Université Gustave Eiffel

Position – Recruitment 2021

Chargé(e) de recherche de classe normale du développement durable

Gustave Eiffel University

Application open until the 19th March 2021 - CR CN4

https://www.concours.developpement-durable.gouv.fr/charge-e-de-recherche-du-developpement-durable-de-a126.html

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Position :	**Researcher in Geotechnical Engineering : physical and numerical modelling**
University :	Gustave Eiffel University - https://www.univ-gustave-eiffel.fr/
Subjets :	Mechanics, mechanical engineering, civil engineering
Specialities :	Geotechnical engineering, soil mechanics, physical and numerical modelling
Laboratory :	Dpt. « Geotechnical engineering, Environment, Natural hazards and Earth sciences Department » (GERS), Lab. « Geotechnical Centrifuges » (CG)
Localisation :	Campus de Nantes (44)
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Background

The CG laboratory conducts research on the behaviour of geotechnical structures under complex loading, including seismic ones, and the development of physical modelling techniques in centrifuge. Our work aims to improve the methods and tools to design structures especially for innovative techniques or structures (piled embankment, foundations of offshore wind turbines and anchors of offshore structures, foundations subjected to cyclic loading), but also to contribute to the reduction of natural hazards (earthquakes, erosion of hydraulic structures, effects of climate change). This research, in large experimental parts, is conducted in centrifuge on small-scale models. Loads are carried out in centrifuge using actuators, robot or the earthquake simulator, remotely piloted from the control room. The results obtained are directly transposable in full-scale, using scaling laws, and allow observing and understanding physical phenomena and validating numerical simulations.

Position

The recruited researcher will conduct work related to the research activities of the CG laboratory in general. The missions concern experimental research mainly around the geotechnical centrifuge: design, execution, interpretation of tests and numerical modelling of centrifuge tests.

Experimental techniques in centrifuge modelling have evolved enormously at Gustave Eiffel University since the commissioning of the centrifuge in 1985. The margins of progress are still considerable due to technological developments in mechanics, robotics and instrumentation. Examples include the rise of imaging methods (Particle Image Velocimetry and the use of transparent soils). The first mission will be to contribute to the development of physical modelling in the following two aspects: (i) conducting research on scaling law and (ii) contributing to the evolution of experimental techniques and procedures.

The second mission concerns the conduct of study or research programs on the behaviour of geotechnical structures under static, cyclic or dynamic loading (offshore geotechnical engineering, anchors and pile and monopile for offshore energies, deep foundations, reinforcement of soils by inclusions, stability of structures, underground structures). Eventually, the candidate will take responsibility for defining experimental programs, piloting them and interpreting the data. These programs are most often aimed at improving design methods, especially in the case of innovative works, by better understanding their behaviour.

These centrifuge experiments are increasingly associated with numerical modelling using the finite elements methods (FEM), discrete ones (DEM) or even with coupling Eulerian-Lagrangian visions. The researcher will need to find the best way to model the centrifuge tests with the potential development of partnerships with research teams already leading in these fields.

Expected profile

The position is open to holders of a doctorate (PhD) in geotechnical or soil mechanics, or can justify an equivalent level especially for foreign candidates (publications, participation in projects, teaching).

The candidate must first have a strong taste for the experimental approach and a curiosity of mind to assimilate and develop new methods and tools. An experience of using numerical models and constitutive laws in geotechnical engineering will also be required. Finally, knowledge of soil dynamics will be appreciated. The application file should highlight his or her ability to develop activities in the laboratory's themes.

The ability to work in a team is an indispensable quality since the centrifuge requires the participation of technicians and operators but also interventions of external partners. The following points will be valued: leading scientific publications (international peer-reviewed journals and/or international conferences), participation in research projects (national and/or European), an appetite for collective work and scientific animation, relational qualities and oral and written communication in English (and French if possible), experience abroad or the ability to mobilize a national and international network. Scientific rigor, as well as autonomy and organizational capacities are also expected. The candidate will be assigned to the Geotechnical Centrifuges Laboratory in the GERS department in Nantes.

It is expected that the candidate will propose in his/her application a scientific project in connection with the host laboratory concerned and, for this, it is very strongly recommended to contact the persons indicated.
