## Université Gustave Eiffel

## IFSTTAR devient l'université Gustave Eiffel

**Postdoctoral position at Université Gustave Eiffel, France**
**(18 months, start from October 2021)**

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| **Subject**: | **Centrifuge Modelling of soft soil reinforced by rigid inclusions subjected to seismic loading** |
| **University**: | **Université Gustave Eiffel** |
| | Since January 1, 2020, Ifsttar has become Gustave Eiffel University! Website of Université Gustave-Eiffel (Click for more information) |
| **Department**: | **Department of Geotechnical engineering, Environment, Natural hazards and Earth sciences (GERS)** |
| **Laboratory**: | **Centrifuges for Geotechnics (CG)** |
| **Contact**: | **Zheng LI**: zheng.li@univ-eiffel.fr; |
| | **Sandra ESCOFFIER** |
| | **Luc THOREL** |

# 1   Description of the postdoctoral position

This postdoctoral position is funded by a French National Research Agency's (ANR) project–ASIRIplus_SDS[1]: Soil improvement by rigid inclusions: Seismic and Dynamic Loading. This project is a part of the development of the technique of reinforcement and improvement of soils by rigid inclusions (RI). RI foundations combined with a granular mattress Load Transfer Platform (LTP) (also known as an unconnected or disconnected foundation) can change the response of the soil and superstructure when subjected to complex loads such as seismic loading. Previous research mainly focused on the behavior of compressible soil reinforced by rigid inclusions and subjected to uniform static loads (backfill weight and overload). Very little attention has been paid to the response of soils reinforced by rigid inclusions under seismic loading and the related soil-structure interaction. The post-doctoral researcher will carry out experimental studies on the performance of rigid inclusions under seismic loading by centrifugal modeling taking into account several highlighted factors:

- The kinematic interaction induced by the presence of RI (without superstructure)

- The influence of RI on the SSI concerning the sliding behavior of the foundation (with a superstructure)

- The influence of RI on the SSI concerning the rocking behavior of the foundation (with a superstructure)

- The influence of RI in terms of settlement

- The distribution of stresses in RI

# 2   Working conditions

## 2.1   The laboratory

The activity of the laboratory of Geotechnical centrifuge modeling (GERS-CG)[2] focuses on the behavior of geotechnical structures under complex stresses and the development of techniques of

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[1] ASIRIplus_SDS in French and ASIRIplus_SDS in English (Click for more information)
[2] Website of laboratory of Geotechnical centrifuge modeling (Click for more information)

centrifuges modeling. Our work aims at developing new techniques and recommandations for variety of geotechnical structures (soil reinforced by inclusions, wind turbine foundations, offshore structures, tunnels, etc.). Also, our work contributes to the reduction of damages caused by natural hazards (earthquakes, erosion of hydraulic structures, liquefaction).

## 2.2   Research facilities

In this project, the experimental program will be performed in centrifuge team at Université Gustave Eiffel (Nantes Campus). The main test facility is the geotechnical centrifuge (200g-ton beam-type centrifuge with a radius of 5.5m). Many different devices have been developed for the preparation and characterisation of the soil models such as automatic sand pluviator, consolidometers, on-board Cone Penetration Test (CPT), T-bar system and so on. In flight actuators, sensors, data acquisition systems, cameras are also in good state. The bedrock motion can be simulated by a 1D embedded dynamic shaking table. A recently developed laminar container which voids the boundary effects is available for dynamic centrifuge tests.

# 3   Qualifications

- Ph.D in geomechanics, geotechnical earthquake engineering or other relevant disciplines

- Experience or strong interests in laboratory tests

- Excellent interpersonal and good teamwork skills

# 4   Experience

- Experience in programming using MATLAB, Python, etc.

- Experience in Digital Signal Processing (DSP)

- Experience in laboratory tests. Especially, the experience of dynamic test is appreciated.

# 5   Application Deadlines

Open until Filled

# 6   Salary

Gross salary: € 2699,63/Month