanics.
- Knowledge and experience in modeling with Discrete Elements and/or Finite Elements Methods.
- Important skills programming (e.g. Python).

Knowledge of:
- Upscaling/homogenization techniques and/or micromorphic continua.
- Dynamical systems and bifurcation theory.
- Artificial Neural Networks.

will be highly appreciated.

CONDITIONS OF EMPLOYMENT

The duration of the appointment is one to two years.

Personal initiative and independent research tasks related with the candidate's interests and CoQuake project will be encouraged. Other activities will include PhD supervision and interaction with Master and undergraduate students.

The project will cover travel expenses for attending international conferences and making research visits.

The successful candidate will be part of the CoQuake research group in GeM Laboratory of the Ecole Centrale de Nantes (https://www.ec-nantes.fr/), which gathers nearly 230 people (including 75 researchers, approximately 120 PhD students and Post-Docs and 35 technical and administrative staff), who work in the areas of mechanics and physics of materials, structures and geomaterials, and their applications.

APPLICATIONS

The position is open and will start upon agreement.

Suitable, highly-motivated candidates should send an application (including a CV, a cover letter describing interests and qualifications related to the offered position and contact details of two reference Professors, all compiled in a single PDF file) to ioannis.stefanou@ec-nantes.fr. Candidate selection will be performed on the basis of the excellence of the CV and motivation.