Postdoctoral position in computational damage geomechanics
Université Côte d'Azur IDEX UCA[JEDI]

This position is part of a multidisciplinary collaboration between Géoazur (geophysics and earthquake mechanics), CEMEF - Mines ParisTech (computational mechanics) and LJAD (applied mathematics).

The main objective of the project is to develop 3D multi-scale computational models to study feedbacks between long-term and short-term processes of inelastic deformation of Earth's crust, from the growth of tectonic faults and the evolution of their damage zones to the earthquake cycles and dynamic ruptures they host. The emphasis is on accounting for the reduction of elastic moduli during rock deformation, by incorporating continuum damage laws. The resulting models will be confronted to field and laboratory observations, and will motivate the development of new data analysis and acquisition strategies.

The postdoctoral position requires expertise in computational mechanics, especially in non-linear inelastic deformation, although not necessarily in Earth sciences. The postdoctoral researcher will be expected to:
- Incorporate continuum damage constitutive equations in two existing 3D finite element codes: a quasi-static large-deformation code developed for industrial applications by CEMEF and a dynamic earthquake rupture code developed by Géoazur.
- Implement regularization approaches to mitigate mesh dependency during localized deformation
- Interface the two codes to enable multi-timescale simulations
- Carry simulations for parametric studies of generic problems and for case studies, in synergy with the multi-disciplinary project team efforts, to confront model predictions to geological, seismological and laboratory observations
- Present the research results in international conferences, academic peer-reviewed publications and project reports

The duration of the appointment is two years.
The position is based in the Sophia Antipolis campus, close to Nice, France.

For further information, please contact Jean-Paul Ampuero (ampuero@geoazur.unice.fr) and Daniel Pino Muñoz (daniel.pino_munoz@mines-paristech.fr).