



Faculty of Applied Sciences
Department of Aerospace and Mechanical engineering
CGEO – Computational Geometry
Prof. Eric Béchet



Université de Liège

PH.D. SCHOLARSHIP

SIMULATION OF WAVES IN COMPLEX MEDIA USING THE EXTENDED FINITE ELEMENT METHOD

The proposed research project is about the simulation of mechanical wave propagation in the underground soil and in geophysical fluid flows. These application areas hold major challenges, from both the scientific, technical, environmental and social perspective. To give a single, topical example, hydraulic fracking, a controversial technique to extract hydrocarbons, poses important questions with respect to the potential for triggering earthquakes. Studying this phenomenon requires the development of novel computational methods, both to handle the description of the heterogeneous soil and to solve the associated (extremely) large-scale wave. For this scholarship, we propose to develop an approach based on the extended finite element method to tackle the complex geometry of the underground, first in the frequency domain (Helmholtz equations) and in a more common explicit time domain. An interaction with other research groups involved in this project is mandatory. The project involves numerical developments, therefore knowledge in numerical analysis and programming languages is a must.

KEYWORDS :

LEVEL-SETS METHOD, EXTENDED FINITE ELEMENTS METHOD, HELMHOLTZ EQUATIONS,
MECHANICAL WAVES

Outstanding candidates holding a Master of Sciences (M.Sc.) or an equivalent degree will be considered for this Ph.D. scholarship.

This scholarship has a duration of 3 years, and shall begin as soon as possible.

Interested candidates may communicate directly with me for more information and/or send a comprehensive curriculum vitae at the email address below.

E. Béchet.

Institut de Mécanique (B-52/3) – Campus Universitaire du Sart-Tilman
Allée de la Découverte, 9
Quartier Polytech
B-4000 Liège (Belgium)
Tél : +32-(0)4-366 9165
Courriel : eric.bechet@ulg.ac.be