School of Computing, Engineering, and the Built Environment
Edinburgh Napier University

PHD STUDENT PROJECT

Application instructions:
Detailed instructions are available at :
https://www.napier.ac.uk/research-and-innovation/doctoral-college/how-to-apply

Prospective candidates are encouraged to contact the Director of Studies (see details below) to discuss the project and their suitability for it.

Project details

Supervisory Team:

- DIRECTOR OF STUDY: Dr Vasiliki Dimitriadi (Email: v.dimitriadi@napier.ac.uk)
- 2ND SUPERVISOR: Dr Daniel Barreto

Subject Group: Built Environment

Research Areas: Civil Engineering, Dynamics, Geotechnical Engineering, Solid Mechanics

Project Title: Exploring the mechanisms of wave propagation in granular materials

Project description:

Shear wave propagation and associated velocity Vs, are fundamental in characterising the small-strain response of soils. In addition, the shear wave velocity is essential input information in the characterisation of soils under static and dynamic conditions and eventually, in the design of geotechnical structures.

The present study aims in exploring the mechanisms of wave propagation in dry and (ultimately) saturated granular materials on an interparticle level through the use of DEM. In particular, the first attempt to capture the problem with the use of DEM is going to be based on simple assumptions, which will gradually increase in complexity to incorporate more information with regards to the micro- and the macro- mechanics of the problem at hand, and link to actual soil conditions.

Being able to evaluate the shear wave velocity of the liquefied soil by means of DEM simulations and under various soil and excitation conditions is going

to provide valuable insight into the behaviour of liquefied soils and allow us to potentially revisit some of the provisions of the existing design codes with regards to the considered shear wave velocity.

Candidate characteristics

Education:

A first degree (at least a 2.1) in Civil Engineering, Geology, Geophysics

Subject knowledge:

Soil mechanics, Geotechnical earthquake engineering, Geophysics

Essential attributes:

- Knowledge of theoretical soil mechanics and soil properties
- Basic knowledge and capability in setting up numerical simulations
- Knowledge of programming languages (C+ preferably)
- Capable of collecting and analysing data sets
- Good oral and written communication skills
- Good time management
- Strong motivation and commitment to research

Desirable attributes:

- Laboratory experience in soil mechanics
- Earthquake engineering